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mahukona resort

Environmental Impact Statement

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REVISED

ENVIRONMENTAL IMPACT STATEMENT

FOR THE PROPOSED

MAHUKONA RESORT

Prepared For: Mahukona Properties

By: Belt, Collins & Associates

For Submission to: Hawaii County Planning Department

September 1981

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PREFACE

On January 28, 1980, Mahukona Properties, a limited partnership, submitted a request for a General Plan change from "Agriculture" to "Resort/Urban" for eight non-contiguous parcels which it owns comprising 1,043 acres of land just south of Lapakahi State Historic Park in North Kohala, Hawaii. Upon review of the request, the Hawaii County Planning Department concluded that:

> The introduction of a resort community involving 1,045 (sic) acres of land and containing 1,500 hotel rooms, 3,500 condominium units, and between 500 to (sic) 600 single-family residential units into an area which is presently uninhabited and into a district with a residential population in 1977 of 3,500 will have significant direct impacts. Additionally, indirect effects of a potentially significant scale may be felt on regional and islandwide levels. (Hawaii County Planning Department; n.d.: 15-16)

Based upon this evaluation, the Department determined that a full environmental impact statement was warranted and so notified the State of Hawaii Environmental Quality Commission. Subsequently, an EIS Preparation Notice was published in the April 8, 1980 edition of the Environmental Quality Commission Bulletin.

As indicated above, the EIS is being submitted in support of a request for an amendment to the Hawaii County General Plan. Such a change is only the first step in a lengthy process that will require the developer to obtain the numerous land use designation changes and permits listed in Chapter VIII. As a result, the developer's plans are extremely conceptual at this time. No site plan has been adopted, for example, and no on-site engineering studies have been performed. Hence, detailed analyses of on-site impacts, and the mitigation thereof, are not a part of this report. Instead, impacts (such as altered topography and drainage, change in wildlife habitat, and water quality effects) that depend primarily on the specific land use layout that is adopted, and the infrastructure items that are constructed, are treated in a generalized fashion. The intent has been to investigate potential solutions sufficiently to insure that satisfactory responses to basic design requirements are available.

The proposed project's hotel rooms, condominiums, and resort residential units would attract a sizeable guest population. In addition, the resort would be a major employment generator. Most of the employees would reside off-site, and the transient population would utilize recreational areas, commercial establishments, and other facilities elsewhere in the region. Taken together, these facts suggest that the secondary impacts of the proposed project have the potential of being significant--perhaps even more substantial than those that would result directly from on-site construction and operation of the proposed project. Because of this, and because the issues that are most appropriately decided at this early stage in the development process have to do with regional growth patterns, a great deal of the work conducted for this study focused on secondary impacts.

Even in the simplest of situations (i.e., when the project being assessed is the only major cause of change, when its magnitude is relatively small, and when there exist clearly defined governmental plans guiding the rate and location of growth), the estimation of secondary impacts is an inherently difficult and uncertain task. This is because secondary growth, unlike the initial resort project, is not initiated by a single entity working from a long-range master plan. A number of factors surrounding the Mahukona Resort project make it a particularly complicated situation. Among the more noteworthy:

- The Mahukona Resort project is only one of four large resort development proposals for Kohala that are in varying stages of implementation. The others are the Waikoloa Beach Resort, the Mauna Lani Resort project (formerly Mauna Loa Land), and the expansion of resort facilities around the Mauna Kea Beach Hotel. Moreover, it is the smallest.

- Existing County plans do not clearly define where secondary growth, either from already-approved resort development or from the proposed Mahukona Resort, will be permitted to occur.

- If resort development proceeds at the rate that developers have indicated, very substantial in-migration will be required in order to meet its labor-force requirements. The character of these in-migrants (i.e., their socio-economic profile and place of origin) will play a significant role in determining the impacts of the project, but it is difficult to predict what their character will be.

- Development plans change rapidly in response to market pressures. Hence, there is considerable chance that the existing plans on which an assessment of impacts must be based will be modified, delayed, or abandoned before being implemented. The ability of the County to influence development through the permitting process is also recognized.

In order to deal meaningfully with the question of impacts in view of all of the uncertainty that exists, this EIS has focused on regional issues that should be considered at this stage of project planning. This has resulted in an emphasis on the comparison of alternatives rather than on the details of a single development scenario. This is in line with recent changes in Federal EIS procedures and enhances the usefulness of the EIS as a decision-making guide. Also, because so much of the impact will depend upon decisions made by the County regarding the spatial distribution of the growth that will be permitted, our analysis explores the implications of different locations for this growth.

chapter one

CHAPTER I
SUMMARY

PROJECT DESCRIPTION

The proposed Mahukona Resort site consists of four non-contiguous pairs of parcels bisected by the Kawaihae-Mahukona Highway and separated by State-owned lands; the parcels stretch along approximately three miles of the western coast of North Kohala. The northernmost parcel is eight miles from Hawi, and from the southernmost boundary to Kawaihae is six miles.

The "intermediate resort" proposed for this site would consist of several hotels with a total of 1,500 guest rooms, 3,200 medium-density resort condominium units, about 500 single-family residences, approximately 75,000 square feet of commercial space, two eighteen-hole golf courses, and other recreational facilities. To support a resort on this site, a new water supply system would be built. Similarly, facilities would be constructed on site for drainage and for sewage collection, treatment, and disposal. The site would be connected with the island-wide electrical transmission and telephone systems.

The existing land use plans for the area do not indicate such urban/resort type uses for the site. The request for a County General Plan amendment from "Agriculture" to "Resort/Urban" led to a determination from the Hawaii County Planning Department that an environmental impact statement was required under Chapter 343, Hawaii Revised Statutes. If this amendment is approved, a State Land Use District change from Agriculture to Urban, and zoning changes would also have to be obtained.

ASSESSMENT BASIS

Impacts resulting from the Mahukona Resort may be classified as primary--the effects of on-site activities, and as secondary--the effects resulting from off-site development stimulated by the resort. Our ability to assess primary impacts at this time is limited by the fact that detailed plans for the resort have not yet been drawn up. Similarly, because there are no plans for the secondary development that would be spurred by the project, to assess the secondary impacts a "development scenario" that realistically projected the growth that would occur had to be developed. Since the impacts of the proposed project must be judged by how future conditions with the proposed resort would differ from future conditions without it, both a "with-project" and "without-project" development scenario were created. The "without-project" scenario outlines the large-scale growth in the impact area which would result from already planned South Kohala resorts. The growth due to the Mahukona Resort is added to the "without-project" numbers to create the "with-project" scenario. The difficult task of assessing secondary impacts for each of these scenarios was rendered even more complex than would otherwise have been the case by the lack of detailed government plans regarding the location of this secondary growth.

PRIMARY IMPACTS

Population Growth

The major direct impact of the Mahukona Resort would be to increase both the resident and visitor populations of the North/South Kohala region. This increase must

be viewed against the larger increases that are already expected as a result of planned South Kohala resort development (the without-Mahukona scenario). The projected increases in the number of visitors, residents, and households in North and South Kohala between now and 2005 resulting from the South Kohala resorts and the proposed Mahukona Resort are as follows:

	South Kohala Resorts	Mahukona Resort	All Development
Visitors (average)	12,600	3,800	16,400
Residents	14,500	3,800	18,300
Households	4,850	1,250	6,100

This amount of population growth will obviously result in major secondary impacts; these are outlined in Table I-1. The direct impacts of the proposed Mahukona Resort are discussed below.

Physiography and Geology

Minor changes to the land forms would result from grading for building sites and drainage patterns, but no significant adverse impacts are expected. The resort location is in the lowest volcanic risk zone of the island. The whole island has a Zone 3 earthquake classification, but fewer earthquakes have occurred in the northern part of the island than elsewhere on Hawaii. Development for the proposed project would be outside the tsunami inundation area.

Soils

During construction of the resort a small increase in erosion could occur, but once landscaping is established the amount of erosion would probably be decreased in comparison with present levels. Development of this site would not result in the loss of any valuable agricultural land.

Biology

Existing vegetation on the site would be removed and new species would be introduced. This is not a significant impact since all the dominant species now on the site are common xerophytic exotics. Site clearance would also disrupt the existing wildlife on the site, which largely consists of birds. No rare or endangered species would be affected. The landscaped resort could support a similar number of birds but the species composition would include fewer game birds and would consist mainly of species that are adapted to man-made environments.

Marine Biology

Development of the resort would not involve any direct physical or chemical changes in the near-shore environment. Since the coral reef ecosystem off the resort site is considered highly valuable and has developed as a result of stable environmental conditions, significant impacts could result from even minor changes in water quality. The only possible cause of this type of change would be increased erosion and sedimentation. However, as long as precautions are taken during grading and site work, adverse impacts are unlikely. Another impact on marine resources would be the result of increased access to the shoreline. Desirable food and commercial species

may experience population declines. The waters fronting the Lamaloloa property are protected from such exploitation by their inclusion in the Lapakahi Marine Life Conservation District.

Archaeology

The archaeological resources of the Mahukona Resort site are highly significant for their potential to yield information on prehistoric cultural patterns. A limited survey has been conducted by the Bishop Museum. Sites on all the parcels have been identified but only those on the makai parcels and the mauka Kaiholena parcel have been precisely located. The Kaiholena parcels were studied most intensively and all sites were placed in a tentative recommendation category--either preservation or mitigation. Further research work will be done and the developer will endeavor to minimize impacts on archaeological resources.

Visual Environment

The location of the resort in the middle of a 20-mile stretch of highway that presently has no development along it and the fact that the site lies on both sides of the highway mean it will result in a conspicuously altered milieu. The changes the resort would cause in the visual environment could be positive or negative depending on the siting and design of the buildings and landscaping as well as the viewer's aesthetic values.

Air Quality

The most significant direct impacts on air quality would result from construction activities raising the levels of particulates in the atmosphere. Some increases in pollutants from internal combustion engines would result from resort-related traffic.

Water Resources

The construction of wells to supply the resort with potable and brackish water and to dispose of excess sewage effluent, will affect the quantity and quality of groundwater in the area. The impact should not be adverse because the amount of water pumped would not exceed the aquifer's sustainable yield, and since the injection wells would only be used to dispose of sewage effluent in the rare cases when the amount of effluent exceeded golf course irrigation needs. Using the sewage effluent for irrigation would reduce the amount of brackish well water needed for this purpose.

Economics

The fiscal impact on the State and County governments should be beneficial as long as visitors spend more than the present neighbor island average. The intended quality of the resort suggests this will be the case. Employment generated by the Mahukona Resort project would result in $20 million in income to Hawaii County residents.

SECONDARY IMPACTS

While the on-site impacts of the Mahukona Resort may be assessed by comparisons to existing conditions, secondary impacts must be judged not in relation to the present situation, but as to how future conditions with the proposed project would differ from future conditions without it. The already planned South Kohala resorts will cause massive changes in the future. The Mahukona Resort would add to these changes, generally in proportion to its size compared to the South Kohala resorts. The major

transformations will result from the great increase in resident and visitor populations, which will cause a wide range of secondary impacts. These impacts, broken down by particular environmental subsystems, are summarized in Table I-1. Changes expected as part of the without-project scenario are listed on the left, and the additional impacts of the Mahukona Resort are discussed in the right hand column; together they show the impacts of the with-project scenario.

RELATIONSHIP TO EXISTING PLANS, POLICIES, AND CONTROLS

The proposed project is generally consistent with the economic objectives of State and County plans and policies and is not in opposition to the objectives relating to the environment and public facilities. The proposed project is not in conformance with any of the geographically specific land use plans (State Land Use Law or Hawaii County General Plan or Zoning.)

ALTERNATIVES

Alternatives which were considered in Chapter VII but not evaluated in depth included: sale of property, alternative types of urban development, recreational use, agricultural use, and alternative patterns of resort use. The "No-Project" and "Reduced-Scale" alternatives were examined more thoroughly.

Table I-1. Summary of Secondary Impacts of Without-Mahukona and With-Mahukona Scenarios.

Area of Impact	Without-Mahukona Scenario	With-Mahukona Scenario: Additional Impacts of Mahukona Resort
Economic Impacts		
(Employment)	Initial phases of South Kohala resorts will provide more than enough employment opportunities for Kohala's current labor force. Tourism jobs may fulfill desire of Kohala residents to keep grown children in area.	Mahukona Resort jobs would fulfill a desire for employment closer to North Kohala residents' homes.
(Housing)	This issue relates to both the without- and with-project scenarios. The extent, type, and location of employee housing and other residential growth has not been determined. This is a major concern of area residents (see Table IV-38). Under present income/construction cost relationships it will be difficult to expand the housing supply to accommodate the households needed to supply the resort labor force while keeping those units in an affordable price range without direct or indirect public or private subsidies. However, if sufficient housing is not available, resorts will not be able to staff their operations and expand as now planned, thereby reducing the demand for additional housing.	
Social Impacts	Distinguishing between the without- and with-project scenarios is relatively unimportant. Given the near tripling (by 2005) of the existing population due to planned South Kohala resort development, the addition of the Mahukona Resort would only marginally increase the magnitude of the social change that may be expected. A plurality of present residents of North/South Kohala favor North Kohala resort development. Social impacts are nearly impossible to summarize, and interested readers should refer to the complete discussion in Chapter IV.	
Physiography and Geology	Minor physiographic changes would result from grading for new house sites.	Mahukona Resort would add to the minor physiographic changes in the region in proportion to its size.
	Two of the planned South Kohala resorts are in relatively high volcanic risk areas. Secondary growth could be directed to areas with lowest risk.	The site is located in the lowest volcanic risk zone.
	Although all of the island is classified as zone 3 for earthquakes, fewer have centered in the northern part of the island.	The Mahukona Resort probably has the same level of risk from earthquakes as the South Kohala resorts.
	No significant tsunami hazard is foreseen as a result of planned South Kohala resort development	Structures on the Mahukona Resort site would be outside the tsunami inundation zone.
Soils	Impacts of planned South Kohala Resorts on soils would be quite limited. Water erosion potential is small on the flat resort sites. There may be limited wind erosion during construction. Once landscaping is installed, erosion will be minimal. None of resort sites are on valuable agricultural land. Secondary growth should be directed onto lands with low agricultural productivity.	Mahukona Resort's impacts on soils would be similarly limited. Although the site is not flat, good soil conservation practices would be followed. Due to this resort as well as others, there is a potential for conversion of good agricultural soils to urban uses but this is subject to government control.
Biology, Marine Biology, Archaeology, Visual Environment	Secondary growth spurred by the South Kohala resorts would result in impacts in these areas, but, until the location of this growth is determined, impacts cannot be assessed.	Again, until the location of Mahukona Resort-induced growth is known, impacts cannot be determined. Generally, impacts should be in proportion to the population growth it induces (20% of all growth).

Table I-1. Summary of Secondary Impacts of Without-Mahukona and With-Mahukona Scenarios. (Continued)

Area of Impact	With-Mahukona Scenario	
	Without-Mahukona Scenario	Additional Impacts of Mahukona Resort
Sonic Environment	Traffic generated by the planned South Kohala development would increase noise levels on land adjacent to Queen Ka'ahumanu Highway, Akoni Pule Highway, and the Waimea-Kawaihae Road significantly (eight, four, and six decibels, respectively). Noise mitigation measures may be necessary to bring levels below 65 L_{dn} for existing residential areas immediately adjacent to the highway.	Mahukona Resort-induced traffic would add one or two decibels to the levels projected without it. (This is generally not noticeable to the human ear.)
Transportation	An additional 6,400 visitor and resident trips (resulting from the planned South Kohala resorts) through the island's airports would require some terminal improvements, probably at Ke-ahole Airport. (The runway there is capable of accommodating the increased traffic.)	The Mahukona Resort would generate about 2,000 additional resident and visitor trips by airplane. The improvements constructed to accommodate the without-project scenario would probably be adequate to handle this additional increase.
	Visitors would probably not use public transit extensively. Residents would probably utilize a worker shuttle service service if it were made available.	The Mahukona Resort could further increase the service base for a public transit system. Whether this would mean greater frequency and more bus routes in the Kohalas is partially dependent on where secondary growth is located.
	The increase in vehicle trips on Queen Ka'ahumanu Highway due to the planned South Kohala resorts would require expansion of that highway to four lanes. The existing Waimea-Kawaihae Road would have to be replaced. Akoni Pule Highway would probably be adequate unless most of the secondary growth is in North Kohala.	With some South Kohala resort-generated traffic using Akoni Pule Highway, the addition of Mahukona-related traffic could require upgrading of this highway to four lanes by about 2000. Development of the Mahukona Resort would mean that improvements to Queen Ka'ahumanu and the Waimea-Kawaihae Road would have to be made earlier.
Air Quality	South Kohala resort-related traffic is likely to cause violations in State ambient air quality standards near major intersections unless highway improvements are made.	If traffic volumes on Akoni Pule Highway exceed its capacity, a situation that is likely to occur after 1995 if the Mahukona Resort and all planned resorts are implemented, carbon monoxide levels close to the highway would probably exceed the standards. However, if highway improvements are made or resort growth does not develop as planned, air quality impacts would be avoided.
	For both scenarios, additional emissions from generating plants supplying the required power to the resorts and secondary growth would result. Ambient air quality impacts are impossible to assess due to dispersed locations of plants.	
Water Resources	Unless South Kohala resort-related secondary growth is distributed in exactly the same fashion as the available surplus water capacities of planned or existing water systems, there will be a need for new source and distribution development.	The same proviso applies to Mahukona Resort-induced secondary growth.

Table I-1. Summary of Secondary Impacts of Without-Mahukona and With-Mahukona Scenarios. (Continued)

Area of Impact	With-Mahukona Scenario: Without-Mahukona Scenario	With-Mahukona Scenario: Additional Impacts of Mahukona Resort
Public Facilities, Services and Utilities		
(Schools)	Although the population growth projected for the region due to the South Kohala resorts cannot be directly correlated to the rise in school-age population, it seems clear that substantial new educational facilities will be required, either by expansion of existing schools or construction of entirely new schools.	The growth in school-age population due to the Mahukona Resort would likely be in proportion to its size, and thus would induce some construction of new school facilities.
(Health Care)	The expected population growth would probably necessitate the construction of a new acute care hospital in North or South Kohala. The future population could support more specialists in the Kohalas.	Development of the Mahukona Resort would probably mean that such a facility would have to be built earlier than would otherwise have been the case.
(Recreation)	To meet recommended standards, 215 more acres of parks would be required to serve the future without-Mahukona population. Some of this (about 70 acres) can be developed through the County Park Dedication Ordinance. Increase population growth under both scenarios might have a beneficial impact on existing and planned historic parks in the Kohalas.	To serve the Mahukona Resort-related secondary growth, 57 additional acres of parks would be required. Nineteen of these acres can be developed as subdivision/neighborhood parks through the County Park Dedication Ordinance.
(Police)	Increases in staffing would be required; level is not determined.	Police staffing increases due to the Mahukona Resort would be in proportion to its size.
(Fire)	New resort and residential development will require the upgrading of existing fire stations and/or new facilities.	Since the Mahukona Resort is so far from existing and planned development, the developer/operators may need to provide on-site fire protection.
(Electrical Power)	Meeting the needs of resort and secondary development will require the construction of significant new generating facilities. It may be possible to utilize geothermal, wind, or OTEC energy.	Development of the Mahukona Resort would require the upgrading of the existing transmission line to North Kohala as well as a new spur line to the resort site. Electricity consumption by the Mahukona Resort and its secondary growth would be a third of that required by the South Kohala resorts and related growth.
(Solid Waste)	South Kohala resorts and related growth would add 42 tons per day of solid waste to the amount now generated in North and South Kohala. Two additional employees would probably be needed at the Waimea landfill.	With the Mahukona Resort, 14 additional tons per day of solid waste would have to be handled at the County landfill in Waimea. Staffing would probably not have to be increased any more than under the without-Mahukona scenario.
(Sewage)	Impacts on the County would be minimal as developers would be required to install sewage collection and treatment systems in all new subdivisions. Problems might occur as these systems age.	Impacts would not differ substantially from without-project scenario.

chapter two

CHAPTER II
PROJECT DESCRIPTION

PROJECT SITE

The proposed Mahukona Resort site is composed of eight non-contiguous parcels spread along approximately three miles of the North Kohala coastline on the island of Hawaii (see Figures II-1, II-2 and II-3). The northernmost parcel is two miles south of Mahukona Harbor and eight miles from Hawi, the district's largest town. From the boundary of the southernmost parcel to the port of Kawaihae is six miles.

The tax map numbers of the parcels (moving from north to south), as well as their approximate acreages, and the name of the ahupua'a in which each is located, are as follows:

TMK No.	Approximate Acreage	Ahupua'a	Location Relative To Akoni Pule Hwy.
5-7-01:20	36	Lamaloloa	makai
5-7-01:23	45	Lamaloloa	mauka
5-8-01:11	266	Kaiholena	makai
5-8-01:16	262	Kaiholena	mauka
5-8-01:10	63	Kaupalaoa	makai
5-8-01:17	45	Kaupalaoa	mauka
5-8-01:9	166	Kehena 2	makai
5-8-01:18	160	Kehena 2	mauka
TOTAL	1,043		

As can be seen from the above list, the parcels are in pairs that are bisected by the Akoni Pule Highway (Kawaihae-Mahukona Highway). The portions of the four ahupua'a mauka of the Mahukona parcels are owned by Richard Smart, from whom Mahukona Properties purchased the resort site. The land north of the Lamaloloa parcels is owned by the State of Hawaii as are the lands between the four pairs of parcels. Land south of the Kehena 2 parcels is owned by the B.P. Bishop Estate.

The parcels are situated on the lower portion of the Kohala Mountain. The average slope is about eight to ten percent, but steeper areas are present on the sides of the numerous erosional gullies that transect the site. Elevations range from sea level to just over 400 feet, and the Akoni Pule Highway averages about 200 feet above sea level. Largely because of the semi-arid climate (average annual rainfall is less than ten inches), the predominant vegetation type is open scrub grassland. Kiawe trees are widely scattered throughout the grasslands. They are more abundant along the coastline and in the numerous gullies.

PROPOSED ON-SITE DEVELOPMENT

Mahukona Properties, Ltd., is proposing the development of an "intermediate resort" on the project site. Referred to throughout this report as the Mahukona Resort, the project would consist of several hotels containing a total of 1,500 guest rooms, approximately 3,200 medium-density resort condominium apartments, and about 500

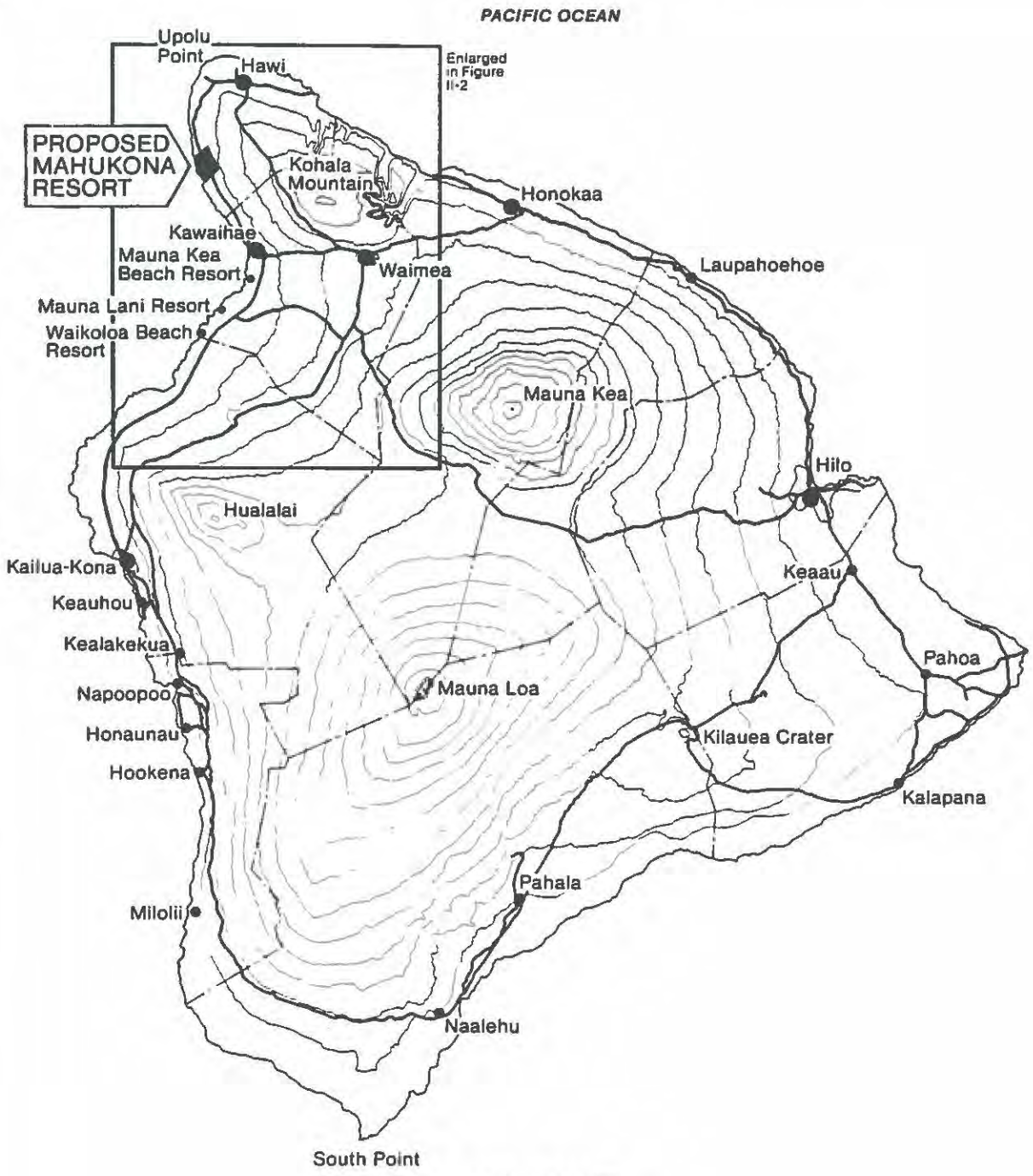


figure II-1. Location of the Proposed Project

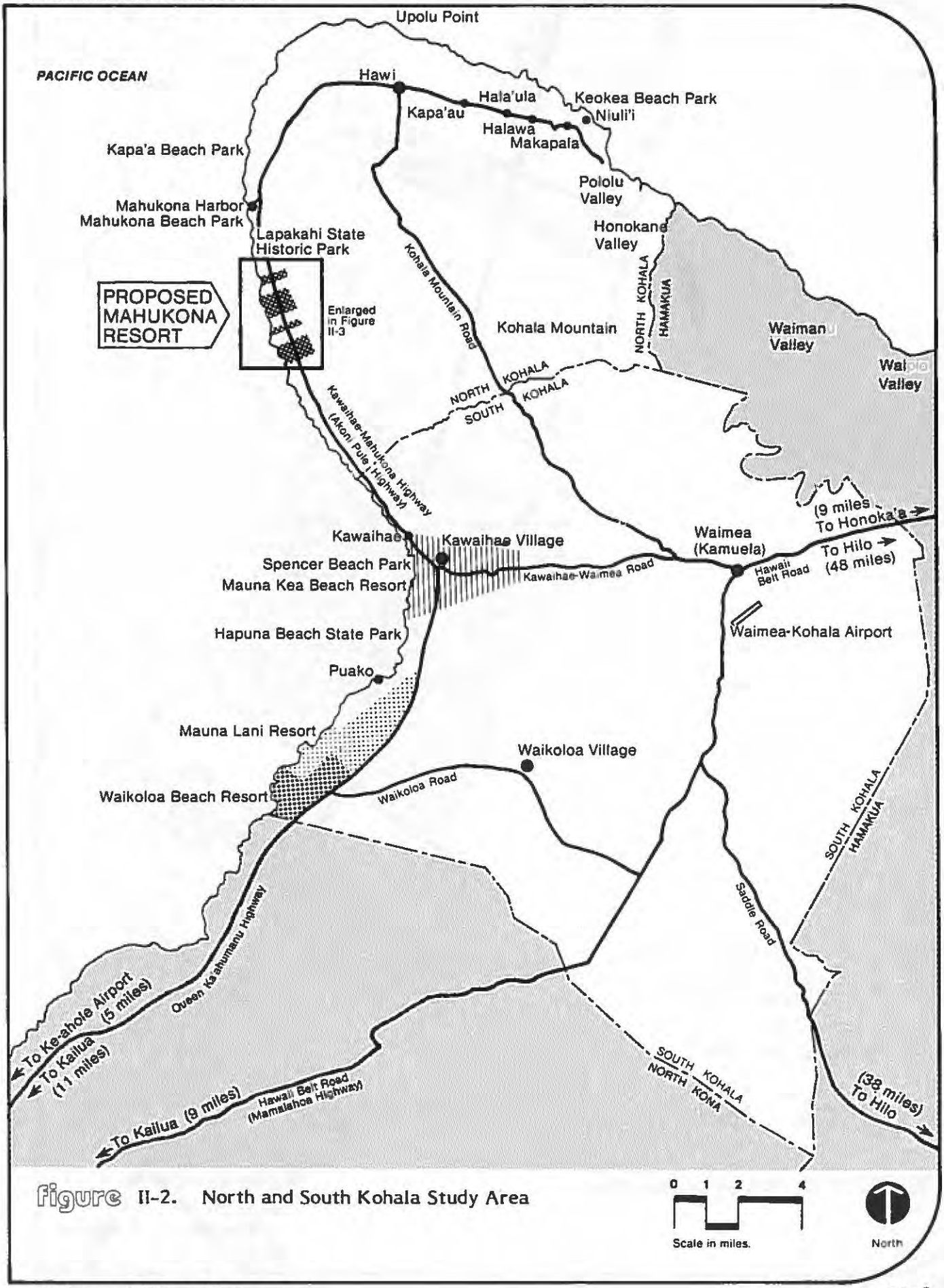


figure II-2. North and South Kohala Study Area

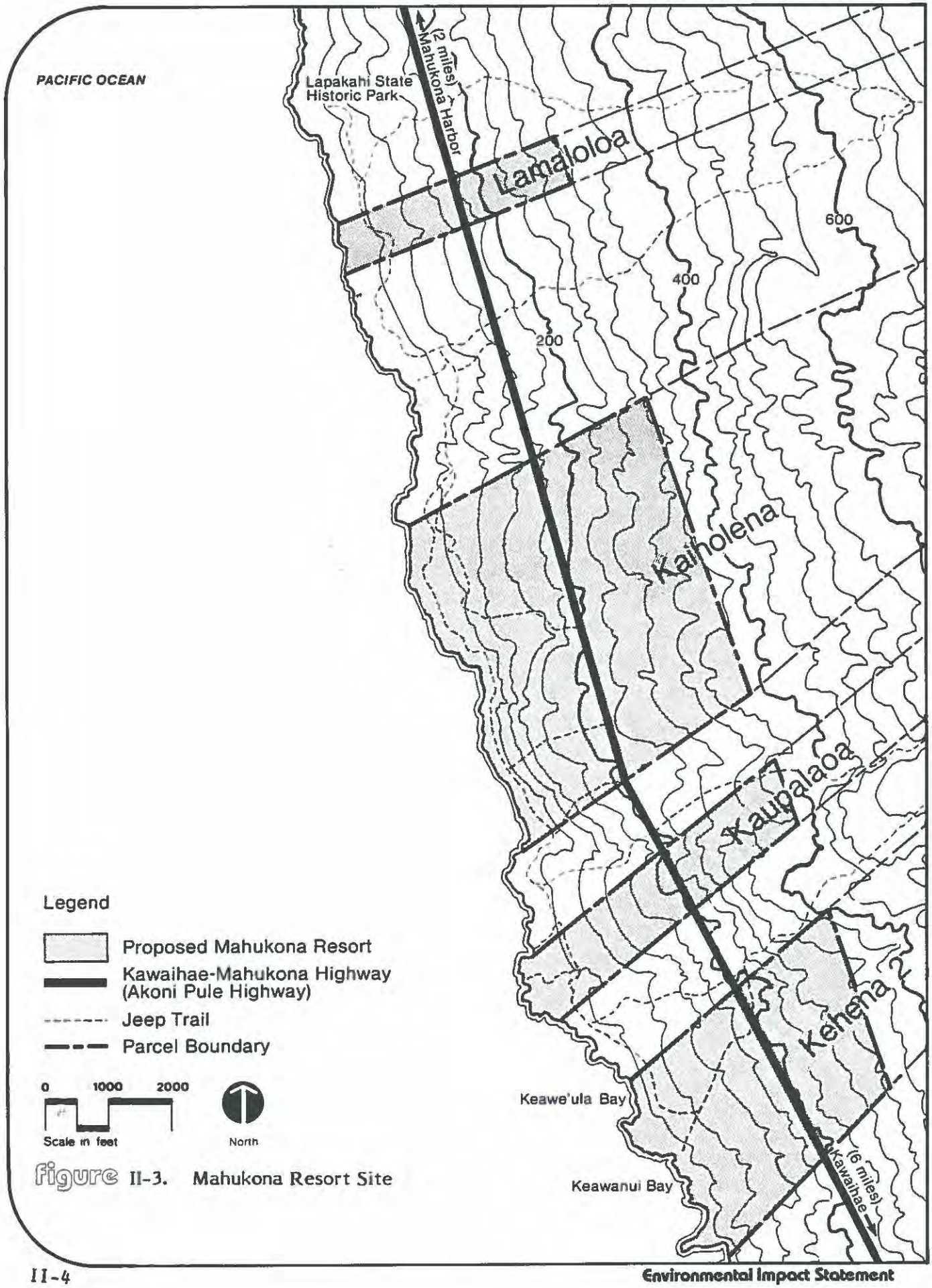


figure II-3. Mahukona Resort Site

single-family detached residential units. In addition, it would include numerous amenities normally associated with a high-quality resort development. These include commercial services and facilities, an eighteen-hole golf course, tennis courts, swimming pools, and trails for horseback riding and hiking. Present plans call for the construction of the project to be spread over a period of 20 years beginning in 1985. A summary of the preliminary development program is presented in Table II-1; the distribution of the units between the various ahupua'a is shown in Table II-2. In general, it is expected that development would begin in the Kaiholena ahupua'a since it is the largest. However, it is quite likely that development would eventually be underway in more than one of the ahupua'a simultaneously.

At this time, no definitive site plan has been prepared. It is expected that this, as well as the preliminary engineering studies on which it would be partially based, would be finalized if the Hawaii County General Plan amendment now being sought is approved. In the absence of such a site plan, it is possible to deal only with the more general aspects of the proposed project.

Access

Access to each of the parcels from Akoni Pule Highway would be limited to one roadway (possibly two for the largest parcels). The access points for mauka and makai parcels in each ahupua'a would be opposite one another, and each pair would be a minimum of 1,500 feet apart. Channelized intersections with acceleration/deceleration and left-turn storage lanes would be provided. Street lights would also be provided as necessary. Internal roadways would be to County standards.

Water Supply

At present, the domestic water systems nearest to the proposed Mahukona Resort project are miles away, and none of them has sufficient excess capacity to make their extension to the Mahukona Resort site feasible. Because of this, it will be necessary to develop a new water supply system for the proposed resort.

Based on the unit counts shown in Table II-1, and the average water use rates summarized in Table II-3, it is estimated that, upon its completion, the proposed Mahukona Resort project would require 2.25 million gallons per day (MGD) of potable water at 100-percent occupancy. Because the actual occupancy rate would be much lower, average water use would be much less. An additional 0.75 MGD of brackish water, fresh water, or treated sewage effluent would be required for golf course irrigation.

A water system feasibility study for the proposed project (Belt, Collins & Associates, January 1980:1) and further analyses have shown that the two most promising water supply alternatives are:

- Deep wells located at elevation 1,200 feet immediately inland from the proposed site; or
- Deep wells at Kokoiki, near Hawi, combined with a long transmission line to the Mahukona Resort site.

Table II-1. Preliminary Phasing Plan for the Proposed Mahukona Resort Project.

Development Type	Number of Units By Time Period				Total Units
	1986-1990[1]	1991-1995	1996-2000	2001-2005	
Hotel Rooms	400	450	350	300	1,500
Med.-Density Condo. Apartments	300	600	1,000	1,300	3,200
Single-Family Homes	100	100	150	150	500

Commercial	Square Feet of Commercial Development by Time Period				Total
Serving Hotels[2]	10,000	11,250	8,750	7,500	37,500
Serving Condos. & Residential Development[3]	4,000	7,000	11,500	14,500	37,000
				Total Commercial =	74,500

1 Construction of the first hotel and golf course, the first condominium project, and the first residential increment is projected to begin in 1985 and be completed in 1987.

2 Estimated on the basis of 25 square feet of retail space per hotel room.

3 Estimated on the basis of 10 square feet of retail space per condominium unit and single-family home.

Source: Mahukona Properties and Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980).

Table II-2. Geographic Distribution of Development in the Proposed Mahukona Resort Project.

Development	Ahupua'a[1] Lamaloloa Acres	Lamaloloa Units	Kaiholena Acres	Kaiholena Units	Kaupalaoa Acres	Kaupalaoa Units	Kehena 2 Acres	Kehena 2 Units	Total Units
Resort Hotel	5	150	35	1,200			5	150	1,500
Med.-Density Condo.			135	1,600			80	1,600	3,200
Med.-Density Single Family					46	265			265
Low-Density Single Family			60	235					235
Ranch Lots	76	20							20

[1] See Figure II-3 for location of ahupua'a.

Source: Belt, Collins & Associates.

Table II-3. Estimated Average Potable Water Use and Sewage Generation Rates.

Type of Use	Estimated Average Water Use (in gallons/day/ occupied unit)	Estimated Sewage Generation Rates (in gallons/day/ occupied unit)
Resort Hotel	350/guest room	245/guest room
Med.-Density Condominium	400/unit	280/unit
Single Family	500/unit	350/unit
Recreational	4,000/acre	2,800/acre
Commercial	3,000/acre	2,100/acre
Ranch Lots	3,000/acre	2,100/acre

Source: Belt, Collins & Associates.

Of the two, the first is preferred by the developer because it entails the lowest construction costs, and minimizes land and easements needed for off-site transmission facilities. However, until a test well is drilled and pumped, this source must be considered unproven. The water supply situation is discussed in more detail in Chapter V.

Sewage Treatment and Disposal

Currently, there is no sanitary sewerage system in the vicinity of the proposed project. Hence, it will be necessary for the development to provide its own sewage collection, treatment, and disposal facilities. Thus far, no detailed sewerage plans have been developed. However, results of a preliminary analysis make it possible to sketch the broad outline of the system that would most probably be used.

Based on estimated sewage generation rates shown in Table II-3, it is projected that at 100-percent occupancy the proposed project would generate approximately 1.6 million gallons per day of sewage effluent when it has been completed. This sewage would be collected by a series of gravity and force mains serving each of the sites. It would then be carried to a single conventional activated-sludge treatment plant. No site has been selected for the sewage treatment plant as yet, but the eight to ten acres that are needed would probably be situated in Kaiholena (the largest parcel) fairly close to Akoni Pule Highway and within the golf course. Such a location would make it possible to use the golf course as a buffer zone, and it would simplify use of the treated effluent for golf course irrigation. Activated sludge has been chosen because it has proven more economical than extended aeration when effluent volumes are in

excess of 0.5 MGD. Installation of mains between parcels in different ahupua'a would require easements from the State of Hawaii, owner of the intervening land.

Treated effluent would be disposed of in one of two ways depending upon the results of further testing and discussions with the County of Hawaii and the State Department of Health. The first, and most desirable, is for the effluent to be used for golf course irrigation; the second is for subsurface disposal via injection wells. The State Department of Health has informally agreed that these two disposal options could be acceptable providing all statutory requirements are met (Ulep, July 1980). Final approval must await preparation of the necessary design plans and necessary soil and hydrologic testing.

Drainage

The sloping nature of the terrain and presence of existing gullies insures that drainage of the project site will present no special problems. No engineering has been undertaken at this time, but conceptual plans call for runoff to be intercepted by a system of catchbasins and swales and channeled to the ocean via the gullies that cross the site. Efforts will be made to retard runoff and increase percolation, but the steepness of the terrain will probably limit the effectiveness of measures taken towards this end.

Utilities

The on-site telecommunications, electrical, and natural gas systems would be designed in accordance with standards established by the various utility companies. In general, most utility lines would be underground. Electrical power would be drawn from the Hawaii Electric Light Company's system as outlined in more detail in Chapter V of this report.

PROJECT RATIONALE: MARKET DEMAND

Hawaii County Visitors

The consulting firm of Hastings, Martin, Hallstrom and Chew, Ltd. has prepared an analysis of the demand for resort units in the North/South Kohala study area (January 1979; June 1979). Results of that study were reviewed as part of the economic impact analysis of the proposed Mahukona Resort project prepared by the same firm (November 1980: 83-87). The conclusion of all three reports is that there will be a strong demand for resort units within the North/South Kohala study area over the next 25 years.

The Hastings, Martin, Hallstrom and Chew resort unit demand estimates are based on the growth rate projections officially adopted for planning purposes by the State Department of Planning and Economic Development (March 1, 1978) and their own assumptions regarding Hawaii County's capture rate. They are summarized in Table II-4. These visitor projections indicate that by the year 2005, there will be about 3,500,000 visitors per year to Hawaii Island; this means that nearly half of the persons visiting the State in that year will spend at least one night on the Big Island.

Table II-4. Tourism Estimates and Forecasts for Hawaii County: 1965-2005.

Year	Westbound		Eastbound[1]		Both Directions[2]
	Percent of State	Estimated Visitors	Percent of State	Estimated Visitors	Estimated Visitors
Past					
1965	35.8	203,000	n.a.	n.a.	
1970	37.1	511,000	n.a.	n.a.	
1975	37.3	823,000	28	174,000	997,000
Forecast					
1980	35.0	1,015,000	25	275,000	1,290,000
1985	40.0	1,480,000	30	480,000	1,960,000
1990	43.0	1,978,000	35	700,000	2,678,000
1995	44.0	2,288,000	38	874,000	3,162,000
2000	45.0	2,475,000	40	1,000,000	3,475,000
2005	45.0	2,500,000	40	1,000,000	3,500,000

1 Estimates based upon surveys of Japanese visitors. Not estimated prior to 1973.

2 Westbound only until 1973.

Source: Compiled by Hastings, Martin, Hallstrom and Chew, Ltd. from data in the Hawaii Visitor Bureau's Annual Research Reports and Japanese Visitor Opinion Surveys.

Forecast of Demand for Transient Accommodations: Hawaii County

The visitor arrival estimates in Table II-4 were translated into forecasted demand for transient accommodation by applying market-segment-specific estimates of average length of stay, average party size, and average occupancy. The resulting projections are presented in Table II-5. They indicate (assuming the 70 percent average occupancy rate generally accepted as the break-even point is realized), that the demand for hotel rooms will rise from 6,600 in 1980 to 15,200 in 1990 and 22,800 in the year 2005. The rate of increase is expected to peak at an average of about 900 units per year between 1985 and 1990.

Estimates have also been made of the locational distribution of the demand for resort facilities (Hastings, Martin, Hallstrom and Chew, Ltd., June 1979:6). These are summarized in Table II-6. They assume that both Hilo and Kona's share of the market will decline over the next ten years. However, due to the expected increase in the total amount of visitors arriving on the island, the absolute number of visitors is projected to increase over the same period--by 120 percent for Hilo and 130 for Kona, respectively.

Forecast of Demand for Transient Accommodations: North and South Kohala

Hastings, Martin, Hallstrom and Chew, Ltd. (January 1979; June 1979:7-8) concluded that the Kohala Coast Resort Region will continue to capture 70 to 90 percent of the transient accommodation demand projected for areas outside Hilo and Kona. They further estimate that 75 percent of the transient accommodation demand is for hotel units and 25 percent is for resort condominium units. Table II-7 presents transient accommodation demand projections based on these assumptions. It also summarizes residential condominium demand estimates developed using empirical hotel room to condominium unit ratios and combines these with the figures for transient accommodations to arrive at an overall hotel room and condominium unit demand projection.

A comparison of the total demand for the North/South Kohala study area with the planned and proposed supply in the region, including the Mahukona Resort, is shown in Table II-8. It indicates that the planned and proposed hotel development in the North/South Kohala study area could exceed the projected demand for the year 2005 by 1,480 rooms without the proposed Mahukona Resort project and by 1,500 rooms more with it. The situation with respect to condominiums is quite different--for these, demand is forecasted to exceed supply by 2,260 to 5,780 units by 2005 if the Mahukona Resort is not constructed. If the proposed Mahukona Resort project is developed as planned, the undersupply of condominium units could be eliminated. The implication of the projected oversupply situation is that the rate of development in other resorts would be slower than presented in Table II-8. If their developers failed to make appropriate adjustments in their development schedules, this could have an adverse impact on their profitability.

Table II-5. Forecast of Transient Accommodation Demand in Hawaii County: 1980 - 2005.[1]

	1980	1985	1990	1995	2000	2005
Westbound						
Visitors	1,015,000	1,480,000	1,978,000	2,288,000	2,475,000	2,500,000
Average Stay, Days	2.5	2.8	3.0	3.3	3.5	3.5
Visitor Days	2,538,000	4,144,000	5,934,000	7,550,000	8,662,000	8,750,000
Average Party Size	1.8	1.8	1.8	1.8	1.8	1.8
Occupied Rooms	3,900	6,300	9,000	11,500	13,200	13,300
Total Rooms Required[2]	5,600	9,000	12,900	16,400	18,900	19,000
Eastbound						
Visitors	275,000	480,000	700,000	874,000	1,000,000	1,010,000
Average Stay, Days	0.8	0.9	1.0	1.1	1.2	1.2
Visitor Days	220,000	432,000	700,000	961,000	1,200,000	1,212,000
Average Party Size	1.7	1.7	1.7	1.7	1.7	1.7
Occupied Rooms	400	700	1,100	1,500	1,900	2,000
Total Rooms Required[2]	600	1,000	1,600	2,100	2,700	2,800
Local						
Visitors	144,000	178,000	227,000	280,000	330,000	335,000
Average Stay, Days	1.5	1.5	1.5	1.5	1.5	1.5
Visitor Days	216,000	285,000	363,000	420,000	495,000	500,000
Average Party Size	1.7	1.8	1.9	1.9	1.9	1.9
Occupied Rooms	300	400	500	600	700	700
Total Rooms Required[2]	400	600	700	900	1,000	1,000
Total[3]						
Visitors	1,434,000	2,138,000	2,905,000	3,442,000	3,805,000	3,845,000
Average Stay, Days	2.1	2.3	2.4	2.6	2.7	2.7
Visitor Days	2,974,000	4,861,000	6,997,000	8,931,000	10,359,000	10,376,000
Average Party Size	1.8	1.8	1.8	1.8	1.8	1.8
Occupied Rooms	4,600	7,400	10,600	13,600	15,800	16,000
Total Rooms Required[2]	6,600	10,600	15,200	19,400	22,600	22,800
Interperiod Change		4,000	4,600	4,200	3,200	0

1 All numbers are rounded.

2 On the average, it is expected that only 70 percent of the available hotel rooms will be occupied. Hence, the total number of hotel rooms necessary to accommodate the specified level of demand is: (occupied rooms) x (1/0.7) = Total Rooms Required.

3 The figures in the "Total" rows are the sum of the components derived under "Westbound", "Eastbound", and "Local." The figures in the "Average Party Size" row under "Total" are rounded; they are not weighted averages.

Source: Hastings, Martin, Hallstrom and Chew, Ltd. (June 1979:5) for 1980-2000. Estimates for 2005 assume a further one percent increase in demand.

Table II-6. Distribution of Occupied Transient Accommodations in Hawaii County: 1965-2005.

Year	Hilo Units	Hilo % of County	Kona Units	Kona % of County	Other Units	Other % of County	County Total[1] Units
1965	293	28.4	693	67.3	44	4.3	1,030
1970	928	39.0	1,183	49.7	270	11.3	2,381
1975	1,242	34.4	2,030	56.2	338	9.4	3,610
Forecast:							
1980	1,150	25.0	2,760	60.0	690	15.0	4,600
1985	1,480	22.0	3,700	50.0	2,070	28.0	7,400
1990	1,910	18.0	4,240	40.0	4,450	42.0	10,600
1995	2,310	17.0	5,440	40.0	5,850	43.0	13,600
2000	2,530	16.0	6,320	40.0	6,950	44.0	15,800
2005	2,560	16.0	6,400	40.0	7,050	44.0	16,000

[1] From Table II-5. Forecasts for the "County Total" are rounded.

Source: Hawaii Visitors Bureau, Annual Research Reports. Forecasts by Hastings, Martin, Hallstrom and Chew, Ltd. (June 1979).

Table II-7. Hotel Room and Condominium Unit Demand Projections for the Kohala Coast Resort Region: 1980-2005.

Time Period	Cumulative Demand for Transient Accommodations[1]			Residential Condominium Units[1]	Total Condo Units	Total Units
	Hotel Units[2]	Condominium Units[3]	Total Units			
1980-1985	1,510-1,930	590- 750	2,100-2,680	1,180- 2,040	1,770- 2,790	3,280- 4,720
1986-1990	3,070-3,920	1,190-1,530	4,260-5,450	3,380- 5,250	4,570- 6,780	7,640-10,700
1991-1995	4,120-5,270	1,600-2,050	5,720-7,320	5,530- 8,120	7,130-10,170	11,250-15,440
1996-2000	4,940-6,330	1,920-2,460	6,860-8,790	7,610-10,520	9,530-12,980	14,470-19,310
2001-2005	5,540-7,090	2,150-2,760	7,690-9,850	7,610-10,520	9,760-13,280	15,300-20,370

1 Range shown is based on the assumption that 70 to 90 percent of the demand outside Hilo and Kona would be in the North/South Kohala study area.

2 Based on 75 percent of projected transient accommodation demand and 70-percent average occupancy.

3 Based on 25 percent of projected transient accommodation demand and 60-percent average occupancy.

Source: Hastings, Martin, Hallstrom and Chew, Ltd. (November 1980:84).

Table II-8. Comparison of Planned and Proposed Resort Development with Projected Demand in North/South Kohala: 1980-2005.

	Five-Year Period Ending in					Cumulative Total
	1985	1990	1995	2000	2005	
Hotel Units						
Projected Hotel Unit Demand[1]	1,510 - 1,930	1,560 - 1,990	1,050 - 1,350	820 - 1,060	600 - 760	5,540 - 7,090
Planned Hotel Unit Supply w/o Mahukona[2]	1,030	2,130	2,130	1,730	0	7,020
Projected Hotel Unit Deficit (Oversupply) w/o Mahukona Resort	480 - 900	(570) - (140)	(1,080) - (780)	(910) - (670)	600 - 760	(1,480) - 70
Hotel Units Proposed at Mahukona Resort[3]	0	400	450	350	300	1,500
Projected Hotel Unit Deficit (Oversupply) with Mahukona Resort	480 - 900	(970) - (540)	(1,530) - (1,230)	(1,260) - (1,020)	300 - 400	(2,980) - (1,430)
Cumulative Unmet Demand (Oversupply) w/o Mahukona Resort	480 - 900	(90) - 760	(1,170) - (20)	(2,080) - (690)	(1,480) - 70	(1,480) - 70
Cumulative Unmet Demand (Oversupply) with Mahukona Resort	480 - 900	(490) - 360	(2,020) - (870)	(3,280) - (1,890)	(2,980) - (1,430)	(2,980) - (1,430)
Condominium Units						
Projected Condominium Unit Demand[2]	1,770 - 2,790	2,800 - 3,990	2,560 - 3,390	2,400 - 2,810	230 - 300	9,760 - 13,280
Planned Condominium Supply w/o Mahukona[2]	1,350	2,140	2,130	1,880	0	7,500
Projected Condominium Unit Deficit w/o Mahukona Resort	420 - 1,440	660 - 1,850	430 - 1,260	520 - 930	230 - 300	2,260 - 5,780
Condominium Units Proposed at Mahukona Resort[3]	0	300	600	1,000	1,300	3,200
Projected Condominium Unit Deficit (Oversupply) with Mahukona Resort	420 - 1,440	360 - 1,550	(170) - 660	(480) - (70)	(1,070) - (1,000)	(940) - 2,580
Cumulative Unmet Demand (Oversupply) w/o Mahukona Resort	420 - 1,440	1,080 - 3,290	1,510 - 4,550	2,030 - 5,480	2,260 - 5,780	2,260 - 5,780
Cumulative Unmet Demand (Oversupply) with Mahukona Resort	420 - 1,440	780 - 2,990	610 - 3,650	130 - 3,580	(940) - 2,580	(940) - 2,580
Total Units						
Cumulative Unmet Demand (Oversupply) w/o Mahukona Resort	900 - 2,340	990 - 4,050	340 - 4,530	(50) - 4,790	780 - 5,840	780 - 5,840
Cumulative Unmet Demand (Oversupply) with Mahukona Resort	900 - 2,340	290 - 3,350	(1,410) - 2,780	(3,150) - 1,690	(3,920) - 1,150	(3,920) - 1,150

1 From Table II-7.

2 From Table III-1.

3 From Table II-1.

Source: Compiled by Belt, Collins & Associates using projections made by Hastings, Martin, Hallstrom and Chew, Ltd. (June 1979).

chapter three

CHAPTER III
ASSESSMENT BASIS

INTRODUCTION

General Approach

For a number of reasons, assessing the impact of a major project such as the proposed Mahukona Resort is an extremely complex undertaking. First, it is necessary to consider the effects both of the "primary" on-site activities that are proposed by the developer and of the "secondary" off-site development by other parties which the resort would stimulate. Since there are presently no plans for this secondary growth, this requires the creation for this EIS of a realistic "development scenario" that defines the direction which the secondary development would probably take. Second, since the impact of a proposed project must be measured by the extent to which future conditions with it would differ from future conditions without it, the analysis must begin by projecting future conditions in the region without the Mahukona Resort but with all of the other development that is likely to occur. In view of the large-scale resort development that has already been planned for South Kohala, this in itself becomes a formidable task. Finally, the generation of long-range development scenarios is further complicated by the absence of any well-defined governmental policies with regard to the places where secondary growth will be allowed to occur.

The analysis presented in the remainder of this environmental impact statement is based on two basic development scenarios. The first assumes that the Mahukona Resort is not implemented but that other currently planned resort growth would be constructed. This is referred to as the "without-Mahukona" or "no-project" scenario. The second alternative examined is the "with-Mahukona" or "with-project" scenario. It assumes that both the Mahukona Resort and other planned resort projects are implemented. This assumption makes it a kind of "worst-case" analysis in that it does not account for the possibility that the resort facilities at Mahukona might simply capture visitors from other planned resorts rather than attract new (i.e., additional) ones.

The two development scenarios outlined above define the amount of resident and visitor growth that is likely to occur. The effects of this growth are also dependent upon such things as the geographic location of the secondary growth that is allowed and the origin and type of persons who fill the resort-related jobs that will be created. The number of possible combinations of these and other variables is too great for us to incorporate them into discrete scenarios. However, the implications of different values for each of the major variables have been explored and are discussed in Chapters IV and V of this report. In Chapter VI the implications of different geographic distribution patterns of secondary growth are examined in more detail.

As a final comment before proceeding, it should be noted that the development of the growth scenarios that are presented here and in subsequent sections of this EIS required numerous calculations. Each of these, in turn, is based on estimates, generation factors, and assumptions derived from available data. Most of the estimates involve at least a modicum of qualitative judgement. These judgements, and the detailed information and reasoning on which they are based, are critical determinants of the conclusions that are reached. Therefore, we have made these judgments explicit in the text, tables, and Appendix A.

Definition of the Primary Impact Area

All of the physical development proposed as part of the Mahukona Resort project would occur in the North Kohala District. However, because the project could draw employees from other parts of the island and attract guests who would make excursions outside North Kohala, it would affect other areas as well. For the purposes of this report, the primary impact area has been defined as encompassing the North Kohala (census tract 218) and South Kohala (census tract 217) Districts of the Island of Hawaii. The boundaries of the area are shown in Figure II-2. Resort development in the Kohalas would undoubtedly have an effect on the remainder of the island, but an analysis of the island's existing population distribution and likely development patterns indicates that the magnitude of these impacts is comparatively small. Moreover, our ability to accurately predict them is severely limited. For these reasons, impacts outside the Kohalas will only be treated qualitatively.

PROJECTED PRIMARY SECTOR GROWTH WITHOUT THE PROPOSED MAHUKONA RESORT

As stated in the introduction to this chapter a decision not to allow the proposed Mahukona Resort does not mean that the North/South Kohala area will remain unchanged through the next twenty-five years. On the contrary, both State and County governments have already made major commitments to large-scale resort development along the South Kohala coast. Assuming the market is capable of supporting them, which the market analysis previously described indicates it would, it seems likely that these planned resorts would be developed over the next twenty years and that this will result in a dramatic change in the physical, economic, and cultural character of the region. The remainder of this section contains a rough sketch of the economic development that is likely to occur if the proposed Mahukona Resort is not constructed. It is the basis of the no-project scenario. It does not discuss the impacts that this growth could produce; rather, it sets the stage for the detailed analysis of such effects that is contained in subsequent chapters of this report.

At present, the only significant resort development in either North or South Kohala is the Mauna Kea Beach Hotel (MKBH) complex located about three miles south of Kawaihae Harbor (see Figure II-2). The owner of the MKBH, Mauna Kea Properties, Inc., has also proposed resort use for over a thousand acres of adjacent land which it controls. Mauna Lani Resort, Inc. has received overall County approval for, and begun work on, a major destination resort at Kalahuipua'a just south of Puako. A third major Kohala Coast destination resort is under construction at Anaeho'omalu Bay. If constructed at the densities now envisioned, these three projects would increase the number of hotel and condominium units available in South Kohala by over 13,000, or about 32 times. Brief descriptions of these three projects are presented below.

Mauna Kea Properties, Inc.

The existing Mauna Kea Beach Hotel and its associated recreational facilities are part of a much larger planned resort/residential community. The site, which is leased from the Parker Ranch, fronts the ocean at Kauna'oa Bay and extends approximately one mile inland (see Figure II-2). It includes about 7,500 feet of shoreline. Features of the resort site include an excellent white sand beach at Kauna'oa Bay, an 18-hole golf course and about 75 acres of land being used for the Mauna Kea Fairways single-family

residential development. Immediately to the south is Hapuna Beach State Park, while to the north are more beaches, coves, and historical heiau sites. The resort lands were originally arid, consisting of native grasses, kiawe trees and lava flows. Using imported soil and extensive irrigation, the dry land has been transformed into a lush, garden-like environment.

The Mauna Kea Beach Hotel complex was begun before the adoption of the State EIS laws, and it has evolved slowly ever since. As a result, there has never been a need to develop a long-range phasing plan for the resort. The most recent printed information is contained in the Revised Environmental Impact Statement for the Lalamilo Water System (Hawaii, State of, Department of Land and Natural Resources, March 1980). It contains a phasing plan for the years 1982 through 1992 that was supplied by the developers. Representatives of Mauna Kea Properties, Inc. were contacted as part of this study and supplied slightly lower ten-year development estimates than are contained in the Lalamilo EIS. These more conservative figures have been used in this report. Mauna Kea Properties, Inc. has not developed firm phasing plans beyond 1990. However, because it is considered unlikely that development will be halted if demand remains strong, we assumed that some additional construction would occur in the 1990-1995 period. These assumptions have been incorporated into the projected development schedule shown in Table III-1.

Mauna Lani Resort, Inc.

The proposed Mauna Lani Resort site is situated in Kalahuipua'a along the South Kohala shoreline between Pauoa and Honoka'ope Bays. It consists of approximately 770 acres of land that was formerly owned by Francis I'i Brown. The resort site is approximately 25 miles north of Kailua-Kona and about 20 miles from the regional airport at Keahole Point. Waimea is 12 miles to the northeast and Kawaihae Harbor is approximately six miles due north. Queen Ka'ahumanu Highway marks the inland edge of the resort, and it is about four miles west of the Waikoloa Village and golf course. Special site features include extensive a'a and pahoehoe lava fields, the Kalahuipua'a fish ponds, and the white sand beaches at Makaiwa Bay.

Present plans for the Mauna Lani Resort call for the construction of 3,000 hotel rooms and 3,200 condominium units over the next 25 years (see Table III-1). The first hotel is in the final design stages at the present time and is scheduled for completion in late 1982. Construction of the first golf course is already well underway.

Transcontinental Corporation

The Waikoloa Beach Resort (WBR) is planned as the major employment center for the 31,000-acre Waikoloa Community that is being developed by the Transcontinental Corporation. The resort site encompasses approximately 1,360 acres of land between Queen Ka'ahumanu Highway and the ocean. Of that total, 500 acres are within the Phase I development area for which County zoning has already been obtained. The WBR is approximately 17 miles southwest of Waimea and 24 miles north of Kailua-Kona. It is immediately south of the proposed Mauna Lani Resort and about ten miles from Kawaihae. Significant site features include a white sand beach at Anaeho'omalu Bay and extensive lava fields. Two ancient Hawaiian fish ponds, Kahapapa and Ku'uali'i are situated immediately mauka of the sandy beach. Petroglyphs, burial caves, a segment of the King's Trail, and other remnants of ancient Hawaiian culture are located throughout the site.

Table III-1. Summary of Resort Development Planned for North and South Kohala Excluding the Proposed Mahukona Resort: 1981-2000[1].

Planned Development	Type of Unit	1981-1985	1986-1990		1991-1995		1996-2000	
		No. Added	No. Added	Cum. Total	No. Added	Cum. Total	No. Added	Cum. Total
Waikoloa Beach Resort	Hotel	460	880	1,340	880	2,220	880	3,100
	Condominium	420	730	1,150	725	1,875	725	2,600
	Commercial (in 1,000 s.f.)	15.7	29.3	45.0	29.3	74.3	29.2	103.5
Mauna Lani Resort, Inc.	Hotel	450	850	1,300	850	2,150	850	3,000
	Condominium	450	910	1,360	905	2,265	905	3,170
	Commercial (in 1,000 s.f.)	15.8	30.3	46.1	30.3	76.4	30.3	106.7
Mauna Kea Properties, Inc.	Hotel	120	400	520	400	920	--	920
	Condominium	230	250	480	250	730	--	730
	Commercial (in 1,000 s.f)	5.3	12.5	17.8	12.5	30.3	--	30.3
Other Developers	Condominium	250	250	500	250	750	250	1,000
All Resort Development	Hotel	1,030	2,130	3,160	2,130	5,290	1,730	7,020
	Condominium	1,350	2,140	3,490	2,130	5,620	1,880	7,500
	Commercial (in 1,000 s.f.)	36.8	72.1	108.9	72.1	181.0	59.5	240.5

[1] Present plans call for all development to be completed by the year 2000.

Source: Transcontinental Corp. (Waikoloa); Mauna Lani Resort, Inc.; Mauna Kea Properties, Inc.; Hastings, Martin, Hallstrom and Chew, Ltd.; Belt, Collins & Associates.

There are six hotel-zoned parcels ranging in size from 11 acres to 19 acres. All have ocean and/or lagoon frontage. Four of the hotel sites are clustered around the ancient fish ponds; these will be maintained as salt water pools and will be surrounded by tropical gardens. Recreational facilities available to all sites include a new 18-hole golf course designed by Robert Trent Jones that is now being constructed immediately mauka of the hotel sites.

The Waikoloa Beach Resort master plan includes about 3,100 hotel rooms and about 2,600 condominiums. Current development is limited to the 460-room Sheraton Royal Waikoloa Hotel, which is now under construction, and the golf course and club house. These will all open between June and September 1981. A phasing plan for the WBR is shown in Table III-1.

Other Planned Kohala Development

In addition to the three major resort developers discussed above, other landowners have also proposed visitor-oriented accommodations in the region. Approximately 400 condominium units are now planned and have received preliminary approvals in the Puako area. Another condominium project, the 550-unit Kohala Makai, has been proposed on the ocean at Waikea on the North/South Kohala boundary. Present zoning would allow a further 600 condominium apartment units in the Puako/Kawaihae area. Altogether, there are about 1,500 resort-oriented condominium units in small projects that could be developed over the next 15 to 20 years if the market demand is there. Since many of these may not be built and others may be used as residential units, we will assume that only two-thirds, i.e., 1,000 will actually be constructed for the visitor market, and that these will be completed at an average rate of 50 per year.

The visitor industry is not the only potential source of additional primary employment in the Kohalas, but it is by far the most important. Agriculture may expand somewhat, and it is even conceivable that a few relatively small manufacturing enterprises may become established. We do not believe this employment base will grow at a rate greater than 10 to 15 workers per year, or about 300 workers between now and 2004. Other employment increases will be in secondary industries that depend on incomes generated by the primary sectors.

PROJECTED PRIMARY SECTOR GROWTH WITH THE PROPOSED MAHUKONA RESORT

As previously stated, the assumption incorporated into this analysis is that the proposed Mahukona Resort would not affect the plans that have already been formulated by South Kohala resort developers. Hence, the with-Mahukona scenario for primary development consists of the sum of the development just discussed under the without-Mahukona scenario and the development that is proposed for the Mahukona Resort site (see Chapter II). This is a "conservative" assumption in that it results in the greatest impact estimates. To the extent that the availability of rooms, condominium units, and other facilities at the Mahukona Resort simply results in the shifting of some visitor activity from South Kohala's planned resorts to the Mahukona Resort site in North Kohala, the proposed project would have a much more limited effect on the regional growth rate.

Table III-2 summarizes the amount of resort development that is projected between the present and the year 2005 at the planned South Kohala resorts, the amount that is planned for the Mahukona Resort project, and the total for all projects over the next 25 years. As can be seen from the information contained in that table, while the

Table III-2. Summary of Planned and Proposed Resort Development in North and South Kohala: 1981-2005.

Planned and Proposed Development	Type of Unit	1981-1985 No. Added	1986-1990 No. Added	1986-1990 Cum. Total	1991-1995 No. Added	1991-1995 Cum. Total	1996-2000 No. Added	1996-2000 Cum. Total	2001-2005 No. Added	2001-2005 Cum. Total
All Planned Development[1]	Hotel	1,030	2,130	3,160	2,130	5,290	1,730	7,020	--	7,020
	Condominium	1,350	2,140	3,490	2,130	5,620	1,880	7,500	--	7,500
	Commercial (in 1,000 s.f.)	36.8	72.1	108.9	72.1	181.0	59.5	240.5	--	240.5
Proposed Mahukona Resort[2]	Hotel	--	400	400	450	850	350	1,200	300	1,500
	Comdominium	--	300	300	600	900	1,000	1,900	1,300	3,200
	Residential	--	100	100	100	200	150	350	150	500
	Commercial (in 1,000 s.f.)	--	14.0	14.0	18.3	32.3	20.2	52.5	22	74.5
Total Development	Hotel	1,030	2,530	3,560	2,580	6,140	2,080	8,220	300	8,520
	Condominium	1,350	2,440	3,790	2,730	6,520	2,880	9,400	1,300	10,700
	Residential	--	100	100	100	200	150	350	150	500
	Commercial (in 1,000 s.f.)	36.8	86.1	122.9	90.4	213.3	79.7	293.0	22	315.0

1 From Table III-1

2 From Table II-1

Source: Mahukona Properties; Hastings, Martin, Hallstrom and Chew, Ltd.; Transcontinental Corp. (Waikoloa); Mauna Lani Resort, Inc.; Mauna Kea Properties, Inc.; Belt, Collins & Associates.

Mahukona Resort is a relatively large project, it represents only a small fraction of the total that is expected. In 1995, for example, Mahukona would account for only 14 percent of both the new hotel rooms and new condominium units that are now planned. Comparable figures for 2005, when all presently planned projects are scheduled to be completed, are 18 and 30 percent respectively.

chapter four

CHAPTER IV

SOCIO-ECONOMIC IMPACTS OF THE PROPOSED PROJECT

INTRODUCTION

As previously noted, the "impact" of an action is measured by the extent to which it alters the future. This, in turn, means that in order to determine the impact of the proposed Mahukona Resort we must predict what development and change is likely to occur without the project, estimate changes that can be expected if it is implemented, and, finally, measure the difference between the two futures. By using the growth scenarios developed in the previous chapter, we are in a position to attempt just that. Before beginning, however, a number of explanatory remarks are in order.

The first aspect of the problem that needs to be understood by readers is that such factors as the long time period that is involved (25 years), the uncertainty of the visitor market, the absence of specific public land use policies for accommodating and guiding resort-related secondary growth, and the lack of concrete plans for expansion of utilities, public facilities, and public services needed to support the projected growth make any attempt at impact assessment highly speculative. This does not mean that this analysis of impacts is untimely or incapable of providing useful information. It does, however, mean that the projections should be treated as gross approximations useful in the formulation of appropriate public policy rather than as precise estimates on which specific program or construction decisions should be based.

In this respect, it may be useful to re-emphasize a point made in the preface to this document. The primary purpose of this EIS as defined by the "accepting authority", i.e., the Hawaii County Planning Department, is to examine the major regional growth issues that are raised by the proposed Mahukona Resort project, to determine what effects the project would have on the achievement of public goals, and to identify mitigation measures that could be used to minimize any adverse environmental impacts. Because the physical development plans for the proposed resort project are at the conceptual stage, detailed site plans and engineering studies have not yet been undertaken. Similarly, specific plans for the accommodation of secondary growth have not been formulated by either the public or private sectors. In the absence of more concrete plans, site-specific impacts resulting from both the Mahukona Resort itself and associated secondary growth have been dealt with in only a generalized fashion in this report. Should the Hawaii County General Plan amendment allowing development of the Mahukona Resort that is now being sought be approved, either in whole or in part, more detailed site planning and engineering will be undertaken. Environmental studies based on these site-specific plans will be conducted and supplemental environmental impact assessments or statements prepared as deemed necessary by responsible County and/or State agencies.

The two regional growth scenarios described in the preceding chapter were formulated in order to provide a practical framework for impact analysis. While they go a considerable ways towards defining the probable future of the North/South Kohala impact area both with and without the proposed Mahukona Resort project, they do not specify the following two aspects of the projected change that will be very important in determining its socio-economic and physical impacts:

- the location and nature of the residences, businesses, and public support facilities (schools, utility systems, libraries, etc.) that constitute the resort-related secondary growth; and

- the demographic characteristics (including place of origin) of the persons and families that will migrate into the region to fill the jobs that are created.

These two factors are far too variable to predict with any certainty at this point in time; on the other hand, they are far too important to neglect. Therefore, while we do not deal with these factors in discussions of the two regional growth scenarios, the impacts of the secondary growth that are dependent upon the geographic distribution of in-migrants are discussed in Chapter VI of this report.

EXISTING SOCIO-ECONOMIC CONDITIONS

KOHALA COMMUNITIES (Refer to Figure II-2)

The North/South Kohala impact area is relatively sparsely populated, and physical, economic, and social circumstances, both present and historical, have resulted in the development of a number of distinct communities, each with its own peculiar set of social and economic characteristics. A brief review of the major factors influencing this development provides a useful background against which the impact of alternative development scenarios can be measured.

North Kohala

The Kohala Volcano or Mountain (also referred to as the Kohala Mountains) divides North Kohala into wet and dry sides. Orographic precipitation, produced as the moist northeast tradewinds rise to clear the 5,000-foot high mountain, keeps the windward side of the mountain covered with lush vegetation while cutting deep stream valleys into the basaltic lavas that make up the volcano. The southwestern side of the mountain (as well as the northern tip where orographic influences are small) is much drier. The pre-contact Hawaiians utilized the resources of both sides of the mountain, but, until very recently, twentieth century residents of the region focused almost all of their economic and social activities on the "wet side." The dry, leeward coastal areas were largely ignored by agriculturalists. Instead a number of ranches (Parker, Kahua, etc.) use it for low-intensity grazing.

The region's land transportation system has been another important determinant of social interaction in North Kohala. North of Honoka'a on the Big Island's windward coast, the Kohala Mountain has been deeply eroded to form the valleys of Waipio, Waimanu, Honokane, and Polulu (see Figure II-2). So wide, steep-sided, and deep as to be virtually impassable, they forced engineers building the Hawaii Belt Highway (the principal circum-island road) to bypass the area by turning inland at Honoka'a and crossing the island through the Waimea Saddle rather than via North Kohala's Upolu Point. Thus, while the town of Waimea had direct access to the population centers of Hilo and Kona, the only road access to North Kohala was the winding, 22-mile long Kohala Mountain Road linking Waimea with Hawi. Until the construction of the Akoni Pule Highway (Kawaihae-Mahukona Road) in 1966, the only penetration into the dry coastal areas of North Kohala was the seven-mile long roadway from Hawi to Mahukona Harbor, where sugar from the district's plantations was shipped. In all respects, North Kohala formed an "end of the road" community which had little contact with the outside.

North Kohala's isolation began to be eroded in the 1960s. A deep-draft harbor was blasted out of the coral at Kawaihae to provide an improved port for West Hawaii, and the Akoni Pule Highway was constructed to provide North Kohala's sugar mill improved access to the new harbor facilities. The highway also made it possible for North Kohala residents to commute to resort jobs at the newly-opened Mauna Kea Beach Hotel--an effect which at the time was thought to be incidental.

Developing, as it did, under the influence of a single dominant economic enterprise (sugar), and geographically isolated from the major forces of change, North Kohala's history for the past century paralleled the history of many rural Hawaiian plantation locales. In the late nineteenth and early twentieth centuries, the characteristic waves of immigrants were brought in to work the land. Settlements were in small, ethnically segregated "camps" around mill sites. Plantation managers, mingling paternalism and

authoritarianism, controlled virtually all social and economic aspects of life in the district until mid-century.

In 1946 the International Longshoremen and Warehousers Union (ILWU) successfully organized the workers, thereby increasing their social autonomy. For the first time in the modern era, workers had gained an effective voice in many of the decisions which affected them most directly. At the same time, unionization raised the labor costs of the plantations. Sugar yields from the North Kohala fields had always been relatively low, meaning that the plantations ran on narrow margins, and plantations in the area periodically closed or consolidated over the next 20 years until only one, Castle and Cooke's Kohala Sugar Company, remained. By 1971, the economic squeeze on the company produced by the combination of low sugar yields and chronically low world sugar prices led Castle and Cooke to announce that all sugar operations in Kohala would be phased out and the mill closed at the end of the 1973 growing year. Government persuasion and a temporary rise in world sugar prices delayed the shutdown by two years, but in 1975 the plantation closed for good.

As a result of the dominant position that the sugar company held in the local economy through the first seven decades of the twentieth century, North Kohala residents today are still overwhelmingly concentrated in the wet-side villages rather than along the dry southwestern coast (see Table IV-1 and Figure II-2). Of the six major villages that developed during the plantation era--Hawi, Kapa'au, Hala'ula, Makapala, Halawa, and Niuli'i--most of the population now lives in those closest to the "dry" side--and, thus, closest to the tourism industry now developing on the "dry" side. The mills at or near Makapala, Halawa, and Niuli'i were closed before 1940, and these communities long since dwindled in population. Since all commercial activities in North Kohala are to be found in Hawi, Kapa'au, or Hala'ula, it may be said that all of North Kohala is an integrated community in one sense. But in another sense, Hawi-Kapa'au-Hala'ula represents the comparatively urban part of North Kohala, and Makapala-Halawa-Niuli'i is the truly rural district of the region.

South Kohala

South Kohala stretches from the crest of the Kohala Mountain south onto the Waimea Saddle and the lower, leeward slopes of the Kohala Mountain and Mauna Kea. Rainfall on the saddle area near Waimea is moderate, but most of the remainder of the district is arid, thereby precluding intensive agricultural use of the land. The dominant economic activity was (and to some extent still is) cattle ranching. Parker Ranch, the largest privately-owned ranch in the nation, resembled the sugar plantations in its paternalistic provision of basic human services such as housing and health care, and several of the smaller ranches in the area are modeled on the same pattern. However, the ranches did not import different ethnic groups to the same extent as did the plantations, so that South Kohala's ethnic composition historically has been more heavily weighted toward part-Hawaiian paniolos and Caucasians. Furthermore, the ranches were never unionized, and ranch owners and managers have maintained much of their social and economic supremacy in the region.

Unlike North Kohala, most of whose residents have generally similar backgrounds and where differences in the social makeup of adjoining settlements are not great, South Kohala's low base population (only 1,500 in 1960) and relatively larger amount of recent development (2,300-person increase in the population between 1970 and 1980) have resulted in the emergence of rather distinct residential communities in Waimea, Kawaihae Village, Puako, and Waikoloa Village (see Tables IV-1 and IV-2 and Figure II-2).

Table IV-1. Principal Communities of North and South Kohala.

Community	Capsule Description	Major Economic Activities	Characteristics of Population
North Kohala			
Hawi-Kapa'au-Hala'ula	Adjacent former sugar towns; contains most population and all commercial activity and government services.	Small retail outlets; nursery operation; small-scale industrial activities (e.g., kim chee factory, heavy equipment repair shop, etc.).	Longtime residents tend to be aging, relatively less educated, former plantation workers; an unknown proportion consists of relatively younger in-migrants from the Mainland.
Makapala-Halawa-Niuli'i	Sugar activities long abandoned here; population low; rural setting.	Only agriculture or subsistence activities; no commercial businesses.	Relatively more part-Hawaiian.
South Kohala			
Waimea ("Kamuela")	Commercial and population center for both South and North Kohala.	Parker Ranch headquarters and Shopping Center; telescope base camp; two large private schools; professional offices; restaurants and minor tourist attractions.	Longtime residents of paniolo tradition; influx of newcomers of professional class; many Oahu residents keep vacation homes here.
Waikoloa	Resort/residential community; homes built on some 200 of total 1,000 lots; 218 condominium units.	Project development; golf course; clubhouse; a few convenience stores.	About 40% retirees (mostly Mainland) and 60% younger, working people (mostly local).
Kawaihae	Most of population in the Kawaihae Village subdivision; a few homes in "old" area near harbor.	Harbor and warehouses; one gas station, one store, one restaurant; wood-chipping plant.	Kawaihae Village intended as employee housing for Mauna Kea Hotel, but most residents are working elsewhere.
Puako	Strip of vacation homes along single dead-end street.	No stores; one condominium apartment-hotel.	Retirees or young people renting old cottages; little interaction with other Kohala communities.

Source: Community Resources (September 1980).

Table IV-2. Geographical and Historical Factors Shaping Present-Day Kohala.

Factors Affecting All Kohala

- Geographical division into "dry" and "wet" sides by Kohala Mountain affects settlement patterns through interaction with economic activities; from mid-nineteenth century, agricultural activities predominate and most human activity is concentrated on "wet" side: sugar at lower elevations and cattle grazing in more mauka areas.
- Blasting of deep-draft harbor at Kawaihae (1960s and early 1970s) creates potential for industrial activities and employment there; this potential remains largely unfulfilled.
- Early tourism development (mid 1960s and early 1970s) at Mauna Kea Beach Hotel and Waikoloa provides new jobs, real estate configurations, and small settlements (Waikoloa and Kawaihae Village) on "dry side."
- Opening of Queen Ka'ahumanu Highway (1975) connects Kohala to Kailua-Kona and Ke-ahole Airport by two-lane, high-speed road.
- Lalamilo Water System (1980) opens door for new and expanded resort development in South Kohala coastal areas from Kawaihae to Honoka'ope Bay.

Factors Primarily Affecting North Kohala

- Sugar plantation history: waves of immigrants settling in ethnically segregated "camps;" social organization determined first by paternalistic system and later by interplay of management and union; concentration of most social and economic activity on "wet side."
- "End-of-road" community--decades of physical isolation from rest of island and limited access to "dry-side" land.
- Early closure of sugar mills in Makapala, Halawa, and Niuli'i, so that these areas have had sharply reduced population in recent years; most remaining population has been in Hawi, Kapa'au, or Hala'ula (nearer to "dry side").
- Opening of Kawaihae-Mahukona Highway (1966) permits some residents (mostly women) to commute to work at Mauna Kea Beach Hotel.
- Plantation sale of houselots and old plantation homes to workers at very low prices (1960s) leads to high home-ownership rate but aging and limited stock of housing.
- Closure of all Kohala Sugar Co. activities in 1975, following 1971 announcement; failure of Kohala Task Force to generate many new agriculture-based industries; lease of most old sugar lands to ranchers and macadamia nut growers, employing few people; government employment programs at Lapakahi State Historic Park and elsewhere to ease economic transition.
- Population shifts in mid 1970s: out-migration of young and of some old plantation families; in-migration of some young Mainlanders; total effect is slight population loss between 1970 and 1980.

Factors Primarily Affecting South Kohala

- Cattle ranching history: social organization also developed along paternalistic lines, but different ethnic composition of population; Parker Ranch remains in business today but is consolidating operations and making lands available to lessees or purchasers for development.
- Principal community is Waimea (Kamuela), straddling "wet" and "dry" sides and situated on major route between Hilo and Kona.
- Dry coastal area becomes weekend refuge for East Hawaii recreationalists, leading to development of Puako community in late 1950s and early 1960s.
- Waimea becomes attractive as second-home area for affluent Oahu residents in late 1960s and 1970s; begins growing more on "dry side" of town.
- Establishment of international telescope operation base camp and a second large private school contributes to population boom of 1970s, which is marked by large increases in numbers of professional-class residents in Waimea.

Source: Community Resources (September 1980).

Waimea. The South Kohala community of Waimea (sometimes called Kamuela) is situated in the cool, mauka grasslands on the southern flank of the Kohala Mountain. The town is headquarters of the Parker Ranch and, as a result of its location on the major crossroads of the area's highway network, the major commercial center of the region as well.

Kawaihae Village. The developers of the Mauna Kea Beach Hotel and the Hawaii Housing Authority originally constructed this project for hotel employee housing. But when units went on sale in 1971, it became apparent that few of the current hotel employees needed and/or wanted homes in the dry, warm subdivision overlooking Kawaihae Harbor. Buyback provisions on the leasehold single-family units were then dropped, and resale values for the townhouse units (on 99-year leasehold from Queen's Medical Center) have risen sharply in recent years. According to the president of the Kawaihae Village Association (personal communication), of the 51 leasehold units, about 30 are inhabited by owner-occupants and the other 21 by renters paying about $500 per month for three-bedroom units. There are also 16 apartment units still owned by Mauna Kea Beach Hotel and rented to employees (or others when there is no employee interest in them). Most Kawaihae Village residents are working people, but about a third of the owner-occupied units are taken by Mainland retirees.

Kawaihae Harbor. Prior to the construction of the Kawaihae Village development, the settlement of Kawaihae consisted of a gas station, two stores (one of which is now closed), the harbor, and a few scattered houses. A wood-chipping plant (and a few other industrial activities), are now located nearby, and the Department of Hawaiian Home Lands is contemplating construction of both an expanded industrial park site and some Homesteads housing (minimum 25 units by 1982--possibly many more if the industrial park becomes a reality). There is also a small restaurant near the harbor. Kawaihae's future could also be affected by expansion of the Kawaihae Village development. Mauna Kea Properties, Inc. has most of the required zoning and permits to construct another 157 units there, and the general area is suitable for even further expansion in the future.

Waikoloa Village. This is part of the development originally proposed by Boise Cascade for 31,000 acres of South Kohala land in the late 1960s. It grew very slowly in the early '70s. Houses have been built on some 200 of the 1,000 lots, and 101 condominium units were completed as of October 1980, with 117 more nearly completed. As of spring 1980, according to the president of the Waikoloa Village Association, the village's population was somewhere between 400 and 500, including approximately 100 children. Roughly 40 percent of the population is now thought to consist of retirees (predominantly from the Mainland) and the other 60 percent of younger people with jobs (many of these employed at Waikoloa itself). For some years, Waikoloa land prices were among the cheapest in South Kohala, but recent price surges suggest that Waikoloa's future population growth may be weighted more heavily toward relatively affluent retirees. Waikoloa has a golf course and clubhouse restaurant, plus a few small convenience stores, but residents still rely on the shopping facilities in Waimea for most needs.

Puako. Puako consists of a single street along the coast. Formerly Territorial land, it was subdivided and auctioned off by the State in the late 1950s to Hawaii residents, who were required to build some structure within three years. Most purchasers were Hilo residents who built small, plain beach cottages. The Puako population today is 257, according to preliminary 1980 census figures. Homes on the makai side have been somewhat improved and house a number of owner-occupants, but the mauka lots still

predominantly hold the original rough cottages--many of which are rented to young people. One condominium development containing 48 units has already been constructed. Socially and politically, the Puako community today remains isolated from other communities in the region.

EXISTING RESORT DEVELOPMENT

While the South Kohala coast has been touted as a possible major resort area since the 1960s, there has been relatively little development there to-date. As of October 1980, in fact, the North/South Kohala impact area contained only 487 visitor units, one quarter of them condominiums (see Table IV-3). Over 85 percent of the region's 362 hotel rooms were at one facility, the luxurious Mauna Kea Beach Hotel (MKBH). The scale of resort development is so small and the units have been developed over such an extended length of time (even the relatively large MKBH was constructed in three phases over a period of more than ten years) that they have attracted mostly long-time residents as workers.

Because the number of existing units is so small, relative to that which is proposed, we have excluded them from our calculations. However, readers should be cognizant of their presence and of the tendency for this prior experience with visitors to smooth the way for the additional development that is planned and proposed.

EXISTING ECONOMIC AND DEMOGRAPHIC CONDITIONS

Population

The most recent comprehensive demographic data for the study area is from the U.S. Census Bureau's 1970 Decennial Census. Final data on county-wide population from the 1980 Census has just become available, but more detailed statistics have not been released as yet. The 1975 Census Update Survey (Community Services Administration, September 1976) combined North Kohala and South Kohala with the North Hilo and Hamakua Districts. While breakouts by individual census tracts are available from the computer tapes, the sample size for these smaller geographic units is so small that the figures are not statistically reliable. Because of this, they have not been used here.

Although the comprehensive data that is available from the 1960 and 1970 Censuses is now somewhat dated, it does provide general background information and an indication of the historical characteristics of the region. Furthermore, the information is helpful in identifying distinctions between the two districts. Table IV-4 summarizes demographic data for the two districts and for Hawaii County for 1960 and 1970.

North Kohala's primary dependence on the sugar industry is reflected in the decline in the district's population from 3,386 in 1960 to 3,326 in 1970. This was principally the result of both increased mechanization in the cultivation and processing of sugar cane and the lack of a more broadly-based, diversified regional economy capable of making up for this shift in labor requirements. In fact, Hawaii County's resident population increase of only 2,136, or 3.5 percent, between 1960 and 1970 is, in part, a testimony to the Big Island's heavy dependence upon the relatively stagnant sugar industry through the 1960s. The lack of growth of the North Kohala communities is further reflected in the low incidence of in-migration and a higher incidence of persons in the older age groups.

Table IV-3. Existing North/South Kohala Hotel and Resort Condominium Units: October 1980.

Name of Facility	Location	No. of Units	Type
Kamuela Inn	Kamuela	19	Hotel
Luke's Hotel	Hawi	23	Hotel
Mauna Kea Beach Hotel	Kaunaoa Bay	310	Hotel
Paniolo Club	Waikoloa	24	Condo
Puako Beach Apartments	Puako	24	Condo
The Lodge	Kamuela	10	Hotel
Waikoloa Village	Waikoloa	22	Condo
Waikoloa Villas	Waikoloa	55	Condo
	Total Hotel Rooms	362	
	Total Condo Units	125	
	Total Units	487	

Source: Hawaii Visitors Bureau (October 1980).

Table IV-4. General Population Characteristics for the North and South Kohala Districts: 1960 and 1970.

	North Kohala District, CT 218				South Kohala District, CT 217				Hawaii County			
	1960		1970		1960		1970		1960		1970	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Number of Persons	3,386	100.0%	3,326	100.0%	1,538	100.0%	2,310	100.0%	61,332	100.0%	63,468	100.0%
Male	1,855	54.8	1,746	52.5	807	52.5	1,205	52.2	32,927	53.7	32,898	51.8
Female	1,531	45.2	1,580	47.5	731	47.5	1,105	47.8	28,405	46.3	30,570	48.2
Age Distribution												
Under 5 Years Old	420	12.4%	333	10.0%	184	12.0%	215	9.3%	6,971	11.4%	5,446	8.6%
5 - 19 Years Old	1,075	31.7	1,059	31.8	507	33.0	694	30.0	19,767	32.2	19,756	31.1
20 - 64 Years Old	1,626	48.1	1,619	48.7	756	49.1	1,254	54.3	30,007	48.9	32,428	51.1
65 Years and Older	265	7.8	315	9.5	91	5.9	147	6.4	4,587	7.5	5,838	9.2
Ethnic Group												
Caucasian			851	25.6%			906	39.2%			18,298	28.8%
Japanese	Not		793	23.8	Not		564	24.4	Not		23,817	37.5
Chinese	Available		142	4.3	Available		30	1.3	Available		1,841	2.9
Filipino			972	29.3			152	6.6			10,454	16.5
Hawaiian/Part Hawaiian			510	15.3			611	26.5			7,809	12.3
Other			58	1.7			47	2.0			1,249	2.0
Education of Persons 25 Years and Older												
Eight Years or Less	1,185	65.4%	784	44.3%	368	50.9%	297	24.1%	17,725	55.3%	12,820	37.2%
Some High School (1 to 3 yrs.)	260	14.4	259	14.6	118	16.3	225	18.2	4,662	14.5	5,539	16.1
Completed High School	309	17.1	531	30.0	169	23.3	422	34.2	6,981	21.8	10,903	31.6
Some College (1 to 3 yrs.)	24	1.3	93	5.2	16	2.2	128	10.4	1,135	3.5	2,638	7.6
4 Years or More College	32	1.8	105	5.9	53	7.3	161	13.1	1,571	4.9	2,601	7.5
Residence Five Years Earlier (Population Five Years or Older)												
Same House	2,325	76.2%	1,525	49.8%	676	58.4%	927	45.7%	34,785	64.0%	36,242	62.5%
Different House, Hawaii County	592	19.4	1,023	33.5	416	36.0	382	18.8	15,906	29.3	12,243	21.1
Different County, State of Hawaii	37	1.2	78	2.6	17	1.5	273	13.4	1,743	3.2	3,215	5.5
Different State or Country	87	2.8	315	10.3	43	3.7	408	20.1	1,745	3.2	4,173	7.2
Moved, Not Reported	12	0.4	116	3.8	5	0.4	41	2.0	182	0.3	2,128	3.7

Source: U.S. Bureau of the Census, Census of Population and Housing, 1960 and 1970.

The data shown in Table IV-4 indicate that, demographically, North Kohala is very similar to the average for the entire Big Island. In contrast, the ethnic mix, average educational attainment levels, and resident mobility of South Kohala's population all vary significantly from the County-wide average. The ethnic mix is heavily weighted toward Caucasians, Hawaiians, and part-Hawaiians. This mix traces its history back to the ranching operations that dominated the Kamuela area. South Kohala experienced a population increase of over 50 percent betweeen 1960 and 1970.

Based upon very preliminary results of the 1980 Census, North Kohala's resident population in the spring of 1980 was about 3,250 (Cavanaugh, August 1980). This is two percent less than the 3,325 persons who were reported as residing there in 1970. The decline appears to be the result of very limited new employment opportunities combined with the closing of the Kohala Sugar Company. In contrast, the preliminary 1980 Census estimates show that the resident population of the entire island rose from 63,500 in 1970 to 92,200 in 1980, an increase of 45 percent. Population in the South Kohala District grew from 2,300 in 1970 to 4,600 in 1980, a 100-percent increase. On the Big Island, only the North Kona District underwent a more dramatic change.

Housing

Housing data for the North/South Kohala impact area is given in Table IV-5 for 1960 and 1970. 1980 Census information on housing is not yet available. Due to the very outdated nature of the 1970 data, detailed analyses would be of little value and were not undertaken. However, it is worth noting that the statistics show the Kohalas to be fairly typical of rural environments. Residential housing units tend to be almost exclusively single-family structures. Average household size tends to be relatively high. Between 1960 and 1970, employee housing appears to have been a very important part of the housing supply in both North and South Kohala, judging by the high percentage of renter-occupied units and the high percentage of these renters who paid no cash rent. The maturity of the North Kohala District relative to South Kohala is again apparent in the housing age statistics. As of 1970, over 63 percent of North Kohala's housing units were 31 years of age or older while the corresponding figure for South Kohala was only 23 percent. Therefore, it is not surprising that the value of owner-occupied housing in North Kohala in 1970 was generally weighted toward the lower end of the value range while that of South Kohala's housing was weighted toward the higher end. Recent sale prices of homes in North and South Kohala are summarized in Appendix E.

The most recent housing data for the Big Island is shown in Table IV-6; the figures are believed to be accurate through December 1976. As shown, North Kohala's housing growth during the six-year period from 1970 to 1976 was only 1.7 percent per year. Housing by 1976 was still overwhelmingly single-family; in that year only 14 units were duplexes and none were in multi-family structures. South Kohala's housing supply during this same period more than doubled from 793 units in 1970 to 1,609 units in 1976. Also, by the end of 1976, multi-family housing comprised almost one-fifth of the total housing supply in South Kohala.

Employment

Impact area employment data for the 1960 and 1970 Census periods is presented in Table IV-7. Again, the usefulness of the data in terms of making meaningful comparisons or identifying relevant trends is quite limited because of its age. This is particularly true of North Kohala since the major economic dislocations associated with the closing of the Kohala Sugar Company did not fully manifest themselves until

Table IV-5. Selected Housing Characteristics for the North and South Kohala Districts: 1960 and 1970.

	North Kohala District				South Kohala District			
	1960		1970		1960		1970	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	1,020	100.0%	941	100.0%	644	100.0%	798	100.0%
Owner Occupied	205	20.1	585	62.2	189	29.4	317	39.7
Renter Occupied	700	68.6	294	31.2	205	31.8	333	41.8
Vacant, Available	39	3.8	17	1.8	15	2.3	16	2.0
Other Vacant	76	7.5	45	4.8	235	36.5	132	16.5
Persons Per Household	3.72	--	3.75	--	3.84	--	3.51	--
Age of Housing								
0 - 10 yrs. old	64	6.2%	218	23.0%	272	44.2%	322	37.1%
11 - 20 yrs. old	53	5.2	64	6.8	106	17.2	230	26.4
21 - 30 yrs. old	912(1)	88.6	64	6.8	238(1)	38.6	115	13.2
31 yrs. and older	--	--	600	63.4	--	--	203	23.3
Persons Per Room, Occupied Units	905	100.0%	879	100.0%	394	100.0%	650	100.0%
1.00 or Less	732	80.9	659	74.9	318	80.7	505	77.6
1.01 to 1.50	173(2)	19.1	135	15.4	76(2)	19.3	92	14.2
1.51 or more	--	--	85	9.7	--	--	53	8.2
Units Lacking Some or All Plumbing Facilities	611	59.9%	155	16.5%	286	44.4%	100	12.5%
Units in Structure								
1	974	95.0%	883	93.4%	600	96.6%	770	97.1%
2	46	4.5	18	1.9	6	1.0	10	1.3
3 and 4	5	0.5	24	2.5	15	2.4	5	0.6
5 - 49	--	--	21	2.2	--	--	8	1.0
50 or more	--	--	--	--	--	--	--	--
Gross Rent, Specified Renter Occupied Units								
Under $40	344	47.8%	33	14.0%	32	16.9%	--	-- %
$ 40 to $ 59	207	28.8	65	27.7	12	6.3	11	3.2
$ 60 to $ 79	48	6.7	39	16.6	8	4.2	4	1.2
$ 80 to $ 99	--	--	32	13.6	5	2.6	33	9.5
$100 to $149	8	1.1	14	6.0	--	--	39	11.2
$150 to $199	--	--	--	--	--	--	58	16.7
$200 to $249	--	--	--	--	--	--	35	10.1
$250 or more	--	--	--	--	--	--	13	3.7
No Cash Rent	112	15.6	52	22.1	132	70.0	154	44.4
Value, Specified Owner Occupied Units								
Less Than $5,000	44	30.1%	23	4.3%	25	18.1%	2	0.8%
$ 5,000 - $ 9,999	50	34.2	82	15.4	37	26.8	17	6.4
$10,000 - $14,999	36	24.7	126	23.6	16	11.6	22	8.3
$15,000 - $19,999	16	11.0	128	24.0	20	14.5	33	12.4
$20,000 - $24,999	--	--	93	17.4	20	14.5	32	12.0
$25,000 - $34,999	--	--	54	10.1	20(3)	14.5	40	15.0
$35,000 - $49,999	--	--	19	3.6	--	--	59	22.2
$50,000 or more	--	--	8	1.5	--	--	61	22.9

(1) 21 years and older.

(2) 1.01 or more.

(3) $25,000 or more.

Source: U.S. Bureau of the Census, Census of Population and Housing, 1960 and 1970.

Table IV-6. Number of Housing Units by District in Hawaii County: 1970 and 1976.

District	1970 Census				December 1976			
	Total	Single	Duplex	Multi	Total	Single	Duplex	Multi
Puna	1,811	1,707	28	76	3,060	2,997	6	57
South Hilo	9,273	8,248	376	649	12,751	10,018	452	2,281
North Hilo	578	493	72	13	566	532	34	—
Hamakua	1,419	1,296	60	63	1,605	1,544	22	39
North Kohala	946	883	18	45	1,045	1,031	14	—
South Kohala	793	770	10	13	1,609	1,311	8	290
North Kona	1,977	1,360	75	542	4,451	2,856	96	1,499
South Kona	1,129	991	106	32	1,565	1,493	24	48
Ka'u	1,007	952	22	33	1,291	1,140	22	129
County Total	18,933	16,700	767	1,466	27,943	22,922	678	4,343

Note: December 1976 information includes units in boarding homes, dormitories, guest homes, military barracks, etc., and is not strictly comparable to the 1970 information.

Source: County of Hawaii, Planning Department, in County of Hawaii, Department of Research and Development 1979 Data Book.

Table IV-7. Selected North and South Kohala Employment Characteristics by Place of Residence: 1960 and 1970.

	North Kohala District				South Kohala District			
	1960		1970		1960		1970	
Employment Status	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Civilian Labor Force	1,216(1)	100.0%	1,355(2)	100.0%	565(1)	100.0%	951(2)	100.0%
Male	987	81.2	856	63.2	401	71.0	624	65.6
Female	229	18.8	499	36.8	164	29.0	327	34.4
Employed	1,148	94.4	1,330	98.2	526	93.1	912	95.9
Unemployed	68	5.6	25	1.8	39	6.9	39	4.1
Employment By Industry								
Agriculture	353	30.7%	(3)	-- %	259	49.2%	(3)	-- %
Construction	45	3.9	34	2.6	25	4.8	124	13.6
Manufacturing	468	40.8	389	29.2	8	1.5	21	2.3
Transportation, Communications, Utilities & Sanitary Services	28	2.4	18	1.4	12	2.3	37	4.1
Wholesale Trade	4	0.3	10	0.8	9	1.7	8	0.9
Retail Trade	46	4.0	39	2.9	69	13.1	145	15.9
Finance, Insurance, and Real Estate	(3)	--	15	1.1	(3)	--	32	3.5
Business and Repair Service	16	1.4	--	--	4	0.8	14	1.5
Personal Services	43	3.7	344	25.9	33	6.3	163	17.9
Health Services	41	3.6	58	4.4	4	0.8	18	2.0
Educational Services	57	5.0	114	8.6	57	10.8	92	10.1
Other Services	12	1.0	23	1.7	0	0.0	17	1.9
Public Administration	19	1.7	73	5.5	25	4.8	28	3.1
Other Industries	16	1.4	213	16.0	21	4.0	213	23.4
Employment By Occupation								
Professional and Technical	73	6.4%	164	12.3	38	7.2%	99	10.9%
Managers and Administrators (Non-farm)	30	2.6	29	2.2	24	4.6	94	10.3
Sales Workers	20	1.7	14	1.1	28	5.3	63	6.9
Clerical	76	6.6	92	6.9	39	7.4	90	9.9
Craftsmen and Foremen	202	17.6	236	17.7	36	6.8	150	16.4
Operatives (Non-Transport)	243	21.2	139	10.5	46	8.7	56	6.1
Transport Operatives			71	5.3			17	1.9
Laborers (Non-Farm)	38	3.3	64	4.8	42	8.0	47	5.2
Farm Workers	345	30.1	176	13.2	228	43.3	151	16.6
Service Workers	86	7.5	328	24.7	19	3.6	126	13.8
Private Household Workers	23	2.0	17	1.3	21	4.0	19	2.1
Not Reported	12	1.0	--	--	5	1.0	--	--

(1) 14 years and older.

(2) 16 years and older.

(3) Reported elsewhere.

Source: U.S. Bureau of the Census, Census of Population and Housing, 1960 and 1970.

after 1970. Less comprehensive employment data for the impact area, as compiled by the State Department of Labor and Industrial Relations (DLIR), is presented in Table IV-8. This data is presented for qualitative purposes only.

The numbers do provide evidence of the region's strong agricultural heritage. In 1960, over 30 percent of North Kohala's employed labor force was in the agricultural sector. Most of the employment in the manufacturing sector, which accounted for forty percent of the total, was associated with sugar cane processing operations and was, therefore, directly related to agriculture. In the same year, almost 50 percent of the jobs in South Kohala were in agriculture (including ranching).

By 1970, the South Kohala economy had undergone considerable change. Although diversified agriculture still remained strong, other sectors of the economy were beginning to exhibit significant growth patterns in terms of other types of employment. South Kohala's retail base kept pace with population growth between 1960 and 1970, and the construction, and service industries also grew substantially. In 1970, the retail, construction, and service industries employed about 60 percent of the work force in South Kohala. Meanwhile, North Kohala workers remained heavily dependent upon the sugar industry. Given the two districts' dissimilar economic structures in 1970 and the fate of the North Kohala sugar industry, it is not surprising that North Kohala's internal growth since that time has been minimal, while South Kohala's growth has exceeded the County-wide average.

Income

Family income data is presented in Table IV-9. As indicated by the figures, gross family income levels in 1969 for North and South Kohala were not radically different from one another even though there was a significant difference in employment mix between the two districts.

Table IV-8. Estimates of North and South Kohala Labor Force Distribution by Place of Employment: 1975.

Category	North Kohala		South Kohala	
	Number	Percent	Number	Percent
Agriculture & Forestry	203	32.3%	142	9.2%
Manufacturing	178	28.3	29	1.9
Transportation, Communication, and Public Utilities	-	-	67	4.3
Wholesale Trade	31	4.9	15	1.0
Retail Trade	77	12.3	303	19.6
Finance, Insurance and Real Estate	14	2.2	34	2.2
Services	17	2.7	803	51.9
Government				
Federal	7	1.1	5	0.3
State	102	16.2	66	4.2
Local	-	-	84	5.4
Total	629	100.0%	1,548	100.0%

Source: State Department of Labor and Industrial Relations, Labor Force Distribution by Employer Site and Industry Category (March 1978).

Table IV-9. Annual Income of Families and Individuals Residing in North and South Kohala: 1959 and 1969.

	North Kohala District				South Kohala District			
	1959		1969		1959		1969	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All Families	738	100.0%	758	100.0%	314	100.0%	562	100.0%
Less than $5,000	462	62.7	133	17.5	186	59.3	130	23.1
$ 5,000-$ 6,999	135	18.3	138	18.2	59	18.8	69	12.3
$ 7,000-$ 9,999	94	12.7	141	18.6	29	9.2	118	21.0
$10,000-$14,999	25	3.4	214	28.2	24	7.6	123	21.9
$15,000-$24,999	18	2.4	105	13.9	16	5.1	97	17.3
$25,000 or more	4	0.5	27	3.6	0	0.0	25	4.4
Median Income	$4,363		$ 9,421		$4,554		$ 9,182	
Mean Income	NA		10,431		NA		11,200	
Families and Individuals	NA		1,047		NA		710	
Median Income	$3,730		$ 7,007		$4,045		$ 7,754	
Mean Income	NA		8,687		NA		9,808	
Individuals	NA		289		NA		148	
Median Income	NA		$ 4,051		NA		$ 2,882	
Mean Income	NA		4,113		NA		4,522	

Source: U.S. Bureau of the Census, Census of Population and Housing, 1960 and 1970.

PROJECTED LABOR FORCE REQUIREMENTS AND POPULATION IMPACTS OF PLANNED AND PROPOSED DEVELOPMENT

WITHOUT-MAHUKONA SCENARIO

Labor Force Requirements Generated by Planned Resort Development

Table III-1 summarizes the known visitor-related development plans (excluding the Mahukona Resort) for the impact area. As can be seen from the table, impending development, represented by projects under construction or with existing development agreements, will have the most immediate impact. Projects in this category include the 460-room Sheraton Royal Waikoloa Hotel that is now under construction at the Waikoloa Beach Resort, the 450-room luxury hotel planned as the flagship of the Mauna Lani Resort, and the 120-room expansion of the Mauna Kea Beach Hotel.

Altogether, developers' present plans call for the completion of an additional 3,160 hotel rooms, 3,490 resort condominium units, and 109,000 square feet of resort commercial space by the end of 1990. By the year 2000, it is expected that the totals will be 7,020 hotel rooms, 7,500 resort condominium units, and 240,000 square feet of resort-oriented commercial space.

The resort development projections shown in Table III-1 were used to estimate the labor force requirements of the region over the next twenty years. These are shown in Table IV-10. The derivation of these estimates involves numerous extrapolations and assumptions, an explanation of which may be found in Appendix A. The peak employment impact of the already planned resort development would occur in the year 2000 when all but the last units are operational and the construction work force is still employed on the last projects. Long-term employment (i.e., not including construction jobs) would be 8,255 when the resort projects are completely operational.

Population Impact of the Planned Resort Development

Visitor Population. The visitor population that would be attracted to the region by the projected resort growth has been calculated using the factors derived in Appendix A and the development scenario outlined in Table III-1. The results for the years 1990 and 2000 are summarized in Table IV-11. They indicate that the average visitor census for 1990 and 2000 would be 5,700 and 12,600 respectively. The average visitor census for the peak month for those years is estimated at 9,600 and 21,000, or about 65 percent higher.

Resident Population. Resort projects can affect the size of the resident population in two ways. First, jobs that they supply can support workers and their families. Second, resort residential units can attract retirees and/or independently wealthy persons who do not need jobs, at least in the traditional sense of the word. For the purposes of this report, we have neglected the latter influence because the available data indicates that retirees and other non-working persons form a small proportion of the total population in such areas.

As discussed in Appendix A, it is expected that there will be a 2.2-person population increase for each additional person employed. However, it is extremely unlikely that all of the workers and their families would relocate to the North/South Kohala study area. Since employment mobility is generally greater than residence mobility, a lag between the creation of new jobs and employment-induced resettlement is expected.

Table IV-10. Projected Employment Due to Construction and Operation of Planned South Kohala Resort Facilities: 1985-2005.[1]

	1985			1990			1995			2000			2005		
	Cons.	Oper.	Total	Cons.	Oper.	Total	Cons.	Oper.	Total	Cons.	Oper.	Total	Cons.	Oper.	Total
Waikoloa Beach Resort															
On-Site	120	490	610	215	1,290	1,505	215	2,090	2,305	215	2,890	3,105	0	2,890	2,890
Off-Site	20	100	120	30	260	290	30	420	450	30	580	610	0	580	580
Total	140	590	730	245	1,550	1,795	245	2,510	2,755	245	3,470	3,715	0	3,470	3,470
Mauna Lani Resort															
On-Site	125	485	610	245	1,295	1,540	245	2,105	2,350	245	2,915	3,160	0	2,915	2,915
Off-Site	20	95	115	35	255	290	35	415	450	35	575	610	0	575	575
Total	145	580	725	280	1,550	1,830	280	2,520	2,800	280	3,490	3,770	0	3,490	3,490
Mauna Kea Properties, Inc.															
On-Site	55	135	190	85	535	620	85	895	980	0	895	895	0	895	895
Off-Site	10	25	35	15	105	120	15	180	195	0	180	180	0	180	180
Total	65	160	225	100	640	740	100	1,075	1,175	0	1,075	1,075	0	1,075	1,075
Other Development															
On-Site	50	40	90	50	90	140	50	130	180	50	180	230	0	180	180
Off-Site	10	10	20	10	20	30	10	30	40	10	40	50	0	40	40
Total	60	50	110	60	110	170	60	160	220	60	220	280	0	220	220
ALL PLANNED DEVELOPMENT															
On-Site	350	1,150	1,500	595	3,210	3,805	595	5,220	5,815	510	6,880	7,390	0	6,880	6,880
Off-Site	60	230	290	90	640	730	90	1,045	1,135	75	1,375	1,450	0	1,375	1,375
Total	410	1,380	1,790	685	3,850	4,535	685	6,265	6,950	585	8,255	8,840	0	8,255	8,255

[1] All figures are for "persons employed" and take into account persons holding multiple jobs. Dates are as of January 1 of the year noted.

Source: Compiled by Belt, Collins & Associates based on projected development shown in Table III-1 and employment generation factors described in Appendix A.

Table IV-11. Estimated Visitor Population Resulting from Planned South Kohala Resort Development: 1990-2000.[1]

	Visitors Present[2]					
	1990		1995		2000	
	Average	Peak	Average	Peak	Average	Peak
Resort Hotels	4,000	5,400	6,650	9,050	8,850	12,000
Resort Condominiums	1,750	4,200	2,800	6,750	3,750	9,000
TOTAL	5,750	9,600	9,450	15,800	12,600	21,000

[1] All figures are as of January 1 of the year noted.

[2] Based on factors developed in Appendix A (see Table A-2) and development scenario summarized in Table III-1. Rounded to nearest fifty (50).

Source: Compiled by Belt, Collins & Associates based on sources referenced in footnotes above.

Table IV-12. Estimated Additional North/South Kohala Resident Population by Supported Planned South Kohala Resort Development.[1]

	1985	1990	1995	2000	2005
Cumulative Increase in Resident Population[2]	3,950	10,000	15,300	19,450	18,150
Percent of Persons Residing in N./S. Kohala Study Area[3]	80	80	80	80	80
Additional Resident Population Residing in Study Area	3,150	8,000	12,250	15,550	14,500
Growth (Decline) Over Preceding Five Years (in persons)	3,150	4,850	4,250	3,300	(1,050)[4]
Cumulative Increase in Resident Households[5]	1,050	2,650	4,100	5,200	4,850

[1] All figures are rounded to the nearest fifty.

[2] Based on employment estimates for both construction and operational employment that are given in Table IV-10 and employment to population relationships discussed in Appendix A.

[3] Percentage estimate is discussed in text. Any error is probably in the direction of over-estimating the percent that would reside within the study area.

[4] Decline is due to end of construction.

[5] Based on an assumed average of 3.0 persons per household.

Source: Compiled by Belt, Collins & Associates based on sources referenced in footnotes above.

Furthermore, the ability of the work force to actually move into the study area depends upon the availability of adequate supplies of affordable housing. In view of the housing development outlook for the region and possible commute patterns from outside the North/South Kohala study area, it is estimated that from 60 to 80 percent of the population supported by the planned and proposed resort development would reside within the region. This is admittedly a broad range, but, at the present time it is impossible to be more exact. To avoid underestimating the probable impacts of expected development, this report assumes that 80 percent of the growth will take place in North/South Kohala. As a result, it may overestimate the extent of the secondary growth which will occur there.

Applying these factors to the employment estimates given in Table IV-10 results in the population projections shown in Table IV-12. These indicate that employment generated by the proposed resort projects and related secondary development could support an increase in the resident population of North/South Kohala of 8,000 by 1990 and 14,500 by 2005. Based on Hastings, Martin, Hallstrom and Chew, Ltd.'s (September 1980:32) estimate of labor force growth brought about by natural increase (see Table IV-13), at least 65 to 75 percent of this increase in the resident population would have to come from in-migration.

There are two ways of assessing the population impacts of the planned South Kohala resorts. As Table IV-13 shows, the projected "natural increase" of the North/South Kohala population is expected to be 5,000 by the year 2005. Counting these 5,000 persons as a population impact of the resorts assumes that if resort employment was not available, they would out-migrate rather than go on welfare and unemployment roles. However, if it is assumed that these 5,000 persons would remain in the area regardless of the presence or absence of job opportunities, then the year 2005 population impact in the North/South Kohala study area attributable to the planned resorts would be 9,500, or 5,000 less than the 14,500 projected under the first assumption.

Comparison of Projected Labor Force Requirements with Forecast Availability

In order to understand the implications of the labor force requirements described above, it is necessary to compare them with projections of labor force availability in the impact area and elsewhere on the Big Island. This has been done for this study by Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980), using a modified cohort-survival projection technique.

The cohort-survival technique is a population projection model which recognizes and incorporates three components of change. These components are: (1) change attributable to natural increase (i.e., the net effect of births minus deaths), (2) change attributable to non-economically induced net migration, and (3) change attributable to economically induced net migration. A comprehensive cohort-survival model measures each of the components on as detailed an age and sex basis as is possible and projects the combined effect of these components on a specified base population to a given future date.

For this analysis the 1970 Hawaii County population census delineation was carried forward in two five-year periods to 1980 using the comprehensive cohort-survival technique; the resulting estimates were then compared to preliminary 1980 census data. The overall County projections for this ten-year period are nearly identical to those contained in the State Tourism Study (Hawaii, State of, Department of Planning

Table IV-13. Population and Labor Force Estimates Based Upon Modified Cohort-survival Projection for Hawaii Island: 1980-2005.

Region	Population						Labor Force					
	Base Year (1980)(1)	Five-Year Projection (1985)	Ten-Year Projection (1990)	15-Year Projection (1995)	20-Year Projection (2000)	25-Year Projection (2005)	Base Year (1980)	Five-Year Projection (1985)	Ten-Year Projection (1990)	15-Year Projection (1995)	20-Year Projection (2000)	25-Year Projection (2005)
North and South Kohala Districts	7,800	8,800	9,900	10,900	11,900	12,800	3,400	3,800	4,300	4,700	5,100	5,500
North Kona District	13,800	15,500	17,400	19,200	21,000	22,600	6,300	7,100	7,900	8,600	9,500	10,200
South Kona District	5,900	6,500	7,300	8,100	8,900	9,600	2,500	2,900	3,100	3,500	3,800	4,100
West Hawaii Subtotal(2)	27,500	30,800	34,600	38,200	41,800	45,000	12,200	13,800	15,300	16,800	18,400	19,800
Hamakua and North Hilo Districts	6,800	7,500	8,300	9,100	9,800	10,300	2,800	3,100	3,500	3,800	4,100	4,300
South Hilo District	40,300	44,500	48,900	53,500	58,000	62,300	17,000	19,000	20,800	22,700	24,600	26,500
Puna District	11,700	13,200	14,900	16,500	18,100	19,500	5,200	5,800	6,500	7,200	7,900	8,500
Ka'u District	3,700	4,100	4,500	4,900	5,300	5,600	1,600	1,700	2,000	2,100	2,300	2,400
Hawaii County	90,000	100,100	111,200	122,200	133,000	142,700	38,800	43,400	48,100	52,600	57,300	61,500

(1) Preliminary 1980 census data, rounded to nearest 100 persons, August 1980. Final census count for Hawaii County could reach 92,000 persons.

(2) North and South Kohala and North and South Kona.

Source: Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980: 24).

and Economic Development, 1978); but adjustments were made to reflect the State's official II-F population forecast (Hawaii, State of, Department of Planning and Economic Development, March 1978) and the preliminary field counts from the 1980 census (Cavanaugh, 22 August 1980). Projections over the ten-year period were estimated at either individual or combined Big Island district levels. The result was an estimated age-and-sex population profile for the individual or combined district delineations, one of which corresponds to the North/South Kohala impact area.

For the 25-year projection period from 1980 to 2005 a modified cohort-survival technique was utilized. With the modified approach, only the natural increase and non-economically induced migration components are integrated into the projection. The third component of economically induced migration is omitted from the analysis. By making this adjustment it is possible to derive a rough estimate of what the change in population would be if the base population were to remain fixed in location and allowed to age naturally; non-economically induced migration, which in this analysis is represented by a positive net increase, is also treated as a natural, though exogenous, element. Deleting the economically induced migration component allows for an estimate of potentially available new labor force prior to such migration. Comparison of this potential labor force vis-a-vis the forecasted new employment needs yields an approximation of the direction and magnitude of likely economically induced migration.

Projections for various sub-regions of the Big Island, made using the modified cohort-survival approach, are presented in Table IV-13. These figures represent a 25-year aging of an immobile resident population. They indicate that the majority of growth (in absolute terms) would be focused in the existing major population centers, i.e., the South Hilo District of East Hawaii and the North Kona District in West Hawaii. It is estimated that South Hilo's population would increase from approximately 40,300 residents in 1980 to 48,900 in 1990 and to 62,300 by 2005 under this "natural aging" scenario. Using the same assumptions, North Kona's population is projected to increase from 13,800 in 1980 to 17,400 in 1990 and 22,600 in 2005.

Under the "natural aging" scenario the resident population in the North/South Kohala impact area is projected to increase from a 1980 base year estimate of 7,800, to 8,800 by 1985, 9,900 by 1990 and 12,800 by 2005 (see Table IV-13). Applying average Hawaii County age- and sex-specific labor force participation rates to the projected population profiles yields the estimates for potentially available additional labor force in the impact area shown in Table IV-14. Because the unemployment rate in the North/South Kohala study area is essentially the same as that for the island as a whole, it has been assumed that the proposed projects would not result in a significant reduction in the unemployment rate among current residents. If the opposite were assumed, (i.e., that new development would draw first and substantially from the ranks of the unemployed), then the projected labor force deficit for 1985 would be approximately 200 lower than shown in the table. A comparison of the labor force expected to be available from natural increase in the impact area with the estimated labor needs generated by planned economic development shows that there will be a need for significant in-migration during each five-year period in which resort expansion is underway. The magnitude of the migration necessary in each five-year period ranges from 1,030 to 1,700 workers. The labor force in the impact area in 2000 is estimated to be more than two times higher than it is today.

Table IV-14. Comparison of Estimated North/South Kohala Labor Force Needs Without the Mahukona Resort with Projections of the Available Work Force: 1985-2005.

	Estimated Cumulative Increase (in persons)				
	1985	1990	1995	2000	2005
Available Work Force Over 1980 Level[1]	400	900	1,300	1,700	2,100
Resort-Related Employment of N./S. Kohala Residents[2, 3]	1,430	3,630	5,560	7,070	6,600
Labor Force Surplus (Deficit)	(1,030)[4]	(2,730)	(4,260)	(5,370)	(4,500)
Surplus (Deficit)Arising During Five-Year Period	(1,030)	(1,700)	(1,530)	(1,110)	870

1 Calculated by subtracting the "Base Year (1980)" labor force in North and South Kohala from the projected labor force (see Table IV-13) for each future year (1985, 1990, etc.). In interpreting these figures, it is important to remember that they assume that all of the projected labor force increase is "available" for resort-related employment. To the extent that this is not the case, the projected labor force deficit would be higher.

2 Assumes that eighty percent of the needed work force (see Table IV-10) will reside in the North/South Kohala study area.

3 The number of additional jobs not related to resort employment that might occur in the North/South Kohala impact area was estimated at less than 150 by the year 2000. Because of the small size of this component, non-resort-related employment was not included in this table.

4 The present unemployment rate in the Kohalas is essentially the same as the islandwide average. Hence, we have assumed that the projected developments would not provide jobs for a significant number of those now unemployed, and this assumption is reflected in this figure.

Source: Hastings, Martin, Hallstrom and Chew, Ltd.; Belt, Collins & Associates.

Possible Sources of In-Migrating Labor Force

The source of the workers needed to make up the projected labor force deficit is a very important determinant of the projected resort developments' impact, but it is difficult to forecast with any accuracy. The modified cohort survival population and labor force projections, together with available information on potential sectors of economic growth, does indicate that some regions of the Big Island are likely to experience significant labor force surpluses in the coming years. This, in turn, suggests that persons from such areas would be in a position to move to areas with greater employment potential. It does not, of course, prove that workers who cannot find jobs in their present districts would choose to migrate to the Kohalas and/or accept resort-related employment.

The East Hawaii region stretching from Hamakua to Ka'u and centered around South Hilo appears to be such a possible labor surplus area. Based upon the modified cohort-survival projection, unabated "natural aging" would result in a resident population of 69,300 persons by 1985 and 76,600 persons by 1990. Corresponding labor force estimates total 29,600 persons and 32,800 persons by 1985 and 1990, respectively. Over this time period, East Hawaii's share of total Big Island employment is forecast by DPED to decline from approximately 72 percent in 1980 to 68 percent in 1985 and 63.5 percent in 1990. The declining capture rate reflects the relatively faster growth rate anticipated for West Hawaii (North Kohala to South Kona) as result of planned visitor industry growth. Utilizing the DPED's II-F employment forecast for the Big Island results in a total East Hawaii employment forecast of 27,700 jobs by 1985 and 29,000 jobs by 1990.

These figures indicate that the growth in the labor force will outpace the increase in job opportunities. Either high unemployment or out-migration is likely to result. With limited alternatives available to them, it is quite possible that a substantial portion of the out-migrants would be attracted to resort-related jobs in the Kohalas. At the same time, experience with other Neighbor Island areas that have experienced rapid, large-scale resort growth indicates that a sizeable portion of the necessary labor force will consist of persons now residing off the island.

WITH-MAHUKONA SCENARIO

Mahukona Resort Project Labor Force Requirements

Labor force requirements for the proposed Mahukona Resort project have been estimated using the phasing plan presented in Table II-1 and the employment factors derived in Appendix A. These projections, which are summarized in Table IV-15 indicate that the proposed development would generate approximately 1,265 new jobs by 1995. By 2005, when the resort is completed, it will have added a total of 2,165 new jobs.

Total Labor Force Requirements

Table IV-15 also combines the labor force requirements projected for the Mahukona Resort with those forecast for other planned developments to arrive at an estimate of the region's total labor force requirements. These figures show that by 2005, when all of the projects are expected to have been completed, the work force for the planned and proposed resorts will be over 10,000 persons. It is expected that 80 percent of this work force will reside in the North/South Kohala impact area.

Table IV-15. Projected Employment Due to Construction and Operation of the Proposed Mahukona Resort and Planned South Kohala Resort Facilities: 1985-2005.[1]

	1985			1990			1995			2000			2005		
	Cons.	Oper.	Total	Cons.	Oper.	Total	Cons.	Oper.	Total	Cons.	Oper.	Total	Cons.	Oper.	Total
Mahukona Resort[2]															
On-Site	--	--	--	120	420	540	185	875	1,060	260	1,330	1,590	0	1,805	1,805
Off-Site	--	--	--	20	85	105	30	175	205	40	265	305	0	360	360
Total	--	--	--	140	505	645	215	1,050	1,265	300	1,595	1,895	0	2,165	2,165
Other Projects[3]															
On-Site	350	1,150	1,500	595	3,210	3,805	595	5,220	5,815	510	6,880	7,390	0	6,880	6,880
Off-Site	60	230	290	90	640	730	90	1,045	1,135	75	1,375	1,450	0	1,375	1,375
Total	410	1,380	1,790	685	3,850	5,435	685	6,265	6,950	585	8,255	8,840	0	8,255	8,255
All Projects															
On-Site	350	1,150	1,500	715	3,630	4,345	780	6,095	6,875	770	8,210	8,980	0	8,685	8,685
Off-Site	60	230	290	110	725	835	120	1,220	1,340	115	1,640	1,755	0	1,735	1,735
Total	410	1,380	1,790	825	4,355	5,180	900	7,315	8,215	885	9,850	10,735	0	10,420	10,420
Mahukona Resort as % of all Development	0.0	0.0	0.0	17.0	11.6	12.5	23.9	14.4	15.4	33.9	16.2	17.7	0.0	20.8	20.8

1 All figures are for "persons employed" and take into account persons holding multiple jobs. Dates are as of January 1 of the year shown.

2 From Table 11, Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:22).

3 From Table IV-10.

Source: Compiled by Belt, Collins & Associates from sources referenced in footnotes above.

Table IV-15 also shows the Mahukona Resort's effect on employment as a percent of total employment increase in the study area. When measured in this light, it is apparent that the project's impact on employment is moderate, with it accounting for approximately one-fifth of the projected 2005 total for the impact area.

Expected Population Impact of the Proposed Mahukona Resort

Visitor Population. The visitor population that would be attracted to the North/South Kohala impact area by the Mahukona Resort was calculated using the factors derived in Appendix A and the development phasing plan shown in Table II-1. The results are summarized in Table IV-16; they indicate that the average visitor census for the years 1994 and 2004 (i.e., the mid-point and end-point of the proposed development) would be 1,750 and 3,800, respectively. During the busiest months, the average visitor census would be from 70 to 90 percent higher.

Combining the Mahukona Resort project with other planned resort development in the study area, it appears that the average visitor population in the North/South Kohala impact area would rise to about 11,000 by the beginning of 1995 and to over 16,000 by 2005. By 2005, it is expected that as many as 28,000 visitors might be in the impact area at one time during the peak month. The proposed Mahukona Resort would account for about one-quarter of these.

Resident Population. As shown in Appendix A, calculations indicate that there would be a 2.2-person population increase for each additional person employed. Applying this factor to the employment estimates given in Table IV-15 and assuming that 80 percent of the population generated by the employment opportunities would reside within the North/South Kohala study area results in the resident population and household growth projections shown in Table IV-17. These projections suggest that employment generated directly and indirectly by the proposed Mahukona Resort could support a resident population of 2,800 persons by 1995 and 4,750 persons by 2005. Eighty percent of these, i.e., 2,250 in 1995 and 3,800 in 2005, would probably reside within the North/South Kohala impact area. This amounts to 15 percent of the projected impact area total of 14,500 for 1995 and 20 percent of the projected impact area total of 18,300 for 2005. The number of additional households contributed by the Mahukona Resort in those same years would be the same proportion of the regional total or about 750 and 1,250, respectively.

The population impact of the with-Mahukona scenario can be viewed in two ways. All of the 18,300 people supported by the planned and proposed resorts in the year 2005 could be attributed to these developments. On the other hand, if it is assumed that the 5,000-person "natural increase" that has been projected (see Table IV-13) would remain in the area whether or not these resort job opportunities exist, then only 13,300 persons should be counted as the year 2005 population impact of the planned and proposed resorts.

Comparison of Projected Labor Force Requirements With Forecast Availability

The available labor force resulting from natural increase would be the same under the with-Mahukona scenario as it would be under the without-Mahukona scenario (refer to Table IV-13). The labor force requirements would, of course, be greater as a result of the addition of the proposed Mahukona Resort to the other planned developments (see Table IV-18) and this would result in a further increase in the labor force deficit. The projected North/South Kohala labor force deficit by 1990, for example, would rise from 2,750 without the Mahukona Resort, to 3,250 with it. The deficit in the year 2000 would increase from 5,350 to 6,850.

Table IV-16. Estimated Visitor Population Resulting From the Proposed Mahukona Resort and Planned South Kohala Resort Development: 1995-2005.[1]

	Visitors Present					
	1995		2000		2005	
	Average	Peak	Average	Peak	Average	Peak
Mahukona Resort[2]						
Resort Hotels	1,200	1,600	1,500	2,050	1,900	2,550
Resort Condominiums	450	1,100	950	2,300	1,600	3,850
Resort-Residential[4]	100	300	200	500	300	750
Subtotal	1,750	3,000	2,650	4,850	3,800	7,150
Other Planned Development[3]						
Resort Hotels	6,700	9,050	8,850	12,000	8,850	12,000
Resort Condominiums	2,800	6,750	3,750	9,000	3,750	9,000
Resort Residential[4]	0	0	0	0	0	0
Subtotal	9,500	15,800	12,600	21,000	12,600	21,000
All Development						
Resort Hotels	7,900	10,650	10,350	14,050	10,750	14,550
Resort Condominiums	3,250	7,850	4,700	11,300	5,350	12,850
Resort Residential[4]	100	300	200	500	300	750
Total	11,250	18,800	15,250	25,850	16,400	28,150
Mahukona Resort as % of All Development	15.6	16.0	17.4	18.8	23.2	25.4

1 All figures are based on units completed as of December 31 of the preceding year.

2 Based on factors developed in Appendix A (see Table A-2) and development phasing plan contained in Table II-1. Rounded to nearest fifty (50).

3 From Table IV-11.

4 The proposed single-family units in this category are assumed to be rented out to visitors. If they were to be occupied instead by permanent residents, their contribution to the visitor population would be lessened.

Source: Compiled by Belt, Collins & Associates from sources referenced in footnotes above.

Table IV-17. Estimated Additional North/South Kohala Resident Population Supported by the Proposed Mahukona Resort and Planned South Kohala Resort Development: 1985-2005.[1]

	Estimated Cumulative Increase (in persons except as noted)				
	1985	1990	1995	2000	2005
Mahukona Resort[2]					
Additional Resident Population	—	1,150	2,250	3,350	3,800
Additional Resident Households	—	400	750	1,100	1,250
Growth (Decline) in No. of Persons Over Preceding 5 Years	—	1,150	1,100	1,100	450
Other Planned Resorts[3]					
Additional Resident Population	3,150	8,000	12,250	15,550	14,500
Additional Resident Households	1,050	2,650	4,100	5,200	4,850
Growth (Decline) in No. of Persons Over Preceding 5 Years	3,150	4,850	4,250	3,300	(1,050)
All Development					
Additional Resident Population	3,150	9,150	14,500	18,900	18,300
Additional Resident Households	1,050	3,050	4,850	6,300	6,100
Growth (Decline) in No. of Persons Over Preceding 5 Years	3,150	6,000	5,350	4,400	(600)
Mahukona Resort as % of all Development	0.0	12.6	15.5	17.7	20.8

1 All figures are rounded to the nearest fifty (50).

2 Based on employment estimates given in Table IV-15 times 2.2 persons per worker (factor derived in Appendix A) and assumption that 80 percent reside within the North/South Kohala study area.

3 From Table IV-12.

Source: Compiled by Belt, Collins & Associates from sources referenced in footnotes above.

Table IV-18. Comparison of Estimated North/South Kohala Labor Force Needs With the Proposed Mahukona Resort with Projections of the Available Work Force: 1985-2005.[1]

	Estimated Cumulative Increase (in persons)				
	1985	1990	1995	2000	2005
Available Work Force Over 1980 Level [2]	400	900	1,300	1,700	2,100
Employment of North/South Kohala Residents Not Related to the Mahukona Resort [2]	1,450	3,650	5,550	7,050	6,600
Employment of North/South Kohala Residents Resulting from the Mahukona Resort [3]	—	500	1,000	1,500	1,750
Total Employment	1,450	4,150	6,550	8,550	8,350
Labor Force Surplus (Deficit)	(1,050)[4]	(3,250)	(5,250)	(6,850)	(6,250)
Projected Surplus (Deficit) Arising During Five-Year Period	(1,050)	(2,200)	(2,000)	(1,600)	600

1 All figures are rounded to the nearest fifty (50).

2 From Table IV-14. In interpreting these figures, it is important to remember that they assume that all of the projected labor force increase is "available" for resort-related employment. To the extent that this is not the case, the projected labor force deficit will be higher.

3 Based on employment estimates given in Table IV-15 and the assumption that 80 percent of the needed work force will reside within the North/South Kohala study area.

4 The present unemployment rate in the Kohalas is essentially the same as the islandwide average. Hence, we have assumed that the projected developments would not provide jobs for a significant number of those now unemployed, and this assumption is reflected in this figure.

Source: Compiled by Belt, Collins & Associates from sources referenced in footnotes above.

IMPACTS ON HOUSING

INTRODUCTION

The employment-related population increase that will accompany implementation both of planned resort projects in South Kohala and of the proposed Mahukona Resort project will greatly increase the demand for housing within the study area. This section discusses the magnitude of the expected increase in the number of housing units that are needed and explores some of the more important implications of this increase.

DEMAND FOR ADDITIONAL HOUSING

In 1970, there were a total of 1,739 dwelling units in Kohala (793 in South Kohala and 946 in North Kohala). By 1976, the total had jumped over fifty percent to 2,654. Most of the increase (816 or 90 percent) was in South Kohala. Based on preliminary population estimates from the 1980 census and other data, it is estimated that in 1980 there were approximately 1,700 dwelling units in South Kohala and 1,100 dwelling units in North Kohala, a total of 2,800 for the entire study area.

The number of additional households that would reside in Kohala with and without the proposed Mahukona Resort has already been calculated (see Tables IV-17 and IV-12, respectively). Table IV-19 translates these figures into housing demand estimates for the next 25 years.

Based on the assumptions that have been used, it appears that (assuming supply keeps pace with demand) the number of housing units in the study area would rise by 5,100 from approximately 2,800 at present to nearly 8,000 in 2005 as a result of already planned resort development. This is an increase of over 180 percent, or 4.2 percent per year compounded annually. If the proposed Mahukona Resort is constructed as well, 6,400 additional housing units would be needed between 1980 and 2005. (These figures do not include replacement housing which would also be needed). This amounts to an increase in the housing stock of over 225 percent in 25 years (4.9 percent/year compounded annually).

A comparison of the construction rates necessary to achieve such an increase in the housing stock with the rates that have prevailed on the Big Island in recent years is instructive (see Table IV-20). Between 1970 and 1976, the number of housing units in North Kohala increased an average of 15 per year; during the same period the number of residential units in South Kohala rose an average of 120 per year. The average annual increase for the entire study area was 135, which is about double the approximately 70 units per year that would be needed as a result of the proposed Mahukona Resort. However, when the needs of the Mahukona Resort are combined with the demand for additional residential units generated by already-planned resort development, the average annual demand increases to the 300 to 400 range, two to three times the current level. As a basis for comparison, this is about the same as the construction rate recorded in the North Kona District during the highly active 1970-1976 period.

Achieving such a growth rate will not be simple. First of all, it will require a substantial expansion of the construction labor force that is available and of the construction equipment as well. When it is realized that the residential construction

Table IV-19. Projected Additional Housing Demand in North/South Kohala Study Area.[1]

	1985	1990	1995	2000	2005
Planned South Kohala Resorts					
Cumulative Increase in Resident Households [2]	1,050	2,650	4,100	5,200	4,850
Cumulative Increase in Housing Units [3]	1,100	2,800	4,300	5,450	5,100
Change Over Preceding 5 Yrs.	+1,100	+1,700	+1,500	+1,150	-350
Average Annual Change Over Preceding 5 Yrs.	+220	+350	+300	+230	-70
Proposed Mahukona Resort					
Cumulative Increase in Resident Households [4]	--	400	750	1,100	1,250
Cumulative Increase in Housing Units [3]	--	420	800	1,150	1,300
Change Over Preceding 5 Yrs.	--	+420	+380	+350	+150
Average Annual Change Over Preceding 5 Yrs.	--	+85	+75	+70	+30
All Planned + Proposed Development					
Cumulative Increase in Resident Households [4]	1,050	3,050	4,850	6,300	6,100
Cumulative Increase in Housing Units [3]	1,100	3,200	5,100	6,600	6,400
Change Over Preceding 5 Yrs.	+1,100	+2,100	+1,900	+1,500	-200
Average Annual Change Over Preceding 5 Yrs.	+220	+420	+380	+300	-40

1 Estimate of housing units present in North and South Kohala in 1980 is 2,800. This is based on preliminary 1980 Census population estimates and Hawaii County Department of Research and Development (1979) data.

2 From Table IV-12.

3 Assumes five percent vacancy rate.

4 From Table IV-17.

Source: Compiled by Belt, Collins & Associates from sources noted above.

Table IV-20. Housing Construction for Selected Areas of Hawaii County: April 1970 to December 1976.

District	No. of Housing Units		Change in Units	
	April 1970	December 1976	1970-1976	Avg. Annual
North Kohala	946	1,045	+99	+15
South Kohala	793	1,609	+816	+120
North Kona	1,977	4,451	+2,474	+365
County Total	18,933	27,943	+9,010	+1,335

Source: County of Hawaii Planning Department as reported in Hawaii, County of, Department of Research and Development (1979).

will have to compete with the resorts themselves for limited resources, it is evident that the possibility of construction delays for low-priority projects will be significant.

Expansion of the residential housing stock will consume significant amounts of raw land. The exact amount is, of course, dependent upon the densities that are achieved, a number that is difficult to predict, but a few calculations are sufficient to provide an order-of-magnitude estimate that is sufficient for our purposes.

From Table IV-19 we know that the planned South Kohala resorts and the proposed Mahukona Resort will generate a need for 5,100 housing units and 1,300 housing units, respectively, by the year 2005, a total increase of 6,400 over the 25-year period. As of December 1976, all of the housing in North Kohala were either single-family detached units or duplexes; in South Kohala, only 18 percent of the 1,600 units were multi-family. At the other extreme (for Hawaii County) one-third of the units in the North Kona District of the island were in multi-family structures. Average densities for future single-family development in the Kohalas will probably be on the order of three to four units per gross acre; for low-rise multi-family units, it will probably be on the order of eight to twelve units per gross acre. Combining these figures gives the range of estimates for land requirements shown in Table IV-21. These range from a minimum of 1,360 acres if densities approximate those achieved in the North Kona district during the 1970-1976 period to a maximum of over 1,800 acres if the densities are those observed in North Kohala during the same period.

A recent inventory of vacant State Urban-designated land in the study area (Belt, Collins & Associates, September 1980) indicates that there is relatively little vacant land in North Kohala which is zoned by both the State and County for urban use (see Table IV-22). Of the 90-some acres in the Hawi-Kapa'au area that have the appropriate zoning, approximately 25 are within the Hawaii Housing Authority (HHA) Kahei Houselots development and another 15 or so have serious physical constraints on development. The remainder are scattered along the fringes of the urban district.

There is a considerable amount of vacant land in South Kohala that is in the State Urban District. The vast majority of this is situated in Waikoloa Village, but land is also available in Kawaihae, Puako, and Waimea. However, most of the State Urban District land in these three communities does not have County urban zoning or is not zoned for residential use.

A comparison of the projected additional demand for land shown in Table IV-21 with the zoning data presented in Tables IV-22 and IV-23 indicates that, either Waikoloa will have to absorb the great bulk of the expected population increase or large-scale rezoning will be necessary. (The implications of this are discussed elsewhere in this chapter and in Chapter VI.) This conclusion leads to another aspect of the housing situation--housing costs.

HOUSING COSTS

Introduction

As evidenced by Kohala residents' responses to a household survey conducted by the Public Affairs Advisory Service (PAAS) in 1980, housing, (the shortage and high price of housing--as well as the possibility that further resort development in the region might make the situation even worse in the future), is a major concern of area residents. (See, for example, the survey results summarized in Table IV-38 of this

Table IV-21. Range of Estimates for Amount of Additional Land Required for Housing in North/South Kohala Assuming Different Single-Family (SF) to Multi-Family (MF) Unit Ratios.

Assuming SF:MF Ratio of New Residential Construction Is the Same as:	SF:MF	No. of Units		Land Required (in acres)[1]		
		SF	MF	SF	MF	Total
North Kohala:1976	100:0	6,400	0	1,830	0	1,830
N. & S. Kohala:1976	89:11	5,700	700	1,630	70	1,700
Hawaii Island:1976	84:16	5,380	1,020	1,540	100	1,640
S. Kohala:1976	82:18	5,250	1,150	1,500	115	1,615
N. & S. Kohala Additions: 1970-76	75:25	4,800	1,600	1,370	160	1,530
N. Kona:1976	66:34	4,220	2,180	1,205	220	1,425
N. Kona Additions: 1970-76	61:39	3,900	2,500	1,110	250	1,360

1 Density assumptions are 3 units/acre for single-family and 10 units/acre for multi-family.

Source: Compiled by Belt, Collins & Associates based on data contained in Hawaii, County of, Department of Research and Development (September 1979:229).

Table IV-22. Estimate of Major Parcels of Vacant Urban-Zoned Land in North/South Kohala Districts.

Geographical Area	Approximate Area (in acres) of Vacant State Urban District Land in Parcels of at Least Three Acres					
	Total	County Urban Zoning			County Ag Zoning	County Unplanned Zoning
		SF	MF	Other		
Hawi-Kapa'au	145	92	--	--	53	--
Waimea	239	49	--	45	145	--
Waikoloa	2,575	2,130	337	108	--	--
Kawaihae Harbor	437	--	15	210	72	140
Kawaihae Village	361	--	23	--	338	--

Source: Belt, Collins & Associates.

Table IV-23. County Urban Zoning Classification by Zone and Section in North and South Kohala Districts: 1978.

North Kohala	Tax Zone +Section	Zoning Designation (in acres) Resid.	MF Resid.	Resort	Busin.	Indust.	Total Urban
Niuli'i	5:2	85.7	--	--	0.4	--	86.1
Hala'ula	5:3	82.5	--	--	0.7	56.5	139.7
Kapa'au	5:4	209.8	--	--	11.5	--	221.3
Hawi	5:5	180.7	--	--	12.6	2.9	196.2
ALL North Kohala =		558.7	--	--	25.2	59.4	643.3
South Kohala							
Kawaihae Harbor	6:1	--	23.7	--	24.0	217.4	265.1
Kawaihae Village/ MKBH	6:2	216.9	57.6	23.3	--	--	297.8
East Waimea	6:4	118.6	--	--	20.2	--	138.8
Central Waimea	6:5	163.0	--	13.3	96.0	--	272.3
W. Waimea/N. Puako	6:6	192.1	12.2	30.7	15.9	--	250.9
S. Waimea	6:7	45.5	--	--	18.7	6.0	70.2
Waikoloa	6:8	2,244.7	364.3		108.0		2,717.0
WBR/Mauna Lani Resort/Puako	6:9	59.8	277.5	216.3	48.3	4.6	606.5
ALL South Kohala =		3,040.6	735.3	283.6	331.1	228.0	4,618.6
Total North/South Kohala		3,599.3	735.3	283.6	356.3	287.4	5,261.9
North Kohala as % of Total		15.5	0.0	0.0	7.6	20.7	12.2

Source: Hawaii, County of, Department of Research and Development (Sept. 1979:80).

report.) This section explores some of the implications that the proposed Mahukona Resort has for the housing market in the study area.

General Considerations

At any point in time, the sales/rental cost of existing housing units in a particular geographic area is a function of the balance between two factors:

- The effective demand, i.e., the amount of money that the population is willing and able to spend on housing itself. This, in turn, is determined by the number and income/wealth of households residing (or wishing to reside in) the area.

- The existing supply, i.e., the number, type, and quality of units that owners are willing to make available under the prevailing market conditions.

A third factor, the relative difficulty and cost of constructing and marketing new units comes into play over the long-term since it determines whether or not an increase in the effective demand will result in the construction of new (i.e., additional) housing units or will simply produce a rise in prices. If the additional families have the financial ability to pay for housing given the prevailing construction costs, if sufficient vacant land suitable for development is present, if financing is available, and if required government approvals are granted, one would expect that housing will be developed (i.e., the supply expanded) sufficiently to accommodate the higher population. If, on the other hand, wages in the area are so low relative to prevailing construction costs that new housing is too expensive, if the amount of vacant developable land is severely constrained, if financing is unavailable or too expensive, or if public approvals are not readily available, then increased demand for housing such as would be generated by the planned South Kohala resorts and/or the proposed Mahukona Resort may be expected to produce a sharp increase in housing prices. The result will be increased crowding as families double-up, longer commuting times as employees try to find less costly housing in adjoining areas, and, quite possibly, a labor shortage.

It should be noted that the burden of these impacts will not fall evenly. Existing residents who own their own homes will be largely insulated from the cost impacts, although they will be faced with increased property taxes, a burden that can be particularly onerous to older families living on fixed incomes. Renters, or at least those renters whose landlords have as their primary objective the maximization of return on investment, will face increased housing costs almost immediately. Finally, effects on the children of present homeowners will be mixed; these persons stand to benefit in the long run from the increase value of their parents' estate, but, they, like everyone else, must confront higher prices in the meantime.

Supply/Demand Relationships

The population projections developed earlier in this chapter make it clear that a very significant increase in the number of housing units in the North/South Kohala study area will need to occur if the planned and proposed resort developments are implemented. In a market with increasing demand, the cost of constructing, marketing, and financing new residential construction determines the minimum possible cost of housing. So long as builders are able to undertake new projects with a reasonable expectation that they can be sold for enough to cover expenses plus profit, they will continue to develop additional residential units (assuming land and necessary

government approvals are available). If their costs are so high that the selling price they would need to ask would place them beyond the financial reach of potential buyers, they will not initiate further development and the number of units will remain steady. The selling price of existing units will rise to the point where the effective demand (i.e., demand backed by money) equals the supply.

As a very rough estimate, minimum construction costs for low-rise, moderate-density housing units are on the order of $40 per square foot, and site acquisition and development costs on relatively low-priced land are on the order of $10,000 to $15,000 per unit. At this rate (and allowing for a low profit of 10 percent), , the minimum cost of developing a smallish two- or three- bedroom unit (say 1,000 to 1,200 square feet) is on the order of $55,000 to $70,000. The cost could easily be 40 percent higher (i.e., $75,000 to $100,000) if additional infrastructure (e.g., water and sewer systems) have to be constructed by the developer or if the units are anything besides the bare minimum.

Assuming a mortgage rate of 13.5 percent, a 30-year term, a 20-percent down payment, and 20 percent of the monthly payment allocated to insurance, taxes, and additional expenses other than principal and interest, monthly payments for the purchase of such a minimum home would be on the order of $650 to $800 per month; with a 10 percent down payment they would be $700 to $900 per month.

Present visitor industry wages average about $10,000 per year, and the great majority of jobs pay less than $15,000 per year. With an average of 1.45 workers per household, average household income for families with both persons employed in the visitor industry would be less than $15,000 per year, too little to break into the housing market if we assume that mortgage payments cannot exceed 35 percent of income (i.e., about $440 per month). In fact, households would have to earn nearly 50 percent above the visitor industry average in order to afford the least expensive monthly payment postulated above. For a $70,000 unit and 10 percent down payment, the monthly mortgage would be about $900 per month. To afford this, an annual household income of over $30,000 would be necessary or twice the visitor industry average.

> [Note: It must be emphasized that these figures are for discussion purposes only. So many factors bear on the equation that it is difficult to generalize. However, the basic point remains clear, even under the best of situations it will not be easy to expand the housing supply to accommodate the households needed to supply the resort labor force while keeping those units in an affordable price range unless governmental assistance is made available on a fairly large scale. This possibility is discussed under the heading of "Mitigation Measures".]

This conclusion is based on present income/construction cost relationships and on prevailing interest rates on conventional home mortgages. Since it would be altered if incomes were to rise more rapidly than construction costs, historic data on income and costs were examined for this study. Relevant time-series data on several income and cost indicators are presented in Table IV-24. They indicate that housing costs have increased at a faster rate than income since 1974, a trend which seems likely to continue and which means it has become increasingly difficult for families to enter the housing market. It should be noted that the data shown reflects only a small portion of the rapid escalation in financing costs that has occurred over the past two years. The jump in typical home mortgage interest rates from 9 percent in 1978 to 13.5 percent or more today has had the effect of increasing monthly mortgage payments by over 40 percent. In terms of its impact on the housing market, this is even worse than if

Table IV-24. Select Income and Cost Indices.

	INCOME INDICES					COST OF LIVING/HOUSING INDICES					
	Per Capita Income[1]			Per Capita Disposable Income		Consumer Price Index[2]		4-Person Family Intermediate Budget[4]		Single-Family Residences Construction Cost Index[5]	
		Hawaii County									
Year	State($)	$	% Increase	$	% Change	Index	% Increase	$	% Increase	Index No.	% Increase
1966	3,192	2,756	12.1	2,729	--	97.3	--	11,190	--	95.6	4.6
1967	3,447	2,960	10.7	2,938	7.7	100.0	2.8	10,902	(3.6)	100.0	4.6
1968	3,796	3,113	5.2	3,188	8.5	103.8	3.8	n.a.	--	106.7	6.7
1969	4,170	3,285	5.5	3,457	8.4	108.5	4.5	12,118	5.6	115.2	8.0
1970	4,599	3,785	15.2	3,798	9.9	114.2	5.3	12,776	5.4	118.0	2.4
1971	4,785	3,836	1.3	4,013	5.7	118.9	4.7	13,108	2.6	125.7	6.5
1972	5,078	4,103	7.0	4,177	4.1	122.8	3.3	13,617	3.9	135.2	7.6
1973	5,529	4,506	9.8	4,602	10.2	128.3	4.5	14,937	9.7	154.7	14.4
1974	6,130	5,138	14.0	5,088	10.6	141.9	10.6	17.019	13.9	164.6	6.4
1975	6,711	5,678	10.7	5,797	13.9	155.0	9.2	18,694	9.8	175.7	6.7
1976	7,134	5,758	1.2	6,114	5.5	162.8	5.0	19.633	5.0	193.9	10.4
1977	7,669	6,126	6.4	6,553	7.2	171.0	5.0	20,883	6.4	221.2	14.1
1978	8,465	6,687	9.2	7,152	9.1	181.1[3]	7.7	23,099	10.6	243.4	10.0
1979	n.a.	n.a.	n.a.	7,718	7.9	204.6	11.1	25,799	11.1	266.2	9.4
1980	n.a.	n.a.	n.a.	n.a.	n.a.	227.5	11.2	n.a.	n.a.	n.a.	n.a.
Average Annual Increase (%):											
1966 - Most Recent			7.7		8.3		6.3		6.6		8.2
1966 - 1974			8.1		8.1		4.8		5.4		7.0
1974 - Most Recent			6.8		7.4		8.2		8.7		10.1

1 1966-1968 figures from State of Hawaii Data Book, 1977; 1969-1978 figures from State of Hawaii Date Book, 1980.

2 State of Hawaii Data Book, 1980:275-6.

3 Revised Index beginnng in 1978.

4 State of Hawaii Data Book, 1980:284.

5 Hawaii County Data Book, 1979:227.

Source: Compiled by Belt, Collins & Associates from sources noted above.

housing prices had increased by that amount because its full impact is felt not only by persons entering the housing market, but by present homeowners who are changing their residences as well. In view of these factors, it appears as though new housing may be increasingly costly (both absolutely and relative to income) in the coming years rather than less so.

Thus far we have discussed what would happen to housing costs in the most favorable situation, i.e., where new housing is constructed in sufficient quantity to meet the expected demand. If this does not occur, i.e., if increased population is not accompanied by an equivalent increase in new construction, the higher demand will tend to force prices up, individuals and families will "double-up", some of the population growth we have projected for the North/South Kohala study area may occur in other, lower-priced areas instead, or the necessary labor force may not materialize. It is this last possibility that makes potential housing shortages largely self-correcting: if satisfactory housing is not available within the price range of prospective employees, they will be forced to out-migrate (in the case of natural increase) or prevented from migrating into the region. If this occurs, resorts will find it impossible to staff their full development scheme and, as a consequence, will either cut back on their construction plans or increase the wages they pay. A decrease in construction will reduce the number of jobs, the extent of the population increase, and the demand for housing. An increase in wages will make it possible for employees to secure the housing that they could not afford at present salary levels. This self-correcting tendency is so reliable that if it were not for the fact that it is effective only for existing owners (and their heirs) and that it does not account for the needs of additional residents generated by natural increase (i.e., the excess of births over deaths), it would prevent any problems.

In the case of the North/South Kohala impact area, a relatively large percentage of the present residents own their own homes. In fact, the 71-percent home ownership rate reported in the 1975 OEO Census Update Survey makes it among the highest districts in the County in that respect. South Kohala's reported rate of 55 percent was considerably lower, but has probably increased somewhat since then as a result of new construction. Except for possible increases in property taxes, these homeowners will benefit from any increase in home values that may occur.

Renters are in a much more vulnerable position than are owners. Many of the small percentage of North Kohala's present residents who rent their homes have relatively stable, long-term agreements with their landlords. It is not expected that rents paid by these persons would increase sharply even if demand outstrips supply. Hence, only the relatively small number of renters who have short-term agreements are likely to be seriously affected. In South Kohala, where the proportion of renters is much larger and most tenant/landlord relationships more recent and commercial, rents may be expected to increase more sharply. Again, the precise amount of increase will depend upon a great many factors that cannot be determined at this time, but (with one possible mitigating circumstance we will discuss in a moment) will be at least as great as the increase in construction costs.

The potential mitigating factor referred to in the preceding paragraph has to do with possible residential use of resort condominiums. Condominium rental rates originally bore a strong relationship to the sales price of units, i.e., they were set such that income from rentals provided a reasonable return on the owner's investments. As condominium sales prices have climbed in recent years, it has become nearly impossible for owners to recover their costs through rents, most persons in the rental market simply cannot afford to pay $500 per month for a studio apartment, the

amount that would be required to cover mortgage payments on a $45,000 to $50,000 unit. Despite this, the market for such units has remained moderately strong. The explanation lies in the fact that investors have switched their emphasis from rental income to capital appreciation. Thus, highly leveraged investors find it advantageous to accept a negative cash flow for a number of years (which can have tax advantages) in return for a large capital gain when the appreciated unit is sold. While the overall social benefits of this process are sometimes questioned, its net result is that housing is built and rented at below apparent cost, a kind of private rental subsidy program. In the long run, of course, the investor expects to recover the subsidy (and some profit as well) in the form of capital gains when the unit is sold.

Mitigation Measures

The effect that additional resort development in the North/South Kohala study area would have on housing cost and availability in the North/South Kohala study area can be minimized in a number of ways. The first and most obvious is to see that sufficient land with appropriate residential zoning is made available to those who are committed to developing moderate-cost sale and rental units. This will eliminate premiums that might otherwise be extracted by the landowners who control the present limited inventory of such land. At the same time, however, it would imply a possible lessening of the County's ability to influence development patterns. Clearly, an "anything is o.k. anywhere" policy is inadvisable, despite the fact that it would tend to minimize the land cost factor. However, it is important to recognize that any restrictions on land use tend to limit the supply of developable land and, in the face of increased demand, to increase the price of land that is developed.

Another means of lessening the impact of resort growth on housing costs is to insist that resort developers also act as low- and moderate-cost housing developers, or arrange for others to do so. This can help insure an adequate flow of venture capital even if more lucrative investments are available elsewhere. The problem, of course, is in determining how many units should be constructed by each resort developer, where they should be located, and what their timing should be relative to the primary employment generators which they are intended to support. Unfortunately, there is no simple or straightforward answer to these questions.

The fact is that, one way or another, free-market mechanisms exist that insure that there will be a "solution" to the employee housing "problem." If sufficient housing that is affordable by employees is not available, resorts will be unable to staff their operations and will not expand as now planned. This, in turn, will decrease the need for new housing. Based on experience elsewhere with areas that have economics based largely on a visitor industry, what typically occurs is the development of a labor force made up of a disproportionate number of young, transient, one- and two-person households who have a higher than average number of workers per household and, because they have relatively few children and/or accept a rather communal style of living, have lower than average expenses. The community they form typically has a high turnover among its members. These characteristics allow the workers to survive in a situation where a more typical work force could not.

Another means of limiting housing cost impacts of the projected resort growth is to relax County development standards with respect to such things as roadway cross-sections, utilities, and lot sizes. There is a relationship between the stringency of these standards and the cost to developers. Relaxing them, as was done, for example, in the Pa'ala'akai development in Hale'iwa, Oahu, can result in markedly lower construction costs without a concomitant decrease in the usefulness or desirability of the housing product.

Finally, utilization of available governmental housing assistance programs can drastically lower borrowing costs and, therefore, the monthly mortgage payments that are required. Being able to finance a purchase with a "Hula Mae" loan at 9.5 percent annual interest rather than a conventional mortgage loan at a 13.5 percent interest rate would reduce the monthly payments by a quarter. Other innovative financing arrangements such as graduated payment mortgages, the Hawaii Housing Authority's Opportunity Allowance Program, and interest-only mortgages, as well as tax measures could also be used to lower housing costs below what they might be on the open market. It should be noted, however, that none of these programs is without hidden costs. In the case of Hula Mae, the cost is to other borrowers who must compete against the State for the limited available capital. In the case of tax measures, the cost falls on other taxpayers who must make up the revenues needed to operate the government.

IMPACT ON INCOME AND RETAIL SPENDING

Economic activity generated by resort development now planned for South Kohala will have a major effect on personal income and retail spending in the North/South Kohala study area. The proposed Mahukona Resort would result in an even greater increase.

INCOME

Table IV-25 contains data on average 1978 wage rates by employment category for Hawaii County. It indicates that the average wage paid hotel workers was $8,580 per year; this average takes into account both full-time and part-time/casual employment. The average annual wage for all non-hotel service employment was $8,624. For this analysis it was assumed that all employment generated by the planned and proposed resort developments would fall into one or another of these two wage categories. More specifically, all on-site resort employment was taken to be hotel-related at a rate of $8,580 per year and all indirectly generated off-site employment is assumed to be non-hotel, service-oriented at a rate of $8,624 per year. (Note that all figures used in this analysis are in terms of 1978 dollars.) "Hotel" employment is, in fact, only a portion of the on-site employment that would be generated, and many of the off-site jobs would be outside the service sector. Since only the retail trade sector had a lower wage rate than the service industries, it is almost certain that our estimate is conservative, i.e., tends to underestimate the income that would be generated.

Applying the average annual wage rates shown in Table IV-25 to the employment projections presented previously in Tables IV-15 gives the income estimates summarized in Table IV-26. They indicate that already-planned resort development is expected to boost personal income by over $70 million (in 1978 $) by 2005. The proposed Mahukona Resort would raise this a further $19 million to a total of $89.5 million. Eighty percent of this figure would go to residents of the North/South Kohala study area.

RETAIL SPENDING

For a relatively rural area such as North/South Kohala, actual retail spending is expected to amount to approximately 35 percent of gross income (Hastings, Martin, Hallstrom and Chew, Ltd., September 1980:37). However, a large amount of leakage in the form of retail spending outside of the impact area is expected to occur. There should be a significant impact on established retail centers located in Kailua-Kona, Waimea, Hilo, and off-island (primarily Honolulu). The resident retail expenditures anticipated to be retained within the impact area will probably be those purchases related to convenience items such as groceries and other selected non-durable goods. Since these retail expenditures typically represent about 20 percent of gross income (Hastings, Martin, Hallstrom and Chew, Ltd., September 1980:38), resident retail spending within the impact area is expected to be closer to that figure. Retail expenditure estimates based on these figures are also summarized in Table IV-26.

As can be seen from Table IV-26, retail spending under the without-Mahukona scenario is expected to rise by about $8 million by 1990 and $14 million in 2005 as a result of already-planned development. The proposed Mahukona Resort would boost this by about $1 million (12 percent) in 1990 and $3.7 million (25 percent) by 2005. With a ratio of about one square foot of retail space per $130 of gross annual sales, by 2005 the proposed Mahukona Resort is expected to add nearly 30,000 square feet to the 109,000 square feet of off-site convenience retail space that would be generated by already planned Kohala resorts. It is expected that 80 percent of this retail

Table IV-25. Average Wages by Industry in Hawaii County: 1978. [1]

Industry	Average Annual Wage
Agriculture, Forestry, Fisheries	$10,233
Mining and Contract Construction	14,803
Manufacturing	12,952
Transportation	13,699
Communication and Utilities	17,631
Wholesale Trade	10,506
Retail Trade	7,390
Finance, Insurance, Real Estate	10,191
Services	
Hotels, Rooming Houses, etc.	8,580
Non-Hotel	8,624
Government	
Federal	N.A.
State	13,785
County	10,875

[1] Includes only workers covered by the Hawaii Employment Security Law and Unemployment Compensation for Federal employees.

Source: State Department of Labor and Industrial Relations, 1978 Employment and Payrolls in Hawaii.

Table IV-26. Resident Income and Retail Spending Impact of Projected Development With and Without the Proposed Mahukona Resort: 1990-2005.

	1990			2000			2005		
INCOME PROJECTIONS[1]	S. Kohala Resorts	Mahukona Resort	Total	S. Kohala Resorts	Mahukona Resort	Total	S. Kohala Resorts	Mahukona Resort	Total
Operations-Related Employment									
No. Persons Employed On-Site	3,210	420	3,630	6,880	1,330	8,210	6,880	1,805	8,685
Estimated Annual Income	27.5	3.6	31.1	59.0	11.4	70.4	59.0	15.5	74.5
No. Persons Employed Off-Site	640	85	725	1,375	265	1,640	1,375	360	1,735
Estimated Annual Income	5.5	0.7	6.2	11.9	2.3	14.2	11.9	3.1	15.0
Construction-Related Employment									
No. Persons Employed On-Site	595	120	715	510	260	770	0	0	0
Estimated Annual Income	8.3	1.7	10.0	7.1	3.6	10.8	0	0	0
No. Persons Employed Off-Site	90	20	110	75	40	115	0	0	0
Estimated Annual Income	0.8	0.2	1.0	0.6	0.3	0.9	0	0	0
Total Estimated Annual Income	42.1	6.2	48.3	78.6	17.6	96.3	70.9	18.6	89.5
RESIDENT RETAIL SPENDING[1]									
Primary/Convenience Goods Off-Site	8.4	1.2	9.6	15.7	3.5	19.2	14.2	3.7	17.9
Total Retail Spending Off-Site	14.7	2.2	16.9	27.5	6.2	33.7	24.8	6.5	31.3
Off-Site Retail Space Requirements for Primary/Convenience Goods (in s.f.)	64,500	9,000	73,500	121,000	27,000	148,000	109,000	28,500	137,500

[1] In millions of 1978 dollars.

Source: Compiled by Belt, Collins & Associates based on Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:76-80).

spending and retail space resulting from the planned and proposed resorts would occur in the North/South Kohala impact area. This amounts to $14.3 million in retail spending for convenience goods, and over 110,000 square feet of retail space for this type of good by 2005.

In addition to increased resident spending, there will be an increase in retail spending associated with the visitor population at the planned and proposed resorts. To serve this market, retail space will be incorporated into the design of the proposed hotel facilities themselves. A general guideline of 25 square feet of commercial space per guest room and 10 square feet of commercial space per condominium unit is used to estimate on-site retail area. Thus, the proposed Mahukona hotel developments could feature approximately 10,000 square feet of on-site commercial space by 1990 to serve hotel guests. This total could increase to about 37,500 square feet by 2005. Other retail development on the Mahukona site, serving condominium and residential occupants, could total 4,000 square feet in 1990 and up to 37,000 square feet by 2005. If there is extensive on-site commercial development and if the planned and proposed resorts are, in fact, relatively self-contained destinations, the impacts of visitor spending on established retail businesses could be limited.

FISCAL IMPACT - GOVERNMENTAL BENEFIT:COST ANALYSIS

COUNTY OF HAWAII FISCAL IMPACT

The long-term, operational fiscal impact of proposed development in terms of governmental revenues and expenditures can be estimated using a benefit-cost analysis. The public sector benefit-cost analysis is a systematic comparison of the additional government revenues that would be generated by the increase in the visitor population and the additional governmental expenditures that would be incurred on behalf of these same visitors. In quantitative terms, the comparison is made on a total amount of dollars basis. If total additional revenues are greater than total additional outlays, the development is considered to be favorable from a fiscal standpoint. The comparison is expressed in terms of a benefit-to-cost ratio; a ratio in excess of 1.0 implies a favorable fiscal impact.

In order to simplify the analysis, the following assumptions and preconditions are imposed. Public sector revenues and costs are measured as they relate to the County government of the Island of Hawaii. The incremental fiscal analysis encompasses 100 percent, or all, of the visitors expected to be attracted to the proposed development; this is not a critical assumption as long as both revenues and costs are measured on an identical basis. The fiscal analysis is measured in terms of 1977 dollars based upon 1977 revenue and cost relationships; this is a critical assumption since the proposed Mahukona developments are not scheduled for full completion until 2005. However, in lieu of actually forecasting, by detail, government expenditures many years into the future, recent historical data provide the most reliable basis for measurement. Data from 1977 also represent the most recent comprehensive information on visitor spending which is a primary component in the revenue calculation. Misrepresentations resulting from the use of historical data will also be minimized, from a qualitative standpoint, to the extent that future increases in both per capita visitor spending and per capita government expenditures might offset one another.

Revenues

The basic formula for calculating revenues and expenditures is patterned after the methodology utilized in the public sector benefit-cost analysis of the State Tourism Study. Increased revenues at the County level are determined by converting total additional visitor spending into additional resident income by accounting for leakage and multiplier factors. An applicable county-specific, revenue-to-income coefficient is then applied to the additional resident income estimate to derive the projected increase in government revenues. The algebraic representation is:

$$R = (VE) \times (Q) \times (R/Y)$$

Where: R = increased government revenues
VE = increased visitor expenditures
Q = visitor expenditures to resident income conversion factor
R/Y = revenue to income ratio.

Increased visitor spending levels (VE) can be measured on either a daily or annual basis. The "Q" conversion factor may be adjusted based upon the desired degree of the multiplier effect to be measured. The revenue-income ratio (R/Y) may be adjusted for exhibited elasticity over time. For this analysis, VE will be based upon an average daily spending estimate subsequently converted into an annual estimate. Two values for "Q" are employed: 0.63, which is applicable to the measurement of a direct and

indirect multiplier effect, and 0.88, which is applicable to the measurement of a direct, indirect, and induced multiplier effect (Hawaii, State of, Department of Planning and Economic Development, December 1975). Based on historical data (Tax Foundation of Hawaii, 1970-1979) the "R/Y" ratio for Hawaii County is estimated by Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:40) at 0.048.

Hawaii Visitors Bureau data for 1977 indicates that expenditures by visitors staying on neighbor islands averaged approximately $50 per person per day. Because the planned and proposed resorts are aimed at the high side of the visitor market, it is expected that they would attract persons spending more than the Neighbor Island average, but the extent of their superiority in this regard is conjectural. Hence, as a basis for comparison, Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:40) also prepared alternative estimates assuming average daily visitor expenditures of $75 and $100 per person. Using their estimate of 5.2 days for the average length of stay, the three alternative spending estimates correspond to expenditures of $260, $390, and $520 per total visit per person (in 1977 dollars).

Using the factors described above, increased revenue estimates were developed for Hawaii County with and without the proposed Mahukona Resort (see Table IV-27). They indicate that already-planned development would increase County revenues in the year 2005 by from $6.9 to $19.4 million depending on which average daily expenditure estimate is used and whether or not induced effects are considered.

Expenditures

Governmental costs are measured on an annual per capita basis. County functions relating to public safety, highways, health and sanitation, recreation, and capital improvements are allocated on a de facto population basis which includes a calculation for the average daily visitor census. All other functions are allocated on a straight resident population basis. The resulting per capita costs for the County of Hawaii in 1977 are presented in Table IV-28. As shown in the table, annual direct cost per visitor is estimated at $282.76, and annual cost per resident is estimated at $472.95.

The direct fiscal cost impact of the proposed developments can be measured by multiplying their projected average daily visitor census by the annual cost per visitor estimate of $282.76.

The resulting estimates are shown in Table IV-29. They are generally comparable to the revenue projections for a "Q" value of 0.63 shown in Table IV-27. The overall total cost impact can be measured by adding on associated resident costs. These are calculated by multiplying the estimated number of persons retained or attracted as a result of the expected increase in jobs by the average annual cost per resident. With this addition, the cost estimate is more comparable to the revenue estimates derived through the use of an 0.88 value for "Q."

County Government Fiscal Benefit: Cost Ratios

The benefit-cost estimates presented in Table IV-30 indicate that if the marginal costs and revenues of the planned and proposed resort development are the same as their present average values, both planned and proposed Kohala Resort developments will produce more County government revenues than costs. The only situation where this would not be true is if visitor expenditures remain at their present levels (i.e., $49.97 per person per day), rather than increasing as expected.

Table IV-27. Estimated Increase in County Government Revenues From Projected North and South Kohala Development With and Without the Proposed Mahukona Resort: 1980-2005.

Revenue Source	Avg. Visitor Census[1]	Avg. Daily Expenditures Per Visitor (1977 $) [2]	Annual Revenues (1977 $)[3] Q = 0.63	Q = 0.88
Planned S. Kohala Development	12,600	49.97	6,950,000	9,708,000
	12,600	75.00	10,431,000	14,570,000
	12,600	100.00	13,907,000	19,426,000
Proposed Mahukona Resort	3,800	49.97	2,096,000	2,928,000
	3,800	75.00	3,146,000	4,394,000
	3,800	100.00	4,194,000	5,858,000
All Development	16,400	49.97	9,046,000	12,636,000
	16,400	75.00	13,577.000	18,965,000
	16,400	100.00	18,101,000	25,284,000

1 From Table IV-16.

2 $49.97 is actual 1977 figure. Average daily expenditures of $75 and $100 per day are shown to indicate the effects that high-quality resorts such as are being planned would have.

3 Annual Revenues were calculated using the formula R = VE x Q x R/Y
where: R = increased government revenues (in 1977 $)
VE = (average daily expenditure per visitor) x (average daily visitor census) x (365 days/year)
Q = visitor expenditure to resident income conversion factor (taken as 0.63 for direct and indirect effects and 0.88 for direct, indirect, and induced effects)
R/Y = revenue to income ratio for Hawaii County of 0.048.

Source: Compiled by Belt, Collins & Associates based on relationships derived by Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:38-44).

Table IV- 28. Hawaii County Government Annual Per Capita Expenditures: 1977.

Function	1977 Expenditures[1] (In $1,000)	1977 Population Estimates[2] (Residents/De Facto)	1977 Per Capita Annual Resident Cost	1977 Per Capita Annual Visitor Cost
General Government	$ 5,605	79,200	$ 70.77	$ --
Public Safety	11,090	85,700	129.40	129.40
Highways	3,761	85,700	43.89	43.89
Health and Sanitation	1,205	85,700	14.06	14.06
Public Welfare	506	79,200	6.39	--
Public Schools	226	79,200	2.85	--
Recreation	3,128	85,700	36.50	36.50
Interest	2,122	79,200	26.79	--
Bond Redemption	2,247	79,200	28.37	--
Pension and Retirement	3,330	79,200	42.05	--
Cash Capital Improvements	5,049	85,700	58.91	58.91
Miscellaneous	1,027	79,200	12.97	--
Totals	$39,295		$472.95	$282.76

1 Expenditures are for the fiscal year ending in 1977, as reported in Government in Hawaii, 1979, published by the Tax Foundation of Hawaii.

2 The larger number represents the de facto population and the smaller number represents the resident-only population. The population estimates are as of July 1, 1977, as reported in Data Book 1979 of the State of Hawaii's Department of Planning and Economic Development.

Source: Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:42).

Table IV-29. Estimated Hawaii County Expenditures Resulting from the Planned and Proposed Resort Developments (in 1977 dollars).

Development Assumptions	Increase in Resid. Pop.	Increase in Visitor Costs (in $1,000)	Increase in Resid. Costs (in $1,000)	Projected Increase In County Expenditures (in $1,000)
Planned South Kohala Development[1]				
o Assumption A	18,150	3,563	8,584	12,147
o Assumption B	13,150	3,563	6,219	9,782
Proposed Mahukona Resort [2]				
o Assumption A	4,750	1,074	2,247	3,321
o Assumption B	4,750	1,074	2,247	3,321
All Planned and Proposed Development				
o Assumption A	22,900	4,637	10,831	15,468
o Assumption B	17,900	4,637	8,466	13,103

1 Assumption A supposes that the 18,150 persons supported by South Kohala resort employment (see Table IV-12) should all be considered in calculating fiscal impacts of the planned and proposed resorts, because if employment was not available to the 5,000-person projected "natural increase" in North/South Kohala's population (see Table IV-13), these persons would out-migrate rather than go on welfare and unemployment roles. Assumption B is that these 5,000 persons would remain on the island regardless of the presence or absence of job opportunities and should therefore not be considered in calculating fiscal impacts of the planned and proposed resorts. See text for discussion.

2 Based on employment estimates in Table IV-15 times 2.2 persons per worker. Note that under "Assumption B", the South Kohala resorts are assumed to have absorbed all the labor force available from North/South Kohala population's "natural increase."

Source: Belt, Collins & Associates.

Table IV-30. Comparison of Projected County Benefit/Cost Ratios With and Without the Proposed Mahukona Resort: 2005.

(1) Situation	(2) ADE[1]	(3) "Q"[2]	(4) Increased Res. Pop.[3]	(5) Increased Revenues[4] ($1,000)	(6) Increased Costs[5] ($1,000)	(7) County Fiscal B/C Ratio[6]
Without Mahukona Resort						
WOMR 1	49.97	0.63	18,150	6,950	3,563	1.95
WOMR 2	49.97	0.63	13,150	6,950	3,563	1.95
WOMR 3	49.97	0.88	18,150	9,707	12,147	0.80
WOMR 4	49.97	0.88	13,150	9,707	9,782	0.99
WOMR 5	75.00	0.63	18,150	10,431	3,563	2.93
WOMR 6	75.00	0.63	13,150	10,431	3,563	2.93
WOMR 7	75.00	0.88	18,150	14,570	12,147	1.20
WOMR 8	75.00	0.88	13,150	14,570	9,782	1.49
WOMR 9	100.00	0.63	18,150	13,907	3,563	3.90
WOMR 10	100.00	0.63	13,150	13,907	3,563	3.90
WOMR 11	100.00	0.88	18,150	19,426	12,147	1.60
WOMR 12	100.00	0.88	13,150	19,426	9,782	1.99
With Mahukona Resort						
WMR 1	49.97	0.63	22,900	9,045	4,637	1.95
WMR 2	49.97	0.63	17,900	9,045	4,637	1.95
WMR 3	49.97	0.88	22,900	12,635	15,468	0.82
WMR 4	49.97	0.88	17,900	12,635	13,103	0.96
WMR 5	75.00	0.63	22,900	13,576	4,637	2.93
WMR 6	75.00	0.63	17,900	13,576	4,637	2.93
WMR 7	75.00	0.88	22,900	18,964	15,468	1.23
WMR 8	75.00	0.88	17,900	18,964	13,103	1.45
WMR 9	100.00	0.63	22,900	18,102	4,637	3.90
WMR 10	100.00	0.63	17,900	18,102	4,637	3.90
WMR 11	100.00	0.88	22,900	25,285	15,468	1.63
WMR 12	100.00	0.88	17,900	25,285	13,103	1.93

1 Average daily expenditure per visitor in 1977 dollars.

2 "Q" = visitor expenditures to resident income conversion factor. The 0.63 figure takes into account direct and indirect effects; the 0.88 figure accounts for direct, indirect, and induced effects.

3 Higher figures in each pair of situtations counts all persons supported by the proposed resort as increase due to the projected development. The lower figure assumes that 5,000 of those persons, i.e., the projected "natural increase" in North/South Kohala would be there anyway and, therefore, are not attributable to the resort development. All estimates are for discussion purposes only.

4 Equal to (ADE) x (average visitor census from Table IV-16) x (365) x ("Q" [0.63 or 0.88]) x (R/Y [0.048]).

5 Increased costs are equal to:
For 0.63 "Q" factor--(Average visitor census from Table IV-16) x (Average cost per visitor [$282.76]).
For 0.88 "Q" factor--(Average visitor census from Table IV-16) x (Average cost per visitor [$282.76]) + (Increase in resident population) x (Average annual cost per resident [$472.95]).

6 (Column 5) ÷ (Column 6).

Source: Compiled by Belt, Collins & Associates based on factors in Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:38-44).

(Note. As used here, the term "marginal cost" is defined as the increase in expenditures that would result from the addition of a unit of visitors or residents to the existing population of those persons. In other words, it is the cost of responding to a specified change in the demand for governmental services. Similarly, "marginal revenues" refers to the amount by which government revenues would change in response to the addition of the specified unit of visitors and residents. Marginal costs and revenues can be (and frequently are) different from the average per capita cost of serving the existing population, but they are extremely difficult to calculate with reasonable accuracy. Because of this, average values have been used in this analysis.)

As noted previously, the intended quality of the planned and proposed resorts makes it likely that expenditures by visitors staying at them will be substantially higher than the present neighbor island average. This, in turn, suggests that their overall fiscal impacts on the County would probably be beneficial.

Because of the large uncertainty associated with all of the estimates, they should be treated as illustrative only. In particular, the absence of accurate data concerning marginal (as contrasted with average) revenues and costs makes a more useful analysis impossible at this time.

STATE OF HAWAII FISCAL IMPACT

Revenues

A State governmental benefit-cost analysis of the with- and without-project situations was also prepared as part of this study. It utilized the same methodology and assumptions that were employed in the County-level analysis described previously, i.e., R = (VE) x (Q) x (R/Y). However, a different value was used for the R/Y factor that reflects revenue/income relationships at the State government level. More specifically:

- Average daily expenditures per visitor were the same as in the County analysis, i.e., $49.97, $75.00, and $100.00 for each of the three cases.

- The "Q" values were assumed to be 0.63 for direct and indirect effects and 0.88 for direct, indirect, and induced effects. These are the same values used in the County-level analysis.

- The R/Y (revenue to income) ratio was assumed to be the 0.135 reported in the State Tourism Study: Public Revenue-Cost Analysis (Hawaii, State of, Department of Planning and Economic Development, 1978).

When these factors are combined, it is apparent that State government revenues, in any of the three cases, will increase 2.8125 times as much as revenues to the County government.

Expenditures

State governmental costs on an annual per capita basis for visitors and residents for 1977 are shown in Table IV-31. Annual per capita cost per visitor is calculated at $243.74, and annual cost per resident estimated at $1,540.20. As before, the direct fiscal cost impact can be estimated by multiplying the forecasted average daily visitor

Table IV-31. State of Hawaii Government Annual Per Capita Expenditures: 1977.

Function	Expenditures[1] (In Millions)	Population Estimates[2] (Resident/De Facto)	Per Capita Annual Resident Cost	Per Capita Annual Visitor Cost
General Government	$ 80.9	891,400	$ 90.76	$ -
Public Safety	65.3	969,200	67.38	67.38
Highways	28.3	969,200	29.20	29.20
Natural Resources	15.3	969,200	15.79	15.79
Health and Sanitation	24.8	969,200	25.59	25.59
Hospitals and Institutions	73.3	891,400	82.23	-
Public Welfare	203.5	891,400	228.29	-
Education/Public Schools	425.2	891,400	477.00	-
Recreation	12.1	969,200	12.48	12.48
Utilities and Other Enterprises	37.7	891,400	42.29	-
Debt Service/Bond Redemption and Interest	108.7	891,400	121.94	-
Retirement and Pension	49.6	891,400	55.64	-
Employee Health Insurance	11.5	891,400	12.90	-
Unemployment Compensation	99.7	891,400	111.85	-
Urban Redevelopment	38.1	891,400	42.74	-
Cash Capital Improvements	81.7	969,200	84.30	84.30
Miscellaneous	35.5	891,400	39.82	-
Total	$1,391.2		$1,540.20	$234.74

1 Expenditures are for the fiscal year ending in 1977, as reported in Government in Hawaii, 1979, published by the Tax Foundation of Hawaii.

2 The larger number represents the de facto population and the smaller number represents the resident-only population. The population estimates are as of July 1, 1977, as reported in the State of Hawaii's Department of Planning and Economic Development, Data Book 1979.

Source: Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:46).

census by the annual per capita visitor cost. The overall total cost impact is measured by adding on associated resident costs; these are calculated by multiplying the population increase attributable to the projected growth by the annual per capita resident cost.

The average annual per capita cost to State government per visitor is only about 83 percent as much as the cost to the County government. The average annual State government expenditures per resident are approximately 225 percent higher than the County expenditures reported previously.

State Government Fiscal Benefit:Cost Ratios

Table IV-32 presents benefit-cost ratios for State government calculated using the revenue and expenditure factors derived above. The data shown therein indicate that the average benefit-cost ratios for the planned and proposed development are greater than 1.0 for nearly all of the scenarios considered. The only instances in which increased State expenditures would appear to exceed increased revenues would be if visitor expenditures do not rise and nearly all of the projected population increase is considered "additional," i.e., over-and-above what would be there without it. In fact, much of the projected population growth would result from natural increase in the existing population that would occur semi-independently of economic growth. Hence, there is considerable reason to believe that higher-than-average unemployment and welfare costs would be incurred by the State government in the absence of the resort development. If this is true, it means that the use of average expenditure figures would seriously understate the relative benefits of the development.

MITIGATION MEASURES

The figures presented above make several things clear about the best means of mitigating undesirable fiscal impacts on County and State government. First, the primary costs result from increased resident population whereas the primary revenues are dependent mainly on the number of visitors. Hence, other things being equal, it is desirable to minimize the number of in-migrants to the County and the State who are attracted by the proposed resort development. This can be encouraged by a variety of techniques such as providing employment training in the appropriate fields to Hawaii County residents entering the labor force, or tying the approval of future development to the foreseeable employment needs of the resident population.

Second, both the County and the State benefit far more from visitor-oriented development aimed at the top end of the visitor market than from accommodations that attract the middle and lower end of the market. Since the top end is limited in size, it behooves the County to avoid overdevelopment that might lead resort operators to draw heavily on the budget market in order to maintain satifactory occupancy rates.

Finally, the benefit-cost ratio of the expected development, including the proposed Mahukona Resort, can be maximized by concentrating additional growth in areas that can be served efficiently by existing and/or new infrastructure (roads, water supply, electrical power, etc.). In some cases initial capital costs may be of primary concern. In others, especially in cases where developers are required to provide the necessary facilities, long-term operating costs may be of greatest importance.

Table IV-32. Comparison of Projected State Benefit/Cost Ratios With and Without the Proposed Mahukona Resort: 2005.

(1) Situation	(2) ADE[1]	(3) "Q"[2]	(4) Increased Res. Pop.[3]	(5) Increased Revenues[4] ($1,000)	(6) Increased Costs[5] ($1,000)	(7) State Fiscal B/C Ratio[6]
Without Mahukona Resort						
WOMR 1	$49.97	0.63	18,150	19,547	2,957	6.61
WOMR 2	49.97	0.63	13,150	19,547	2,957	6.61
WOMR 3	49.97	0.88	18,150	27,301	30,855	0.88
WOMR 4	49.97	0.88	13,150	27,301	23,169	1.18
WOMR 5	75.00	0.63	18,150	29,337	2,957	9.92
WOMR 6	75.00	0.63	13,150	29,337	2,957	9.92
WOMR 7	75.00	0.88	18,150	40,978	30,855	1.33
WOMR 8	75.00	0.88	13,150	40,978	23,169	1.77
WOMR 9	100.00	0.63	18,150	39,113	2,957	13.23
WOMR 10	100.00	0.63	13,150	39,113	2,957	13.23
WOMR 11	100.00	0.88	18,150	54,636	30,855	1.77
WOMR 12	100.00	0.88	13,150	54,636	23,169	2.36
With Mahukona Resort						
WMR 1	49.97	0.63	22,900	25,439	3,849	6.61
WMR 2	49.97	0.63	17,900	25,439	3,849	6.61
WMR 3	49.97	0.88	22,900	35,536	39,050	0.91
WMR 4	49.97	0.88	17,900	35,536	31,364	1.13
WMR 5	75.00	0.63	22,900	38,183	3,849	9.92
WMR 6	75.00	0.63	17,900	38,183	3,849	9.92
WMR 7	75.00	0.88	22,900	53,336	39,050	1.37
WMR 8	75.00	0.88	17,900	53,336	31,364	1.70
WMR 9	100.00	0.63	22,900	50,912	3,849	13.23
WMR 10	100.00	0.63	17,900	50,912	3,849	13.23
WMR 11	100.00	0.88	22,900	71,114	39,050	1.82
WMR 12	100.00	0.88	17,900	71,114	31,364	2.27

1 Average daily expenditure per visitor in 1977 dollars.

2 "Q" = visitor expenditures to resident income conversion factor. The 0.63 figure takes into account direct and indirect effects; the 0.88 figure accounts for direct, indirect, and induced effects.

3 Higher figures in each pair of situtations counts all persons supported by the proposed resort as increase due to the projected development. The lower figure assumes that 5,000 of those persons, i.e., the projected "natural increase" in North/South Kohala would be there anyway and, therefore, are not attributable to the resort development. All estimates are for discussion purposes only.

4 Equal to (ADE) x (average visitor census from Table IV-16) x (365) x ("Q" [0.63 or 0.88]) x (R/Y [0.135]).

5 Increased costs are equal to:
For 0.63 "Q" factor--(Average visitor census from Table IV-16) x (Average cost per visitor [$243.74]).
For 0.88 "Q" factor--(Average visitor census from Table IV-16) x (Average cost per visitor [$243.74]) + (Increase in resident population) x (Average annual cost per resident [$1,540.20]).

6 (Column 5) ÷ (Column 6).

Source: Compiled by Belt, Collins & Associates based on factors in Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:38-44).

SOCIAL EFFECTS OF PLANNED AND PROPOSED RESORT DEVELOPMENT

INTRODUCTION

As part of this study, Community Resources, a Waimanalo-based firm specializing in survey research, community planning, and social impact analysis, was commissioned to analyze the social changes that are likely to occur within the North/South Kohala study area over the next 25 years both as a result of the proposed Mahukona Resort project and as a result of the large-scale resort development that is already planned for South Kohala. Entitled Potential Social Impacts and Social Management Issues Arising From Development of a Proposed Resort Complex At Mahukona, North Kohala, Island of Hawaii, Community Resources' report forms the basis for the summary of social impacts presented below. The length of the report (nearly 250 pages) prevented us from including it in its entirety here, but readers wishing to read the complete document will find it on file with the Environmental Quality Commission in Honolulu and at the Hawaii County Planning Department in Hilo.

The report concluded that the planned and proposed resort development is likely to generate significant social impacts by:

- increasing the number of tourists (outsiders or transients) in or near residential areas, particularly the established communities in North Kohala;
- increasing the number of employment opportunities in the construction and visitor industries;
- inducing large-scale in-migration and rapid population growth; and
- expanding the demand for (and market price of) Kohala land and housing.

These social impacts would occur at two levels, primary and second-order. The primary impacts include changes to such things as employment, business activity, income, population, housing, and land values. For the most part, primary impacts are more readily subject to quantification than are the second-order effects, and are discussed in detail in other sections of this report. Second-order social impacts stem from the primary effects of development and involve variables related to community cohesion or disruption. Included in this category are impacts associated with:

- Social organization (ethnic/class relations and power);
- Social activities (other than family life);
- Attitudes towards tourists;
- Social functions of outdoor life;
- Family life;
- Crime;
- Mental health; and
- Community security and services.

The primary focus of this section is on the second-order social impacts listed above. In addition, however, we have also included a summary (see Table IV-33) of the most important social implications of the primary economic and demographic effects covered in previous sections.

Table IV-33. Summary of Primary Socio-Economic Impacts.

General Topic	Specific Issue	Impact	Likelihood and/or Qualifications
EMPLOYMENT AND BUSINESS ACTIVITY	Employment Need	Initial phases of South Kohala projects will provide more than enough employment for Kohala's current labor force.	From islandwide perspective, Hawaii County faces continued employment problems.
	Employment Desire: Closer Jobs	Employment opportunities at Mahukona Resort potentially can significantly reduce commuting for North Kohala residents who now work outside district--at least one-sixth (and probably more) of the current labor force.	
	Employment Desire: Jobs to Keep Grown Children in Kohala	Most Kohala youth initially leave for education purposes. Tourism jobs likely to lure back only a few youths who have gone for higher education, but can probably keep many of those who would leave for reasons other than education.	Major residential growth could generate demand for some professional services which could attract departed youth home. Also, awareness programs in high school could direct Kohala youth toward tourism management educational opportunities.
	Employment Desire: More Economic Diversity in North Kohala	Economic upheavals in the 1970s created sense of insecurity, cynicism about new opportunities. Mahukona Resort provides an alternate tack to the generally unsuccessful agriculture-based efforts to provide more economic opportunity.	
	Off-Site Business Opportunities	Newcomers, large outside chains may seize most opportunities; major capital investments needed in North Kohala.	Residents may benefit as employees, landlords.
INCOME	Percentage of Residents with Inadequate Incomes	Statistics indicate substantial improvements in percentage of residents classed at "poverty" or "low-income" level after resort development.	There is a lack of solid information about possible qualifying factors--e.g., possible inflationary pressures from tourism; extent to which original residents' incomes improve.
	Money Spent on Energy	Savings in personal income spent for commuting by North Kohala residents.	

Table IV-33. Summary of Primary Socio-Economic Impacts. (Continued)

General Topic	Specific Issue	Impact	Likelihood and/or Qualifications
POPULATION CHANGES	Visitor Population	With scheduled development of the Mahukona Resort, in 1995 there would be 1,750 more tourists (a 17% increase in the average daily census) than would be generated by the South Kohala developments alone (10,000). By 2005, Mahukona would add 3,800 tourists (a 29% increase) to the South Kohala resorts' total of 13,200.	
	Resident Population	Kohala-wide, the Mahukona Resort would result in 2,250 more residents in 1995, or 16% of the total increase expected from planned and proposed resort development (i.e., 14,500 instead of 12,250); in 2005, 3,800 more residents, or 21% of the total (i.e., 18,300 rather than 14,500 more residents in the study area). The Mahukona Resort would also probably result in proportionately more residents living in North Kohala, although there are considerable uncertainties about the distribution of new residential growth, with or without Mahukona.	In terms of percentage increases, rate of population growth would be greatest in 1980s--with or without Mahukona. Thus, social changes most affected by resident population growth and in-migration would precede social changes more closely connected with increased visitor-resident ratios.
	Visitor-Resident Ratio	Without the Mahukona project, full development of South Kohala projects would mean that about 35% of the people in North and South Kohala on any given day would be tourists. With Mahukona, tourists would constitute only 1% or 2% more of de facto population (due to further in-migration of residents).	Visitor-resident ratio would become highest in 1990s, then stabilize for awhile.
	Identity of In-Migrants	This is a major unknown and a crucial determinant of second-order social change. Could be young people from East Hawaii. However, there is also a strong likelihood that many would be young Mainlanders initially coming through Kona; there is both high unemployment and high mobility among this type of person.	
	Distribution of In-Migrants Throughout Kohala	Another major and crucial unknown. (See remarks on employee housing.)	

Table IV-33. Summary of Primary Socio-Economic Impacts. (Continued)

General Topic	Specific Issue	Impact	Likelihood and/or Qualifications
HOUSING, LAND VALUES	Price of Land	Depends on both supply and demand. Presence of thousands of tourists will greatly increase demand. Supply situation uncertain, especially in North Kohala.	Current proposals for agricultural park and agricultural subdivisions seen as conflicting for North Kohala; this policy question could affect tourism impacts on land, and vice-versa.
		SPECIAL COMMENTS	
	Employee Housing: Extent, Type, and Location	This is perhaps the greatest unknown about Kohala's future. The Mahukona developer must come up with some solution to make the project viable, because no housing would mean no employees. However, neither the County nor the South Kohala developers have yet determined any long-range policy about the extent, type, or location of employee housing and residential growth to be generated by those projects. Housing needs are being approached on a short-range, incremental basis. The only guiding principle appears to be that on-site employee housing is not desired by workers and has not been successful elsewhere. Many of the social impacts of resort development in South Kohala or Mahukona depend on these decisions yet to be made. The possibility that different approaches to housing could attract different types of in-migrants offers some hope for actual management of the social impacts from all resort development in North or South Kohala. This issue transcends the proposed Mahukona development. The County, citizen groups, and all Kohala developers would benefit from a coordinated planning approach. But the possible use of different housing types to attract different types of in-migrants is a question of statewide significance, and the possibility of State-sponsored research should be explored. With or without such research, major planning and policy decisions about future residential growth in Kohala must be made by the County and State governments. The possibility and nature of government housing programs in Kohala must be addressed in such a planning effort. The input and assistance of community groups, developers, and landowners would be vital.	

Source: Community Resources (September 1980:36-39).

In analyzing the aspects of the planned and proposed resort development likely to cause social change, it became evident that in many instances it is difficult to predict social impacts. It is even more difficult (and often impossible) to distinguish between social change that would result from the proposed Mahukona Resort and that which is expected to occur as a by-product of the large-scale resort development that is already planned for South Kohala. A number of factors contribute to the difficulty, but the most important is the fact that a large number of private and public policy decisions, which will do much to determine the nature of the secondary growth that will occur, have not yet been made. Among the most important of these decisions are the following:

- The location, availability, price, and character of new residential housing that is developed.

- The disposition of a number of large agricultural subdivision proposals in North Kohala, e.g., Castle and Cooke, Inc.'s proposal involving 1,700 acres and the proposed Kohala Estate subdivision (over 4,000 acres).

- Legislative action with respect to the establishment of a large agricultural park in North Kohala.

- The extent to which possible future government development of recreational and historical resources in Kohala affects recreational activity in the area.

- The willingness and ability of the State and County to make necessary infrastructure improvements (highways, water systems, etc.) in advance of the residential growth that is expected.

- The nature of Department of Hawaiian Homes Land plans for its extensive properties near Kawaihae.

Since the outcome of these "decisions yet to be made" cannot be known at this time, and since they may interact in ways that are impossible to predict, our projections of social impacts must remain tentative.

The figures in Table IV-34 show that the increment of increase in resident population due to the Mahukona Resort is relatively small compared to the total resident population that is expected to result from the planned South Kohala resorts. Although the 3,800 residents it is expected to add to the study area by 2005 is not a small figure, given the near tripling (by 2005) of the population (from 7,900 to 22,400) due to planned South Kohala resort development, most of the significant changes due to increases in the resident population would occur even if the proposed Mahukona Resort project is not implemented. The Mahukona Resort's effect on the size of the visitor population would be similarly limited in comparison with the effects of already-planned resort development. In short, implementation of existing resort development plans will result in major social changes within the study area; the addition of the proposed Mahukona Resort to the resort development that is already planned would marginally increase the magnitude of the social change that may be expected, but, except insofar as it is allowed to affect the geographic location of the secondary growth which occurs, it would not alter the fundamental character of those impacts. Because of this, distinguishing between the with- and without-project scenarios appears to be relatively unimportant. What is called for instead is a clearer understanding of the kinds of techniques that may be used to mitigate the effects of North/South Kohala resort development in general.

Table IV-34. Comparison of Projected North/South Kohala Resident and Visitor Populations With and Without the Proposed Mahukona Resort.

	Existing (1980)	1990	1995	2000	2005
Average Daily Visitor Census					
Existing & Planned Kohala Development [1,2]	600	6,350	10,100	13,200	13,200
Proposed Mahukona Resort [3]	0	750	1,750	2,650	3,800
All Development	600	7,100	11,850	15,850	17,000
Resident Population					
Total w/ Existing & Planned Kohala Development [4]	7,900	15,900	20,150	23,400	22,400
From Proposed Mahukona Resort [5]	0	1,150	2,250	3,350	3,800
Total Average De Facto Population					
Without Mahukona	8,500	22,250	30,250	36,600	35,600
With Mahukona	8,500	24,150	34,250	42,600	43,200
Visitors As Percent of De Facto Population					
Without Mahukona	7.1	28.5	33.4	36.1	37.1
With Mahukona	7.1	29.4	34.6	37.2	39.4

1 Estimate of existing (1980) numbers based on Table IV-3 unit estimates, and factors in Appendix A.

2 Estimate is existing plus additional visitors as shown in Table IV-11.

3 From Table IV-16.

4 Estimate from Table IV-17 plus existing population from preliminary 1980 Census results.

5 From Table IV-17.

Source: Compiled by Belt, Collins & Associates from sources shown in footnotes.

SUMMARY OF EFFECTS

Social Organization

As used here, the term "social organization" refers to the inter-related topics of class, ethnicity, and power. For the most part, little quantitative data is available concerning these subjects; hence, the analysis was based primarily on information obtained from a thorough literature review, informal interviews with various Kohala community leaders, and a qualitative application of this information to the projected situation in North and South Kohala.

Community Resources' study found that Kohala's old "upper class" of haole owners and managers of plantations and ranches has largely disappeared. A new "middle class" of merchants, teachers, skilled workers, and union officials is beginning to emerge, but is still in an embryonic phase. It is also ethnically fragmented. Class distinctions are not so sharp as they once were, but still linger in altered form. Old sensitivities remain between ethnic groups, and recently arrived haoles in particular comprise a separate, but growing subculture. At the same time, ethnic relations are characterized far more by tolerance than by serious resentment or hostility.

Five specific issues relating to social organization were identified in the Community Resources report (September 1980:40; 118-129). They are summarized below.

Ethnic Tensions. The in-migration which will be required to meet resort-related labor force requirements is likely to alter the relative size of ethnic groups, particularly by increasing the proportion of Caucasians in the population. This would require social adjustments, especially in North Kohala.

Class Relations. The large-scale resort development planned for South Kohala would increase the probability of upper-middle class formation in the study area, especially in North Kohala. The proposed Mahukona Resort would contribute marginally to this trend. There is a danger that the upper-middle class could be predominantly newcomer Caucasians, with limited numbers of Orientals and Hawaiians. This, in turn, could resurrect memories of the old, ethnically divided two-class system that typified plantation life. At the same time, if an ethnic split could be avoided, North Kohala residents could benefit from more opportunities for upward mobility.

Political Power. Population growth expected to result from resort development in South Kohala will increase West Hawaii's political power vis-a-vis the existing population centers in East Hawaii. Development of the proposed Mahukona Resort would contribute to this trend. As a result, political power will become more evenly balanced between the two halves of the island. It should be noted, however, that to the extent that the expected in-migrants have different political goals than the present residents of the study area, these "old-timers" could experience an actual decrease in their own political influence at the same time that the political power of the region as a whole is growing.

Power of Hotel Labor Unions. The economic and political power of labor unions is likely to increase as a result of large-scale resort development in South Kohala. The total size of the organized labor force would be increased by the proposed Mahukona Resort, but it would probably not significantly alter the nature of the labor unions.

Citizen Organizations. The projected change in the socio-ethnic background of area residents that would accompany resort development in South Kohala and at Mahukona

could lead to a change in the leadership of citizen organizations. In other areas where substantial numbers of in-migrants have settled, more verbally assertive newcomers have tended to gain control of citizen organizations, and this could happen in Kohala as well.

Social Activities

Social activities relate to those pursuits that take place outside the work situation. This section focuses on patterns of church attendance and leisure patterns. Family life, a third type of social activity, is discussed separately later in this section.

A 1971 survey of North Kohala residents (Hawaii, State of, Department of Planning and Economic Development, 1972) provides the only quantitative data concerning social activities in Kohala. Results of the survey indicated that informal social activities such as parties and luaus were far more prominent than relatively formal ones such as church attendance and club membership. This is consistent with Chang's (1973:58-62) observation that residents preferred to spend time with their families rather than at club activities.

Significant social changes began to take place in North Kohala in the 1960s. The opening of the Mauna Kea Beach Hotel and the consequent hiring of women from North Kohala opened new social opportunities for women whose previous social life consisted primarily of family activities and occasional conversations with friends in the immediate neighborhood. The break-up of the old plantation camps that occurred at about this time resulted in the relocation of residents that also stimulated the growth of new social relationships.

A number of changes in the mid- and late-1970s affected social patterns and activities. Among these were the completion of the County sports complex in Kapa'au; a long series of seminars (Project LEARN) that generated increased community interest in civic affairs and meetings; the strengthening of the Senior Citizens Club; development of a community center at the Hala'ula annex of the Kohala School; and the establishment of a community newsletter. Family activities and informal, less organized, social activities (e.g., picnics, fishing, hunting, surfing, gatherings in public parks, luaus, after-work drinks, etc.) probably still remain at the core of social life in North Kohala. However, the changes listed above--possibly combined with shrinking family size--appear to indicate that clubs, sports, and other relatively formal and organized social activities are more important in North Kohala today than ten years ago.

North Kohala still has little in the way of either "night life" for adults or organized activities for teenagers. Waimea has clearly emerged as the entertainment center of the region. The town now has three major restaurants with bar or night club facilities, and all feature various types of musical entertainment--predominantly Hawaiian or rock. (There is also a restaurant in Kawaihae and of course the facilities of the Mauna Kea Beach Hotel, although few residents patronize the hotel frequently.) Waimea's public sports facilities are more antiquated than those of North Kohala, but Parker Ranch has just constructed a stage and theater complex in Waimea which may prove to be the major cultural facility for the entire Big Island.

The planned South Kohala resorts will have a major effect on social activities as a result of their impact on the number and type of persons present in the region. The most significant changes are summarized below.

Entertainment/Night Life. The planned South Kohala resorts will attempt to capture as much of their guests' entertainment expenditures as possible, but some visitor activity will inevitably spread beyond the destination resort sites. Waimea will probably become the major off-site entertainment center, and visitors will compete with residents for the available facilities. New commercial enterprises will be established to meet the increased demand, and local residents will benefit from the greater variety that is available. At the same time, they may find that they are "out-bid" by tourists and that their favorite places are "taken-over" by other groups.

The addition of the proposed Mahukona Resort would increase the number of visitors present and, therefore, the demand for entertainment facilities. Because of the project's location, it seems probable that most of these needs would be met on-site, in Waimea, or at the South Kohala resort sites.

Outdoor Socializing. By the year 2000, the planned South Kohala resorts will have increased the average de facto population of the region by about 28,000 (15,500 residents and 12,500 visitors). This would result in a tremendous increase in use of parks and other public areas in both of the Kohalas, but the extent to which each of the two districts is affected depends in large part upon where the secondary residential growth occurs. The increased congestion would tend to interfere with the kind of leisure-time socializing that now occurs. This issue is particularly important for North Kohala beach parks. Because of its location, the proposed Mahukona Resort would send proportionately more tourists into North Kohala than would the already-planned South Kohala resorts. Hence, beach park congestion due to the tourist factor could become more of a problem in North Kohala because of the Mahukona Resort project unless a conscious effort is made to channel guests from it elsewhere or to retain them at man-made swimming areas on-site. At the same time, potential government development of new parks and/or historic sites creates a management opportunity.

Organized Social Activities. The impacts of resort development are uncertain. Changes in the size and character of the population will inevitably be reflected in the kinds of social groups that are present. There could be a particular need to strengthen organized youth activities that will reinforce present community values, as the presence of a large-scale visitor culture offers enticements to the area's youth that are contradictory to these values. No clear distinction can be made between the without-Mahukona and with-Mahukona scenarios.

Attitudes Towards Tourists

Development schedules for the planned South Kohala resorts imply that between three and four of every ten people present in the North/South Kohala study area in the year 2000 would be a tourist--whether or not the Mahukona Resort is built (see Table IV-32). Such a high visitor-resident ratio guarantees that tourists would not be unusual or "special" people in residents' eyes. Although some highly rewarding human relationships between residents and visitors would certainly occur, the major focus of concern involves the possibility of negative attitudes or behavior toward tourists on the part of residents.

At least two major concerns can be raised over the prospect of negative resident attitudes and behavior toward tourists. First, any type of social conflict may be viewed as intrinsically undesirable and contradictory to the island value of Aloha. Second, resident unfriendliness or hostility to visitors can endanger the viability of the tourism industry.

Sociological and anthropological literature on tourism effects around the world give conflicting reports on resident attitudes toward tourists. It seems clear that no one particular resident attitude toward tourists is "inevitable," and one review of the available literature on the subject (Knox, 1978) listed several dozen variables which could affect the nature of resident-visitor interaction.

However, two themes have been emerging as dominant ones in published literature. First, there is the argument--made among other places, in a World Bank review of tourism's social impact (Noronha, 1977: 45-46)--that negative attitudes really stem from a loss of local control and benefits when tourism grows large and institutionalized; the tourist is just a "convenient focus" for anger over political and economic displacement. A second view is that tourists occasion anger by unintentionally intruding on privacy or special places--in effect, invading residents' territory outside hotel grounds. This view has been strongly argued by Farrell (1979), based on his studies of tourism in Maui and other Pacific Islands.

In view of the disagreement which currently exists among the experts, any prediction of impacts on attitudes towards visitors must remain conjectural. With or without the proposed Mahukona project, the high visitor/resident ratio that is expected to result from planned resort development raises the possibility that residents of the area will feel resentful, even "invaded." The proposed Mahukona project could expand the territory in which visitors stay or play, but this depends upon the secondary growth pattern that emerges and the touring pattern that evolves. It should also be noted that resident reactions can be affected by (1) public and private management steps taken to insure minimal group tourist "invasions" of resident "territory," and (2) maximum resident participation in decisions about tourist development. In pursuing the latter, it must be realized that the "public" present during the later years of the expected development will be very different (and much larger) than today's populace.

Social Functions of Outdoor Life

The outdoor environment serves at least four relatively concrete functions for North Kohala residents (and, perhaps with different emphases, South Kohala residents as well). First, outdoor activities still represent the primary source of personal and family recreation outside the home. Second, the ocean, coastal areas, and mauka hunting grounds are sources of food for many residents. Third, agricultural activities remain the basis of economic livelihood for some residents, and not long ago formed the basis of livelihood for virtually all residents. Fourth, historic sites scattered throughout the community contribute to the ethnic identities and community pride of some residents.

On a more abstract level, the outdoor environment is a major factor in producing social bonds and community cohesion, as well as shaping individual aesthetic and spiritual feelings. Several community studies of North Kohala in the early 1970s (Bostwick, 1972: 82-83; Chang, 1973: 25-27, 40) took note of the value which residents attached to their "country" environment and of residents' belief that "country" life was both physically and socially better than "city" life.

On a similar dimension of abstract values, there is a potential psychological stress involved in the value conflict over how land should be viewed--as an ultimate source of life (a typical view in agrarian societies) or as an intermediary tool for making money (a typical view in urbanizing areas in which rising land values lead residents and outsiders to consider land as a commodity). Such a value shift is a radical one. Sociologists and geographers have only recently begun to study the ways in which

different perception of the environment can affect social and economic development (c.f., Cohen, 1976).

However, at present there is absolutely no evidence to indicate the extent to which Kohala residents may already view the environment as a commodity; the extent to which other land development projects will affect value orientations; the extent to which Mahukona would produce such a value change; or the actual social and psychological difficulties which such a value change would cause. Therefore, this discussion is limited to a consideration of more tangible aspects of outdoor social impacts--particularly recreation and food collection, which both involve issues of access to the coast or mountains. The larger issue (interrelation of society and environment) remains a matter for speculation rather than analysis.

Outdoor Recreation. Tourists would have little impact on most public active-use parks and recreational facilities. On the other hand, the increased resident population would generate a need for expansion of these facilities. Except where the activities are based on a limited resource (e.g., beaches), it should be possible to expand the facilities as they are needed. In the case of beaches, increasing congestion could become a major social issue, and the extent and timing of implementation of government plans for new park development will determine whether or not significant adverse impacts occur. The proposed project is several miles from Mahukona Harbor and would not interfere in any way with the use of the public boat launching ramp located there.

Historic Sites (Resident Awareness). At present, the archaeological remains scattered profusely throughout the study area are a largely neglected resource. In order to obtain necessary governmental approvals, extensive research has been conducted on the site of the planned South Kohala resorts and on the proposed Mahukona Resort site. Results of these investigations have added significantly to the understanding of aboriginal Hawaiian culture, and the incorporation of sites into resort developments could (if sensitively done) contribute to resident awareness of the area's history and culture, and to resident pride in this heritage. The management study of all potential North Kohala historic sites that is currently underway offers an opportunity to introduce a strong cultural element to Kohala tourism.

Fishing and Food Gathering. The "dry side" of the Kohalas is not as bountiful an area for fishing and food gathering as is the "wet side." However, the weather is generally better on the "dry side," and the marine resources off the dry North Kohala coast were found to be more abundant than areas surveyed along the Kona coast.

Both solitary fishermen and family groups frequently take jeep trails to and along the coast for fishing and picnics. Some dislocation of such activities is to be expected from development of the planned South Kohala resorts. It is difficult to predict how much effect these South Kohala developments will have, or how much more effect the Mahukona Resort would have, because the impacts will arise more from induced residential growth than from tourist activities. As previously noted, the timing, distribution, and composition of residential growth generated by the South Kohala resorts all remain unknown, hampering assessment of the effects of the proposed Mahukona project.

The Mahukona Resort site itself, i.e., the land, is of limited value as a food gathering site, and the developer intends to provide public access to the shoreline as required by law. With the influx of people expected as a result of both the Mahukona Resort and already-planned South Kohala resorts, access to both the shoreline and "wet-side" mountain areas is likely to become a more volatile issue. Some of the currently used

access trails are not for legal entry except with permission of property owners, and so public rights-of-way provided by the new resorts would actually increase legal accessibility to the coast from the highway. At the same time, the nature of the shoreline experience may change from its present, relatively solitary character, and fishing--already considered in some decline by local fishermen due to greater numbers of persons fishing--would probably suffer some further decline in terms of the available stock.

Social Values Relating to Space and the Sense of "Country". The planned South Kohala resort development will stimulate large-scale secondary growth. The Kohalas are a large area and will still remain largely undeveloped. But the pockets of urbanization will be greatly expanded. Hence, while vast areas of hinterland will remain, areas near transporation arterials, i.e., the places that most persons see most often, will be much more intensively developed. In particular, Waimea and other existing communities may increase greatly in size, undergoing a fundamental change in character in the process.

On a regional scale, the proposed Mahukona Resort would produce only a marginal increase in urbanization. However, it would introduce development in the middle of a twenty-mile long corridor that is now largely free of it. If it stimulates a disproportionate amount of residential growth in and around existing North Kohala communities, it could affect the "country" feeling of those areas as well.

Family Life

Since the beginning of Hawaii's visitor industry boom in the early 1960s, there has been great interest in the possible impacts of tourism development on family life. Prior to the closing of the plantation and the opening of the Mauna Kea Beach Hotel, Kohala families generally were structured along traditional lines in which the husband was the prime (often the only) breadwinner and the wife was a full-time mother and/or housekeeper. After the economic changes of the late 1960s and early 1970s, many Kohala families went through a period in which husbands were unemployed and wives working at the hotel became the sole breadwinners. Even when the husbands later found work, the combined incomes of both spouses often were only slightly in excess of the former agricultural income for the husband alone, and the combined incomes were sometimes barely enough to match the financial demands created by the elevated standard of living expectations which typified the mid-1970s.

Thus, reported stresses on family life consisted of wives' initial entrance into the labor force (particularly into the "glamorous" environment of a luxury hotel); flux in family finances; and the structural shift from a husband-only-breadwinner to a wife-only- or two-spouse-breadwinner family. Reported consequences included battered wives, a spate of divorces, unsupervised children getting into trouble, and a shift in women's social relationships from a primary dependence on extended families to a growing reliance on friends and colleagues from work.

In assessing the current and possible future states of family life in Kohala, several factors must be kept in mind:

- The changes observed following the opening of the Mauna Kea Beach Hotel did not flow from tourism alone, but from a combination of factors that affected traditional concepts about the rights and roles of men and women. As we enter the 1980s, this particular combination of social forces has changed considerably.

- Some observers believe that certain negative social phenomena reported in the late 1960s and early 1970s were transitional in nature. They believe that the economic adjustment to a non-plantation economy is largely completed and that the first, and possibly strongest, shocks to the family structure have now died down. At the same time, the survival of some values from the former agrarian, male-dominated society continues to cause problems.

- While the shift to breadwinner status for women may have been a social shock for many Kohala residents, the change in women's roles is not unique to Kohala. The State as a whole has one of the highest female labor-force-participation rates in the nation.

Family-Oriented State Social Services. One measure of family problems is the extent to which the population of an area requires Title XX social service programs (most, though not all, of which relate to family needs) that are administered by the State Department of Social Services and Housing. Recent data on the caseloads reported for North and South Kohala are tabulated in Table IV-35. For purposes of comparison, figures are also provided for the State and Hawaii County and for the resort areas of North Kona, Maui County, and West Molokai.

Data in this table indicate that, compared to the distribution of Title XX caseload for the County as a whole, North Kohala's caseload is generally oriented more toward employment/training counseling and health support services, and less toward family-related services. (One exception is the relatively large North Kohala caseload for Protective Services to Children and Adults. Various sources suggest that this is due to some continuing problems of wife abuse in the area.)

The figures for North Kona and West Molokai provide generally contradictory conclusions about the extent of Title XX caseloads in such resort areas. North Kona's total caseload of 197 represents only 11.1% of Hawaii County's total caseload--which is less than North Kona's share of the Big Island population (15.3%). But West Molokai's share of the total Maui caseload is more than its share of the estimated 1980 population (5.3% vs. 3.6%).

However, North Kona and West Molokai share one similarity in regard to their Title XX caseload patterns. Both areas require disproportionate State subsidies for day care services. Since a State survey has indicated that some 69 percent of the Neighbor Island hotel work force consists of women (Hawaii, State of, Department of Planning and Economic Development,1977:156), it is possible that resort development in Kohala will increase the per capita need for day care facilities and (depending on cost considerations) for State support.

Household Size. State- and island-wide trends suggest that the average family size on the Big Island will continue to decline slowly in the future irrespective of whether the Mahukona Resort is developed or not. This tendency will be accentuated if the resorts do not attract residents of the projected labor surplus areas of east Hawaii, and are forced instead to rely heavily on young transients for their labor force.

Average household size is a function not only of average family size, but also of other factors such as the incidence of extended families, the cost of housing relative to income, and the prevalence of young (usually transient) in-migrants in the labor force. Evidence from the resort areas of North Kona and West Maui suggests that household size may hold constant or even increase somewhat due to the expected higher housing costs.

Table IV-35. Title XX Social Services Program Caseload in Various Parts of Hawaii: January 1980.

Area		Chore	Day Care	Employ./ Training	Family Plan.	Foster Care	Health Support	Indiv./ Family Counsel	Protect. Service	Social Rehab.	TOTAL
STATE	Number	982	3,277	1,068	632	2,033	318	2,744	980	629	13,196
	Percent	7%	25%	8%	5%	15%	2%	21%	7%	5%	100%
HAWAII	Number	164	383	61	71	141	28	610	145	155	1,778
COUNTY	Percent	9%	22%	3%	4%	8%	2%	34%	8%	9%	100%
North	Number	7	12	9	1	2	3	3	7	5	50
Kohala	Percent	14%	24%	18%	2%	4%	6%	6%	14%	12%	100%
South	Number	8	12	3	2	6	3	18	5	7	64
Kohala	Percent	13%	19%	5%	3%	9%	5%	28%	8%	11%	100%
North	Number	19	72	5	9	6	3	46	25	11	197
Kona	Percent	10%	37%	3%	5%	3%	2%	23%	13%	6%	100%
MAUI	Number	271	250	49	79	76	21	577	81	79	1,503
COUNTY	Percent	18%	17%	3%	5%	5%	1%	38	5%	5%	100%
West	Number	17	20	0	5	3	2	30	1	2	80
Molokai	Percent	21%	25%	0%	6%	4%	3%	38%	1%	3%	100%

Notes:
1. Caseload for Neighbor Island census tracts not recorded prior to 1980.
2. "TOTAL" may include duplicate cases, since individuals could obtain more than one service. Also, "TOTAL" includes counts for three additional services--adoption, alcoholism and drug abuse, and homemaker assistance--which were omitted in table due to small number of cases recorded.
3. Eligibility for all Title XX services (except Protective Services to Children and Adults) is restricted to recipients of State income maintenance services who meet a maximum income requirement. Thus, caseload in any area is affected by : (a) need, (b) request or reporting, and (c) percentage of residents meeting eligibility criteria.

Source: State of Hawaii, Department of Social Services & Housing, Public Welfare Division, unpublished records.

Child Abuse. The effect of tourism on the relative incidence of child abuse is difficult to predict. However, the evidence now available does not show any apparent statistical link between the two.

Child Neglect. Although lack of adequate supervision for young children was one of Kohala's most frequently mentioned social problems in the early 1970s (Cottington, 1969; Smith, 1972; Chang, 1973; Hawaii, State of, Department of Planning and Economic Development, 1972), there were no reported cases of child neglect in North Kohala and only a few in South Kohala during 1978 and 1979. Evidence concerning the effect of increased visitor industry activity on child neglect is anything but definitive, but there is some reason to think that a development scenario which involves in-migration of many young, Mainland-originating hotel workers would involve the potential for increased rates of child neglect--if not abuse--in Kohala's population. The reason for this appears to be that the in-migrants lack extended family, friends, or other social support systems that can help care for their children during working hours. In-migration of a more locally-rooted work force might cause relatively fewer difficulties, but only to the extent that such a work force contains fewer persons who are single parents and/or more workers with support networks or resources to provide for caretaking of children during work hours.

The problem could be somewhat alleviated in the case of younger children if existing or new facilities are able to provide adequate child care during resorts' extended working hours. As noted at the beginning of this discussion on "family life," DSSH caseloads for day care services are disproportionately high in several resort areas considered possible models for Kohala's development as a tourism center. Thus, establishing more or expanding privately-operated day care centers could transform the "social impact" of child neglect into a "fiscal impact" for taxpayers partially subsidizing these operations.

Juvenile Delinquency. If the Kona area is accepted as the best model for predicting the likely impact on Kohala of growth from large-scale tourism development, it appears that the impact may be acceptable in regard to juvenile delinquency. The estimated percentage of overall Big Island population living in North and South Kona is 21.9 percent, according to preliminary 1980 census figures. (It was probably a percentage point or so less in 1978.) The number of juvenile arrests or "cleared" cases located in Kona represented approximately the same percentage of the island total. Again, final confirmation of this conclusion must await complete 1980 crime and age-specific census figures, but the preliminary evidence suggests that large-scale tourism development has not brought a disproportionate amount of juvenile delinquency to the island's current major resort district. Such juvenile delinquency as can be detected in Kona does involve a disproportionately large amount of Part I (serious) offenses, but this is already the case in both North and South Kohala (possibly due to thefts from area beach parks).

Marital Stability. An early concern with respect to tourism development was that it would adversely affect marital stability. A survey conducted by Public Affairs Advisory Service (1979) for this study indicates that this fear has largely disappeared; only 4.8 percent of the survey's 521 Kohala respondents having listed it as a possible impact. The divorce rate on the island did climb sharply during the 1970s, a period when the visitor industry also grew significantly. However, there was no significant difference between the increase in Hilo (where the number hotel rooms rose by only 750 [62%] between 1970 and 1978) and the increase in Kona (where the number of hotel room doubled to 3,650 in the same period).

While no reliable figures exist, some Kohala community leaders and social service professionals told Community Resources that wife abuse may sometimes be a problem, particularly in North Kohala. If tourism development in North and South Kohala, including the proposed Mahukona Resort, results in an influx of young Mainlanders to work in the hotels, then the overall rate of wife abuse in comparison to the entire resident population will probably be reduced. Even among current residents, an increased population and more contact with the outside world will reduce the sense of isolation, considered to be one cause of spouse abuse. Perhaps the greatest uncertainty exists in regard to the factor of male self-image. If employment opportunities maintain or improve self-image among males, one potential cause of wife abuse would be reduced or eliminated. But as noted earlier, some 70 percent of the Neighbor Island hotel work force consists of women. Thus, it may be advisable to pay careful attention to male attitudes and employment opportunities in Kohala resort development.

Support for the Elderly. Economic development of any sort in Kohala may provide more opportunities for grown children to remain in the area, close to their aging parents--a positive social impact. However, this is predicated on the existence of a desire on the part of North Kohala youths to remain in the region in order to take tourism jobs or perhaps even any other type of job. To the extent that the proposed Mahukona Resort encouraged offspring to remain in the area and be supportive of their aging parents, it would have a positive effect on the elderly. It should also be noted that the major problems affecting the elderly could be more "economic" than "social" in nature--living on a fixed income in a potentially high-priced tourist area.

Time for Family Activities. Insofar as tourism development in the Kohalas increases the labor force participation rate, it would reduce the amount of time remaining for family activities. On the other hand, if the proposed Mahukona Resort attracts workers who now commute from their homes in North Kohala to jobs in South Kohala or North Kona, it would reduce the amount of time workers must spend commuting, thereby allowing them more time to spend with their families. Another effect, the significance of which is not known, would be to increase the relative proportion of shift and weekend work. This is a potentially disruptive impact of resort-related employment, whether in South Kohala or at the proposed Mahukona Resort.

Crime

The mutual impacts of tourism and crime upon one another have become a major issue in Hawaii during 1980 as a result of widespread publicity accorded the topic in newspapers on the U.S. mainland and in Canada. While an accurate evaluation of Hawaii's crime situation is complicated by a number of factors, there is little doubt that the crime rate throughout the State has been growing recently. Difficulties arise, however, when an attempt is made to interpret the statistics or, more importantly for our present purposes, to use them to predict the effect that planned and proposed growth in the Kohalas will have on criminal activity on the Big Island.

Big Island court records tell one part of the story. In fiscal year 1974-75, the Third Circuit Court had a total caseload of 2,894, of which only 315 (11 percent) involved criminal activity. Of these 315 criminal actions, the greatest numbers involved burglary (81, or 26 percent of the 315) and narcotics drug law offenses (61, or 19 percent). By fiscal year 1978-79, the total caseload had increased by 41 percent to 4,074. The number of criminal actions increased at an even more rapid rate, to 851 (21 percent of the total). Of these 851, the largest numbers still involved narcotics offenses and burglary, but narcotics offenses now accounted for proportionately more

cases than burglary (250, or 29 percent, vs. 170, or 20 percent) (State of Hawaii, the Judiciary, 1979: 53; 1980: 81).

However, court cases reflect only a portion of arrests, and arrests occur for only a portion of reported crimes. When reported crime data is examined, it appears that serious Crime (i.e., Part I offenses such as murder, rape, robbery, etc.) increased by over 180 percent between 1970 and 1979. When corrected for the population growth that took place over the same period, this amounts to an increase in the per capita rate for serious crimes of 100 percent. However, the Big Island's estimated 1979 crime rate of 5.6 per one-hundred residents was only 75 to 80 percent of the rates experienced on Kauai and Oahu in the same year; and it was just over half the rate recorded on Maui.

While the absolute number of crimes in Kohala increased greatly from 1970 to 1979, crime has also been growing islandwide. As a result, the area's share of serious crime has actually declined. Table IV-36 presents district comparisons for serious crime rates in 1970 and 1979. These show that North Kohala's Part I crime rate approximately doubled from 1970 to 1979. However, Hawaii County's overall crime rate also doubled, so that North Kohala's relative crime rate today remains what it was in 1970--only half that for the island as a whole. The same table also indicates that South Kohala's crime rate for Part I offenses increased only very slightly, so that it is now probably a little less than the rate for the island as a whole instead of being substantially higher, as it was in 1970.

Kona provides one model for predicting potential crime impacts of resort development in Kohala. As indicated in Table IV-36, Kona's example is a complex one. The overall rate of reported serious crime there did increase during the 1970s, which was a period of substantial tourist and residential growth for the area. Interestingly, though, Kona's crime rate did not rise as rapidly as the rate for the island as a whole. On the other hand, it should be noted that Kona did suffer some substantial increases in several types of violent crime--particularly rape and robbery--during the 1970s according to figures obtained from the County of Hawaii Police Department.

Several published studies have examined statistical evidence about the association between crime and tourism. Studies in Mexico (Jud, 1975) and Florida (McPheters and Stronge, 1974) found strong relationships between tourism and crimes against property (e.g., burglary or larceny) but not crimes of personal violence (such as rape or robbery). However, a more technically rigorous study on data from the entire state of Hawaii (Fujii, Mak, and Nishimura, 1978) found evidence of overall statistical relationship between tourism and some crimes of violence--particularly rape--as well as the expected relationship between tourism and crimes against property.

North and South Kohala police officials were interviewed in order to supplement the foregoing statistical information. Both the North Kohala police and other community informants suggested that the actual crime situation in the area may be slightly more problematic than the recorded numbers would imply. This is first, because North Kohala residents are felt to be unlikely to report minor thefts, and, second, because North Kohala police are often able to keep order in their small community through informal actions which do not appear on the police blotter. According to the North Kohala police, the district's clearance rate (percentage of cases resolved) was nearly 80 percent, a phenomenally high figure for Hawaii. Because of the low crime rate and the high clearance, the County administration for the past two years has not filled four vacancies in the North Kohala police force. Consequently, there is no midnight-to-8 a.m. shift working in North Kohala.

Table IV-36. Hawaii County's 1970 and Approximate 1979 Per Capita Part I Crime Rates.

Area	Year[1]	Part I Crime Rate Per 100 Residents[2]	Approximate 1970-1979 Percentage Change in Rate
Hawaii County	1970	2.71	+98.2
	1979	5.37	
North Kohala	1970	1.32	+107.6
	1979	2.74	
South Kohala	1970	4.68	+7.3
	1979	5.02	
North & South Kona	1970	4.48	50.0
	1979	6.72	

[1] Population figures for 1979 were actually preliminary revised 1980 census figures. Thus, the 1979 crime rates are actually approximations which probably slightly underestimate the true crime rates for the various areas.

[2] Crime rates computed by dividing total Part I offenses by appropriate population figure. (Total Part I offenses were calculated by including "Aggravated Assault" but excluding "Other Assaults.")

Source: Crime rates computed from crime figures obtained from County of Hawaii Police Department and from 1970 and (preliminary revised) 1980 Census figures. Data compiled by Community Resources.

Both North and South Kohala police agreed the main tourism-associated crime problems in the area have involved larceny at beach parks. Employee theft and/or burglaries at the Mauna Kea Beach Hotel have been extremely rare. Residents and tourists alike are victimized in the beach parks of South Kohala, and the perpetrators are often transients or residents of other parts of the island. In North Kohala, tourists are more likely victims in the parks, and the perpetrators are usually local residents who come to be known to the police. Police have also come to expect some types of crime from tourists themselves--e.g., bad checks or baggage insurance fraud.

A final comment from the police involved the rise in the number of construction workers in South Kohala. South Kohala police have observed an increase in the number of minor altercations (e.g., fights in bars) in early 1980, which they attribute to friction between off-island workers and local men.

In evaluating the probable impact of tourism development, Kohala police sources and the head statistician for the County of Hawaii Police Department all predicted increases in larceny associated with more tourists in public places such as parks. And based on experiences in Kona (where hotel security is often less effective and worker morale lower than at the Mauna Kea Beach Hotel), they predict more employee thefts and/or hotel burglaries. There was less unanimity about possible increases in violent crimes, although continued minor problems associated with off-island construction workers can be expected.

In summary, evidence is mixed about the likely impacts of Kohala tourism development on crime in the area. There does appear to be a strong tendency for tourism to breed crimes against property because of tourist vulnerability and unfamiliarity with an area while on vacation. However, such a tendency is not an inevitability, since it can be countered by measures such as information campaigns, hotel security, and maximizing resident participation in the benefits of resort development. Certainly, without some attention to such issues by both public and private sectors, there is a strong possibility that tourism-related crime can produce the same negative consequences in Kohala as those which have occurred in Kona, Waikiki, or the island which witnessed the greatest growth in both crime and tourism during the 1970s-- Maui.

Virtually all of the foregoing discussion has focused on the possible relationship between crime and tourism growth in general. However, since the without-project scenario for this social impact analysis specifies major tourism growth in South Kohala and possible attendant residential population growth in North Kohala, it remains to be asked what <u>particular</u> crime impacts might be attributed to the proposed Mahukona resort in the with-project scenario. It is clear that additional tourists and additional residents mean a greater overall <u>amount</u> of crime, but is not so clear whether Mahukona's contribution to crime would be proportionately equal to, higher than, or lower than the contribution of South Kohala's tourism development (i.e., whether it would have the same impact on the crime <u>rate</u>).

There are at least two major and interrelated unknowns which impair prediction. First, it is not yet really known whether the usual relationship between tourism growth and crime growth is of a linear nature (e.g., if X new tourists per day cause Y more crimes, then the next 3X tourists per day will generate 3Y crimes) or whether this relationship involves marginal "savings" in crime (i.e., X tourists may cause Y crimes, but the next 3X tourists will cause only 2Y crimes). Second, there is the factor that the Mahukona project would be located in <u>North</u> rather than in South Kohala. It is possible that later South Kohala tourism development would not generate crime to the same extent as the first developments, but would the Mahukona project generate

crime at the reduced rate of a "later" South Kohala resort or at the higher rate of an "initial" North Kohala resort?

The research has not yet been carried out in Hawaii to permit such questions to be answered with any real degree of confidence. It is Community Resources' (September 1980:190) opinion that the Mahukona project would have a reduced impact on crime rates because it would be built after the first major projects in South Kohala--i.e., that there would indeed be a marginal "savings" in crime impact which would be little affected by the distance between projects because all the projects are located in the same "dry-side" geographical region. This is not to say that a Mahukona project would fail to raise the rate as well as the amount of crime (at least for crimes against property); the statistical evidence suggests such a tendency. But the magnitude of the increase should not be as great as the magnitude of increase from initial South Kohala developments. However, it should again be stressed that the research to confirm or disprove this contention has not yet been carried out.

Mental Health

The available evidence about the mental health situation in Kohala is incomplete and contradictory. There was a reported upsurge of problems in the mid-1970s when the plantation closed, and the Waimea clinic caseload again increased greatly in the late 1970s. North Kohala residents in particular are reluctant to seek professional assistance for mental health problems, and there are indications that North Kohala has more transient situation disorders (i.e., reaction to a strong, temporary stress) than the State as a whole. Nevertheless, neither community leaders nor mental health professionals consider the area to be a mental health "trouble spot" in comparison to other Big Island districts.

Impact of Planned and Proposed Resort Development. There are two possible clues for predicting impacts on mental health of major resort development in Kohala: assessment of the mental health situation in Kona, and examination of ethnic differences in rates and types of behavioral problems for State mental health patients. (The latter approach is useful only to the extent that is is assumed tourism development may cause a major shift in resident ethnic composition.) To explore these questions, Community Resources examined unpublished data made available by the Hawaii State Department of Health's Mental Health Division.

The total count of Kona clinic patients increased substantially in the late 1970s despite a new State policy which tended to reduce counts elsewhere. (However, an increase in the number of "deferred diagnoses" in Kona kept the actual number of cases under treatment approximately equal.) A great majority of the Kona patients were Caucasians. Compared to patients for the county as a whole, Kona patients were more likely to be diagnosed as having neuroses, alcohol or drug problems, or "other personality disorders"; they were less likely to be diagnosed as reacting to transient situations. (Again, this comparison must be viewed with caution, since it could also reflect differences in the diagnostic tendencies of mental health professionals.)

According to the acting head of the West Hawaii Mental Health Service, however, these statistics fall far short of describing Kona's increasing and acute mental health problems. Because the Kona clinic staff has not increased, it has been necessary to make large increases in the number of cases referred to private agencies. He stated that 45 prospective new patients came to the clinic in June of 1980, whereas only 10 or 15 new cases would appear each month two years ago. He also estimated that Kona Hospital's psychiatric ward now houses an average of two or three acute cases each day, whereas four years ago the ward had only about three cases each week.

The backdrop for these increases reportedly involves in-migration of Mainlanders with specialized skills for working in Kona's increasingly resort-oriented society and subsequent friction with longtime local residents, according to the Mental Health Service head. He said longtime local residents who feel supplanted are less likely to come to mental health clinics and more likely to engage in "acting-out" behavior such as crime or expressions of hostility. Newcomers, however, are more likely to internalize problems associated with a sense of rejection, culture shock, and (for housewives or others who stay at home) isolation. While many Mainland newcomers in Kona may be categorized as "transients," a large portion of those seeking assistance are people with good incomes. Both newcomer groups are less likely than longtime residents to have extensive social support systems, which means that when they have acute psychiatric problems they tend to stay in the hospital longer.

If Kohala resort development follows the Kona pattern of attracting large numbers of in-migrants who originated on the Mainland, the available evidence from West Hawaii suggests that increased rates of mental health problems can be expected. However, problems of mental health (in the clinical sense) are more likely among the newcomer population than among the longtime local resident population. Lack of support networks among this group would mean a heavier reliance on public counseling and psychiatric facilities. Should the development scenario for Kohala provide instead for in-migration of present Big Island residents from East Hawaii to West Hawaii, expected mental health problems would be far less and would probably depend on the extent to which the new residents have strong social ties among themselves and/or with longtime Kohala residents. There is no evidence to date suggesting that resort employment generates severe psychiatric stress with any more frequency than do other types of employment--although it is perhaps obvious that service work may clash with the preferences and self-images of some people, and that the ideal society from a mental health viewpoint is one with a sufficient diversity of economic activities to allow residents a wide choice of occupations. Although it is frequently alleged that tourism employment can impair self-image through encouragement of "servility", no scientifically conducted study has ever been carried out to test this proposition for Hawaii's tourism work force.

RESIDENT EVALUATION OF SOCIO-ECONOMIC TRADE-OFFS

The preceding sections discussed a wide variety of likely or possible impacts of both the planned South Kohala resort developments and the proposed Mahukona Resort. Some would clearly be considered positive by most residents; some would be considered as negative impacts; and others might be regarded with mixed or uncertain feelings. The impacts are of different types and involve different aspects of life. How then does one add up these "apples and oranges" to come up with a single verdict on the project's impacts? One possible way is to survey residents on perceived effects of the project and then to ask them to state their attitude towards it. This was done in a survey commissioned by the developer and conducted by Public Affairs Advisory Services, Inc. (PAAS) in April of 1980.

This section provides a brief overview of the results of the PAAS survey. Particular emphasis is placed on residents' attitudes towards various issues related to the proposed Mahukona Resort. The complete report, including extensive data tabulations, is on file with the Hawaii County Planning Department in Hilo.

Survey Methodology

Public Affairs Advisory Services, Inc.--a Honolulu-based firm with extensive experience in public opinion polling--designed, conducted, and analyzed this survey. Data were collected from Saturday, April 12 through Monday, April 14, 1980.

Results are based on 261 replies from North Kohala and 260 from South Kohala, or 521 for the entire sample. According to Public Affairs Advisory Services, maximum sampling error at the 95 percent confidence level is about plus or minus 4.4 percent for the overall sample and plus or minus 6.2 percent for either of the two Kohala samples (South or North) considered separately. This means the chances are 95 out of 100 that, if 50 percent of the entire sample makes a certain response to a given question, somewhere between 45.6 and 54.4 percent (50% plus or minus 4.4%) of the entire population of Kohala would have made the same response to the same question if everyone could have been asked that question. The range of error would be even less if the sample percentage is greatly different from 50 percent, i.e., if, for example, either 80 percent or 25 percent of the sample population gave a particular answer.

Public Affairs Advisory Services originally planned a pinpoint sampling technique, which would have involved intensive door-to-door personal contact procedures only in selected geographical areas. However, to improve the representativeness of the sample, the company insead chose to attempt to reach every residential housing unit in North and South Kohala. Inevitably, some households could not be approached because they were too isolated to find or because some threat to a survey worker's personal safety (e.g., guard dog) was present.

The survey instrument was a self-administered "secret ballot" left by the survey worker and picked up at a later time. The refusal rate among residents who were contacted was estimated to be approximately eight percent. However, no record was kept of the number of households at which nobody was home. In such cases, no survey instrument was left, and no return visits were made. Some households returned more than one survey. Assurances of anonymity were made to all respondents. Survey workers were Kohala residents hired by Public Affairs Advisory Services, but not informed of the client's identity (in order to minimize biases which might be communicated by survey workers).

A full demographic description of the sample is included in the complete report on file at the Hawaii County Planning Department in Hilo. Respondents were approximately evenly divided as to sex; two-thirds were married; the largest ethnic groups were Caucasians and Hawaiians/part-Hawaiians, followed by Japanese and Filipinos; the median family income appears to be around $15,000 and the median age in the early 30s; half the respondents had educations of high school or less; and half had lived in Kohala for 18 or more years.

Because complete 1980 census data are not yet available, it is impossible to say whether this sample was truly representative of the overall Kohala population. However, the fact that certain expected differences were found between the North and South Kohala sub-samples--for example, the respondents tended to be older in North Kohala, and there were relatively more Filipinos in North Kohala and more Caucasians in South Kohala--suggests that this is so. It should be noted that "overall" results are slightly biased toward opinions of North Kohala residents, since preliminary 1980 census figures indicate only 42 percent of Kohala residents lived in North Kohala, whereas North Kohala residents made up 50 percent of the sample for this survey.

The 1980 U.S. Census reports the population of North Kohala was 3,249 and the population of South Kohala was 4,607. Thus, the sample of 261 North Kohala residents represents eight percent of the total population of that district, and the sample of 260 South Kohala residents represents nearly six percent of the total population of that district. The sample thus represents even higher percentages of the adult population of Kohala, although exact percentages cannot yet be determined because the Census Bureau has not reported any age breakdown for Hawaii's population.

Summary of Survey Results

Results of the PAAS survey indicate that a plurality of present residents of the North/South Kohala study area favor North Kohala resort development. This is true regardless of how the issue is posed--in general terms or with specific reference to a major resort development in the Mahukona area. The major perceived benefit is employment, with many of the respondents perceiving resort-related jobs as representing the best hope for keeping young people in the area. Major perceived possible negative effects involve competition for housing and high rents. However, most respondents want new employees housed in the existing residential centers of North Kohala.

Tables IV-37 and IV-38 show results for two questions, posed early in the survey, on perceived "advantages" and "disadvantages" of major resort development in the Mahukona area. (These results are limited in the sense that they are obtained from check lists rather than from write-in responses, but experience has shown that many people do not respond to write-in questions.) Note in Table IV-37 that by far the most frequently checked "advantage" relates to new job opportunities, with secondary support for other types of economic benefits. In Table IV-38 there is not so sharp a consensus on "disadvantages," but the primary concern clearly involves impacts on housing/rents and secondary concerns involve open space and environmental impacts. Also, note that respondents checked fewer numbers of disadvantages than of advantages.

A later survey question asked respondents to choose a single consequence (presumably the "prime result") of a major resort development in North Kohala. The list of possible consequences included a single economic benefit (increased standard of living due to employment opportunities) and five different potential negative impacts relating to recreation facilities or social problems. Table IV-39 shows that, in South Kohala, roughly equal percentages of respondents checked the positive consequence (44.9%) as checked the various negative consequences (combined total of 45.5%). But in North Kohala, more than twice as many respondents (59.9%) checked the positive economic benefit as did respondents who checked all negative social consequences combined (27.8%). Among the overall minority who considered one of the negative consequences to be the prime result, there was relatively more concern about crowding of recreational facilities and tensions between residents and newcomers than about possible family or crime problems.

Demographic analyses of results for this question indicated that age and education are the two variables most likely to affect views regarding the prime result of resort development at Mahukona. Residents of North or South Kohala under 40 years of age are much more likely than older residents to check some negative consequence, although pluralities in the younger age categories still choose the positive "employment" response. Also, as education increases, there is less likelihood that Kohala residents check the positive "employment" result as the main consequence of the resort development. (See Public Affairs Advisory Services, 1980: 43, 47.)

Table IV-37. Kohala Residents' Perceived Advantages of Major Resort Development in the Mahukona Area.[1]

Advantage	North Kohala (N=261) (in %)	South Kohala (N=260) (in %)	Entire Area (N=521) (in %)
More job opportunities	82.7	68.7	75.1
Archaeological sites might be restored	16.9	14.3	15.5
Strengthen economy	27.7	28.2	27.9
Good for local businesses	25.8	31.3	28.8
Improved public parks & ocean access	16.9	14.4	15.6
Reduce commuting time for resort employees	20.5	10.5	15.1
More nearby recreational & entertainment facilities	14.9	12.5	13.6
More new residents	10.7	6.9	8.6
More job opportunities for local entertainers	19.9	12.6	15.9
Other	0.4	2.1	1.3
TOTAL[2]	236.4	201.5	217.4

[1] Question posed was: "In your opinion, what are the advantages of having a major resort development in North Kohala (area between Lapakahi Historic State Park and Kawaihae)? (CHECK ONE OR MORE)."

[2] Totals exceed 100.0% due to instructions "CHECK ONE OR MORE."

Source: Public Affairs Advisory Services, Inc., Final Report of a Kohala (North & South) Survey of Public Opinion Concerning Resort Development and Related Topics, 1980: 3.

Table IV-38. Kohala Residents' Perceived Disadvantages of Major Resort Development in the Mahukona Area.[1]

Disadvantage	North Kohala (N=261) (in %)	South Kohala (N=260) (in %)	Entire Area (N=521) (in %)
Less open space because of development	28.0	28.4	28.2
Increased traffic/congestion	22.2	25.7	24.1
Too many new residents	24.2	19.6	21.7
Not enough housing/high rents	41.4	40.5	40.9
Increase in crime	28.0	22.9	25.2
Destruction of environment & historic sites	33.8	31.7	32.7
Strain on community resources	14.9	15.1	15.0
Other	2.4	2.9	2.7
TOTAL[2]	194.9	186.8	190.5

1 Question posed was: "In your opinion, what are the disadvantages of having a major resort development in North Kohala (area between Lapakahi Historic State Park and Kawaihae)? (CHECK ONE OR MORE)."

2 Totals exceed 100.0% due to instructions "CHECK ONE OR MORE."

Source: Public Affairs Advisory Services, Inc., Final Report of a Kohala (North & South) Survey of Public Opinion Concerning Resort Development and Related Topics, 1980: 4.

Table IV-39. Kohala Residents' Perceived Prime Result of Major North Kohala Resort Development.[1]

Prime Result (Effect)	North Kohala (N=261) (in %)	South Kohala (N=260) (in %)	Entire Area (N=521) (in %)
Improve the standard of living due to employment opportunities	59.9	44.9	51.8
Make our recreation facilities more crowded	7.6	13.0	10.5
Increase marital problems & divorce	1.5	7.5	4.8
Increase the rate of child neglect	1.6	7.2	4.6
Increase crime & drug abuse	6.7	6.8	6.7
Increase tensions between residents & newcomers	10.4	11.0	10.7
TOTAL RESPONDING TO QUESTION	87.7	90.4	89.1
No reply to question	12.3	9.6	10.9
	100.0	100.0	100.0

1 Question posed was: "In my opinion, a major hotel-resort development in North Kohala would-- (CHECK ONE)."

Source: Public Affairs Advisory Services, Inc., Final Report of a Kohala (North & South) Survey of Public Opinion Concerning Resort Development and Related Topics, 1980: 7.

The ultimate question is whether the survey respondents favored such a project after considering its potential impacts. Table IV-40 shows that a majority of North Kohala respondents and a plurality of South Kohala respondents did favor a major hotel-resort development in the Mahukona area. Opposition was voiced by only a quarter of the North Kohala respondents and a third of the South Kohala respondents. Again, age and education were the two most influential demographic variables. Older Kohala respondents were much more likely to say they favored such a project. Active opposition was much more likely among respondents with a college education (Public Affairs Advisory Services, 1980,:45, 76).

Table IV-40. Kohala Residents' Reaction to a Major Resort Development in the Mahukona Area.[1]

Reaction	North Kohala (N=261) (in %)	South Kohala (N=260) (in %)	Entire Area (N=521) (in %)
Favor	51.4	42.1	46.3
Oppose	26.7	33.7	30.5
It doesn't matter much to me	19.7	22.1	21.0
TOTAL RESPONDING TO QUESTION	97.8	97.9	97.8
No reply to question	2.2	2.1	2.2
	100.0	100.0	100.0

[1] Question posed was: "Do you favor or oppose the building of a major hotel-resort development like Keauhou in the area between Lapakahi Historic State Park and Kawaihae? (CHECK ONE)." The survey also contained several other questions on attitudes toward resort development in North Kohala. Percentage results for these other questions were consistent with those appearing for the question above.

Source: Public Affairs Advisory Services, Inc., Final Report of a Kohala (North & South) Survey of Public Opinion Concerning Resort Development and Related Topics, 1980: 11.

chapter five

CHAPTER V
PHYSICAL IMPACTS OF THE PROPOSED PROJECT

INTRODUCTION

In Chapter IV, our discussion focused on the economic, demographic, and social changes likely to be caused by the proposed Mahukona Resort project. In this chapter we shift to the physical impacts of the proposed development. As before, particular emphasis is placed on comparing future conditions on the site and in the surrounding region that are likely if the Mahukona Resort project is developed with those likely to exist at the same point in time if the plans are not implemented.

As was the case in Chapter IV, much of the discussion is broad and conceptual. The reasons for this--the absence of concrete information regarding many of the factors that determine the nature and intensity of the effects that will be produced by a given action--are similar. There is, however, a difference. Much of the uncertainty regarding socio-economic impacts expressed in Chapter IV was due to the absence of specific public plans regarding the location of the secondary growth stimulated by resort development and the difficulty in knowing with any certainty the kinds of people who would remain in the area or in-migrate as a result of the increased employment opportunities such development would generate. In contrast, limitations on our ability to predict physical impacts are related primarily to the absence of specific physical development plans, both for the Mahukona Resort itself and for secondary growth which it would stimulate. As was stated in the introduction to Chapter IV, if the General Plan amendment for this project is approved, more detailed site planning and engineering will be undertaken. Environmental studies based on these site-specific plans will be conducted and supplemental environmental impact assessments or statements prepared as deemed necessary by County and/or State agencies. More specific assessment of environmental impacts would also be required of major secondary developments.

The chapter is divided into 11 sections, each of which deals with a particular aspect of the physical environment. They are:

- Physiographic and Geologic Impacts
- Soils Impacts
- Sonic Impacts
- Biological Impacts
- Impacts on the Nearshore Marine Community
- Impacts on Historic and Archaeological Resources
- Visual Impacts
- Transportation Impacts
- Air Quality Impacts
- Water Resource Impacts
- Impacts on Public Facilities, Services, and Utilities

In general, each of the sections identifies project-related actions which could produce adverse impacts, discusses the nature of the changes that may be expected, both with and without the proposed Mahukona Resort project, and outlines steps which can be taken to mitigate those effects.

PHYSIOGRAPHIC AND GEOLOGIC IMPACTS

EXISTING CONDITIONS

Regional

Hawaii Island has been built by five individual volcanoes (see Figure V-1). In order of decreasing age they are: Kohala (5,505 feet), Mauna Kea (13,784 feet), Hualalai (8,251 feet), Mauna Loa (13,679 feet), and Kilauea (4,040 feet). The proposed Mahukona Resort would be constructed low on the leeward flank of the Kohala volcano, and flows from the first four of the five may be found within the North/South Kohala study area. Volcanic activity in the Hawaiian chain has migrated from northwest to southwest. Hence, on Hawaii Island the Kohala Volcano is the oldest and Kilauea the youngest.

Kohala Volcano has been inactive for several tens of thousands of years. Mauna Kea, whose flows cover the area just south of the Kohala Mountains has had no eruptions within historic times, but there is evidence that it has erupted within the past 5,000 years (Mullineaux, 1974:7). It is considered dormant, rather than extinct, but the probability of it erupting in any particular century is judged by the U.S. Geological Survey to be slight. Hualalai, which is situated in North Kona just outside of South Kohala, last erupted in 1800 and 1801 and can be expected to erupt again. However, as with Mauna Kea, the frequency of the eruptions is likely to be low (Mullineaux, 1974:7). Finally, the area between the Mauna Kea and Hualalai lavas is filled with flows from much more active Mauna Loa. The most recent of these is the 1859 flow that reaches the South Kohala coastline between Kiholo and Anaeho'omalu Bays.

The lavas of the Kohala Volcano and Mauna Kea have flowed together to form the Waimea saddle at an elevation of 2,000 to 3,000 feet. Similar, but higher (5,000 to 6,500 feet in elevation), saddles exist between Hualalai and Mauna Loa, and between Mauna Kea and Mauna Loa.

Mahukona Resort Site

As previously indicated, the proposed resort site is located between sea level and elevation 400 feet on the leeward side of the Kohala Volcano (see Figure II-2). The general topography is moderately sloping (eight to ten percent), with numerous relatively shallow (20- to 40-foot depth) erosional gullies transecting the parcels.

PROBABLE IMPACTS

Without-Mahukona Scenario

None of the three planned South Kohala resort developments involve major changes to the existing landforms. Earthmoving is simply too expensive for that to be feasible in an area where topographic relief occurs on a massive scale. Minor surficial adjustments will be made to improve drainage and provide adequate building sites. Some of these may involve the movement of relatively large quantities of material, but the change in surface contours is likely to be slight. Secondary growth will, with only a few possible exceptions, involve fewer physiographic changes than the resorts themselves.

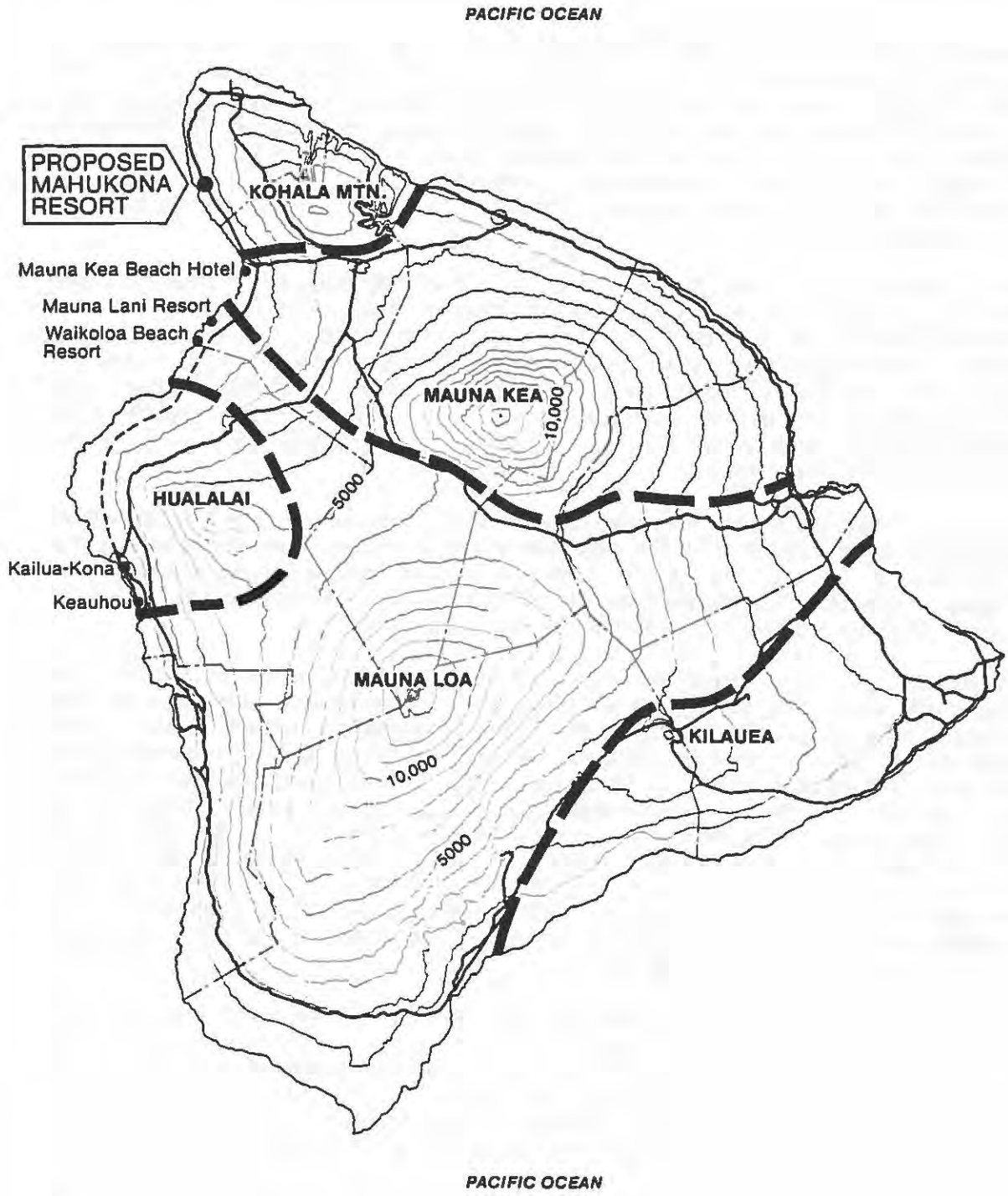


figure V-1. The Five Volcanoes of Hawaii Island

0 4 8 16
Scale in miles.

North

Figure V-2 identifies zones of overall risk from volcanic activity. With respect to susceptibility to damage from volcanic activity, two of the three planned resorts (the Waikoloa Beach Resort and the Mauna Lani Resort) appear to be in a relatively high risk area ("E" on a scale of "A" to "F" with "F" being the highest) as defined by Mullineaux (1974:51-53). Mauna Kea Properties' resort lies in zone "B" indicating that it is much less susceptible to damage from volcanic hazards. Most, if not all, of the areas where secondary growth/employee housing is likely to be built is in the lowest risk zones (A or B).

Having concluded that the risk from volcanic activity to two of the planned resort areas is relatively high, we must now qualify that by noting that it is impossible to accurately predict the severity of the risk on an absolute scale. During the historic period for which good records are available, only the lava flow of 1859 crossed the impact area, reaching the coast about two miles south of Anaeho'omalu Bay. The Keamuku lava flow, believed to have been laid down about 1750, was headed in the general direction of the Mauna Lani Resort site, but stopped about twelve miles away at an elevation of 3,000 feet.

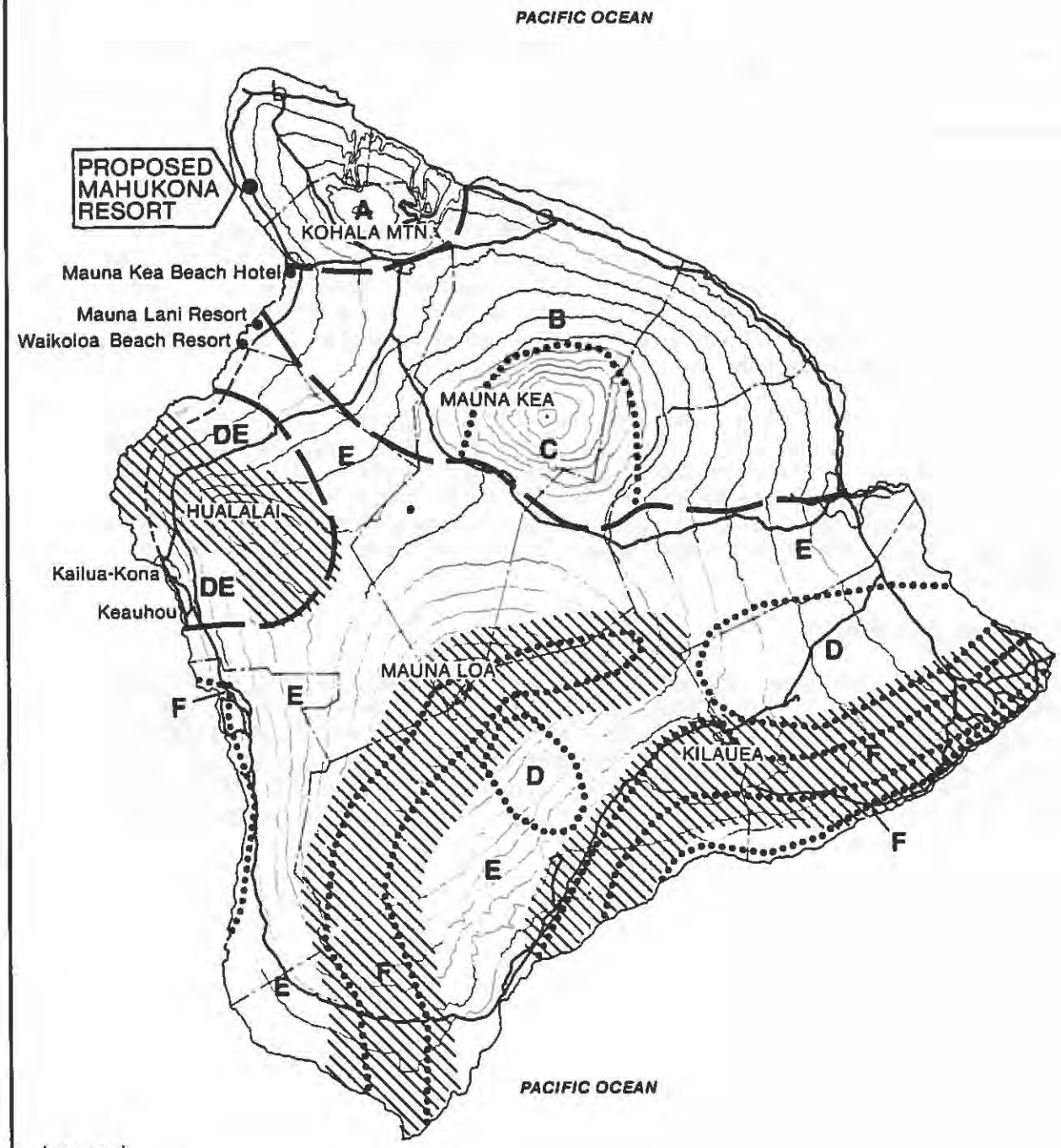
Recurrence intervals for the volcanic activity that threatens the two planned resort areas cannot be calculated from the data that is now available. However, based on the historic record, the odds are against damaging volcanic activity within the expected life-span of the two most-exposed resorts. The Mauna Kea Properties, Inc. land and the areas of likely secondary growth must be considered safe.

Earthquakes occur very frequently on Hawaii Island, but the vast majority of these tremors are small ones associated with the rapid movement of magma within the volcanoes' internal plumbing systems. It is the occasional movement of large fault blocks such as occurred near the southern tip of the island in 1868, in the Kealakekua fault west of Kealakekua Bay in 1951, and along the southeast coast of the Ka'u District in 1975 that have resulted in significant damage and loss of life during historic times. Most of the major earthquakes have occurred under the southern part of the island, but damage has also resulted from tremors centered in the north (Mullineaux, 1974:48). In response to this, the entire island has been classified as a Zone 3 area for the purpose of structural design. This is the highest in Hawaii (Oahu is Zone 1), and is surpassed only by areas such as San Francisco and Los Angeles which lie along major fault zones and are designated Zone 4.

The Hawaii County Building Code requires that all new structures be designed to resist forces that might be expected in Zone 3 areas. This, of course, does not guarantee absolute safety, but it does provide a reasonable level of protection. Persons in the study area will always be at a greater risk than if they were in a less tectonically active region, but resorts in North/South Kohala appear to be relatively less susceptible to damage by earthquakes than those situated elsewhere on the island.

Tsunamis, the other hazard of geological origin that affects Hawaii Island, strike the Kohala coast periodically. However, the wave run-ups there that have been reported from past tsunamis are modest in comparison with those recorded in most other areas of the Big Island. As a result, a design wave of less than 10 feet above mean sea level is used for the area south of Kawaihae. Somewhat higher waves have struck the shoreline between Kawaihae and Mahukona Harbor, and a design height of from 12 to 14 feet is appropriate there.

Because the ground slopes upwards as one moves inland, the building sites closest to the water at the Mauna Lani and Waikoloa Beach resorts are at nearly the same elevation as the design wave. Remaining sites at the Mauna Kea resort area are above



Legend

- Physical boundaries, approximately located
- Judgmental boundaries
- Areas possibly endangered by particle-and-gas clouds
- A — F Risk increases from A through F

figure V-2. Zones of Overall Relative Risk from Volcanic Hazards

0 4 8 16
Scale in miles.

North

this elevation. Because of this no significant tsunami hazard is foreseen as a result of currently planned resort development.

With-Mahukona Scenario

The addition of the proposed Mahukona Resort would not increase the exposure to volcanic risks except insofar as it attracts additional visitors to an island where the overall threat is likely to be greater than it is in their place of residence. North Kohala is the oldest and most volcanically inactive area on the Big Island. The likelihood of the Mahukona Resort or any of the secondary growth which it would generate being adversely affected by volcanic activity is very small. Hence, development of the proposed Mahukona Resort would not significantly increase the overall level of risk from volcanic activity.

Development of the Mahukona Resort would not significantly increase risks from earthquakes, either. As with the planned South Kohala resorts, impacts from grading activities would not be major, as physiographic changes would be slight. While the design tsunami at the Mahukona Resort site is about three to five feet higher than that at the South Kohala resorts, the land in back of the shoreline rises much more steeply as well. As a result, the potential for tsunami inundation there is even lower than is true of South Kohala.

MITIGATION MEASURES

Avoidance of high risk areas is the only means of mitigating the potential impacts associated with the Big Island's vulcanism. The proposed Mahukona Resort is in the most volcanically inactive, least earthquake-prone, least tsunami-threatened region of the island. It is the closest of any of the four major resorts under consideration to the geologically safe North Kohala communities. Hawaii County could minimize the overall risk to projected development from geologic sources by channelling secondary growth into low-risk areas.

SOILS IMPACTS

EXISTING CONDITIONS

Soils on the site of the proposed Mahukona Resort are composed of the Kawaihae very fine sandy loam series. They are extremely stony to rocky and are formed primarily of volcanic ash. Typically, pahoehoe bedrock is found at a depth of about three feet. In general, the soils are suitable for extensive pasture, wildlife habitat, and home sites. The U.S. Department of Agriculture's Soil Conservation Service (December 1973:26, plate 6) has classified them as belonging to capability classes VI and VII, i.e., as having severe limitations that make them largely or completely unsuited to cultivation. Because of the moderate slopes and physical character of the soil, it is highly erodible if exposed.

The coastal area that is the site of the three already-planned South Kohala resorts also consists largely of the Kawaihae series (see Figure IV-3). The more fertile Kamakoa series is present on the Puako flats, but barren lava fields begin just south of that and stretch for miles along the coast of South Kohala and North Kona.

Soils in the settled areas of North Kohala, i.e., in the Hawi to Niuli'i sector, belong to the Kohala-Hawi-Mahukona association. They are moderately good to good for agriculture and were formerly used extensively for sugarcane. Since the demise of the Kohala Sugar Company in the mid-1970s, large areas have either lain fallow or been used for pasture.

Soils in the vicinity of Waimea are highly variable. The flatter areas of the saddle consist largely of soils in the Waimea-Kikoni-Na'alehu association. They are well-drained sandy loams that formed in volcanic ash. These soils are susceptible to erosion and are in capability class III, i.e., have limitations that significantly affect the management practices that must be used. When properly handled, however, they can be quite productive.

PROBABLE IMPACTS

Without-Mahukona Scenario

The soils-related impacts of planned resort development are expected to be quite limited. Two of the three South Kohala resorts are on a relatively flat coastal plain with very little rainfall. As a result, the water-erosion potential during construction and subsequent operation of the resort is limited.

The Waikoloa Beach Resort site has little soil of any kind, however, wind erosion is likely to occur there during the placement of fill material imported from off-site. Similar wind transport of soil will occur, but to a lesser extent, at the Mauna Lani Resort and at the Mauna Kea Properties' land. Once the resorts are completed, the presence of irrigated landscaping should reduce erosion of all types to a minimum. The borrow area(s) used will have to be monitored and rehabilitated following termination of activities.

Use of the planned resort sites for that purpose will not directly result in the loss of any valuable agricultural land. However, secondary growth induced by resort-related economic activity could place pressures on good agricultural land in North Kohala and Waimea as homebuilders and commercial enterprises compete for the limited available

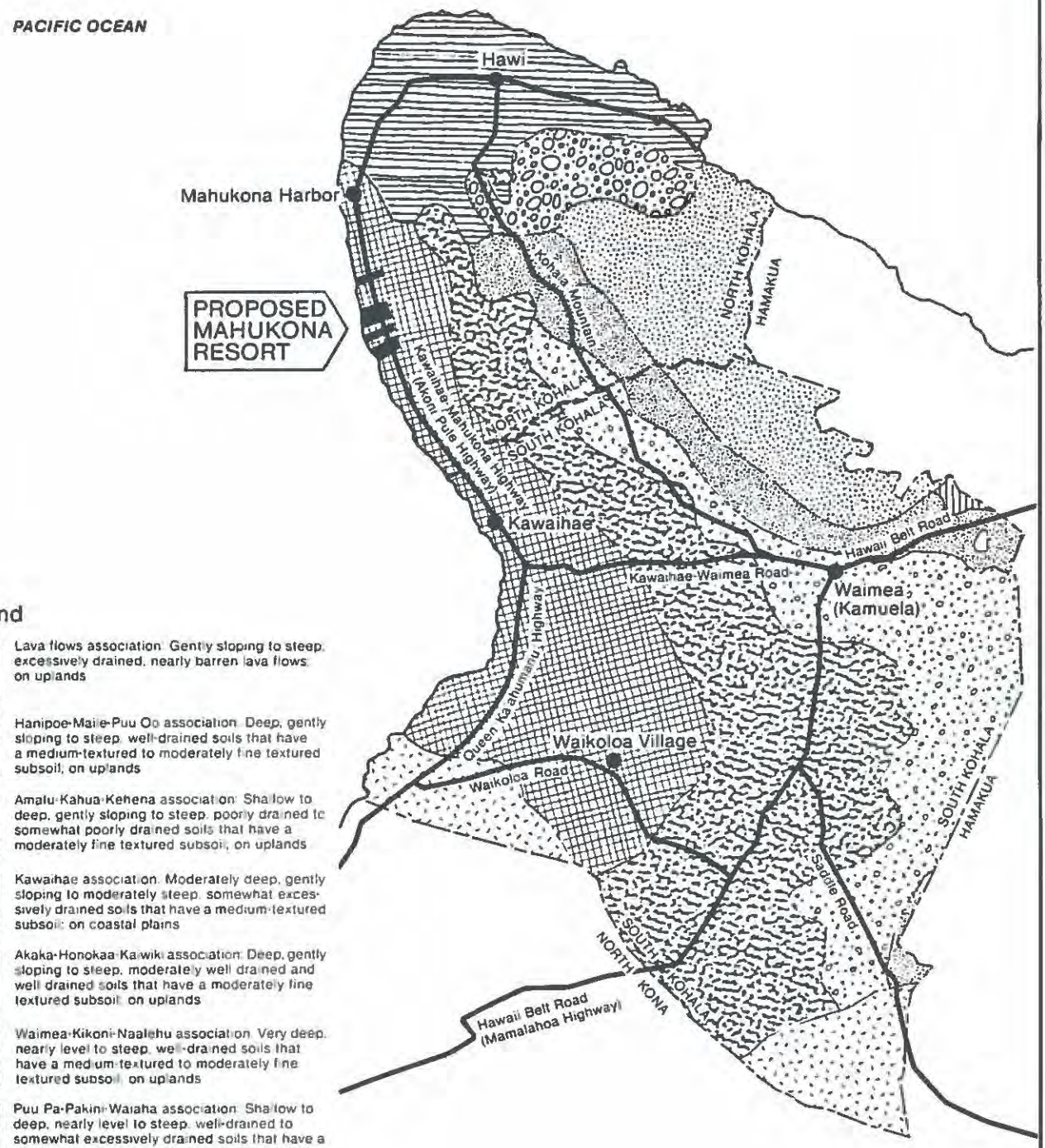


figure V-3. Soils of North and South Kohala

resource. A strong, perhaps even rigid, County policy against conversion of productive agricultural land to other purposes may be necessary to forestall this.

With-Mahukona Scenario

The site of the proposed Mahukona Resort is very poorly suited for agricultural uses of any sort except for grazing; even for that, the low rainfall and modest fertility severely limits its productivity. Hence, its conversion to resort use would not entail a significant adverse impact on the agricultural productivity or potential productivity of the County. On the other hand, the secondary growth that would be stimulated by project-related employment would, like the already-planned South Kohala resorts, involve residential and commercial development within the North/South Kohala impact area. This, in turn, could increase urban development pressures on land that is suitable for agricultural use.

Because of the Mahukona Resort's proximity to existing North Kohala communities and the former sugarcane land which surrounds them, it is likely that landowners in that area will seek to develop residential and commercial units in support of the resort. A number of proposals are already being reviewed that involve the subdivision of agricultural land (for example, the Kohala Corporation's proposal for a 350-unit single family residential subdivision on Kynnersley Road).

The extent to which the potential for conversion of good agricultural soils to non-agricultural use would actually be realized depends in large part on the land use policies that are adhered to by the County. A few of the persons in higher-paying resort-related jobs could afford to buy large parcels with agricultural zoning and use them for residences. Most people could not. Given the limited amount of appropriately-zoned residential land that is now available in North Kohala, this means that secondary growth in that district could be limited and the growth channelled instead to South Kohala. However, a supply-side growth limit such as this would almost certainly work to increase housing prices in North Kohala, and the implications of this are discussed elsewhere in this report. However, the fact remains that most secondary growth could probably be kept off of productive agricultural land if the County so-chooses. The pressures on the region's good agricultural land, much of which is in North Kohala, would be greater with the proposed resort than without it. But the difference is marginal and, in our opinion, subject to effective control.

MITIGATION MEASURES

Significantly increased soil erosion is not a likely result of either development scenario because all of the projected development is expected to utilize good soil conservation practices. All of the primary resort development that is planned would be built on land not suitable for agriculture. The location of secondary growth is undetermined at this time. However, more than enough developable land with low agricultural productivity is available within the region to accommodate the growth projected under both scenarios. Hence, the County's land use control authority can be used to mitigate potential impacts on this resource.

SONIC IMPACTS

INTRODUCTION

Activities associated with resort development and with the secondary growth that it would generate have the potential to increase noise levels within the study area. While this noise stems from many sources, vehicular traffic is by far the most important in terms of its magnitude, persistence, and geographic range. Construction noise, which is often a significant concern, is so site- and process-specific that it cannot be addressed until more detailed development plans are available, both for the Mahukona Resort itself and for the secondary growth which it would induce.

EXISTING TRAFFIC NOISE ENVIRONMENT

Land Use Suitability as a Function of Ambient Noise Levels

Because it is so highly variable over time and distance, and because humans' primary concern relative to noise is more its physiological, social, and economic effects than its inherent physical properties, numerous different scales have been developed by those attempting to measure and charcterize it. Over the past few years, the use of the "Day-Night Sound Level" (L_{dn}) has become generally recognized as the single best descriptor of community noise levels (U.S. Department of Defense, 15 June 1978; U.S. Department of Housing and Urban Development, 12 July 1979). In conjunction with this, a consensus among Federal agencies has developed that locations for residential housing are to be considered acceptable so long as the exterior noise level does not exceed 65 L_{dn}. The U.S. Environmental Protection Agency's earlier proposal that 55 L_{dn} be adopted as the limit appears unlikely to be adopted by other Federal agencies (National Research Council, 1977), but it is generally recognized as a desirable long-term goal.

Table V-1 indicates typical L_{dn} values for various types of neighborhoods. Levels of L_{dn} 60 or greater are usual along city streets whose average daily traffic (ADT) exceeds 2,500 vehicles. In city business districts, where vehicular traffic is a dominant noise source, L_{dn} values of 65 to 70 are most common.

Existing Noise Levels

Exterior noise measurements along existing roadways which would service the planned South Kohala resort developments were obtained in November 1979 as part of work undertaken for the EIS for the proposed Lalamilo Water System (Hawaii, State of, Department of Land and Natural Resources, March 1980: III-138 to III-142). These are summarized in Table V-2. Along Akoni Pule Highway in the vicinity of the proposed Mahukona Resort site, traffic noise levels at a distance of 50 feet from the roadway centerline are approximately 62 L_{dn}. Estimated traffic noise levels in Hawi and Kawaihae at a 50-foot distance from the through road are 61 L_{dn} (Darby-Ebisu and Associates, July 1980:5). A comparison of measured sound levels with those predicted using the U.S. Department of Transportation's FHWA Technical Advisory T50405.5 (September and October, 1978) indicated a very good correlation between the two. Hence, the methodology outlined therein was utilized in computing future day-night (L_{dn}) sound levels.

Table V-1. Typical Values of Yearly Day-Night Average Sound Levels for Various Residential Neighborhoods.[1]

Type of Area	Average L_{dn} (in dB)
Rural (undeveloped)	35
Rural (partially developed)	40
Quiet Suburban	45
Normal Suburban	50
Urban	55
Noisy Urban	60
Very Noisy Urban	65

1 Values shown are for areas where there are no well-defined sources of noise other than the usual transportation noise.

Source: National Research Council (1977).

Table V-2. Existing and Projected Traffic Noise Levels Adjacent to Major Arterial Roadways.

Roadway	Location	Measured L_{eq} (dB)[1]	Estimated Traffic Noise Levels By Distance From Roadway Centerline (in L_{dn})			
			Dist. From Centerline (ft.)	Existing[4]	Future w/o[4,5] Mahukona	Increase Attributable to Mahukona
Queen Ka'ahumanu Hwy.	South of Mauna Lani Resort Site	n.a.	50	63	71	
			100	59	66	<1
			200	54	62	
Queen Ka'ahumanu Hwy.	South of intersection with Waimea-Kawaihae Road	51.3	50	67	72	
			100	62	67	<1
			200	58	63	
Akoni Pule Highway	Between Kawaihae Harbor and Hawi	56.6	50	66	69	
			100	61	65	2
			200	57	60	
Waimea-Kawaihae Road	Between intersection with Queen Ka'ahumanu Hwy. & Kawaihae Harbor	55.5[2]	50	64	69	
			100	59	65	1-2
			200	55	60	
Waimea-Kawaihae Road	Between Kawaihae Village and Waimea	59.5[3]	50	66	71	
			100	61	66	1-2
			200	57	62	
Waimea-Kawaihae Road	35 mph posted speed zone in Waimea town	63.5	50	64	69	
			100	59	65	1-2
			200	55	60	
Waimea-Kawaihae Road	Near intersection w/the Hawaii Belt Road	n.a.	50	59	62	1-2
			100	55	58	
Hawaii Belt Road	Honoka'a side of intersection with Waimea-Kawaihae Road	64.6	50	62	64	
			100	57	59	<1
			200	53	55	
Hawaii Belt Road	Past Waimea commercial area towards Honoka'a	66.6	50	66	68	
			100	62	64	<1
			200	57	59	

1 From Darby-Ebisu & Associates as reported in Hawaii, State of, Department of Land and Natural Resources (March 1980: III-138 to 142). Level is measured 50 feet from centerline of roadway unless otherwise noted.

2 95 feet from centerline of roadway.

3 120 feet from centerline of roadway.

4 From State of Hawaii, Department of Land and Natural Resources (March 1980:III-140,1).

5 Note that figures shown are based on a somewhat different growth scenario than is postulated in this report. The differences are not great, however, and do not substantially affect the estimates.

Source: Compiled by Belt, Collins & Associates.

PROJECTED CHANGES IN TRAFFIC NOISE LEVELS

Traffic noise levels are a function of many things. Among the more important are the number and type (passenger car, light duty truck, heavy duty truck, etc.) of vehicles using the roadway, average vehicle speed (faster is generally noisier), and roadway grade (steeper grades result in greater noise). Up to a point, increasing traffic volume tends to result in higher noise levels. However, if traffic volumes become excessive, average vehicle speed decreases and this tends to stabilize or reduce noise levels as well. Because planned resort development, together with the secondary growth that it would stimulate, is expected to cause congestion on existing roadways if improvements are not made, the estimation of traffic noise levels is necessarily speculative. To quote from the noise study conducted for this report:

> Total project and non-project traffic volumes...are anticipated to reduce service levels, with a net effect of reducing average vehicle speeds along the roadways of interest. The net effect of these increased traffic volumes is to place an upper limit on traffic noise levels as the volumes approach roadway capacity (Darby-Ebisu & Associates, July 1980:6).

Because of these uncertainties, the traffic noise projections shown in Table V-2 should be treated as indicative rather than definitive. Nevertheless, they make at least three things apparent:

- Development already planned for South Kohala will increase noise levels on land adjacent to Queen Ka'ahumanu Highway, Akoni Pule Highway, and the Waimea-Kawaihae Road by about eight, four, and six decibels, respectively--a significant rise.

- The proposed Mahukona Resort would add only one to two additional decibels to the level projected without it, a difference that is not generally noticeable to the human ear.

- Noise levels immediately adjacent to the highway are likely to exceed the 65 L_{dn} level considered by Federal agencies as an acceptable upper limit for residential areas. Hence, noise mitigation measures will be necessary for development close to the roadway.

MITIGATION MEASURES

In view of uncertainties over traffic volumes, it is impossible to develop a definitive set of mitigation measures at this time. However, the following are representative of the kinds of actions that could be taken to minimize or avoid potential noise problems.

- Noise barriers six to ten feet high could be constructed adjacent to affected noise sensitive areas. Noise reductions on the order of three to ten decibels are possible depending upon the specific topography, lot layout, and height of affected structures. If aesthetic or other considerations preclude the use of noise barriers, sound insulation could be applied to residential or other noise-sensitive units to reduce interior noise levels to acceptable levels.

- Further development of residential units within 100 to 200 feet of the centerline of the busiest highway segments should be prohibited. In existing urbanized areas, lower speed limits should be considered. As an example, on a roadway with an hourly traffic volume of 2,000 (i.e., the maximum for a two-lane facility),

decreasing the speed from 55 mph to 35 mph reduces noise by about three decibels (Gordon, et.al., 1971:10).

- Maintenance of wide buffer zones adjacent to high traffic volume roadways in areas that have not yet been developed and realignment of those roadways where they currently pass through urbanized areas is the surest means of reducing adverse noise impacts. The State Department of Transportation has stated that the cost of realigning roadways would have to be borne by the developer in order to be considered an acceptable mitigation measure.

BIOLOGICAL IMPACTS

FLORA

Introduction

Construction of the proposed Mahukona Resort would involve the clearance of much of the existing vegetation on the resort site and its replacement with exotic grasses and landscape plants. Secondary growth stimulated by it would also result in a loss of vegetation elsewhere in the region, but in the absence of specific development plans identifying the location of this growth it is impossible to assess the significance of such land use changes at this time. Hence, it is not included in our discussion.

Readers will also note that only direct impacts on vegetation, i.e., those resulting from actual clearance of the land, are addressed here. Other topics involving vegetation, such as the effect of vegetation loss on soil erosion, or the effect that the addition or loss of vegetative screens could have on views, noise levels, air quality, or other aspects of the environment are covered elsewhere in this chapter.

Methodology

In order to obtain information regarding existing flora on the Mahukona Resort site and to evaluate the probable effects that construction of the proposed project would have on it, a vegetation survey and impact analysis was conducted by a team of biogeographers (Elliott and Hall, August 1979). Major steps in the study are outlined below.

Reconnaissance. Existing maps and aerial photographs were used to determine the general distribution, variability, and relationship to terrain of the cover types present. They were also used to locate potential field check routes. Next, a reconnaissance survey was made over a two-day period for all of the project properties and adjoining lands as necessary. During this walk-through survey, observations were made concerning zonation, structure, floristic composition (including presence or absence of endangered species), and variation of cover between properties.

Field Survey. Subsequently, a more detailed survey was initiated for the Kaiholena property because it would be the first to be developed. Detailed walk-through surveys were conducted on this property to observe characteristics of each of the existing cover types. In addition, 23 sample plots (each 30 feet by 30 feet) were established by tape measurement and compass headings along transects approximately parallel to the longer property boundaries (59°N). These plots, located in portions of the open scrub grassland, were sampled to determine the relative cover and abundance of each species. Observation on soil, substrate, slope, aspect, vigor, and structure of vegetation were also recorded throughout the field survey.

Vegetation Mapping. During the field survey, air photo signatures were verified by ground observations. This information was later used to generate biogeographic cover maps showing gross vegetation patterns and environmental relationships on each of the four properties.

Impacts Assessment. Findings of the field survey and mapping phases were combined with observations of other elements of the environment. These were then evaluated with respect to actions which may accompany resort development and operation. Finally, an assessment was made of the project's probable impacts on vegetation.

Description of Existing Vegetation Cover Types

Based on (i) the vegetative structure (height, physiognomy, stratification, and cover/abundance), (ii) the floristic composition (dominant plant species), and (iii) the habitat association (site and terrain characteristics), vegetation and land cover for the entire project area was divided into four cover types:

- o Open Scrub Grassland
- o Coastal Forest
- o Gully Vegetation
- o Rocky Shore

Appendix B of this report lists all of the plant species observed during the survey. Brief descriptions of the four cover types are presented below.

Open Scrub Grassland. This is by far the most widespread cover type on the proposed Mahukona Resort site. Open scrub grassland is characterized by moderately to widely spaced kiawe trees and shrubs which occur in association with vast rolling annual grasslands. Kiawe (Prosopis pallida) is an exotic plant species introduced to Hawaii in the 1800s. It is well adapted to the harsh, arid environment of this area and constitutes the only major tree species in open scrub grassland. The herb layer, on the other hand, is characterized by dense growths of the exotic feathery pennisetum (Pennisetum setosum)* with scattered, and occasionally pure, small stands of the native piligrass (Heteropogon contortus). Other plants common to this layer include stinkgrass (Eragrostis cilianensis), waltheria (Waltheria americana), and ilima (Sida fallax var. fallax and S. cordifolia). Table V-3 lists relative cover values for these and other species sampled in the open scrub grassland in the Kaiholena parcels. During periods of drought, most of these species die off or become dormant. Many patches of grey, dead plant material and barren soil were observed at the time of survey, and outer shoots of living plants were typically dried or yellow. The average height of the grass ranges from one to two feet; trees are commonly 15 to 25 feet high. Species less tolerant of the dry, open conditions in the grasslands tend to concentrate in shaded areas or depressions beneath larger kiawe trees. Such species include the wild spider flower (Gynandropsis gynandra), nettle-leaved goosefoot (Chenopodium murale), and hairy merremia (Merremia aegyptia).

Coastal Forest. This cover type is characterized by a dense, continuous cover of kiawe trees (30 to 40 feet in height) concentrated near or along the coast. Whereas open scrub grassland strongly resembles savannah, this cover type is conspicuously closed in its canopy and hosts a strongly shaded herb layer. Soils are deeper and more moist with occasional dense layers of organic debris (kiawe branches, leaves, seed pods). Temperatures are significantly lower than those of adjoining cover types. Although the understory is less dense, species are similar to open scrub grassland and include feathery pennisetum, nettle-leaved goosefoot, stinkgrass, waltheria, and swollen fingergrass (Chloris inflata). These species sometimes extend beyond the forest canopy to the edge of the rocky shore.

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* Note: Some taxonomists prefer to divide this grass into two distinct species--Pennisetum setosum (feathery pennisetum) and Cenchrus ciliaris (buffelgrass). The confusion arises from the fact that Cenchrus ciliaris may be a taxonomic link between the genera Cenchrus and Pennisetum. As such, it is very similar to Pennisetum setosum. However, since the issue of nomenclature is not yet resolved among taxonomists, the choice of names seems largely preferential.

Table V-3. Species List for the Kaiholena Property Open Scrub Grasslands.

Scientic Name	Common Name Hawaiian Name	Status	Cover[1]
TREE LAYER			
Prosopis pallida	mesquite kiawe	exotic	2
SHRUB LAYER			
Prosopis pallida	mesquite kiawe	exotic	+
Gynandropsis gynandra	wild spider flower honohina	exotic	+
HERB LAYER			
Grasses:			
Pennisetum setosum Cenchrus ciliaris	feathery pennisetum buffelgrass	exotic exotic	3
Heteropogon contortus	piligrass pili	indigenous	1
Eragrostic cilianensis	stinkgrass	exotic	1
Sporobolus diander	Indian dropseed	exotic	+
Chloris inflata	swollen fingergrass mau'ulei	exotic	+
Chloris radiata	radiate fingergrass	exotic	+
Eragrostis tenella	Japanese lovegrass	exotic	+
—	Dead grasses	—	1
Forbs:			
Waltheria americana	waltheria hi'aloa; 'uhaloa	indigenous	1
Jacquemontia sandwicensis	Hiiaka's little skirt Pa'u-o-hi'i-'aka	endemic	+
Sida fallax var. fallax	ilima 'ilima	indigenous	+
Sida cordifolia	pantropic sida 'ilima	indigenous	+
Sida spinosa var. spinosa	prickly sida	exotic	+
Chenopodium murale	nettle-leaved goosefoot	exotic	+
Atriplex semibaccata	Australian salt bush	exotic	+
Merremia aegyptia	hairy merremia koali-kua-huiu	exotic	+
Cucumis dipsaceus	wild spiny cucumber	exotic	+
Euphorbia hirta	garden spurge koko-kahiki	exotic	+
Exposed rock and soil	—	--	2

[1] Cover/Abundance Values:

+ sparse; small or negligible cover
1 plentiful, but less than 5% cover
2 5 - 25% cover
3 25 - 50% cover

Source: Elliot and Hall (August 1979:10 & 11).

Gully Vegetation. The widely spaced gullies in this area are characterized by taller, greener, more vigorous grasses, particularly feathery pennisetum. The shrub layer is dominated by kiawe but includes koa-haole (Leucaena leucocephala) which is conspicuously absent in the drier, more open grasslands. Other species more often found in the gullies than open areas include wild spiny cucumber (Cucumis dipsaceus), hairy merremia, and guinea grass (Panicum maximum). Soils here are more shaded and less dessicated than in outside areas. Shallow gullies (less than ten feet deep) more closely resemble adjoining open scrub grasslands.

Rocky Shore. This cover type is characterized by black lava-rock boulder beaches. The transition between coastal kiawe forest and rocky shore is abrupt, with strand or other vegetative cover conspicuously absent on most of the boulder beaches. Occasionally nettle-leaved goosefoot, Australian saltbush (Atriplex semibaccata), and swollen fingergrass occupy pockets of soil between the lava boulders.

Summary. Table V-4 summarizes the characteristics of each cover type and lists the dominant species for each. For the project area as a whole it is convenient to consider these cover types in terms of their zonal relationship to the physical terrain. Rocky shore, for example, occurs in a thin strip along the coast and at the base of low volcanic sea cliffs. coastal kiawe forest occurs in a wider strip along the coast where groundwater is available and soils transported from uplands have tended to accumulate. Finally, the steadily rising slopes of the remnant Kohala shield volcano, with its thin soils, rolling hills and rock outcrops, serve as habitat for the xerophytic open scrub grasslands; these are interrupted only by Akoni Pule Highway and the occasional gullies with their associated gully vegetation. Figure V-4 illustrates this relationship between land cover and terrain by means of a typical profile diagram.

Geographic Distribution of Cover Types

Figures V-5 and V-6 show the spatial distribution of the different cover types. The maps are based on intensive field surveys and aerial photographic interpretation (Elliott and Hall, August 1979). Brief descriptions of the flora present on each of the four properties are presented below.

Lamaloloa. With only 84 acres, Lamaloloa is the smallest of the four properties that constitute the Mahukona Resort site. More than 90 percent of this narrow strip of land is characterized by open scrub grassland. Kiawe trees and shrubs are sparser on the parcel mauka (uphill) of the the highway. The coastal kiawe forest is dense but occurs as a very narrow fringe along the rocky shore. Very few gullies cut through this property.

Kaiholena. The Kaiholena property is the largest (528 acres) of the parcel pairs in the project area, and with respect to cover and terrain, it is also the most variable. While most of this property is categorized as scrub grassland, there are many large patches of pure open grassland devoid of trees or shrubs. Like most of this region, the property exhibits rolling hills, boulders, and rock formations. There appears to be a relatively greater concentration of gullies, however, and these are significantly wider and deeper than those of the other properties. Along the coast the kiawe forest is not continuous, with some areas of open scrub grassland reaching the edge of coastal cliffs and rocky shore. The largest stands of coastal kiawe forest within the property boundaries are situated at the extreme northwest and southwest corners of the parcel.

Kaupalaoa. The Kaupalaoa property's 108 acres are characterized by rolling open scrub grasslands with very few gullies. Its coastal forest, although not extensive, is

Table V-4. Summary of Cover Types on the Mahukona Resort Site.

	Cover Type	Characteristics	Important Plant Species
1.	Open Scrub Grasslands	Vast open rolling spaces covered with grasses. Scattered trees and shrubs constitute less than 60% of total cover and give this category its savannah-like appearance.	Kiawe (Prosopis pallida) trees and shrubs, feathery pennisetum (Pennisetum setosum), buffelgrass (Cenchrus ciliaris), piligrass (Heteropogon contortus), stinkgrass (Eragrostis cilianensis), ilima (Sida spp.), waltheria (Waltheria americana).
2.	Coastal Forest	Continuous, closed canopy trees 30 to 40 feet high. Conspicuous absence of open grasslands. Herb layer highly shaded and supports sparse cover of grasses, forbs.	Kiawe trees, feathery pennisetum, swollen fingergrass (Chloris inflata), nettle-leaved goosefoot (Chenopodium murale), waltheria.
3.	Gully Vegetation	Shaded, relatively moist soils. Steep to moderate slopes, numerous boulders. Plants greener, grasses taller than in dry areas.	Kiawe trees and shrubs, koa-haole (Leucaena leucocephala), feathery pennisetum, wild spiny cucumber (Cucumis dipsaceus), hairy merremia (Merremia aegyptia).
4.	Rocky Shore	Beach comprised of black lava boulders. Conspicuous absence of plant cover. Occasional low volcanic sea cliffs.	Occasional scattered species in small pockets of soil--swollen fingergrass, nettle-leaved goosefoot, Australian saltbush (Atriplex semibaccata).

Source: Compiled by Belt, Collins & Associates from information reported by Elliott and Hall (August 1979).

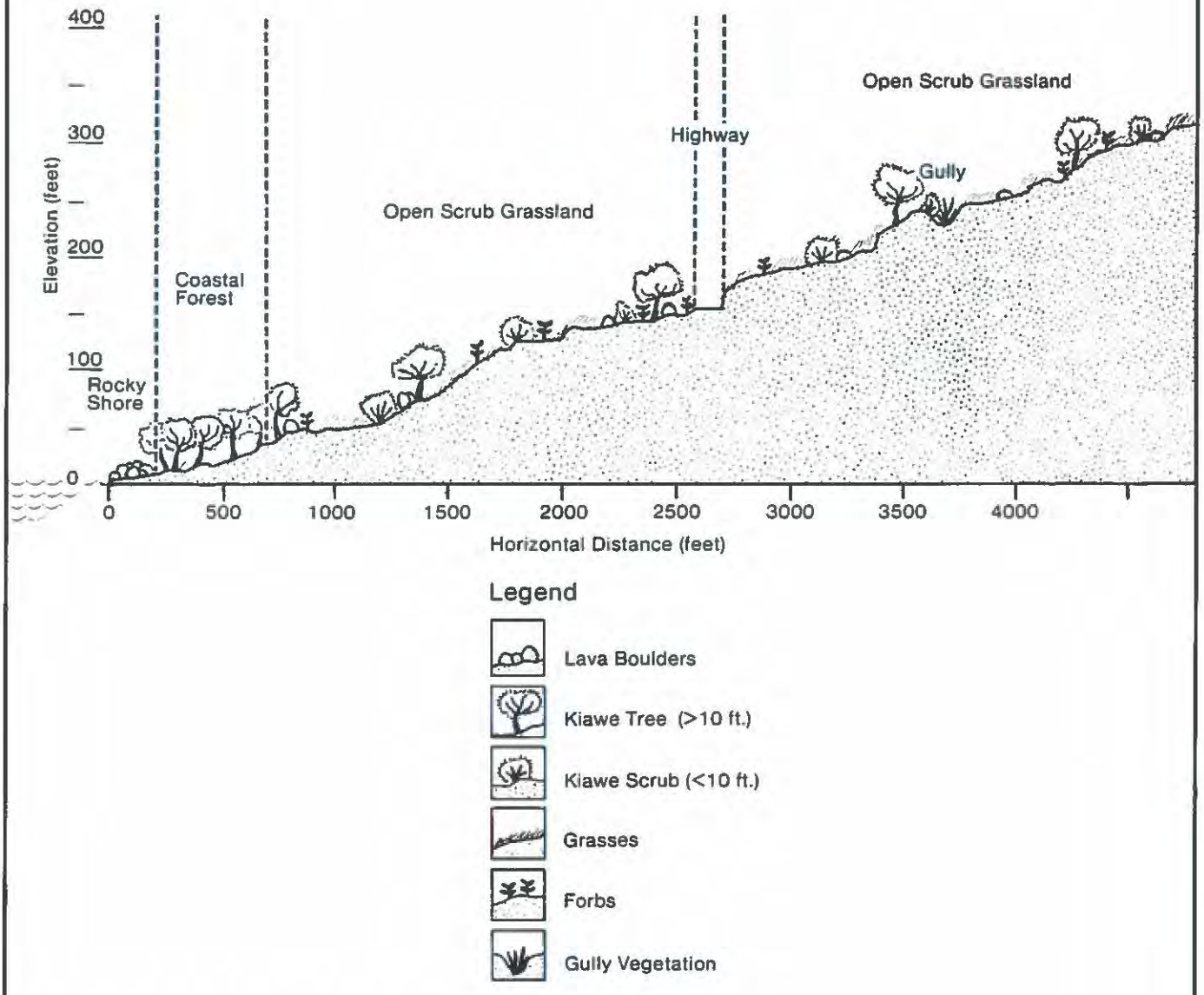


figure V-4. Typical Vegetation Profile Diagram of the Mahukona Resort Site

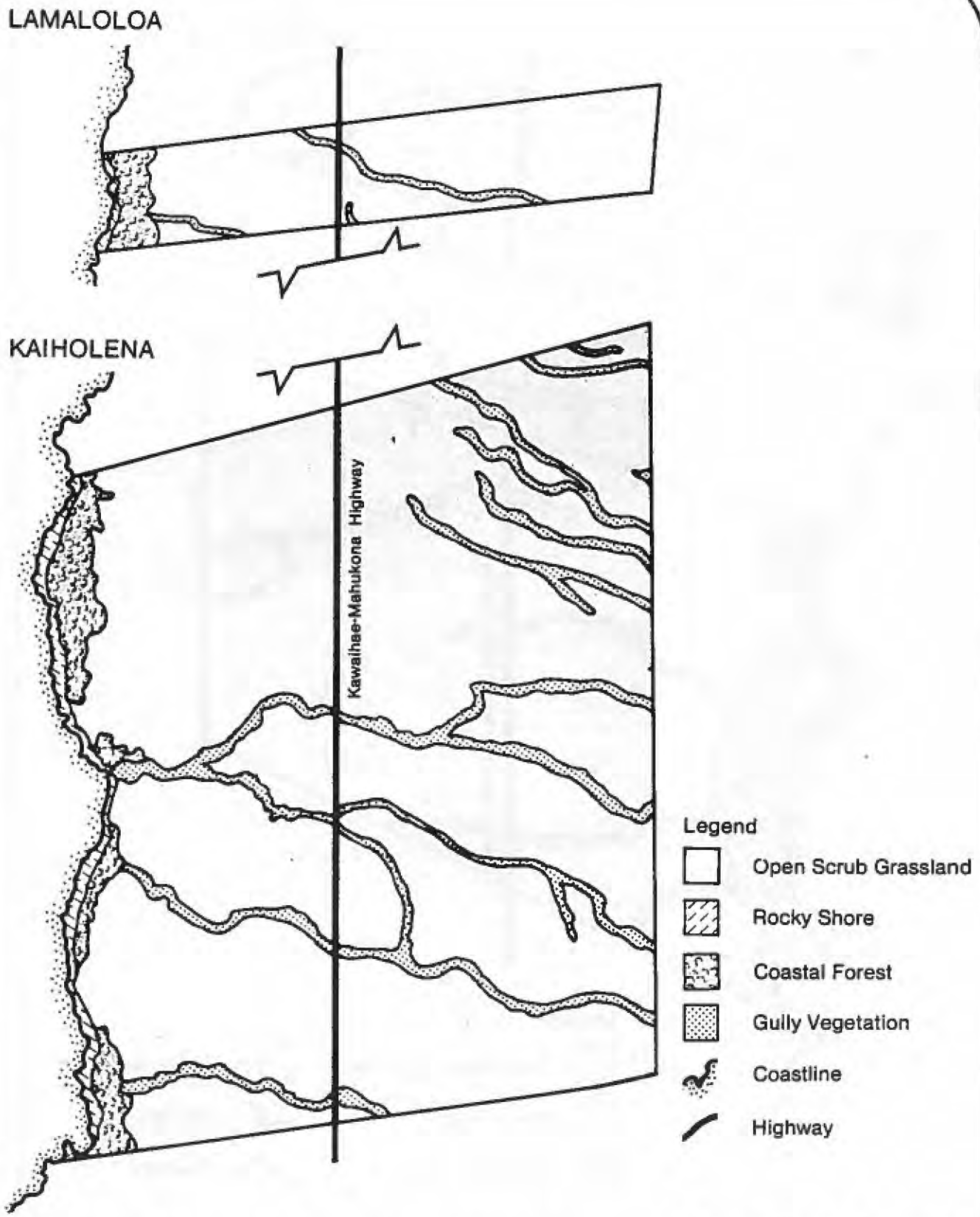


figure V-5. Vegetation Cover Types: Lamaloloa and Kaiholena Properties

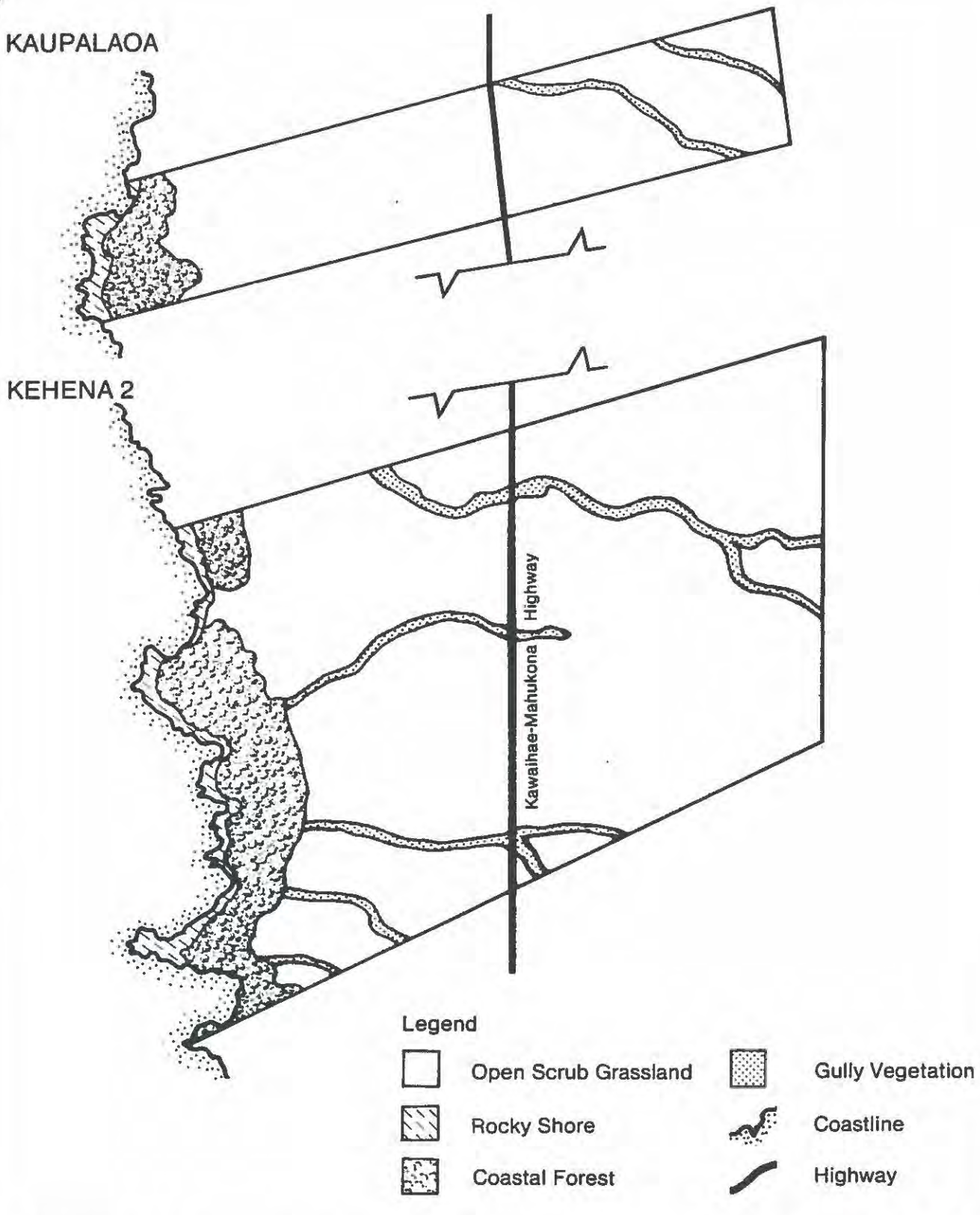


figure V-6. Vegetation Cover Types: Kaupalaoa and Kehena 2 Properties

dense and well developed in places. The rocky shore is somewhat wider here than along previously mentioned parcels. Many jeep trails cross this small parcel, and scenic vistas from the uplands towards the ocean are exceptional.

Kehena 2. The 326 acres in the two parcels that constitute the Kehena 2 property make it the second largest on the project site. It is also the southernmost of the development areas. As one would expect, the dominant cover type is open scrub grassland, but the topography is generally more rugged than that of the other properties. The gullies, however, are not as deeply incised as in Kaiholena. Numerous bays and inlets occur along the coast. Boulder beaches, though wide in places, are discontinuous. Coastal forest occurs in dense patches.

Probable Impacts on Vegetation

Construction of the proposed resort would involve extensive clearance of the existing vegetation, as well as the importation of many exotic species for use in landscaping and the establishment of grass and other new ground cover for the proposed golf course. As a result, major changes in the floristic makeup of the area may be expected.

Despite the fact that there would be extensive changes in the type and distribution of vegetation types on the Mahukona Resort site, Elliott and Hall note that even without specific site plans for the development we can be relatively sure that no <u>significant</u> direct adverse impacts on vegetation are likely to result from the proposed project:

> There is little diversity of cover types and even within cover types there is little diversity of individual plant species. Dominants are all exotics which are xerophytic, (i.e.) adopted to harsh, dry, desert-like environments. Native species are poorly represented and of these, no rare or endangered species are known to exist... While some flora will inevitably be destroyed,... these will be replaced by a variety of ornamental and non-ornamental species. Planting, fertilization, weed control, and irrigation in particular will improve the project site as a habitat for plant and consequently some animal species (Elliott and Hall, August 1979:26,33).

While they believe that direct impacts on vegetation will not be significant, Elliott and Hall (August 1979) do call attention to indirect effects that vegetation changes can have on such things as climate, soil loss and fertility, the hydrologic cycle, air quality, and aesthetics. These effects are covered in other sections of this chapter.

Mitigation Measures

As indicated above, no significant adverse impacts on vegetation are expected as a result of the proposed project. However, this conclusion is based on only a general description of development plans and a vegetation survey conducted during the dry season. Once more detailed site plans become available, these conclusions could be reviewed and, if necessary, modified. Such a review might also provide an opportunity to observe the area during the wet season when more annuals are apparent.

FAUNA

Introduction

The vegetation changes just described, together with the increased human activity that would accompany development and operation of the proposed resort facilities have the potential of affecting the area's fauna. To determine whether or not these effects are likely to be significant, a wildlife survey of the Mahukona Resort site was conducted in June 1979 by Phillip Bruner, a biologist at Brigham Young University-Hawaii. In addition to the on-site survey, background research (literature review and personal interviews with biologists familiar with this area) was undertaken as well.

The primary objectives of this study were to survey the overall avifaunal composition and usage of the area, to learn whether or not any "endangered" species were present, and, if so, to determine the extent to which they depended upon the resources of the site. A secondary goal was to investigate the feral mammals utilizing the habitat with special attention directed towards determining whether or not the "endangered" Hawaiian Bat (Lasiurus cinereus semotus) occurred there.

Observations were conducted with binoculars and by listening for vocalizations. All accessible areas were surveyed. At randomly selected sites eight-minute counts of all birds either seen or heard were taken. These counts were made in all types of habitat (open grassland, Kiawe thickets, shoreline, roadside), at different times of the day, and under slightly varying weather conditions; they provide much of the basis for the population estimates contained in this report as well as serving to indicate general distribution patterns.

Wildlife Present

Non-resident (Migratory) Birds. Only one Wandering Tattler (Heteroscelus incanus) was observed along the rocky shoreline. However, since most migratory birds had left Hawaii by May (i.e., before field work began), few sightings were to be expected. During the winter months (September to April), one would expect to find both Wandering Tattler and Ruddy Turnstone (Arenaria interpres) common along these shores. The grassland is probably too dense and tall to be utilized by inland migratory species such as the Golden Plover (Pluvialis dominica).

Resident Indigenous (Native) Birds. No resident native birds were recorded during the study. The extreme dryness of the habitat probably precludes use by most native species, but the endemic Hawaiian Owl, called Pueo (Asio flammeus sandwichensis) might be expected. Pueo are fairly common on ranchland and in forests on Hawaii Island. They have been found frequently along the Saddle Road, and also at lower elevations such as Honaunau. Some have been sighted in the Kohala coastal region.

Resident Exotic (Introduced) Birds. Bruner (1979:3) recorded a total of 14 exotic bird species in the vicinity of the project. The relative abundance and habitat preference of these species is indicated in Table V-5. Of particular interest is the relatively localized nature of some species. For instance, only small groups (two to four individuals) of Mockingbirds (Mimus polyglottus) were found on the properties planned for resort use, while further north, near Mahukona Harbor, the coastal Kiawe thickets contained flocks of more than thirty. Other exotic passerine species varied from abundant to uncommon. Of note was the fact that Common Myna (Acridotheres tristis) and Japanese White-eye (Zosterops japonica) were less common than expected. Perhaps this was due to the lack of varied vegetation and the arid nature of the habitat.

Table V-5. Relative Abundance and Habitat Preference of Exotic Birds at Mahukona Resort Site.

COMMON NAME	SCIENTIFIC NAME	HABITAT[1]	ABUNDANCE[2]
Ring-necked Pheasant	Phasianus colchicus	G,K,E	R=4
Erckel's Francolin	Francolinus erckelii	G,K,E	C
Gray Francolin	Francolinus pondicerianus	G	R=2
Japanese Quail	Coturnix Coturnix	G,K,E	U
Barred Dove	Geopelia striata	K,E,G,H	A
Spotted Dove	Streptopelia chinensis	K,E,G,H	U
Barn Owl	Tyto alba	K,G	R=3
Mockingbird	Mimus polyglottos	K,H,E	C
Common Myna	Acridotheres tristis	H,K,E	U
Japanese White-eye	Zosterops japonica	K,H,G	C
Northern Cardinal	Cardinalis cardinalis	K,H	C
House Finch	Carpodacus mexicanus	K,H	U

1 Habitat - Area most frequented. Order of most preferred or utilized begins at left.

G = Grassland
K = Kiawe thickets
H = Housing (man-made structures)
E = Edge of road

2 Abundance - Number of times observed during survey or frequency on eight minute counts:

A = Abundant (average number on 8 minute count > 10)
C = Common (average number on 8 minute count = 5 to 10)
U = Uncommon (average number on 8 minute count < 5)
R = Recorded but not on 8 minute count. Number that follows is the actual number seen or heard.

Source: Bruner (June 1979).

Of the several game species known to inhabit the area, Erckel's Francolin (Francolinus erckelii) and Japanese Quail (Coturnix Coturnix) were found to be the most common. Fish and Game personal familiar with the North Kohala area report Gray Francolin (Francolinus pondicerianus), Black Francolin (Francolinus francolinus), Chukar (Alectoris chukar), and Ring-necked Pheasant (Phasianus colchius) as common. Only two of these species were recorded during the survey, and these were seen only in low numbers.

Mammals. Although the Hawaiian Bat (Lasiurus cinereus semotus) occurs on Hawaii, it was not observed during this study and we are unaware of any records for this species at Mahukona. Most sightings of this bat have been made around Hilo and in the higher rainforests.

House Mouse (Mus musculus) and Mongoose (Herpestes auropunctatus) were abundant in the study area. In fact, the House Mouse population seemed to be at epidemic proportions. On the second day of the survey, 72 mice were counted during a 15 minute period. This figure is all the more surprising considering that this species is predominantly nocturnal.

Impacts on Wildlife

Development of the Mahukona Resort would alter the composition of the wildlife community that is present by changing the physical and floral environment in which the fauna must subsist. However, given the absence of any rare, endangered, or otherwise particularly sensitive species, it appears that the impact of the proposed project on wildlife would not be significant.

The birds and mammals that utilize the site are highly mobile and, unlike the vegetation that is present, would not be destroyed during site clearance operations. However, since adjacent undisturbed areas are probably already at their carrying capacity, it should not be assumed that there would be no decrease in the population of individual species as a result of the proposed project. On the contrary, significant changes in species composition should be expected as the animals adjust to changed conditions. Species which will probably exhibit an increase in their current population with the advent of new housing and introduced vegetation are Warbling Silverbill, House Sparrow, White-eye, and Myna. Game bird populations should be expected to decline with loss of habitat and the influx of dogs and cats that usually accompany housing developments.

While no Pueo were recorded on the site, it is a likely foraging area for this species, especially considering the large number of rodents (the Pueo's primary food) that were observed there. Development on the approximately two square miles of the Mahukona Resort site would reduce the Pueo's habitat, and perhaps population, as would new housing areas resulting from resort-related population growth. However, it should be noted that the habitat range of the Pueo is extremely broad as it "appears to be tolerant of wide climatic extremes" (Berger, 1972:93) and that the overwhelming majority of its Big Island habitat would remain.

Mitigation Measures

No endangered or native species are known to inhabit the site of the proposed resort, although the Pueo has been sited on occasion in similar habitats elsewhere in the region. To mitigate impacts on game birds and Pueo as much of the natural grassland and Kiawe forest as possible should be retained, as these species rely on this kind of habitat, as opposed to manicured lawns and other resort landscaping, for cover and foraging.

IMPACTS ON THE NEARSHORE MARINE COMMUNITY

Introduction

The parcels that make up the site of the proposed Mahukona Resort are bordered by approximately 10,000 feet of coastline and adjacent nearshore reef which supports a rich marine community. While the proposed resort development would have no direct effect on this area, changes in runoff volume and water quality would probably occur that have the potential of creating adverse impacts if particularly sensitive marine communities are present. Because of this, a survey of the nearshore area was commissioned as part of this study (Dollar and Boucher, November 1980). The purpose of the analysis was:

- To identify any resources present that may be of significant commercial or recreational value or that represent rare or unique ecological features susceptible to adverse effects from the proposed development;
- To estimate the significance of changes that are likely to occur; and
- To help determine an appropriate methodological approach for the future evaluation of project-related changes.

It must be emphasized that the absence of specific site plans made it necessary to work at a very conceptual level and that a review of the conclusions presented below will be necessary once additional information regarding the proposed development becomes available.

It must also be noted that the discussion limits itself to the area fronting the Mahukona Resort site. Secondary development generated by resort-related employment also has the potential for affecting the marine environment, but, in the absence of specific knowledge regarding its location and character, it is impossible to characterize this impact at the present time.

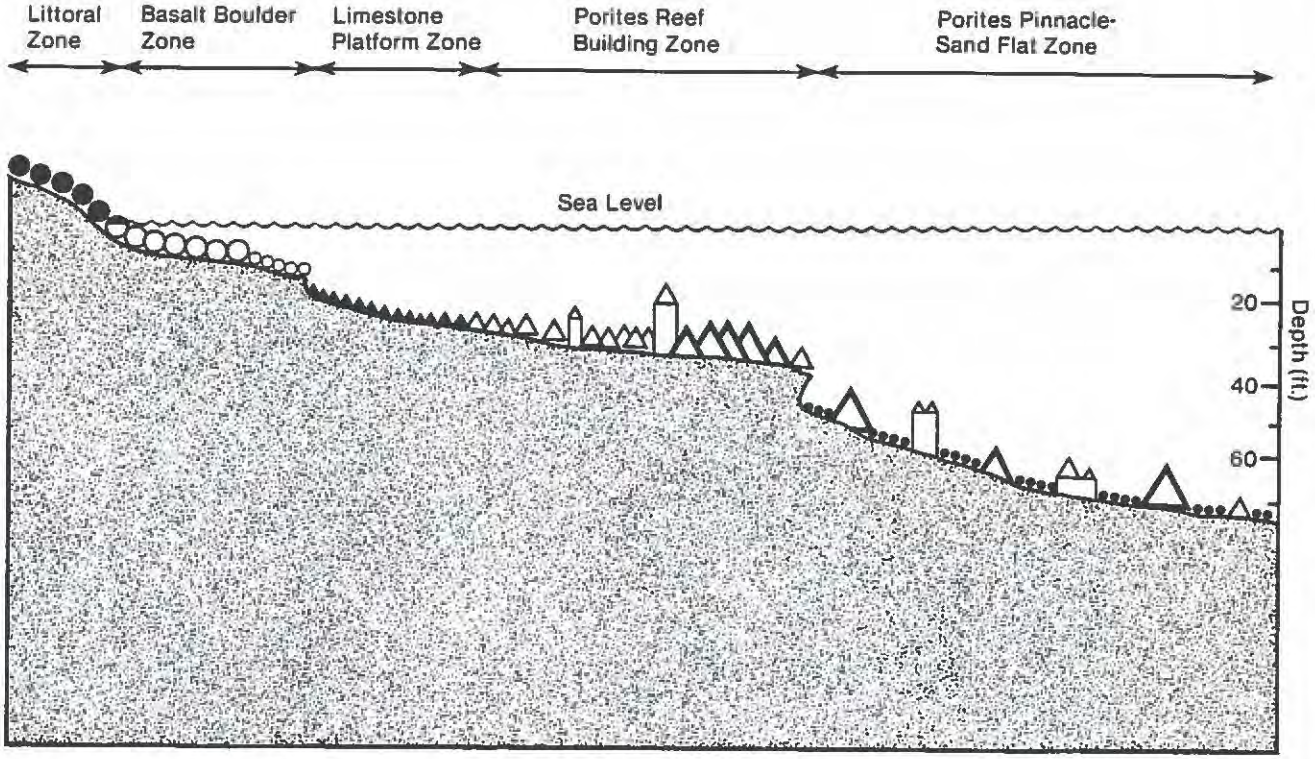
DESCRIPTION OF THE MARINE COMMUNITY

Physiography

The physical structure of the shoreline and reef platform fronting the Mahukona Resort site is shown in Figure V-7. It is characterized by an accumulation of limestone on a volcanic basalt basement complex. From a physiographic standpoint, the reef can be divided into the following five zones:

Littoral Zone. The littoral zone encompasses the area between the low-tide mark and the upper reaches of the wave-splash zone. Lava headlands consisting of jagged, barren lava platforms dotted with tide pools separate a series of small bays and give the coastline a scalloped appearance when seen from overhead. The bays generally contain small beaches made up of rounded basaltic boulders mixed with scattered bleached limestone cobbles.

Basalt Boulder Zone. The boulders that comprise the littoral beaches extend below the low tide mark and form the first true benthic (bottom) zone. These well-rounded boulders change in color from black above the water line to pinkish-white below due to a solid covering of encrusting coralline algae. This zone extends to a depth of 10 feet and a distance of 25 to 30 feet offshore. At the seaward edge of the boulder zone is a



Legend

- Exposed Boulders
- Submerged Boulders
- Limestone Pavement
- Live Coral Colonies
- Basalt Blocks
- Sand

figure V-7. Typical Coral Reef Zonation Pattern at the Mahukona Resort Coastline

vertical drop of about eight feet. This drop-off is composed of an undercut ledge that may represent a submerged shoreline. Off the lava platform headlands, the boulder zone is replaced by short vertical basalt cliffs. It is of interest that these headlands extend seaward below water level as narrow flat-topped fingers.

Limestone Platform Zone. Seaward of the drop that abruptly marks the edge of the boulder zone, the bottom consists of a flat, barren limestone platform, from 20 to 30 feet wide, lying in 18 to 25 feet of water. This platform is also covered with coralline encrusting algae. The major topographic feature of this area is a honeycomb of shallow pits dug by the burrowing activity of several species of sea urchin. The relative paucity of fauna in both this and the previous zone is due to physical stress associated with storm waves breaking on the shallow reef.

Porites Reef-building Zone. At a depth of approximately 25 feet, live coral colonies become the dominant bottom cover and form a solid carbonate reef platform. Numerious cube-shaped basalt extrusions and boulders are scattered over the platform. The tops of these are generally covered with live coral. Small patches of white calcareous sand were infrequently observed in this region. The terminus of this zone was marked by a second undercut step-ledge eight feet high.

Porites Pinnacle/Sand Flat Zone. Seaward of the second ledge the substrate is predominantly fine white calcareous sand. Interspersed on the sand bed are numerous living coral pinnacles or mounds, as well as basaltic slabs and boulders. Many of these coral mounds are large pyramid-shaped Porites lobata colonies. As one moves seaward these coral mounds gradually become less abundant until at a depth of 80 feet they cease to occur and the substrate consists entirely of white sand.

Corals

One of the most important components of the tropical benthos is the scleractinian, or stony corals. These animals play a keystone role in that they are major contributors to the physical structure of the reef, provide food and shelter for other species groups, as well as provide a protective barrier to shoreline erosion. Species assemblage characteristics of coral communities are also known to be accurate indicators of natural environmental conditions as well as pollution since they are adversely affected by wave stress, turbidity, siltation, and changes in salinity. Hence, corals are very useful in evaluating reef community structure.

During the course of the survey conducted for this study (Dollar and Boucher, November 1980), no corals were observed in the littoral or inshore basaltic boulder zones. Only small, scattered encrustations of Porites lobata and Pocillopora meandrina were present in the limestone platform zone. This paucity of corals is apparently due to the heavy wave stress that occurs in these shallow areas.

In contrast to the very small amount of living coral present in the littoral and inshore basaltic boulder zones, corals are the dominant physiographic, as well as biological feature, of the Porites reef-building and Porites pinnacle/sand zones. Large hemispherical and pyramid shaped colonies of Porites lobata and dense thickets of branching Porites compressa blanket the ocean floor in the zones of active upward reef accretion. While the coral cover is high, species diversity is uncommonly low, with only four species other than Porites encountered.

In general, Porites is the most succesful competitor on Hawaiian reefs. When conditions suitable for its growth persist with relatively little disturbance, it can

displace other species of corals through substrate monopolization. Its dominance in the reefs at Mahukona suggest that they have developed in an environment where a low frequency of large-scale wave disturbance and absence of major fluctuations in water quality have allowed the coral community to reach an advanced successional stage. This conclusion is also supported by the fact that there is no Pocillopora-dominated zone in the offshore waters at Mahukona. Pocillopora is known as a "fugitive species" because of its ability to occur commonly in areas that are too harsh for other species. The relative abundance of Pocillopora is a useful biological indicator of natural wave stress. This species was infrequently observed on the limestone platform and the few colonies of this species noted in the reef-building zone were all in the process of being overgrown by Porites thickets. In addition to those noted above, other coral species that occurred frequently (under ledges or outcrops) were the ahermatype Tubastrea coccinea and the antipatharian Cirrhipathes anguina. Pavona varians, Montipora verrucosa, Palythoa Tuberculosa and Porites (Synaraea) convexa were also noted on the reef platform.

Benthic Invertebrates

The macrobenthic invertebrate community in the vicinity of the Mahukona Resort is a exceptionally rich and diverse, relative to that found elsewhere along the West Hawaii coast and elsewhere in the Hawaiian archipelago. A total of 80 species were observed by Dollar and Boucher during their 1980 field survey (see Appendix C). Molluscs (46 species) and echinoderms (21 species) were the dominant components of the benthic fauna.

In the littoral zone, the molluscs Littorina pintado, Nerita picea, and Cellana sandwichensis (opihi) are abundant; they form a typical littoral moluscan assemblage clinging onto the basalt substrate where they feed upon algae and detritus. A pulmonate limpet (Siphonaria normalis) was occassional in the intertidal zone, and the armored sea urchin (Colobocentrotus atrata) is very abundant at the zero tide level. The basalt shoreline of this region is riddled with honeycombs bored by the sea urchins Echinometra mathaei and Echinometra oblonga, both of which are very common. The cowry Cypraea caputserpentis, the sea cucumber Actinopyga mauritiana and the crab Grapsis grapsis are also present.

Due to the high wave stresses characteristic of the basalt boulder zone, corals which provide shelter for other invertebrate species are absent, and habitat diversity is low. Consequently, the invertebrate fauna diversity of this region is low and restricted to organisms capable of withstanding high wave energy. Among the sea urchins, Echinometra mathaei, Echinometra oblonga and Tripneustes gratilla are extremely abundant, while Heterocentrotus mammillatus and Echinostrephus aciculatus are occasionally found tightly wedged into crevices. Echinothrix diadema is also prominent. Filter feeders such as barnacles and the tube-dwelling Dendropoma sp. and molluscs such as Drupa morum, Morula uva, Chama iostoma, and Cypraea maculifera, all typically associated with regions of high wave energy, are found here.

Though still somewhat barren, the diversity of macrobenthic invertebrates increases in the limestone platform zone, apparently due to deeper water and less wave stress. The sea urchins mentioned above continue to predominate. Heterocentrotus mamillatus becomes more abundant while Echinometra oblonga diminish. The long spined urchin Echinothrix calamaris occurs abundantly on the reef flat as do the

sea stars Linckia guildingii and Linckia multiflora. Mollusc species associated with hard substrate with sand pockets, such as Conus textile and Conus ebraeus are seen, as are Drupa morum and Morula uva.

The wide range of habitats found in the Porites lobata reef building zone--live coral, sandy substrate, coral rubble, ledges, and caves--each support a characteristic faunal assemblage:

- Live coral regions contain a wide variety of animals. In addition to those already mentioned, Acanthaster planci (the crown-of-thorns starfish), Coralliophillia violacea (a gastropod mollusc), and Spirobranchus gigantea (a ploycheate worm) are abundant. The brittle stars (Opihiocoma spp.), sponges such as Clathrina sp. and hydroids such as Halocordyle disticha inhabit the interstitial spaces of live corals.

- Regions of dead coral rubble support a very diverse population of molluscs. Among species highly prized by collectors are the cowries Cypraea helvola, Cypraea isabella, Cypraea talpa, and the endemic Cypraea gaskoini, Charonia tritonis (Triton's trumpet), Conus textile, Tonna perdix, Cymatium pileare, Bursa cruentata and Casmaria erinaceous. Bivalves such as Trapezium oblongum and Tellina elizabethae were observed wedged into rubble crevices. The sponge species Spirastrella vagabunda and Chondrosia chucalla are occasionally found encrusting the substratum. Nudibranch mollusc species Hexabranchus sanguineus and Phyllidia varicosa, which prey upon sponges, were also noted in this region, as were the sea urchins Echinometra mathaei and Eucidaris metularia, the pincushion starfish Culcita novaeguinae, and mollusc species such as Swainsonia newcombi and Latirus nodatus.

- Ledge and cave fauna included several species of sponges and hydroids, as well as oysters (Spondylus sp.) and the slipper lobster Arctides regalis. Chondreocidaris sp. was infrequently observed in ledges at depths exceeding 20 meters. This observation was significant since this species of sea urchin is only rarely found in shallow reef habitats. Bryozoan species such as Lichenopora sp., Holoporella sp. and Triphyllozoan hirsutum were seen encrusting the ledges and cave walls.

- Invertebrate species found in sandy areas of the Porites lobata reef-building zone are the same as those found in the sand and coral mound zone discussed below.

In addition to invertebrates associated with solid substrata, species typically found in sand are present in the Porites pinnacle/sand flat zone. Molluscs predominating in this region were found by fanning sand tracks. The auger shells Hastula lanceata and Hastula penicillata, the miter Imbricaria olivaeformis, and the cerithid Rhinoclavis sinensis live in sand pockets, where they feed upon polychaete worms and hemichordates. Filter feeding bivalves such as Trachycardium orbita, Haumea juddi and Pinna muricata occur occasionally. Echinoderms such as the sea cucumber Holothuria atra, sea urchin Pseudoboletia indiana and heart urchin Clypeaster reticulata are also present.

Reef Fishes

Diversity of reef fish is generally positively correlated with topographic relief of the substrata and the stability of the environment. The large number of different zones, or habitats, as well as the highly complex vertical relief associated with the coral platforms, lava structures and undercut ledges present along the Mahukona shoreline support a highly varied fish fauna. The relative stability of the offshore environment,

i.e., the infrequency with which the fish are subject to the stress of high wave energy and/or major fluctuations in the physio-chemical quality of the water, has also allowed highly complex and specialized fish-habitat interactions to evolve there. As a result, the reef fish assemblage at Mahukona is very diverse, and a total of 76 different species were observed during the brief survey conducted for this report (see Appendix C).

In addition to being very diverse, the reef fish population in the vicinity is relatively high. This appears to be a function both of the diversity of habitats already mentioned and of the relatively low fishing pressure that results from the area's remote location and difficult access. The absence of significant fishing pressure is evidenced by the abundance of individuals that are highly regarded food species such as goatfish and squirrelfish. Also, species considered to be highly desirable aquarium fish were abundant here, in contrast to Kona reefs where aquarium fish collecting is a profitable cottage industry.

Benthic Algae

In general, the seaweed flora of the Mahukona area is sparse and is monopolized by a few species (see Appendix C). This depauperate species assemblage is typical of the west coast of the island of Hawaii. Foliose algal species, whose presence is indicative of highly variable conditions, were predominant only on the limestone reef flat where there is a constant movement due to wave action. They were rare in the low-energy environment farther offshore.

The most noticeable algal species of the intertidal zone are those growing at zero tide level directly exposed to the force of incoming waves. Pterocladia capillacea and Ahnfeltia concinna form a dense algal fringe at zero tide level. A small amount of Ulva fasciata or "sea lettuce" was observed on exposed basalt. The most abundant species present was Porolithon onkodes, a coralline alga, which forms a dense pinkish crust covering the rocky basalt faces and boulders of the intertidal zone.

In the intertidal zone Pterocladia caerulescens forms a dense green mat where it grows upon rocks in tidal pools. The branching, calcareous Jania sp. was found growing intertwined with the Pterocladia mat. Amansia glomerata and Valonia aegagropila were uncommon in tide pools.

Subtidally, the crustose coralline species Porolithon onkodes and Hydrolithon sp. were found encrusting virtually every exposed surface. In the subtidal boulder zone Porolithon onkodes formed a crust over the basalt boulders and the shells of barnacle and mollus species living there. Hydrolithon sp. was abundant on the limestone reef flat and covered coral rubble in the deeper habitats. Foliose algal species were extremely rare in the deeper coral-dominant zones.

IMPACT OF THE PROPOSED MAHUKONA RESORT

As mentioned in the introduction, the absence of detailed site and infrastructure plans for the proposed Mahukona Resort makes it impossible to perform an in-depth analysis of the project's potential impacts on the marine biological community at this time. However, the information that is available is sufficient to reach some general conclusions regarding such effects, and these are discussed below.

Relative Quality of the Marine Community

In the opinion of Dollar and Boucher (November 1980:15),

> The reef communities at Mahukona represent some of the most pristine and diverse invertebrate and fish assemblages in the Hawaiian Islands. Reef coral diversity is low but percent bottom cover is high, indicating competitive monopolization resulting from highly predictable conditions. The sum of these factors is a particularly interesting and beautiful Hawaiian coral reef that will add useful recreational and aesthetic resources to the planned development.

A survey conducted as part of an earlier study by the State Department of Land and Natural Resources (1975) included the shoreline area fronting the northernmost of the parcels on which the proposed Mahukona Resort would be built. The report reached a similar conclusion:

> Coral growths (sic) was luxuriant...in many other areas along the Lapakahi coastline. In terms of color, abundance, variety of form and shape, the coral growth at Lapakahi rivals that found at Kealakekua Bay Marine Life Conservation District and Underwater Park in Kona. The variety and numbers of fishes at Lapakahi are also equal to, and in some instances better than, what was present at Kealakekua Bay before it was established as a Marine Life Conservation District. (Hawaii, State of, Department of Land and Natural Resources, 1975:5).

Results of this and earlier surveys led to the establishment of the Lapakahi Marine Life Conservation District in February 1979. The waters fronting Lamaloloa (the northernmost of the Mahukona Resort parcels) were placed within subzone B of the District, confirming Dollar and Boucher's assessment of its values.

Probable Impacts

Studies conducted for this report indicate that the biological communities present in the offshore areas along the resort site are highly adapted to relatively stable and benign environmental conditions (e.g., low sedimentation and turbidity, constant salinity, etc.). This, in turn, suggests that they are relatively sensitive to changes in these factors that are beyond the normal range. In other words, it indicates that physical development that alters these conditions could produce a relatively large change in the structure of the biological community.

Having concluded that the reef community at Mahukona is rather susceptible to change (but not necessarily destruction) if the physical environment in which it exists undergoes much modification, it is now necessary to consider whether such modifications are likely to occur as a result of the proposed Mahukona Resort.

The proposed project does not involve any direct physical or chemical modifications to the nearshore environment. Hence, there would be no physical disruption of the existing habitat and, more importantly, no changes that would affect the amount of wave energy (the primary determinant of reef community structure) striking the shoreline. In the absence of an ocean outfall for treated sewage effluent or gross over-fertilization of the proposed golf course and landscaping, none of which are expected, the proposed resort development would not have a significant effect on water chemistry. In view of the above, the only possible effect of development

activities that is of concern is increased erosion and sedimentation resulting from land clearance and grading operations and from changed land cover and drainage patterns.

The amount of erosion that will occur on any given piece of land is a function of many factors. The most important of these are the slope, the characteristics of the soil itself (particle size, cohesiveness, permeability, etc.), the type of ground cover present, and the intensity and frequency of the rainfall that may be expected to occur. The slope on the Mahukona Resort site is moderate and the erodibility potential of the soil (a shallow, very fine sandy loam) is relatively high. On the other hand, the permeability of the soil (as measured in laboratory tests, not in situ), is moderately high (from 0.63 to 2.0 inches per hour) and both the average rainfall (10 inches per year) and the most intense storm rainfall (1.5 inches per hour for the 100-year, one-hour event) are comparatively low (U.S. Weather Bureau, 1962:22). As a result, the potential for damage to the marine environment from the proposed project is slight. So long as normal precautions are followed during grading and site preparation, construction of the proposed resort is unlikely to increase sedimentation rates to the point where the existing marine community would be seriously altered.

One additional effect may result indirectly from the proposed project. By making shoreline access much easier, the Mahukona Resort would almost certainly increase the number of local fishermen exploiting the area's resources. This would result in a decline in the populations of desirable food and commercial species. (Note that, assuming reasonable enforcement of the State regulations governing the Lapakahi Marine Life Conservation District, the area fronting Lamaloloa, the northernmost of the parcels, would be largely protected from this impact.) Visitors interested only in viewing the magnificent concentration of tropical fish that is now present may view the decline in population as an adverse impact. Local residents whose families would benefit from the availability of these rich fishing grounds would view the change favorably.

IMPACTS ON HISTORIC AND ARCHAEOLOGICAL RESOURCES

INTRODUCTION

In earlier times, Kohala supported a large population of aboriginal Hawaiians. They left behind them rich evidence of their culture, evidence that anthropologists have only recently begun to explore. One of the most significant research programs has focused on Lapakahi, just a short distance to the north of the proposed Mahukona Resort site, and material uncovered there made it evident that development activities on the Mahukona Resort property had a high probability of disturbing valuable archaeological remains there.

In addition to the direct effects that construction of the proposed resort project could have on archaeological resources situated on-site, it could also indirectly impact archaeological resources both on adjacent lands and in the larger region. Access to parcels between and adjacent to the proposed development would be made easier as a result of the resort project, and an increase in the number of people using these areas could lead to the disturbance or destruction, intentionally or unintentionally, of archaeological resources. The secondary growth spurred by the project could also impact archaeological sites elsewhere in the region. However, since the exact location of this induced future growth is not known, these indirect impacts cannot be assessed until development approvals are being sought for support housing and other secondary growth projects. Because of this, the discussion in this section focuses only on archaeological resources within the proposed Mahukona Resort site.

ARCHAEOLOGICAL RESEARCH ON THE PROPOSED RESORT SITE

Prior to the present development proposal, very little archaeological work had been done on the Mahukona Resort site. The 1972 Statewide Inventory conducted by the State Parks Division of the Department of Land and Natural Resources (DLNR) contained far too little information to allow an assessment of the impacts of the proposed project. Therefore, an initial archaeological walk-through surface reconnaissance survey was conducted in June 1979 by the Bishop Museum Department of Anthropology (Sinoto, August 1979) in order to gain a better understanding of the resources that were present.

The results of this reconnaissance survey not only reconfirmed the existence of a significant number of sites, "but also located additional, previously unrecorded sites, and provided preliminary insights into significant variations in morphological types and differential spatial distributions" (Schilt and Sinoto, January 1980:8). Recommendations from this survey called for progressively intensive archaeological investigations, with both long-range and incremental phase objectives.

Based on the results of the reconnaissance survey and discussions with representatives of Mahukona Properties, the Bishop Museum staff then conducted a limited "Phase I" archaeological survey of the site (Schilt and Sinoto, January 1980). Note that, as used here and in their report, "Phase I Survey" refers to the fact that the survey is the first of a proposed [by the Bishop Museum] series of investigations on the Mahukona site. While the property slated for development during the first phase of the development schedule (Kaiholena) was studied most intensively, the survey encompassed all of the acreage covered by the present proposal. Within Kaiholena, precise plane-table and instrument locational mapping of all surface remains was undertaken. The scope of work for the other three properties--Lamaloloa, Kaupalaoa, and Kehena 2--called for only the accurate delineation of site or cluster perimeters. Time constraints did not

allow an adequate instrument locational survey of the mauka parcels of these properties. The makai parcels were given priority because the reconnaissance survey indicated that they contained a greater number of sites.

The purpose of the Phase I archaeological work was to carefully identify the existing remains, to define further necessary work, and to help establish a mitigation program for the proposed resort development. Research objectives entailed establishment of a tentative formal classification, based on morphological site types in the Kaiholena property, which would be applicable to the other properties as well.

FINDINGS OF PHASE I SURVEY

The Phase I survey designated 24 discrete sites and 21 site clusters within the makai parcels of the three properties not scheduled for immediate development as "restricted areas". It recommended that further work be done on these parcels before site plans are drawn. Table V-6 shows the resources recorded in the Lamaloloa, Kaupalaoa, and Kehena 2 makai parcels.

A total of 270 sites (18 in the mauka parcel and 252 in the makai parcel) (Schilt and Sinoto, n.d.:1) were identified within Kaiholena, the first of the properties scheduled for development. The location and characteristics of these sites were recorded and they were classified on the basis of the structural morphology of the surface remains. As indicated in Table V-7 the sites range in complexity from natural salt pans and simple single-stone modifications to elaborate, multi-featured compound structures.

In general, the mauka parcel of this property exhibits characteristics of the mid-elevation intermediate zone identified at Lapakahi (Newman 1970:9). A predominance of small crude sites in low numbers, and the frequency of trails suggest temporary utilization of this area as a link between the coastal settlement and the inland agricultural lands. The most frequently represented site types in the mauka parcel are ahu and C-shape structures. The trails that do occur have been extensively disturbed at some time in the past, and only partial segments are present. There are two parallel segments which are atypical since they are oriented north-to-south (i.e., parallel to the coast) rather than in the common mauka-makai pattern.

The sites in the makai parcel of Kaiholena are generally characterized by their large size, elaborate construction, and the frequent occurrence of accessory features such as salt pan/water catchments and bait cups. The predominant site types are ahu (45), C-shapes (52), enclosures (33), platforms (19), and compound structures (43). In terms of spatial distribution, the coastal sites exhibit a continuous dense pattern from sea level to a 100-foot elevation (about 100-150 meters linear distance inland). The large number of extensive midden scatters suggests that the area was intensively used by the aboriginal Hawaiians. Sites and site complexes of particular interest in the makai portion of the Kaiholena parcel are:

- A unique, extensive complex of ahu and modified outcrops, numbering more than 70;
- A remarkably well-preserved square enclosure surrounding what is probably a stone-lined well;
- Two large platforms located well above the typical elevations for the more elaborate structures; and

Table V-6. Summary of Archaeological Resources Located in the Makai Parcels of the Kaupalaoa, Kehena 2, and Lamaloloa Properties.[1]

Property Name	Resource Type	No. of Examples Recorded
Kaupalaoa	Enclosures	2
	C-shapes	2
	Remnant structure	1
	Alignment	1
	Ahu	1
	Clusters of sites	6
Kehena 2	Enclosures	6
	C-shapes	2
	Platforms	5
	U-shapes	2
	Disturbed structure	1
	Clusters of sites	8
Lamaloloa	Enclosure	1
	U-shape	1
	Clusters of sites	7

[1] Time constraints did not allow thorough investigations of the mauka parcels. Priority was given to the makai parcels due to the far greater number of sites known to be present there.

Source: Schilt, Rose and Sinoto, Aki (January 1980). Limited Phase I Archaeological Survey of Mahukona Properties: North Kohala, Island of Hawaii. Department of Anthropology, Bernice P. Bishop Museum: Honolulu (Ms. 013180), pp. 12-13.

Table V-7. Archaeological Resources of the Kaiholena Property.

NATURAL	
Unmodified	
Salt pan/water catchment	1
Overhang/cave shelter	1
Modified	
Modified outcrop	11
Overhang/cave shelter	2
ARTIFICIAL	
Non-structure	
Single-stone modification	
papamu	2
petroglyph	4
bait cup	3
salt pan/water catchment	5
Structure	
Informal	
ahu	69
Formal	
cairn	3
platform	
circular/oval	1
rectangular/square	13
enclosed	1
other	4
stone alignment	
single stone alignment	1
low stone border/terrace	4
wall structure	
linear wall	1
open-ended walled structure	
C-shape	61
U-shape	8
enclosure	
circular/oval	16
rectangular/square	18
other	2
compound	
homogeneous integral components	18
heterogeneous integral components	25
OTHERS	
Trails	11
Anomalous/undefined structure	3
Remnant	14
Cultural deposit	7

Source: Schilt, Rose and Sinoto, Aki (January 1980). Limited Phase I Archaeological Survey of Mahukona Properties: North Kohala, Island of Hawaii. Department of Anthropology, Bernice P. Bishop Museum: Honolulu (Ms. 013180), pp. 16-18.

- An apparent holua slide (usually considered a chiefly sport).

Table V-7 categorizes by type the 270 sites recorded in the Kaiholena parcels. Since the frequencies include multiple tallies from a single site, the numbers add up to more than 270.

VALUE OF SITES

The archaeological resources documented in the Bishop Museum report offer tremendous potential as a data base from which to explore several focal questions in Hawaiian archaeology. Their importance is underscored by comparison with the research work done at Lapakahi, an ahupua'a north of the proposed resort site which shows many similarities of archaeological resources. While most of the structures at Lapakahi are of the post-contact period, indications are that the Kaiholena coastal settlements were abandoned in the prehistoric or early historic period and did not experience extensive historic modifications. The archaeological remains here are valuable for testing the model of cultural transformation developed from the research at Lapakahi. The Bishop Museum report (Schilt and Sinoto, January 1980:121) concluded:

> In summary, we view the archaeological remains in Kaiholena to be highly significant in their potential to yield information critical to understanding the emergence of complex, ranked social systems in Kohala and Hawaii as a whole. Also, the excellent condition and preservation of large numbers of archaeological sites [afford] a preservation and public interpretation potential which equals that of the Lapakahi State Park.

Because only a reconnaissance survey was done of the other three properties, their resources could not be analyzed in the same manner as those in Kaiholena.

The criteria used in evaluating the sites on the Kaiholena property and in formulating tentative recommendations included the following:

1) The present condition of the site or the amount of damage that the feature has already sustained due to jeep road construction, erosional processes, camping activities, etc.

2) The size and complexity of each site and its potential to yield information relevant to major archaeological questions.

3) The extent to which the site is represented in the total inventory of site types.

4) The qualification of the above criteria by a consideration of the site's location vis-a-vis other similar and different sites and its nearest neighbors (i.e., spatial relationships indicating possible functional associations).

The Bishop Museum's report presented tentative recommendations for each of the sites in the Kaiholena property (Schilt and Sinoto, January 1980:122-135). These are summarized in tabular form in Appendix D. Sites were placed in one of two categories: preservation or mitigation. The preservation category includes a subset called "main precinct." Figure V-8 shows very broadly where the groupings of sites in each category are found, and the boundaries of the main precinct. The Bishop Museum

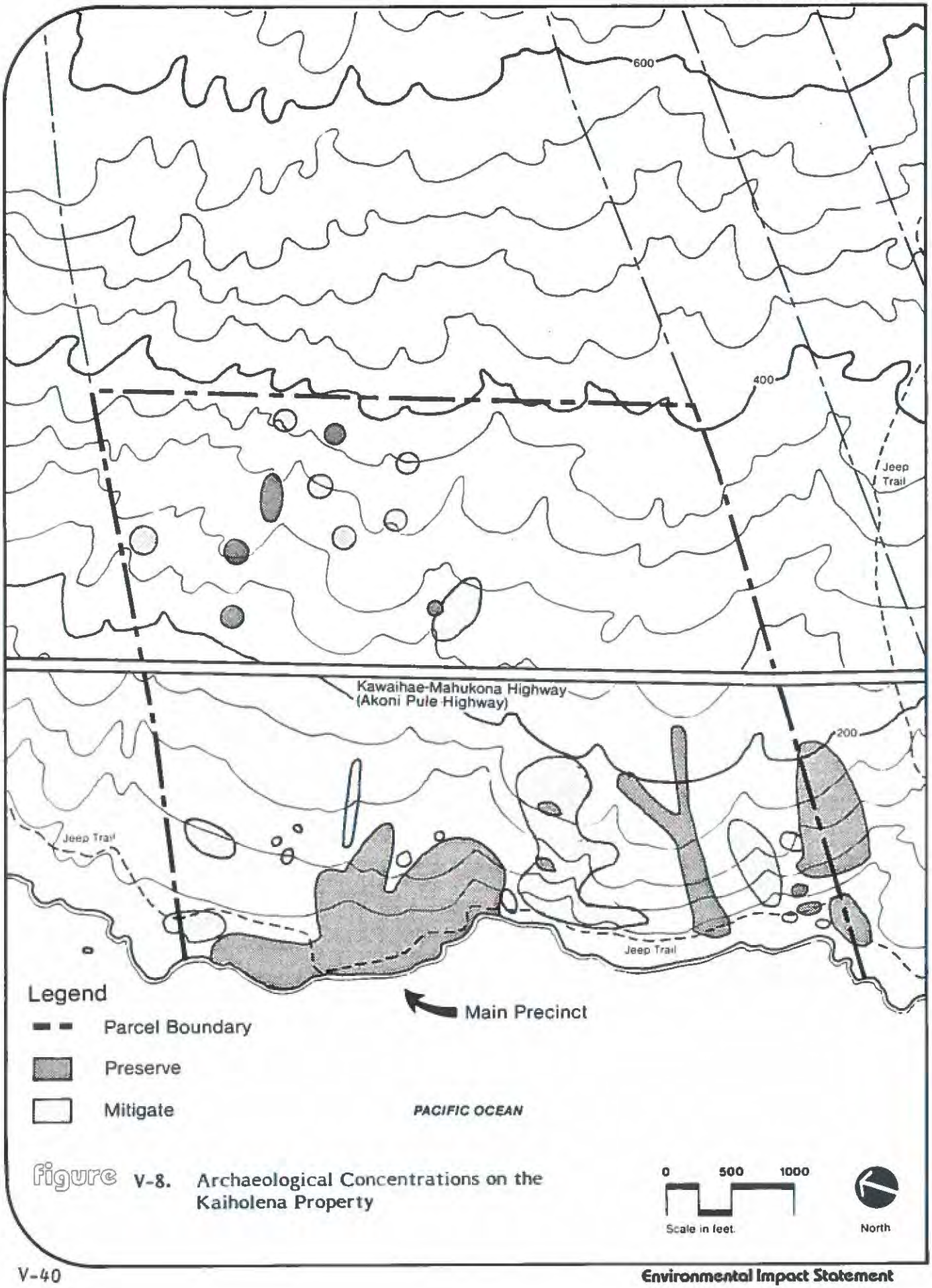


figure V-8. Archaeological Concentrations on the Kaiholena Property

stresses that their recommendations regarding each site may change, depending on the results of more intensive work.

Sites that were in very good condition, were considered sufficiently unique, or were representative of a particular site type were placed in the preservation category. The need to conserve sites for data recovery by future generations of researchers was also considered in determining whether or not to designate them as "preservation". Sites were recommended for placement in the "main precinct" category if the preservation of spatial and functional associations was necessary, or if the sites had potential for development into an historical theme park for public interpretation. Placement in this category implies preservation but not total avoidance; investigation and restoration work would be performed on some sites.

The "mitigation" category was recommended for sites where research and salvage excavations would be appropriate. Sites were placed in this category if their condition was too poor to merit preservation, if they were not deemed worthy of preservation but could provide significant archaeological information, or if they were threatened with imminent destruction.

PROBABLE IMPACTS AND MITIGATION MEASURES

Since there are so many archaeological sites of considerable value, if great care is not taken in the design of the project to preserve not only individual sites, but also groupings and relationships, the impact of the proposed Mahukona Resort project on archaeological resources could be highly adverse.

On February 19, 1980, a meeting took place in the DLNR State Parks Division office involving representatives of the State Historic Preservation office, the developer, the planning firm, the design consultant, and the Bishop Museum. The development plans, the archaeological findings, and the recommendations were discussed, and a general verbal agreement was reached by all parties involved to implement the major actions recommended by the Bishop Museum. No definite archaeological program has been set, both because further research work is necessary and site-specific development plans have not been decided upon. The developer intends to work with the Bishop Museum archaeologists to minimize impacts of the proposed development on archaeological resources.

VISUAL IMPACTS

The proposed Mahukona Resort would stretch along 5 kilometers (3.1 miles) of the North Kohala coast. Situated on the moderately sloping lower flank of the Kohala Mountain, the area's open grasslands and scattered kiawe give it a distinctly open feeling. Views are extensive rather than confined, and the highway is close enough to the shore to make the ocean a major visual component of the setting. The construction of 5,200 condominium apartments, hotel rooms, and homes would inevitably result in a change to an urban setting. The overall density of about five units per acre is relatively low, but many of the actual hotel and apartment sites would be developed quite intensively. Moreover, the fact that the urbanization would occur near the middle of a twenty-mile-long stretch of presently undeveloped land would tend to accentuate people's awareness of it.

The absence of site plans for the proposed development makes a detailed consideration of its visual impacts impossible at this time. However, the openness of the terrain, the fact that the site is bisected by the region's main arterial roadway, and the development densities that are being sought combine to insure that man-made structures and landscaping associated with the resort will be visually dominant. Depending upon the site layout that is adopted, particularly with respect to the placement of large structures in proximity to the highway, the impact could be severe or relatively benign. The best that can be done (barring a rerouting of the highway above the site) is to utilize the proposed golf course, other recreational open space, and the low-rise, low-density residential units as buffers between the highway and the mass of the development. This would allow viewers' eyes to climb gradually to the tallest, most massive buildings, as well as making them the backdrop to a fresh, lush landscape near at hand. The worst impact (from the public's viewpoint) would result if sizeable apartment or hotel structures were constructed close to the highway, especially if they were not heavily screened by landscaping placed close to the roadway.

In short, the proposed resort development would inevitably result in a sharp alteration in the visual environment on and immediately around the project site. Whether or not the change would be positive or negative (i.e., would improve or degrade existing views) depends upon the specific site layout that is adopted and the architectural quality of the structures that are built, as well as on the particular aesthetic values of the viewer.

Secondary growth generated by the Mahukona Resort would also affect the visual environment of the North/South Kohala study area. However, until basic land use decisions are made by the County regarding the type and location of residential development that will be allowed and developers respond to these decisions and to underlying market forces with concrete proposals, a meaningful discussion of the visual impacts of secondary growth is impossible.

Finally, it should be noted that already-planned South Kohala resort development and its attendant secondary growth will result in much more substantial regional changes in the existing visual environment than would the proposed Mahukona Resort project. However, to the extent that the present proposal increases the amount of urbanization that occurs or substantially affects its location, development of the Mahukona Resort could significantly affect visual impacts for either better or worse.

TRANSPORTATION IMPACTS

INTRODUCTION

The proposed Mahukona Resort, like the other destination resorts already planned for South Kohala, will affect the transportation network in a variety of ways. First, it will increase the volume of aircraft operations that must be handled by Big Island airfields, especially Ke-ahole Airport in North Kona. Secondly, it will increase the demand placed upon and the financial support for the Big Island's public transportation system. Finally, it will significantly increase vehicular traffic of all types on the existing highway network. These effects are described in more detail in the remainder of this section.

In reading this material, it should be remembered that transportation impacts are by their very nature geographically specific. In view of the uncertainty which surrounds the exact location of the secondary growth that would be stimulated by the resort development postulated under both regional growth scenarios (i.e., with and without the proposed Mahukona Resort), a precise delineation of future highway traffic volumes is impossible at this time. Instead the analysis presented here discusses the general constraints which exist and highlights areas where significant problems could occur as a result of the projected growth.

AIR TRANSPORTATION

Existing Conditions

At present, commercial airlines and air taxi services provide the only regular passenger service between the Island of Hawaii and the remainder of the state. The major inter-island gateways are Hilo's General Lyman Field and Kona's Ke-ahole Airport; limited passenger service is also provided at the Waimea-Kohala Airport in Kamuela and at the Upolu Point field in North Kohala. General Lyman Field also handles flights to the U.S. mainland, making it the only place in the state, other than Honolulu, having direct air access to overseas markets. Passenger and cargo information for recent years is summarized in Table V-8. Air operations for Hilo and Ke-ahole are summarized in Table V-9.

Hilo's General Lyman Field is the only airport on the island which is currently capable of handling fully-loaded long-range jet aircraft on an all-weather basis. There is space available to lengthen the runway at the Ke-ahole Airport so that it could accept direct flights to the mainland, but present State and County policy is to retain Hilo as the island's only international gateway for the forseeable future.

Resident Air-Trip-Generation Rate. Readily available airline passenger data does not distinguish between residents and visitors. However, a coarse approximation of the present split can be had by translating the Hawaii Visitor Bureau's data on visitor arrivals and intended outer island visits into passenger estimates for the Big Island and then subtracting those from the passenger totals for the island's airports. The methodology used for deriving the air-trip-generation rate for Big Island residents is admittedly rough; however, it is adequate for discussing impacts on air transportation facilities on Hawaii Island because the percentage of resident trips is so small compared to total trips.

In 1978, approximately 30 percent of westbound passengers (i.e., about 910,000) arriving in the state indicated their intention to visit the island of Hawaii (Hawaii

Table V-8. Overseas and Inter-Island Passengers and Cargo--Hawaii Island: 1977.

	Overseas Passengers		Inter-Island Passengers		Cargo (short tons)	
	In	Out	In	Out	In	Out
General Lyman Field[1]	108,631	139,332	585,382	549,260	8,846	24,123
Ke-ahole Airport[1]	--	--	545,990	560,267	2,837	2,081
Waimea Airport[1]	--	--	13,381	12,189	384	178
Upolu Point Airfield[1]	--	--	1,512	1,297	1	3
Hilo Harbor[2]	----------8,381----------				614,843	398,324
Kawaihae Harbor[2]	--	--	--	--	614,843	191,516
Total[3]	108,631	139,332	1,146,265	1,114,013	753,551	616,225

1 Data for 1977 from State of Hawaii, Department of Transportation, Air Transportation Division, Statewide Airport Statistics, 1960-1977 and other reports, and County of Hawaii Department of Research and Development Data Book 1978 (September 1978:167).

2 From U.S. Department of the Army (1977).

3 Passenger totals do not include Hilo Harbor.

Source: Compiled by Belt, Collins & Associates from sources referenced above.

Table V-9. Air Operations By Category of Operator at General Lyman Field and Ke-ahole Airport: 1971, 1977, 1978.

Airport and Year	Total Operation	Operations By Category of Operator (as % of Total) Air Carrier	Air Taxi	General Aviation	Military
General Lyman Field:					
1971	56,167	35.9	2.7[1]	47.1	14.2
1977	60,377	33.5	5.9	43.1	17.5
1978	52,677	38.8	12.5	32.1	16.6
Ke-ahole Airport:					
1971	27,132	39.3	18.8	35.9	6.0
1977	83,616	18.1	18.0	47.9	16.0
1978	91,033	18.0	21.7	44.5	15.8

1 Air Taxi Operations were combined with general aviation operations until July 1971.

Source: County of Hawaii Department of Research and Development (September 1979:92)

Visitors Bureau, 1978 Monthly). No data is available for eastbound visitors, but, based on the assumption that they are only about half as likely to visit the Big Island as are westbound visitors, it is estimated that about 90,000 of them visited Hawaii County in 1978. At one arrival and one departure per visitor, this would account for 2,000,000 trips by out-of-state visitors. The State Department of Transportation (as reported in Hawaii, County of, Department of Research and Development 1979:191) figures for 1978 show a total of about 2.7 million passengers arriving and departing the Big Island. This means that about 700,000 passenger trips were made by residents of the State. In 1978, residents of Hawaii Island constituted about nine percent of the State total (Hawaii, State of, Department of Planning and Economic Development, November 1979:17). Assuming that a Big Island resident is about twice as likely to generate a trip in and out of Hawaii Island as is a resident of another island, then an increase of one resident in the population would lead to an additional 1.5 to 2.0 trips per year. This is generally consistent with data gathered in a 1975 survey of passengers at Big Island airports (Kentron Hawaii, Ltd., October 1976:C-66).

Impacts on Air Transportation Facilities and Their Mitigation

Without-Mahukona Scenario. Based on the information presented above, it is estimated that the resort growth presently planned for the North/South Kohala impact area would generate an additional 6,400 air passenger trips per day in and out of Big Island airports by the year 2000 (see Table V-10). This is almost 80 percent more than the 7,600 trips per day that were recorded in 1978. Even if the average passenger loads stayed at the 75-person per flight level recorded in 1975 and all of these flights were handled at Ke-ahole Airport, both of which are "worst-case" assumptions unlikely to occur, the increase in flight operations by air carriers would amount to an average of 85 per day, or almost twice the present number. Ke-ahole, with its spacious layout and generally good flying conditions, is quite capable of accommodating this growth (Hawaii, State Department of Transportation, October 1976), although some improvements in terminal facilities and could be required.

With-Mahukona Scenario. The addition of the proposed Mahukona Resort to other planned development would increase the average number of passenger-trips through Big Island airports by about 2,000, or about 15 percent, above what it would be without it. The limited terminal improvements necessary to accommodate the development projected under the without-Mahukona scenario would also suffice for the with-Mahukona scenario.

PUBLIC GROUND TRANSPORTATION

Existing Conditions

As one would expect given the generally rural nature of Hawaii County, the existing public transit system is rather limited. The County of Hawaii's Mass Transportation Agency operates the "Hele On" bus system which provides inter-and intra-city bus service, as well as shuttle service for employees of the Mauna Kea Beach Hotel. Ridership figures for fiscal years 1978 and 1979 are presented in Table V-11.

As might be expected, the per-capita bus ridership on the Big Island is very much lower than it is on more urbanized and less spread-out Oahu. In 1978, for example, public transit ridership on Oahu averaged 87 trips per resident (Hawaii, State of, Department of Planning and Economic Development, November 1979:16 and 301), while Hawaii Island had an average of about 4.5 trips by public transit per resident (Hawaii, County of, Department of Research and Development, September 1979:188),

Table V-10. Estimated Air-Passenger Trips to and From Hawaii Island.

Average Number of Passenger Trips Per Day For:	1990	1995	2000	2005
Planned South Kohala Resorts[1,2,3]	3,300	5,000	6,300	6,300
Existing Development[4]	7,600	7,600	7,600	7,600
Proposed Mahukona Resort[2,3,5]	—	950	1,300	1,900
Projected Secondary Growth				
- Without the Mahukona Resort[6]	50	80	110	100
- With the Mahukona Resort[7]	60	100	130	125
TOTAL				
- Without the Mahukona Resort	10,900	12,700	14,000	14,000
- With the Mahukona Resort	10,900	13,600	15,300	15,900

1 Average visitor census for planned resorts from Table IV-11: 1990--5,750; 1995--9,450; 2000--12,600; 2005--12,600.

2 Based on the following average length of stay: 1990--3.5; 1995--3.75; 2000--4.0; 2005--4.0.

3 Calculated by (Average Visitor Census) ÷ (Average Length of Stay) x (2).

4 Total passenger trips for 1978 ÷ 365.

5 Average visitor census for proposed Mahukona Resort from Table III-14: 1995--1,750; 2000--2,650; 2005--3,800.

6 Based on population projections shown in Table IV-12 and an estimated 2.0 passenger trips/year resident.

7 Based on population projections shown in Table IV-17 and an estimated 2.0 passenger trips/year/resident.

Source: Compiled by Belt, Collins & Associates.

Table V-11. Ridership On the "Hele On" Bus System: Fiscal Years 1978 and 1979.

Route/System	Ridership		Aver. Persons Per Day (FY 1979)
	FY 1978	FY 1979	
Hilo System	167,249	174,797	479
Kona System	30,600	67,733	186
Kona-Hilo	37,756	38,883	107
Honaka'a-Hilo	16,207	20,777	57
Ka'u-Hilo	12,038	11,518	32
MKBH-Kohala	45,906	48,914	133
MKBH-Honoka'a	32,763	30,183	83
Ka'u Shuttle	1,820	321	1
All Routes	367,773	417,414	1,144

Source: Hawaii, County of, Department of Research and Development (1977 and 1978).

or about one-twentieth as much. Of the public transit trips that were made in 1979 on the Big Island, almost 20 percent were on the shuttles that serve employees of the 310-room Mauna Kea Beach Hotel (MKBH). In contrast, the Kailua-Kona system, which serves the primary West Hawaii resort area with over ten times as many hotel rooms as the MKBH, carred only about 15 percent of the island total. These figures make it clear that, except where there is special bus service for workers, residents of the North/South Kohala impact area are heavily dependent on their automobiles for transportation.

Impacts on Public Transit

The development that is projected under the without-Mahukona scenario would greatly increase the visitor and resident population of the North/South Kohala impact area. It may be presumed that tour operators will provide bus service to visitors, but development of a public transit system that meets the needs of residents is less certain. Based on experience at the Mauna Kea Beach Hotel, it is evident that employees will use a shuttle service for their work commute trips if it operates on a convenient schedule at a reasonable price. Given the isolation of the presently-planned resorts from existing residential areas, the wage structure of the visitor industry, and the increasing cost of operating private automobiles, it appears that hotel operators may have to imitate the MKBH shuttle program if they are to attract the workers they will need during at least the initial phases of their developments. Whether this initial contract service can eventually be replaced by regularly scheduled service open to the general public will depend upon a number of factors, particularly the location of the residential areas that develop in support of the resort employment centers.

The addition of the proposed Mahukona Resort to the other planned visitor destination areas (i.e., the with-project scenario), will increase the residential and transient population of the impact area. This, in turn, will provide a larger population base on which a bus system could draw, thereby offering economies of scale and the potential for increased frequency of service. At the same time, since the Mahukona Resort is separated from the other planned resorts, service to it could be uneconomical (except for employee shuttles) unless a significant amount of the required support housing is placed in North Kohala.

HIGHWAYS

Existing Road Network

North and South Kohala's existing road network is shown in Figure V-9. Queen Ka'ahumanu Highway, which serves all of the planned South Kohala resort areas, originates just outside of Kailua-Kona. It terminates at a T-intersection with the Waimea-Kawaihae Road. The western leg of the "T" leads to the beginning of the Kawaihae-Mahukona Highway (Akoni Pule Highway) and to Kawaihae Harbor. The eastern leg of the Waimea-Kawaihae Road continues on to the town of Waimea. There, it joins the Hawaii Belt Road, which provides access east to the Hamakua coast and Hilo, and south to the upland areas of South Kohala and North Kona. The other roads in the area that are of particular note are Waikoloa Road, which connects Queen Ka'ahumanu Highway with the Hawaii Belt Road via Waikoloa village, and the Kohala Mountain Road linking Waimea with Hawi on the northern tip of the island.

All of the roads are two-lane facilities, and only Queen Ka'ahumanu Highway and portions of Akoni Pule Highway are of modern, high-speed design. With the exception

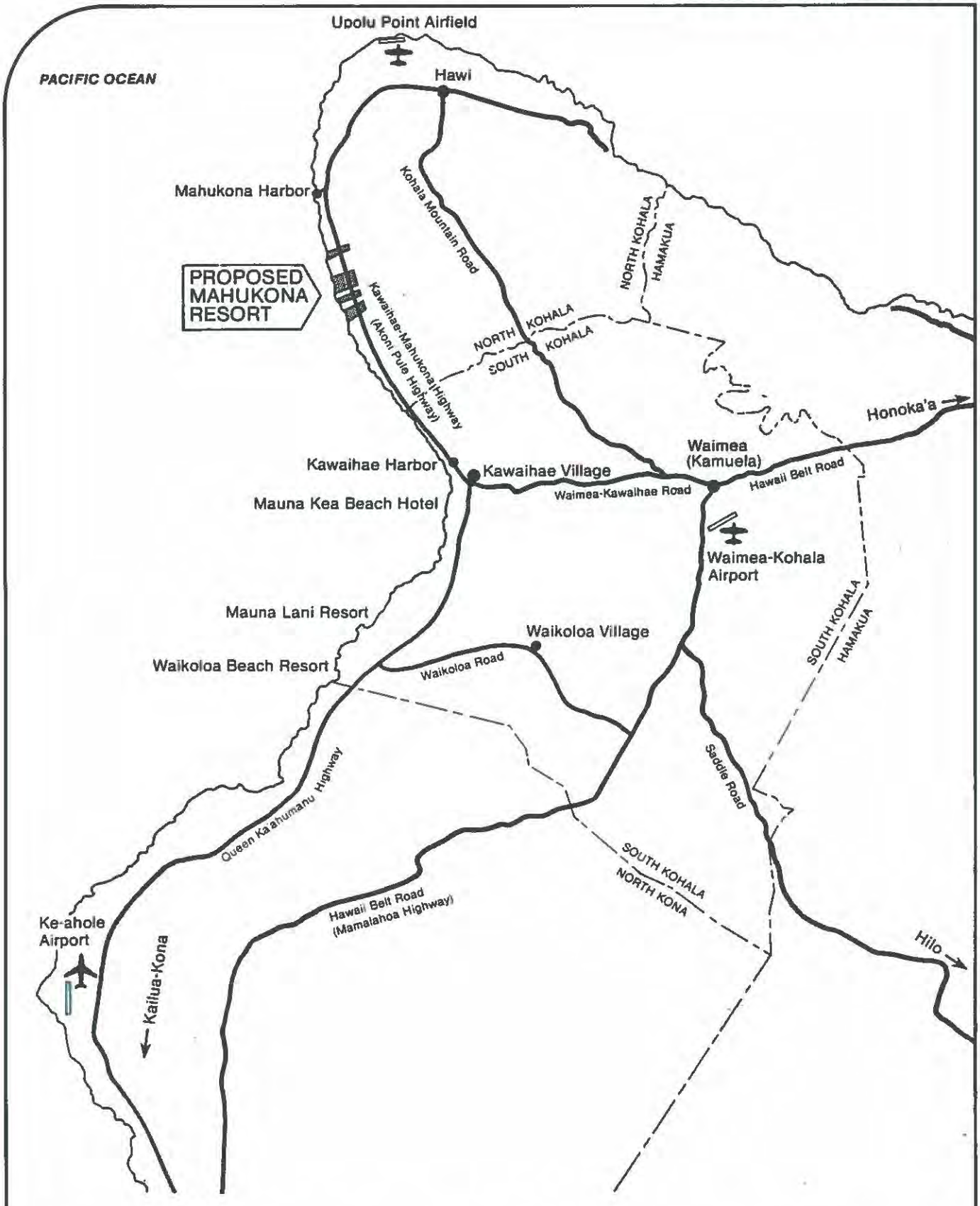


figure V-9. Transportation Facilities Serving North and South Kohala

of the Mauna Kea Beach Hotel entrance road, all of the roads intersecting Queen Ka'ahumanu Highway are designed to high standards and have separate acceleration/deceleration and left-turn storage lanes. The Waimea-Kawaihae Road is an older facility with relatively steep grades and many curving sections. According to the State Highways Department, a new four-lane alignment for this roadway has been proposed, but no definite construction schedule has been set.

Existing Traffic Volumes

The greatest traffic impacts that would result from the proposed Mahukona Resort and planned South Kohala resort development will occur on Queen Ka'ahumanu Highway, Akoni Pule Highway (Kawaihae-Mahukona Road), and the Waimea-Kawaihae road, especially in the vicinity of intersections. As indicated by the following estimates of average daily traffic (ADT), present traffic volumes on those and other main roadways in the region are presently light (Voorhees, 1979:7):

- 1,750 vehicles per day (vpd) on Queen Ka'ahumanu Highway north of the Waikoloa Road intersection.
- 3,100 vpd on Queen Ka'ahumanu Highway at the Waimea-Kawaihae Road.
- 2,800 vpd on the Waimea-Kawaihae Road at its intersection with Queen Ka'ahumanu Highway.
- 2,450 vpd on the Waimea-Kawaihae Road west of its intersection with Queen Ka'ahumanu Highway.
- 7,500 vpd on the Hawaii Belt Road (Mamalahoa Highway) east of its intersection with the Kawaihae-Waimea Road.

Accident History

Accident data maintained by the State Department of Transportation provides useful insights into highway safety conditions on the major roadways in the region. The annual number of accidents and fatalities on each roadway segment for three recent years is shown in Table V-12.

The numbers of accidents per million miles of vehicle travel in 1978 on each roadway segment were 0.7 for Queen Ka'ahumanu Highway, 4.6 for the Waimea-Kawaihae Road, and 4.4 for the Akoni Pule Highway. These rates compare with an estimated rate of 3.3 accidents per million miles of vehicle travel on all State roadways on the Island of Hawaii. Hence, Queen Ka'ahumanu has a lower than average rate of accidents while the Waimea-Kawaihae Road and Kawaihae-Mahukona Highway have a higher than average rate of accidents. In general, the older roadways have a higher accident rate than the newer roadway.

Projected Traffic Volumes

Without-Mahukona Scenario. As we have emphasized repeatedly in this report, so much development is planned for South Kohala over the next twenty years that forecasting conditions without the proposed Mahukona Resort project is extremely difficult. To provide a general indication of the traffic levels that may be expected, the resort project development plans summarized in Table III-7 and the household growth estimates shown in Table III-10 were used together with the trip-generation rates shown in Table V-13 to produce the trip estimates summarized in Table V-14.

Table V-12. Accident Summary Report for Major Roads in North/South Kohala.

Roadway Segment	Number of Accidents Per Year 1976	1977	1978
Queen Ka'ahumanu Highway	16	14	15
Waimea-Kawaihae Road	32	50	52
Kawaihae-Mahukona Highway (Akoni Pule Hwy.)	2	4	4

Source: State Department of Transportation; table compiled by Alan M. Voorhees & Associates (1979).

Table V-13. Trip-Generation Rates Used In Projecting Traffic Volumes.

Type of Unit	Vehicle-Trips/Unit During Peak Month[1] Per-Day	Peak Hour
Resort Hotel	5.0	0.50
Resort Condominium	3.6	0.32
Resort Residential	2.7	0.27
Resort Commercial (1,000 s.f)	58.0	5.80
Residential	6.0	0.72

[1] Incorporates occupancy assumptions stated in Appendix A.

Source: Estimates by Belt, Collins & Associates.

Table V-14. Vehicle Trips Resulting From Planned and Proposed Resort Development.

Type of Development	Projected Number of Vehicle-Trips Generated (by Year)							
	1990		1995		2000		2005	
	Daily	Peak-Hour	Daily	Peak-Hour	Daily	Peak-Hour	Daily	Peak-Hour
Planned S. Kohala Resorts[1]								
Resort Hotel	15,800	1,600	26,500	2,700	35,100	3,500	35,100	3,500
Resort Condo	12,700	1,100	20,200	1,800	27,000	2,400	27,000	2,400
Resort Commercial	6,300	600	10,500	1,100	13,900	1,400	13,900	1,400
Residential	20,100	2,400	30,600	3,700	39,000	4,700	36,000	4,300
Total	54,900	5,700	87,800	9,300	115,000	12,000	112,000	11,600
Proposed Mahukona Resort [2]								
Resort Hotel	2,000	200	4,300	430	6,000	600	7,500	750
Resort Condo	1,100	100	3,200	290	6,800	600	11,500	1,070
Resort Commercial	800	80	1,900	190	3,000	300	4,300	430
Residential	2,700	320	5,700	690	8,400	1,000	9,600	1,150
Total	6,600	700	15,100	1,600	24,200	2,500	32,900	3,400
All Development								
Resort	38,700	3,680	66,600	6,510	91,800	8,800	99,300	9,550
Residential	22,800	2,720	36,300	4,390	47,400	5,700	45,600	5,450
Total	61,500	6,400	102,900	10,900	139,200	14,500	144,900	15,000

1 Based on projected development from Table III-1, households from Table IV-12, and trip-generation rates from Table V-13.

2 Based on projected development from Table II-1, households from Table IV-17, and trip-generation rates from Table V-13.

Source: Compiled by Belt, Collins & Associates.

It must be emphasized that the figures in Table V-14 are merely rough estimates of the total number of additional vehicle trips that would be made throughout the region as a result of the expected development. Not all of the trips would be made on the same highway segment. Moreover, since the traffic generation rates are based in large-part on studies of trip-ends, there is undoubtedly some "double-counting." Nevertheless, the figures do provide some insights into the magnitude of potential future traffic volumes with and without the proposed Mahukona Resort. The following are among the most important conclusions that can be drawn from the data:

- By the year 2000, already-planned South Kohala resorts would generate up to 76,000 trips per day on Queen Ka'ahumanu Highway. To the extent that the residential development that occurs in support of the resorts also depends on Queen Ka'ahumanu Highway, the number of trips generated on it could be even greater. Assuming a normal time distribution for these trips, they would cause the capacity of the existing roadway to be exceeded. Expansion of Queen Ka'ahumanu Highway to a minimum of four lanes, careful attention to intersection design, and signalization of busy crossroads would be required.

- The existing Waimea-Kawaihae Road, with its dangerous curves and low capacity, will quickly become inadequate and require replacement. If significant residential development occurs in North Kohala before a new alignment is built, reconstruction of the Queen Ka'ahumanu Highway/Waimea-Kawaihae Road intersection will be necessary.

- The capacity of Akoni Pule Highway would probably not be exceeded unless the great majority of secondary growth (residential and commercial) that would be generated by South Kohala development is situated in North Kohala, an unlikely occurrence.

- Highway improvements will have to take into consideration the location of the secondary growth that will be supported by the planned resort development.

With-Mahukona Scenario. As illustrated by the estimates shown in Table V-14, the addition of the proposed Mahukona Resort would increase the total number of additional vehicle trips made in the region by 30 percent. Some of the more important implications of such an increase include:

- A dramatic increase in traffic congestion on Akoni Pule Highway would be produced by the Mahukona Resort. However, because of the low existing volume (about 2,500 vehicles per day in 1978), it is possible that the Mahukona Resort alone would not cause traffic to exceed its capacity. However, when the effects of the other planned South Kohala resort developments are taken into account as well, it seems likely that the Kawaihae-Mahukona Highway would reach capacity sometime between 1995 and 2000. Upgrading to four lanes or the establishment of an effective bus system would become necessary at that time. Localized congestion at intersections could occur before that time.

- The traffic that would be generated by the proposed Mahukona Resort is only about one-third the volume that would result from already-planned development. Because of the location of the proposed Mahukona Resort, perhaps as much as a third or more of the traffic it would directly and indirectly generate would not affect the roadways most impacted by the planned South Kohala resorts.

- o Adverse impacts on traffic flow could be minimized by making North Kohala and the proposed Mahukona Resort a largely self-contained unit. More specifically, this would involve:

  - steps to insure that most Mahukona Resort employees live in North Kohala;
  - efforts to confine most employee housing for South Kohala resorts to South Kohala;
  - use of the Mahukona Resort primarily as a base for exploration of North Kohala's attractions and for visitor activities on site.

- o The Mahukona Resort would also contribute traffic to Queen Ka'ahumanu Highway and the Waimea-Kawaihae Road. Major improvements to these roadways would be necessitated in any case by the already-planned South Kohala development, but implementation of the proposed Mahukona Resort would hasten the day when they would have to be made.

Mitigation Measures

Mitigation of traffic congestion that would be produced by the construction of the proposed Mahukona Resort cannot realistically be separated from measures needed to accommodate traffic generated by other resort development in South Kohala except, possibly, on Akoni Pule Highway.

Were the proposed Mahukona Resort the only project planned for the North/South Kohala impact area, it is likely that provision of adequate turning and acceleration/deceleration lanes at the access road intersections with the Akoni Pule Highway might be sufficient to avoid major traffic problems from the proposed development, at least until after 2000. However, when potential traffic increases associated with planned South Kohala resort development are taken into account as well, it appears that widening Akoni Pule Highway to four lanes or establishment of an effective and efficient bus system could prove necessary. The developer might be expected to undertake highway improvements on land fronting his property, but the responsibility for improvements elsewhere along the route would probably fall to State or County government. These could be made in conjunction with changes to Queen Ka'ahumanu Highway and the Waimea-Kawaihae Road necessitated by resort development in South Kohala.

AIR QUALITY IMPACTS

INTRODUCTION

The proposed Mahukona Resort could affect air quality in several ways. First, and most importantly, increases in vehicular traffic generated by the proposed project could affect pollutant concentrations in the vicinity of roadways. The generation of power needed to satisfy the energy needs of the resort and attendant secondary growth, as well as the construction activities associated with the development process, would also affect atmospheric quality. These effects, viewed in the context of continuing resort development in South Kohala, are discussed in the remainder of this section.

EXISTING AIR QUALITY

No air quality data is available for the Mahukona Resort site or for other parts of the study area likely to be affected by the proposed project. The nearest State Department of Health air quality monitoring station is in Hilo some 60 miles and several large mountains away. Recent data from that station show that both the National Ambient Air Quality Standards and the State's much more stringent air quality standards (see Table V-15) are being met there. In view of the absence of any significant man-made pollutant sources in the vicinity of the Mahukona Resort site, it seems likely that air quality there is even better than at Hilo, and for the purposes of this analysis it may be considered pristine. (It should be noted that the worst air pollution episodes on the Big Island are due to infrequent and unpredictable volcanic activity. Emissions from this source have not been completely characterized, but it is known that they contain high levels of particulates accompanied by gasses containing mercury and sulfur.) The latest emissions inventory for the County is shown in Table V-16.

CLIMATIC FACTORS

The two climatic factors which have the most direct and significant effects on air quality are wind and rain. Average annual rainfall within the North/South Kohala study area varies greatly from place to place. On the wet windward side of the Kohala Mountain it ranges from 3,250 to 4,500 millimeters (125 to 175 inches) per year; Kamuela, in the high plateau between the Kohala Mountain and Mauna Kea, receives about 2,000 millimeters (75 to 80 inches) per year; the leeward coastline of the Kohalas from Anaeho'omalu to Mahukona receives less than 250 millimeters (10 inches) per year.

What little rainfall the dry Kohala coast does receive tends to occur in the winter months. The five driest months, April through August, average less than 9 millimeters (0.35 inches) of rainfall each, or about four percent of the annual total.

Hourly wind data for the dry Kohala coast collected by the U.S. Army Corps of Engineers (1967) shows that east-southeast winds prevail during the night and early morning hours while west-northeast sea breezes occur during most of the daylight hours. This land-seabreeze regime is present over 80 percent of the time. In general, the nighttime land breezes are slightly lighter than the daytime sea breezes (an average of 2.8 meters per second [6.3 miles per hour] compared to an average of 3.6 meters per second [8.0 miles per hour]). Winds in excess of 10.7 meters per second (24 miles per hour), which occur with some regularity at many places on the state's windward shores, are extremely rare here. Because of the dominance of the land-sea

Table V-15. Air Quality Data for Hilo Compared to Federal and State Ambient Air Quality Standards.

Pollutant	Maximum Average (in ug/m^3) in any 24 hours			Air Quality Data - Hilo					
	Federal Standards		State Standard	Range of Values for 24-Hours Concentrations (ug/m^3)					Average 1975-1979 (ug/m^3)
	Primary[1]	Secondary[2]		1975	1976	1977	1978	1979[4]	
Particulate Matter	260	150	100	12-89	11-64	15-80	13-169[3]	17-65	32
Sulfur Oxides	365	—	80	< 5-32	< 5	< 5	< 5-45	< 5-20	< 5
Nitrogen Dioxide	—	—	150	< 5-29	9-24[4]	- no sampling -			17

1 Intended to prevent adverse effects on public health.

2 Intended to prevent adverse effects on public welfare including effects on comfort, visibility, vegetation, animals, aesthetic values, and soiling and deterioration of materials.

3 Since one 24-hour average a year may be above the standard, this does not represent a violation of the standard.

4 Three months of data.

Source: Morrow (1979: Table 1) based on data from State Department of Health.

Table V-16. County of Hawaii Air Pollutant Emissions Inventory: May 1978.

Source	Tons/Year				
	Sulfur Oxides	Particulates	Carbon Monoxide	Hydro-Carbons	Nitrogen Oxides
Transportation					
Motor Vehicles	135	324	24,643	3,758	3,032
Aircraft	56	147	1,233	712	378
Vessels	201	27	50	38	166
Gasoline Handling & Evaporation	0	0	0	331	0
Subtotal	392	498	25,926	4,839	3,576
Fuel Combustion in Stationary Sources					
Residential, Commercial, Institutional	38	20	11	9	50
Industrial	1,348	6,046	1,527	1,518	1,915
Steam-Electric Utilities	2,275	79	29	19	1,007
Subtotal	3,661	6,145	1,567	1,546	2,972
Solid Waste Disposal					
Open Burning	3	153	1,116	236	43
Incineration	0	0	0	0	0
Subtotal	3	153	1,116	236	43
Industrial Process Losses	64	1,989	0	1,625	0
Agricultural Field Burning	0	6,564	23,166	7,722	722
TOTAL	4,120	15,455	52,644	16,117	7,388

Source: Morrow (1979: Table 2) based on data from State Department of Health.

breeze regime, the potential for pollutant buildup over longer-term averaging periods is greater than at locations where the tradewinds prevail.

IMPACTS OF TRAFFIC ON AIR QUALITY

Without-Mahukona Scenario

Air quality impacts for a situation very closely approximating the "without-Mahukona" scenario outlined in this report were investigated as part of studies conducted by the State for the Lalamilo Water System (State of Hawaii, Department of Land and Natural Resources, March 1980: III-123 through III-135). As is true for the present study, the absence of detailed information regarding the location of secondary growth limited the detail to which the study could be carried. Nevertheless, sufficient information was available for the report to conclude:

> Unless the current road system is expanded to meet the projected demand, State, and possibly Federal, air quality standards are likely to be exceeded at locations near major intersections (p. III-135).

The report went on to note that highway improvements aimed at eliminating potential congestion might not completely eliminate the possibility of standards violations, but that it would significantly reduce near-roadway ambient pollutant concentrations. Moreover, because of the pristine quality of the existing air, the dispersed nature of the automotive sources when viewed in an overall regional context, and the absence of significant non-automotive sources of the major pollutants (except particulates), the projected resort development and secondary growth were not seen as producing standards violations in areas removed from the major arterial roadway intersections.

In view of the great uncertainty which exists regarding the exact location of secondary growth (a problem which has been mentioned elsewhere in this report as a complicating factor in the present analysis), the Lalamilo EIS did not attempt to quantify pollutant levels. Quantitative analysis was also forestalled by the fact that specific intersection and roadway designs are not available for road segments that would need to be improved in order to accommodate the projected traffic volumes.

With-Mahukona Scenario

Emission Factors. In order to estimate both total emissions and ambient air quality impacts attributable to the proposed Mahukona Resort project, our air quality consultant, James Morrow, computed appropriate average annual emission factors using the U.S. Environmental Protection Agency's (EPA) MOBILE 1 program (U.S. Environmental Protection Agency, August 1978) and input values for highway traffic volume and average highway speed developed by Morrow (1979: Table 7). Lead emission factors were derived from other EPA publications (U.S. Environmental Protection Agency, 1977). To make the analysis as locationally-specific as possible, the vehicle age distribution for Oahu was used in lieu of the national average statistics.

Annual Emissions. Annual emissions of the principal automotive pollutants that would result from the proposed Mahukona Resort project were estimated using the emission factors referenced above and the trip generation rates described in the traffic impact section of this chapter. They are summarized in Table V-17. As might be expected, the emissions of carbon monoxide (CO), total hydrocarbons (THC), and the oxides of nitrogen increase with time as traffic volumes increase and average speeds decrease. This is true even during the 1985-1995 period when composite emission factors are

Table V-17. Estimated Average Annual Emissions From Mahukona Resort-Related Traffic on Akoni Pule Highway Between Kawaihae and Hawi: 1985-2005.

Pollutant	Estimated Emissions (in tons/year)[1]					Projected 2005 Emissions as % of 1978 Hawaii Co. Total[2]
	1980	1990	1995	2000	2005	
Carbon Monoxide	200	160	320	440	630	1.2
Total Hydrocarbons	22	18	31	42	60	0.4
Nitrogen Oxides	24	30	59	88	106	1.4
Lead	80	25	18	23	22	n.a.

1 Based on estimates made by Morrow (1979: Figures 4-7).

2 Calculated by dividing amount shown for 2005 by the May 1978 emissions totals shown in Table V-16. Note that, because other emissions will change as well, this is not an estimate of the percentage contribution in 2005.

Source: Compiled by Belt, Collins & Associates.

generally dropping as the proportion of newer, well-controlled (from an emission standpoint) vehicles increases. Emissions increase even more markedly after 1995 when no new emissions standards that might offset traffic increases are scheduled to take effect. The projected slowing in nitrogen oxide increases after 1995 is due to the fact that increased congestion is expected which will lead to lower average traffic speeds and, consequently, lower nitrogen oxide emissions per vehicle-mile travelled. Because of the interrelationships between average highway speeds and emissions and between average highway speed and the volume of traffic relative to capacity, the post-1990 emission rates could differ significantly from those shown here depending upon what highway improvements are actually made.

The lead emissions exhibit a quite opposite pattern as they initially decline sharply despite the projected increase in traffic. This is largely due to the increasing fraction of new, controlled cars which cannot use leaded gasoline and the resulting sharp reduction in the use of leaded gasoline. However, after about 1995 they too start to rise again. This is due to the presence of trace amounts of lead (.01-0.5 grams per gallon) even in "unleaded" gasoline (U.S. Environmental Protection Agency, 1977). The reason for the apparent decline after 2000 is the same as discussed above for nitrogen oxides.

In comparison with the "without-project" scenario, emissions from vehicles using the Akoni Pule Highway would be much higher if the project is constructed than if it is not. However, until regional growth patterns have been more clearly established, it is impossible to quantify the change.

Ambient Air Quality Impacts. For this study, a microscale analysis of the Mahukona Resort project's impact on ambient air quality (Morrow, 1979) was performed for the section of Akoni Pule Highway between Mahukona Resort and Kawaihae (i.e., the road segment most affected by the project) using the EPA-developed computer model HIWAY (U.S. Environmental Protection Agency, February 1975). Because carbon monoxide is the largest fraction of pollutant emissions by mobile sources and is relatively inert (i.e., non-reactive), in the atmosphere, it was judged a good indicator of potential air quality impacts and was modeled for this study. Estimated concentrations were computed for an array of receptor locations ranging from 5 to 20 meters from the edge of the highway. Peak-hour and eight-hour peak traffic volumes were considered for each phase of the development. Worst-case and most-probable-case meteorological conditions were input for each of the traffic periods considered.

The results of this analysis indicate that so long as the traffic volume on the highway remains below capacity (i.e., the v/c ratio is less than 1.0) all State and Federal ambient air quality standards would easily be met. The highest one-hour average concentration of CO, for example, is estimated at less than 5 parts per million (ppm) as compared to a State standard of 9 ppm and a Federal standard of 35 ppm; the highest eight-hour average CO concentration was less than 1 ppm versus the State standard of 4.5 ppm and the Federal standard of 9 ppm. However, once the volume/capacity ratio on the highway exceeds 1.0, a situation which would probably occur sometime after 1995 if both the Mahukona Resort and all planned south Kohala development are implemented, the resulting congestion is likely to produce CO levels in excess of standards close to the highway. Since it is extremely improbable that the postulated resort and residential growth would occur in the face of a transportation tie-up, two alternative traffic/air quality scenarios appear more likely. The first is that roadway improvements would be made that would increase capacity, thereby reducing the projected v/c ratio and the pollutant build-up potential to the point where standards violations would not occur. The second is that the amount of development that actually occurs will be less than has been postulated, both as a result of the

County's refusal to grant continuing development permits in the face of severe existing traffic congestion and by the reluctance of developers to proceed with tentatively scheduled projects made inaccessible by traffic congestion.

In summary, the proposed Mahukona Resort project would not, in and of itself, result in a violation of State or Federal ambient air quality standards. If developed in conjunction with planned South Kohala projects, there is a high probability that projected traffic volumes on the Akoni Pule Highway would be in excess of existing capacity. If an over-capacity situation develops, ambient air quality violations would occur. However, likely responses to the projected traffic congestion would be to increase the capacity of the highway and/or to restrict further development, and this would eliminate the potential problem.

IMPACTS OF ELECTRICAL POWER GENERATION ON AIR QUALITY

In addition to the emissions that would result from traffic generated by the projected primary and secondary growth, electrical power production on the island would need to be increased as well. Based on planning factors provided by the Hilo Electric Light Company (July 1979) and an assumption that the energy source would be primarily Bunker C residual oil, estimates of the amount of emissions that would be generated are shown in Table V-18. An understanding of their relative size can be had by comparing them with the current emissions inventory shown in Table V-16.

Because of the dispersed nature of the electrical power grid (many sources, overlapping service areas), it was not possible to estimate changes in ambient air quality that would result from the projected growth. However, in order to obtain the necessary operating permits for new generating units it installs to meet the demand, HELCO will need to prepare a detailed assessment of this topic.

It should also be noted that the estimates are based on oil being used as a fuel. With the geothermal projects now being developed on the Big Island and the renewed interest in efficient utilization of organic wastes (bagasse, refuse, wood, etc.), it is highly likely that Bunker C oil will supply only a part of the energy that is needed. The air quality impacts of these alternatives must be addressed on a source-by-source basis as concrete proposals are made.

SHORT-TERM (CONSTRUCTION) IMPACTS ON AIR QUALITY

The principal source of short-term air quality impact will be construction activity. Construction vehicle activity will increase automotive pollutant concentrations along the Akoni Pule Highway as well as at the project site itself. Increased truck traffic on that highway will also reduce its service level and lower the average operating speed. This would contribute to higher emissions of most pollutants, the major exception being nitrogen oxide. The site preparation and earth moving will create particulate emissions as will building and on-site road construction. Construction vehicle movement on unpaved on-site roads will also generate particulate emissions. Since the area is very dry due to an annual rainfall of less than ten inches, it will be important to employ continuous and effective dust-suppression measures. Failure to do this will undoubtedly result in violations of State and possibly federal particulate standards. This will become even more important in later phases as more people will then be living in the area. The sea breeze that seems to dominate most of the daylight hours will carry particulate emissions inland which provides further reason for effective dust control.

Table V-18. Estimates of Emissions Attributable to Electric Power Generation to Serve the Mahukona Resort.

Pollutant	Emissions (tons/year) 100% Occupancy	70% Occupancy
Sulfur Oxides	276	191
Nitrogen Oxides	151	105
Particulates	20	14
Carbon Monoxide	6	4
Hydrocarbons	1.3	1.0

Source: Morrow (1979: Table 13).

WATER RESOURCE IMPACTS

INTRODUCTION

Construction of the Mahukona Resort would directly affect the region's water resources in two ways. First, various wells which would be constructed for the resort's potable water systems, to irrigate its golf courses, and to dispose of treated sewage effluent, would alter the quantity and quality of groundwater in this vicinity. Second, stormwater runoff from areas to be developed would occur more frequently and in somewhat greater amounts than does runoff from the existing, open terrain.

In addition to these direct effects at the resort site, the project would have secondary effects on water resources elsewhere in North and South Kohala. New residents and commercial activity, stimulated by the resort but located elsewhere in the region, would increase water consumption. This would add to the pressure (generated by the planned South Kohala resort development and related secondary growth) to develop additional supply and distribution capacities.

FACILITIES WHICH WOULD DIRECTLY IMPACT THE HYDROLOGIC ENVIRONMENT AT THE RESORT SITE

As indicated in Chapter II, at this stage in planning the resort, specific decisions on construction of water, sewerage, drainage, and golf course irrigation facilities have not been made. However, resource availability, topography, and practical economics limit options for these to the following:

Water Supply. The success of a potable water well drilled 3.5 miles south of the resort at Kohala Estates justifies exploratory drilling inland of the resort site for a source of water supply. (See Figure V-10 and Table V-19; the recently completed Kohala Estates well is designated number 3.) If the groundwater inland proves to be of inadequate quantity or quality, then wells 8 miles north in the vicinity of Kokoiki could be developed. The groundwater in Kokoiki is known to be more than adequate for the needs of the resort (Bowles et.al., 1874:61; Sewaki, 1980). With either development option, the cost of wells, transmission, and distribution facilities would be substantial. It should be noted that all of the areas identified as potential well locations lie beyond the boundary of the Mahukona Resort site. In obtaining a satisfactory water supply it will be necessary for the developer to negotiate agreements with neighboring landowners and/or the State and County governments.

Sewerage. An activated sludge treatment plant would deliver secondarily-treated effluent to the golf course irrigation system for reuse. When the quantity of effluent exceeds irrigation needs, excess effluent would be disposed of in injection wells located on the treatment plant grounds. Calculations indicate that this would not normally be necessary as the needs of the golf course exceed the amount of effluent that is available.

Brackish Irrigation Wells. Initially, brackish wells would be the sole source of irrigation supply for the resorts' first golf course. As visitors and commercial activity at the resort increase, treated sewage would first supplement and then largely replace brackish well water as the supply source. Two brackish wells would be required for the first 18-hole golf course. Depending on the quantity of treated sewage available, either one or two more brackish wells would be needed when the second golf course is constructed. Prospective brackish well locations are shown on Figure V-10.

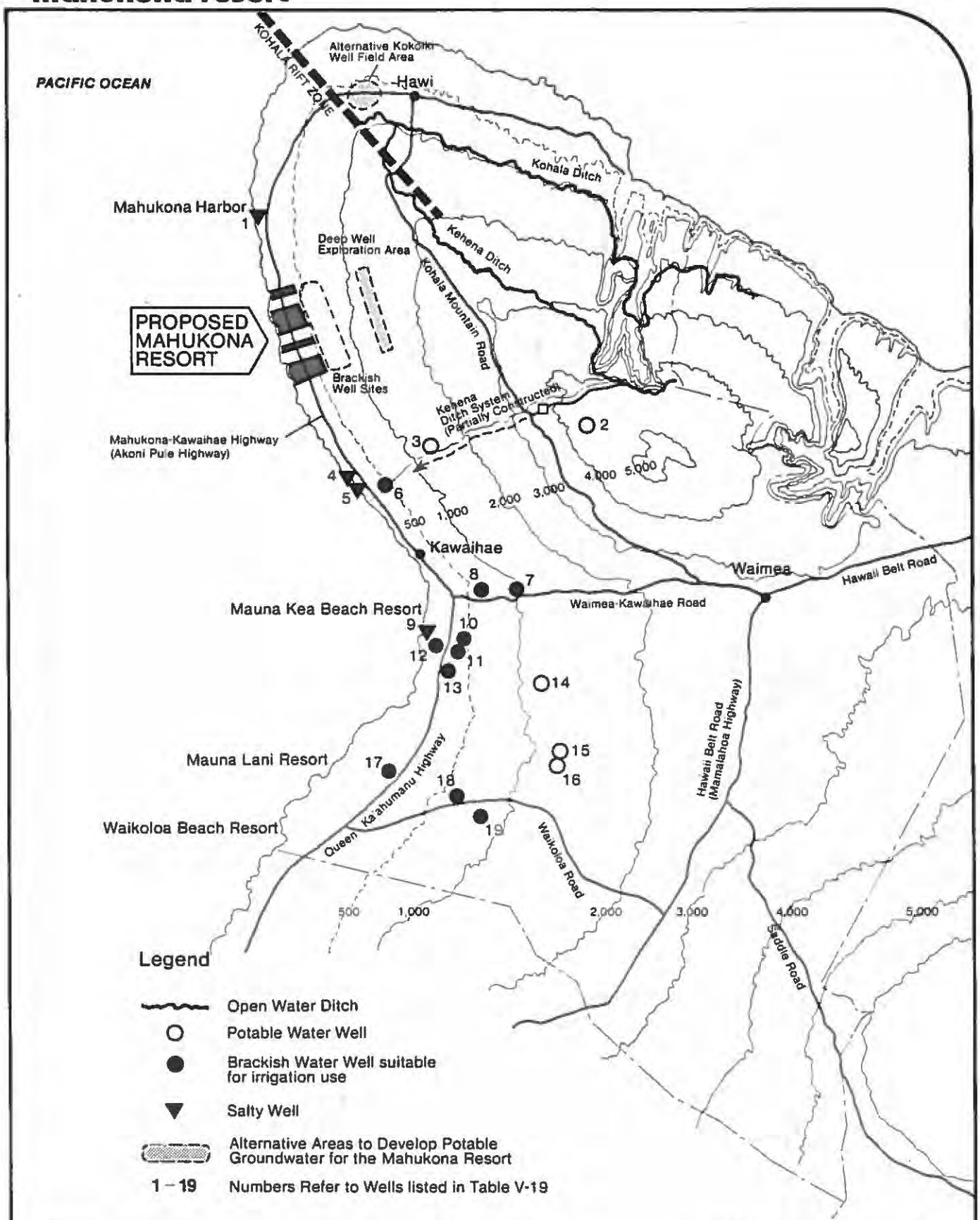


figure V-10. Water Development Features of North and South Kohala

Table V-19. Data on Wells in the North and South Kohala Region of Relevance to the Mahukona Resort.

Identifying Number on Figure V-10	USGS Well Number	Identifying Name (If any)	Year Installed	Ground Elevation (ft. msl)	Bottom of Well Elevation (ft. msl)	Still Water Level (ft. msl)	Representative Chloride Content (mg/l)	Original Purpose of Well	Current Use	Year-Round Average Pumpage Rate (MGD)
1	7154-01	McCandless well at Mahukona	1881	30±	unknown	unknown	unknown	exploratory	unused	0.00
2	6645-01	Grove No. 1	1962	4200±	4044	4133[1]	unknown	exploratory	unused	0.00
3	6549-01	Kohala Estates	1979	1462	-53	6.5	60	exploratory	domestic	pump not yet installed
4	6451-02	Windmill Estates	1972	40±	unknown	unknown	950	industrial	unused	0.00
5	6451-01	Grove No. 2	1962	40±	unknown	unknown	2400	exploratory	unused	0.00
6	6450-01	--	1980	400±	-10 to -15	unknown	1400±	irrigation	irrigation	pump not yet installed
7	6147-01	Kawaihae 16	1963	982	-58	4.6 to 5.2	180 to 260	exploratory	unused	0.00
8	6148-01 & 6148-02	Kawaihae 14	1961 & 1969	575	-41	3.3	350	exploratory	domestic	0.15 (each)
9	6049-02 & 6049-03	Mauna Kea Beach Hotel 3 and 4	1967 & 1969	50	-40	unknown	1800	air conditioning	air conditioning	2.00 (each)
10	6048-01	Kawaihae 15	1961	392	-37	3 to 5	550	exploratory	unused	0.00
11	6048-02	Mauna Kea Beach Hotel 1	1964	340	-40	4.7	700	irrigation	irrigation	0.36
12	6049-01	Mauna Kea Beach	1964	188	-30	4.7	700	irrigation	irrigation	0.36
13	5948-01	Hapuna	1970	246	-24	2.6	440	irrigation	irrigation	0.05
14	5946-01	Lalamilo-A	1977	1172	-105	8.2	75	exploratory	unused	0.00
	5946-02	Lalamilo-B	1979	1089	-69	6.6	32	exploratory/ domestic	domestic	not yet in service
	5946-03	Lalamilo-C	1980	1087	-46.5	7.6	55	exploratory/ domestic	domestic	not yet in service
15	5745-01	Parker 5	1969	1207	-20	16	30	domestic	domestic	0.20
16	5745-02	Parker 4	1969	1208	-24	16	30	domestic	domestic	0.20
17	5750-01	Parker Shaft	1961	37	-3	2.8	700	irrigation	irrigation	0.85
18	5648-01	Parker 2	1968	622	-31	5.1	380	exploratory	unused	0.00
19	5648-02	Parker 1	1968	815	-34	6.1	560	exploratory	irrigation	0.72

1 This well hit perched water at a depth of 67 feet; 5 feet lower, the water in the hole was lost (Lao and Adams, 1968).

Source: Compiled by Belt, Collins & Associates. The primary source of information is the USGS files, Honolulu Office, 6th Floor of the Federal Building. This is supplemented by field measurements of Belt, Collins & Associates or information obtained from well owners and/or drillers.

Drainage Structures. The eight percent slope across the resort site dominates drainage considerations. Because of this gradient, it would be necessary to employ swales or conduits running across slope to deliver runoff from developed areas to the on-site gulches which run almost directly downslope to the shoreline. The area is generally dry and storm rainfalls are infrequent and of modest intensity. However, once concentrated runoff does collect in one of these gulches, it moves toward the shoreline at high velocity. Due to the greater extent of impervious surfaces, runoff from intensively developed areas of the resort would tend to increase the frequency and amount of stream flow in the gulches. The landscaped areas of the site would slow the runoff more than the present sparse vegetation and therefore increase percolation, resulting in less and less frequent runoff. Despite this lessening of runoff due to landscaping, the overall effect of site development is likely to be an increase in runoff.

ASSESSMENT OF THE RESORT'S DIRECT IMPACT ON THE HYDROLOGIC ENVIRONMENT

The impact of the modest change in frequency and amount of stormwater runoff is dealt with in the section of this report dealing with impacts on the nearshore marine community. A more significant aspect to consider is the impact on groundwater of the resort's various wells. Tables V-20, V-21, and V-22 show projected pumping, irrigation, and injection rates. These numbers were created using plausible assumptions which are stated in the tables and their footnotes, but it should be kept in mind that they only establish approximate use and disposal rates. Moreover, because they are stated in terms of average rates, they also mask short-term anomalies which would occur in unusually rainy periods or if occupancy rates vary significantly above or below 70 percent.

The most important conclusion regarding the impact on groundwater portrayed in Tables V-20, V-21 and V-22 are as follows:

(i) Virtually all treated sewage effluent would be used for golf course irrigation; the only exception would occur during a particularly rainy period and/or when visitor occupancy rates are unusually high.

(ii) After initial golf course start-up, when approximately one MGD of brackish well water would be needed for irrigation, use of well water for irrigation would drop off significantly.

(iii) Total groundwater consumption would amount to about 1.0 MGD in the early stages of the project and increase to two or three MGD when the development reaches maturity.

Based on these use rates and the likely locations of the various wells, no adverse effect on ground water would be expected. If the potable wells are located directly inland of the resort site, then the 2 to 3 MGD ultimate groundwater withdrawal rate would utilize all the developable groundwater flux in this area. Careful management of well pumping schedules would be required to avoid overdraft, a practice which would be in the developer's interest. If it is not done, progressive salting of the irrigation wells might occur. It could even extend as far inland as the potable wells.

If the potable wells are located to the north in Kokoiki, there would be less possibility of overdraft at either Kokoiki or the resort site. Kokoiki is on the opposite side of the Kohala mountain's rift zone from the resort (refer to Figure V-10). Groundwater resources there are proven by existing wells and the natural flow is greater than on the

Table V-20. Projected Potable Water Use Rate of the Mahukona Resort.

	1986-1990	1991-1995	1996-2000	2001-2005	Total
No. of Units Developed In Period:[1]					
Hotel Rooms	400	450	350	300	1,500
Condominium Apartments	300	600	1,000	1,300	3,200
S-F Residential Homes	100	100	150	150	500
10,000 s.f. Commercial	1.4	1.8	2.0	2.0	7.2
Acres of Recreation Space	8	6	6	5	25
Additional Water Use (in MGD) By Development Constructed in Time Period:[2]					
Hotel Rooms	0.140	0.158	0.123	0.105	0.526
Condominium Apartments	0.120	0.240	0.400	0.520	1.280
S-F Residential Homes	0.050	0.050	0.075	0.075	0.250
10,000 s.f. Commercial	0.008	0.011	0.012	0.005	0.036
Acres of Recreation Space	0.032	0.024	0.024	0.020	0.100
Total	0.350	0.483	0.634	0.725	2.192
Cumulative Water Use (in MGD) By Development Type:					
Hotel Rooms	0.140	0.298	0.421	0.526	
Condominium Apartments	0.120	0.360	0.760	1.280	
S-F Residential Homes	0.050	0.100	0.175	0.250	
10,000 s.f. Commercial Space	0.009	0.019	0.031	0.036	
Acres of Recreation Space	0.032	0.056	0.08	0.100	
Total	0.350	0.833	1.467	2.192	

1 From Table II-1.

2 Based on water use rates projected by Belt, Collins & Associates (1980:13 & 14) as follows: Hotel - 350 gal/room/day; Condominium Apartment - 400 gal/unit/day; Single-Family Residence - 500 gal/unit/day; Commercial - 6,000 gal/10,000 s.f. floor area/day; Recreation - 4,000 gal/acre/day. These reflect 100 percent occupancy rates and are, therefore, higher than what the year-round usage rate would be.

Source: Belt, Collins & Associates.

Table V-21. Summary of Projected Domestic Water Use, Sewage Generation, and Golf Course Irrigation Requirements of the Mahukona Resort.

Year	Expected Wet-Season (Nov. thru February) Flow Rates[1]			Expected Dry-Season (June thru September) Flow Rates[3]		
	Domestic Water Use Supplied by Deep Wells (MGD)	Sewage Generated for Possible Reuse (MGD)	Golf Course Irrigation[2] Requirement (MGD)	Domestic Water Use Supplied by Deep Wells (MGD)	Sewage Generated for Possible Reuse (MGD)	Golf Course Irrigation[4] Requirement (MGD)
1990	0.25	0.18	0.88	0.42	0.29	1.05
1995	0.58	0.41	0.88	1.00	0.70	1.05
2000	1.03	0.72	1.63	1.76	1.23	1.92
2005	1.53	1.07	1.63	2.63	1.84	1.92

1 Wet-season potable water and sewage generation rates are taken to be 70 percent of year-round, 100 percent occupancy flow rates. Sewage flow is assumed to be 70 percent of potable water use.

2 The wet-season golf course irrigation application is taken to be 1.5 inches per week less about 0.23 inches taken care of by rainfall during these winter months. It is assumed that the first 18-hole course will have 180 irrigated acres; the second 18-hole course, to be added in the third development phase, will add 150 irrigated acres.

3 Dry-season potable water and sewage generation rates are taken to be 120 percent of year-round, 100-percent occupancy flow rates.

4 Dry-season golf course irrigation is taken to be 1.5 inches per week with no effective rainfall.

Source: Belt, Collins & Associates.

Table V-22. Summary of Groundwater Pumping and Injection at the Mahukona Resort by Time Period.

Time Period	Wet-Season (Nov.-Feb.) Rates[1]				Dry-Season (June-Sept.) Rates[1]			
	Pumping		Injection[3] at Sewage Treatment Plant	Net[4] Groundwater Withdrawal	Pumping		Injection[3] at Sewage Treatment Plant	Net Groundwater Withdrawal[4]
	Potable Wells	Brackish[2] Wells			Potable Wells	Brackish[2] Wells		
Preparation[5]	0.00	0.88	< 0.01	0.88	0.00	1.05	< 0.01	1.05
1986-1990	0.25	0.70	< 0.01	0.95	0.42	0.76	< 0.01	1.18
1991-1995	0.58	0.47	< 0.01	1.05	1.00	0.35	< 0.01	1.35
1996-2000	1.03	0.91	< 0.01	1.94	1.76	0.69	< 0.01	2.45
2001-2005	1.53	0.56	< 0.01	2.09	2.63	0.08	< 0.01	2.71

1 All figures in MGD.

2 Pumpage from brackish wells is the difference between the sewage flow and the irrigation requirements as shown in Table 3.

3 Injection wells would be constructed as a back-up effluent disposal system, but golf course irrigation would normally utilize all the effluent generated. The wells would be used only in case of problems with the golf course irrigation system or during exceptionally rainy periods.

4 Note that the estimates assume that the development is served by one integrated system. Failure to connect all the sewage treatment facilities with the golf courses could result in an increase in total withdrawals.

5 "Preparation" involves the establishment of the golf course. Since this occurs prior to the occupation of the site by visitors, residents, or employees, all of the irrigation water must be drawn from the brackish wells.

Source: Belt, Collins & Associates.

leeward side of the rift zone. There is little doubt that the resort's potable water requirements could be met by several wells there. (Bowles, et.al., 1974:58-64 provides a good summary of groundwater development potential on the Kokoiki side of the rift zone.) At the resort site, groundwater withdrawals would only be for brackish irrigation water if the Kokoiki source were used for potable water, and there is undoubtedly adequate groundwater for this use.

SECONDARY IMPACTS ON WATER RESOURCES OF NORTH AND SOUTH KOHALA

Without-Mahukona Scenario

New residential and commercial development, located off the region's major resort sites but attributable to it, will have impacts on regional water resource allocation and capacities of some of the existing water systems. Data on which the discussion of these impacts are based are summarized in Tables V-23 and V-24 and Figures V-11, V-12, and V-13. Some of their most significant aspects are:

- Water use in Waimea increased steadily at about seven percent per year through the 1970s, but held reasonably constant in North Kohala and along the Kawaihae-Puako coast (Table V-23 and Figure V-11). In North Kohala, this reflects a stable population. In Kawaihae-Puako, limited supply capacity through the pipeline from Waimea was a factor, particularly in the last several years of the decade.

- Completion of the Lalamilo water system, expected in June 1981, will greatly increase water supply capacity and service area of the County system serving the South Kohala coast (Figures V-12 and V-13, and Table V-24). This will enable several condominium projects in Puako, now held up because of inadequate water service capacity, to proceed. More significantly, it will allow two large-scale resort developers, Mauna Kea Properties, Inc. and Mauna Lani Resort, Inc., to proceed with hotel and condominium projects. These two developers contributed $2 million to the construction of the system, and 1.0 MGD of the system's water has been committed to their use.

- After the first increment of the Lalamilo system is on-line in mid-1981, the substantial surplus supply capacities shown in Table V-24 will exist in various Kohala systems. Of particular benefit is that the Waimea system can be relieved of supplying the South Kohala coast. This will result in a surplus there and put off the need for source and treatment additions for some years.

- Private systems, particularly the Waikoloa system, seem destined to have less impact than the county system on regional water supply, in proportion to their capacities, for at least some years hence. This is largely a matter of their location in relationship to the region's population centers.

A time-series analysis of water consumption and population growth in the area served by the Waimea water system indicates that average per capita water use (based on the estimated de facto population) remained steady at 170 gallons per day throughout the 1970s. Because it serves a similar user mix, this consumption rate is believed to be a good indicator of the water use rate that will be experienced in the Kohalas between now and the completion of the Mahukona Resort project.

Using this 170-gallon (per capita, per day) use rate together with estimates of existing population from Table V-13, the resort development projections shown in Table III-1, and the secondary growth forecasts summarized in Tables IV-16 and IV-17, future

Table V-23. Water Service by the County Department of Water Supply to North and South Kohala Through the 1970s.

Fiscal Year	Average Metered Consumption (MGD)				Number of Metered Services			
	South Kohala		North Kohala	Total for North and South Kohala	South Kohala		North Kohala	Total for North and South Kohala
	Kawaihae -Puako	Waimea			Kawaihae -Puako	Waimea		
1979-1980	0.504	0.673	0.341	1.518	248	1,369	977	2,594
1978-1979	0.491	0.631	0.323	1.445	246	1,272	959	2,477
1988-1978	0.484	0.701	0.336	1.521	239	1,158	916	2,313
1976-1977	0.706	0.644	0.335	1.685	234	1,088	900	2,222
1975-1976	0.667	0.550	0.320	1.537	226	1,032	893	2,151
1974-1975	0.658	0.506	0.332	1,496	219	993	881	2,093
1973-1974	0.580	0.524	0.339	1.443	220	953	865	2,038
1972-1973	0.622	0.440	0.324	1.386	205	872	841	1,918
1971-1972	0.555	0.455	0.318	1.328	205	805	828	1,838
1970-1971	0.455	0.339	0.276	1.070	188	733	801	1,722

Source: Annual Reports of the Hawaii County Department of Water Supply.

Table V-24. Present and Near-Future Capacities and Use of Water Systems in the South and North Kohala Region.[1]

Water System	Present Situation: Existing On-Line Capacity	Present Situation: Average Consumption	Present Situation: Possible Additional Consumption[3]	Near-Future Situation[2]: Near Future On-Line Capacity	Near-Future Situation[2]: Average Consumption	Near-Future Situation[2]: Possible Additional Consumption[3]	Prospects for Expanding Supply
Public Systems:							
Waimea	3.5[4]	1.2	0.8[5]	3.5[4]	0.8	1.2	Expansion of raw water storage and subsequent expansion of treatment capacity required.
Lalamilo	(presently under construction)			3.7	1.4[6]	0.7	Additional wells would expand the system to 5.3 MGD capacity; following that, a new well field and transmission system would be required.
North Kohala	1.15[7]	0.34	0.3	1.15[7]	0.4	0.3	Groundwater resources are more than adequate, but installation of new wells would be required.
Private Systems:							
Waikoloa	2.0	0.07	1.1	2.0	0.23[8]	0.9	New wells could expand capacity to between 5 MGD and 7 MGD.
Kohala Estates	—	—[9]	—	1.0	0.05	0.5	New wells might expand capacity to 2 MGD or 3 MGD.
Mahukona Resort	—	—	—	—	—	—	Exploratory drilling would be required to establish a supply source directly inland; next logical supply choice is 7 miles north near Hawi.

1 All figures in MGD.

2 The near-future situation depicted here assumes: the Lalamilo Water System, presently under construction, is brought on-line; DWS terminates delivery of Waimea water to the coast with completion of the Lalamilo system; the deep well drilled inland of Kohala Estates is outfitted with a 1.0 MGD pump.

3 Possible additional consumption is the difference between average consumption and DWS' definition of the safe supply capacity. The safe supply is the on-line capacity reduced by a 1.15 factor to account for transmission/distribution leakage and by a 1.5 factor to account for peak-season consumption.

4 The published capacity of the system is 3.5 MGD (Department of Water Supply, 1971:44) but experience in recent droughts has shown its practical capacity to be substantially less than this. It is supplied by surface water and a valid probability analysis is required to establish actual yield.

5 All of the current Waimea system surplus would have to be used in Waimea. There is no excess transmission capacity to the Kawaihae-Puako coastal area.

6 Consumption of Lalamilo system water initially will include current Kawaihae-Puako use, several Puako condominium projects on hold pending water development, and the initial projects of the Mauna Lani and Mauna Kea Properties resorts.

7 North Kohala system on-line capacity is based on low-flow rates from tunnel sources and the 400 gallon per minute well and pump in Hawi.

8 Near-future consumption of Waikoloa system water will include the 460-room hotel now under construction at Anaeho'omalu Bay.

9 Approximately 15 to 20 homesites in Kohala Estates used water trucked from Kawaihae to the Estates' distribution reservoir. The amount of this use is included in the figure of Waimea useage.

Source: Compiled by Belt, Collins & Associates using sources and assumptions noted above.

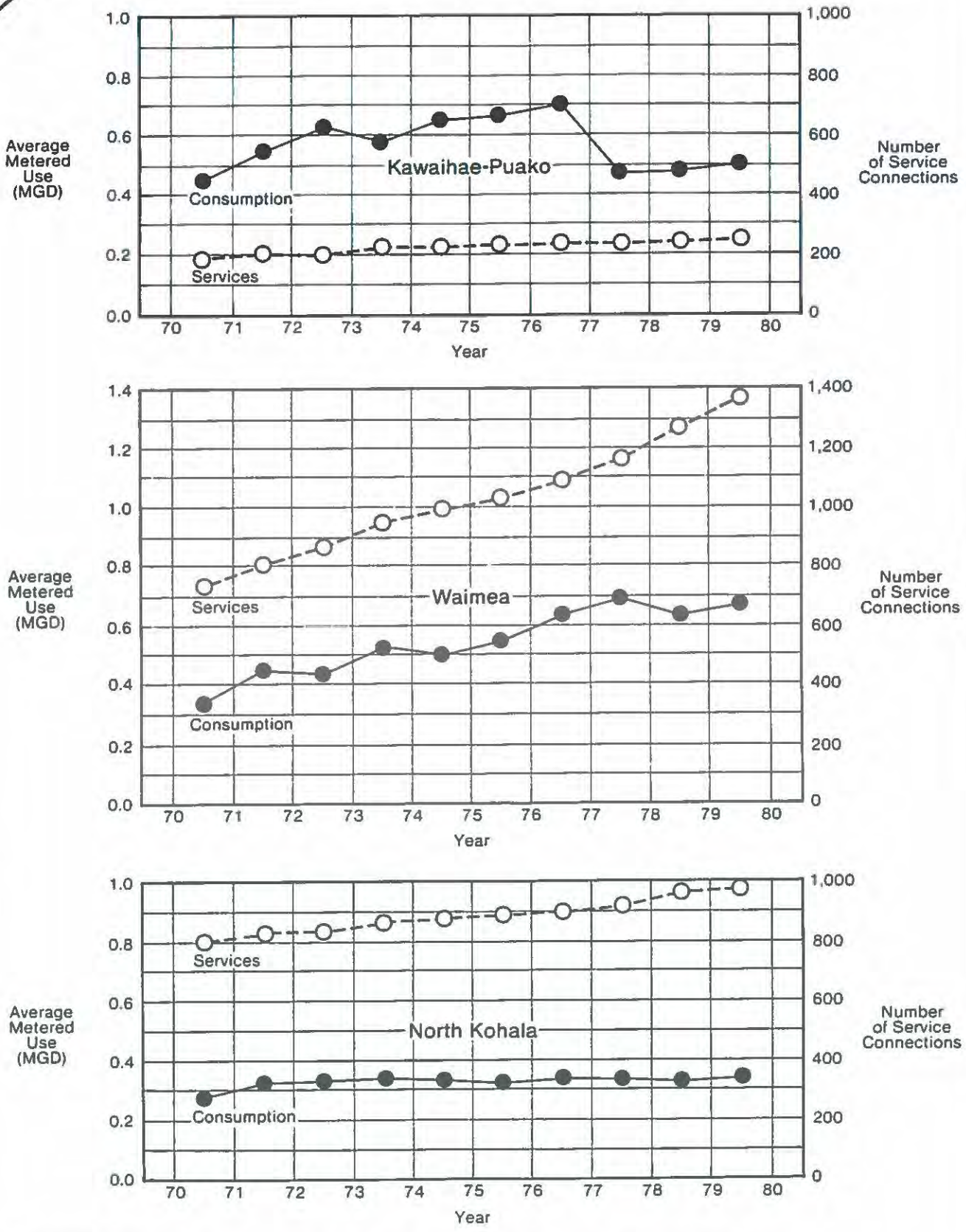


figure V-11. Trends in Service Connections and Water Consumption for County Department of Water Supply Systems in North and South Kohala: 1970s

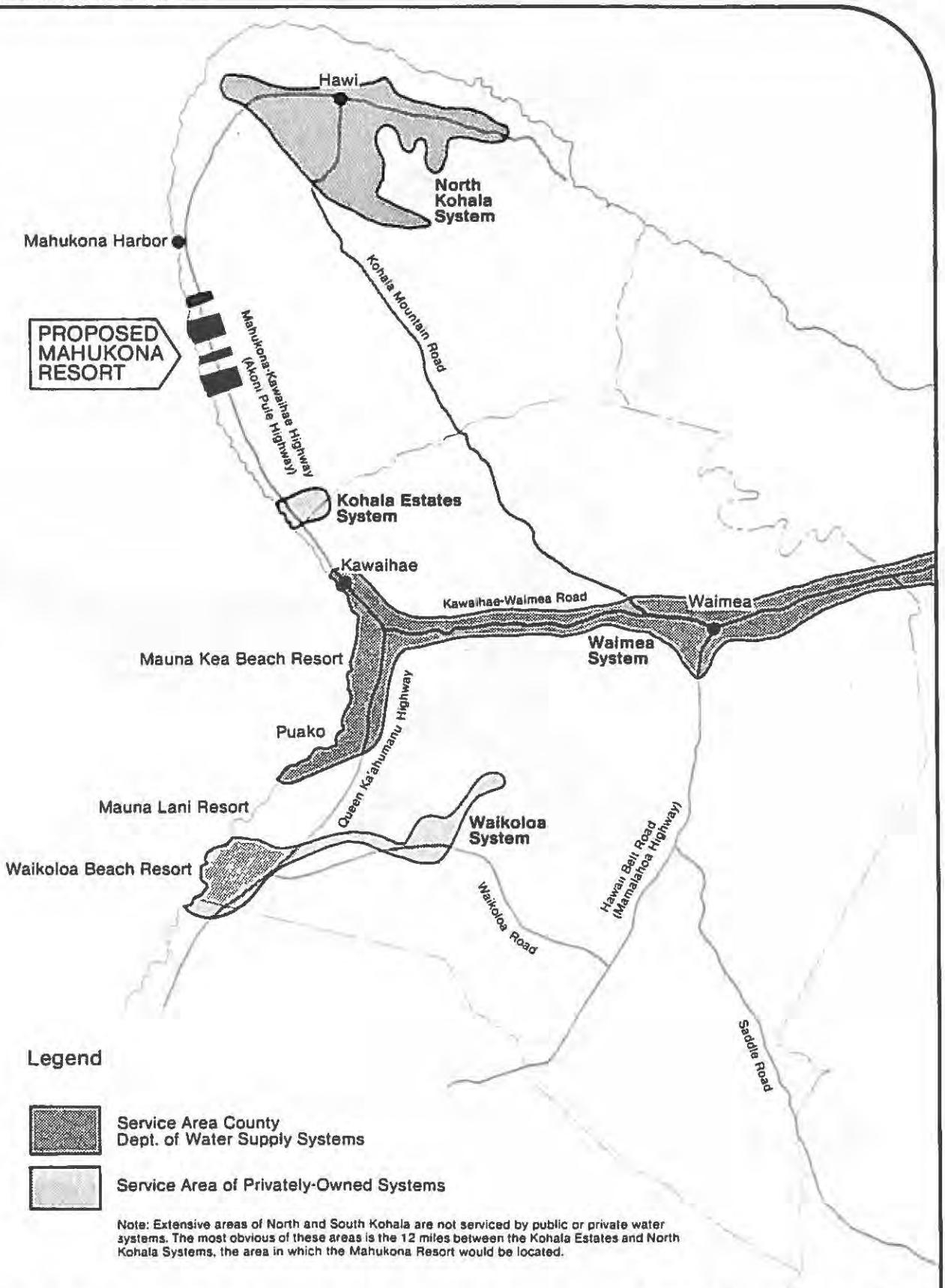


figure V-12. Service Areas of Existing Water Systems in North and South Kohala

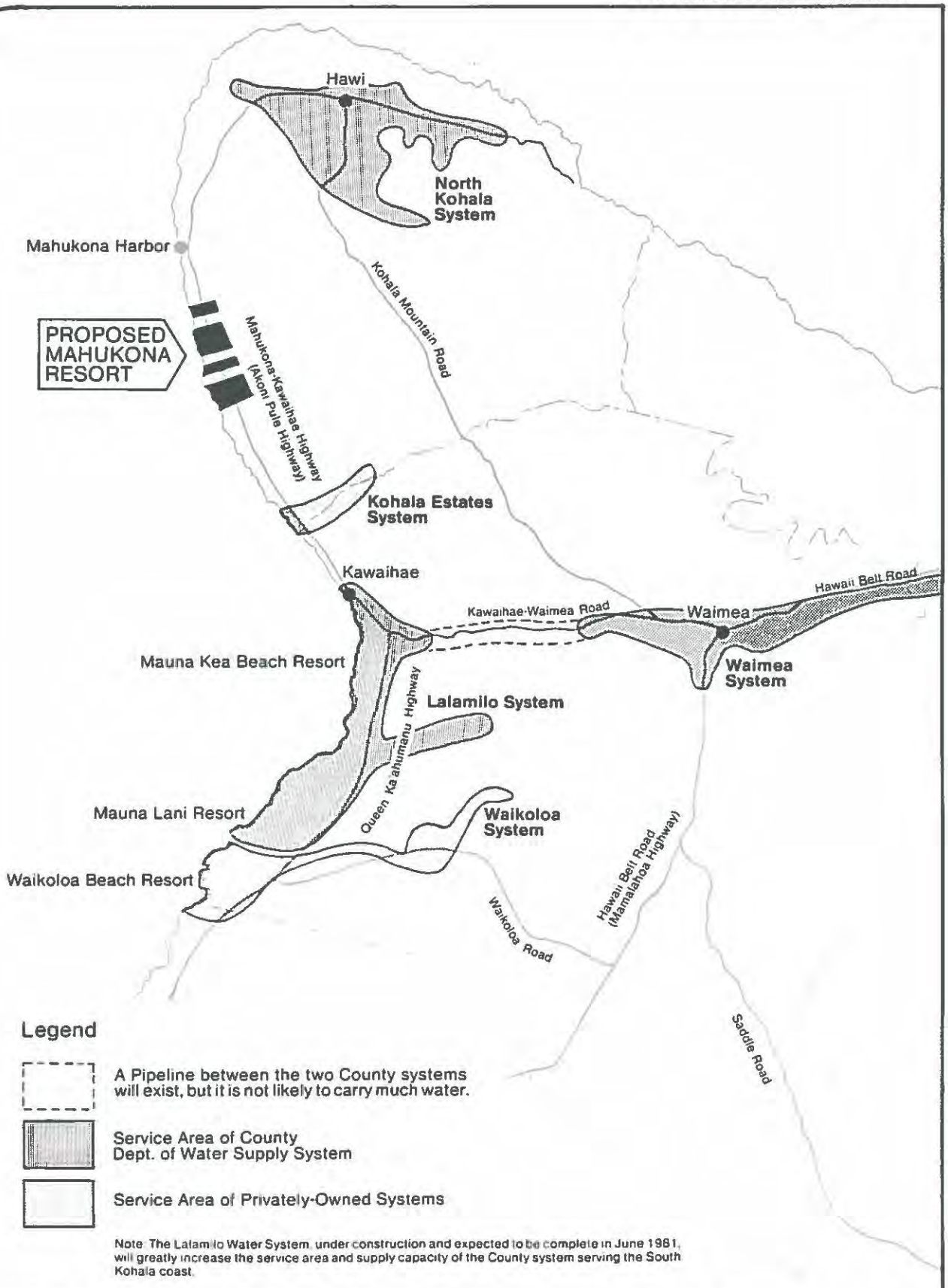


figure V-13. Near-Future Service Areas of Water Systems in North and South Kohala

water demand in the North/South Kohala study area can be projected and compared to the total capacities of planned water systems in the region. This comparison is depicted in Figure V-14. In region-wide totals, it appears that the capacity of existing and planned systems will comfortably exceed demand at least through the year 2000. However, a number of factors dictate that this conclusion be treated with caution.

First, in order for the apparent region-wide surplus depicted in the figure to be realized, population growth will have to be distributed in proportion to the capacity of the water systems. Specifically, new residents will have to settle primarily in the service areas of the Lalamilo, Waikoloa, and Kohala Estates systems. Only limited numbers could settle in the traditional population centers of Hawi and Waimea (see Table V-24).

Second, the surplus shown for the Waimea system may actually be much smaller than the official estimate shown in Table V-24. The system depends upon a surface water source whose flow is highly variable. Recent experience during drought periods suggests that demand may already be very close to the amount that the system can provide on a reliable basis. A valid probability analysis of both the flow rate of the source (Kohakohau Stream) and the use patterns of consumers will be required to establish its actual yield.

Third, the population distribution that would be required to efficiently utilize all of the sources is not one that is likely, or even possible, under existing State and County land use designations, and it is not one which necessarily matches landowners' present intentions. Plans for the Kohala Estates subdivision, for example, call for only 400 residential units to be built. At an average use rate of 500 gallons per day per unit, this amounts to only 200,000 gallons per day, or 20 percent of the system's potential 1.0 MGD capacity. Unless additional residential or commercial development is undertaken within the service area of this system, the remaining 0.8 MGD capacity could not be utilized to support the projected secondary growth. In the same vein, it is not clear that the residential units that can be developed at Waikoloa will be sold at a price that persons who are economically dependent upon the projected resort development will be able to pay. If they are not, residential development there may proceed slowly and the available water resources may not be fully utilized.

With-Mahukona Scenario

The potential impact of the Mahukona Resort on future water resource allocation needs to be looked at in two ways, first in terms of region-wide totals and then specifically in reference to North Kohala. Population projections presented elsewhere in this EIS show the project would increase regional resident and visitor population by 17 and 29 percent, respectively. Reasonably, visitors who stay at the Mahukona Resort would be supplied by the resort's new water system, one paid for by the resort developer and whose contribution to regional water system capacity is not reflected in Figure V-14. This leaves the resort's secondary population growth to be accommodated within the surplus capacity depicted on Figure V-14. This secondary population is estimated to be 2,250 in 1995 and to reach 3,800 by the time the project is completed. Using the same factors upon which Figure V-14 is based, these new residents would consume 0.38 MGD and 0.65 MGD in those two years, respectively. This would require on-line system capacities of 0.66 MGD in 1995 and 1.12 MGD ultimately. These numbers are within the region-wide apparent surplus shown on Figure V-14.

While it appears that the existing and planned water supply in the region is sufficient to accommodate population growth associated with the Mahukona Resort on the

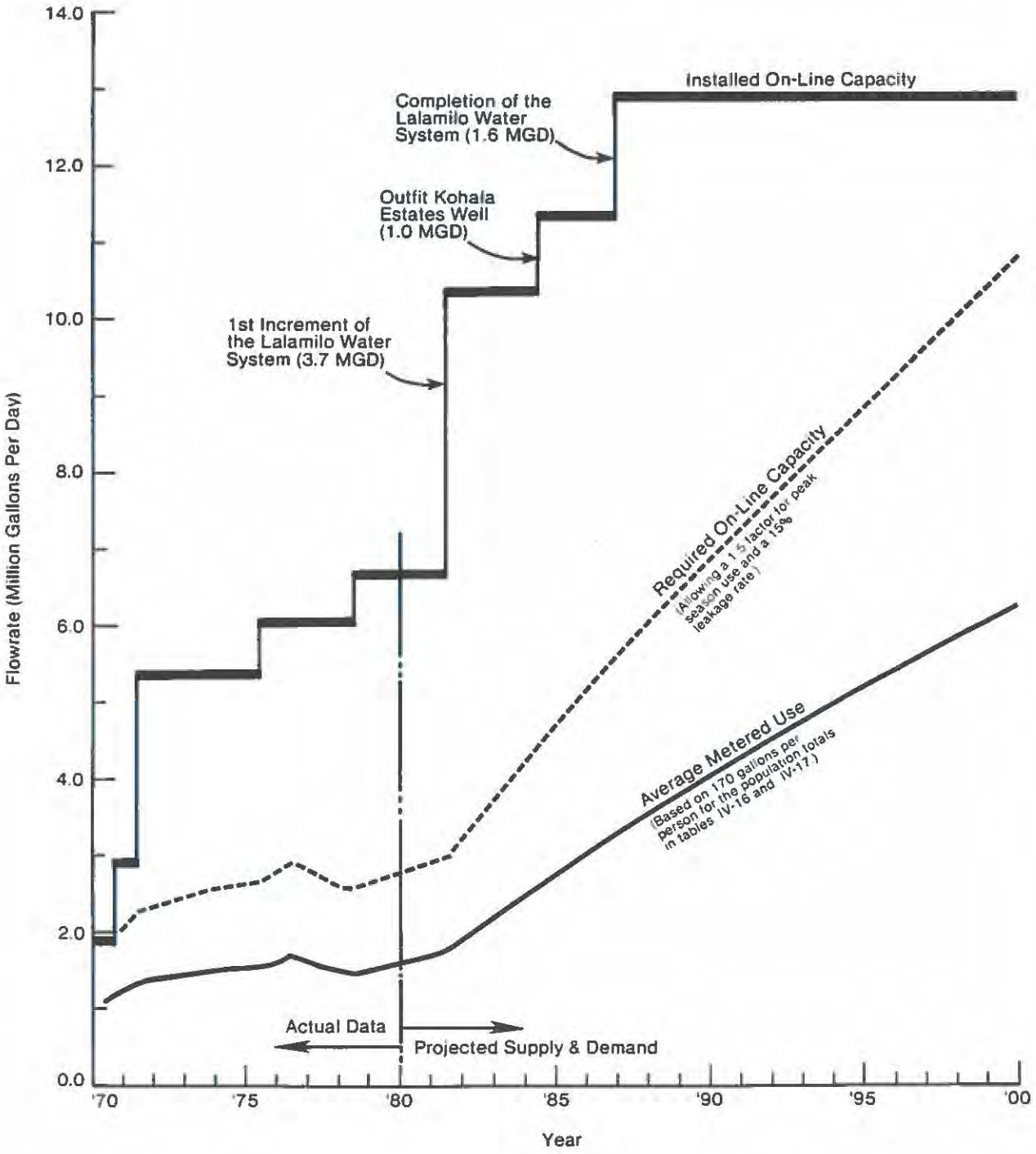


figure V-14. Projections of Water Supply and Demand in the North/South Kohala Region

condition that the growth is distributed geographically in almost exactly the same way that water supply is available, there is a significant possibility this would not occur. In particular, the Mahukona Resort's proximity to existing North Kohala communities suggests that, in the absence of strong control exerted by the County, a substantial proportion of the secondary population growth it would produce might locate there. If this does occur, expansion of the existing county water system there would be required, including new supply wells and greater distribution capacity. It is established that the water resource is adequate for such expansion. It would simply be a matter of making the necessary capital investments.

It is worth noting in passing that the presence of a resort developer at Mahukona could benefit the County if the need to expand the North Kohala system does arise. Without the Mahukona Resort project, the Department of Water supply would probably have to pay for new source development at Kokoiki. With it there is a possibility that the developer could be induced to put up a sizeable portion of the required capital in return for a substantial share of the water, much as has been done with the Lalamilo Water System project in South Kohala.

Cost Considerations

All of the planned and proposed resort projects are being required to develop and/or finance water systems in order to obtain necessary development permits. As a result, the public is being required to finance only a small portion of the capital cost. The Waikoloa, Lalamilo, and Kohala Estates systems, i.e., the three major new water systems expected to serve Kohala development, all utilize deep wells with lifts of from 1,100 to 1,400 feet. Because of this, the cost (per 1,000 gallons) of electricity needed to operate the systems will be significantly greater than the present county-wide average. In fact, electricity costs alone are expected to be greater than $0.50 per 1,000 gallons, or more than the Department of Water Supply now charges users. The Waikoloa and Kohala Estates systems are expected to remain private; owners will undoubtedly recover their costs by charging more than the rates set by the Department of Water Supply. (Waikoloa residents currently pay about $1.00 per 1,000 gallons, or twice the DWS rate.) The Lalamilo system will be a public system however, which means that residents who live in areas with lower water supply costs will subsidize users of water from this source.

IMPACTS ON PUBLIC FACILITIES, SERVICES, AND UTILITIES

The growing population of the North/South Kohala area would require a gradual expansion of the existing public facilities, services, and utilities. While it is not possible, at this time, to project precisely the needs that would exist by the year 2005, it is possible to anticipate the types and approximate magnitude of the demand. This chapter addresses the projected needs for schools, health care facilities, recreational facilities, police and fire protection, electrical power, solid waste disposal, and sewage treatment systems.

SCHOOLS

Existing Facilities

The North/South Kohala impact area is served by three public and three private schools. Kohala High/Elementary serves the North Kohala District, from kindergarten through 12th grade. Waimea Elementary/Intermediate serves South Kohala for kindergarten through 9th grade. South Kohala high school students are bused to Honoka'a High for grades 10 through 12. The private schools are Hawaii Preparatory Academy (grades 1-12), the Parker School (grades 7-12)--both in Waimea, and the Kohala Mission School (grades 1-8) in Hawi. The 1978 enrollment at these three private schools was, respectively, 396, 106, and 22 (Hawaii, State of, Department of Education, December 1978:21).

The capacities, current enrollments, and the Department of Education's projections of year 2000 enrollments in the public schools serving the area are shown in Table V-25. The enrollment projections do not specifically take into account expected resort-related secondary growth. However, the large growth in enrollment foreseen for Waimea Elementary/Intermediate is a projection of current growth trends in the area resulting largely from the impetus of the visitor industry.

Projected Impacts

The Department of Education (Lau, March 24, 1981) does not normally make projections for school enrollment based on the limited information now available about the planned and proposed resorts and related secondary growth. They wait until the plans for projects are much more concrete, usually after zoning approval, to calculate new projections. The DOE's experience with the resort area of Ka'anapali on Maui, where many workers are bused in from the Wailuku/Kahului area, and with Waikoloa Vilage, which has generated very little public school enrollment, leads them to downplay the effect that the planned and proposed resorts will have on the schools.

There are obviously many unknowns which make projections for school enrollment difficult. Among these are:

- the exact demographic makeup (e.g., age, income, family size) of the expected additional families;
- the location of the necessary additional residential areas;
- factors which could cause residents to send their children to private schools.

Still, the impact of the planned and proposed resorts can be roughly estimated.

Table V-25. Capacities, Current Enrollment, and Enrollment Projections for Schools Serving North/South Kohala.

School	Grades	Capacity[1]	Current Enrollment[1]	DOE Projected Enrollment (year 2000)[2]
Kohala	K-12	773	710	630
Waimea	K-9	788[3]	683	1,070
Honoka'a	K-12	1,088	1,037[4]	1,110
	Total	2,649	2,430	2,810

1 Howard Lau, Facilities Branch - DOE, phone conversation March 24, 1981.

2 Ed Matsushige, Planning Branch - DOE, phone conversation March 20, 1981.

3 Capacity as of 1980 (Belt, Collins & Associates: March 1980); four classrooms are now being added.

4 An examination of Waimea Intermediate enrollment by grade (Hawaii, State of, Department of Education, September 1978:11) indicates that about 150 students at Honoka'a High are from South Kohala. Therefore the total public school enrollment of students from North and South Kohala is approximately 1,540.

Source: Compiled by Belt, Collins & Associates based on sources noted in footnotes above.

Results of the 1980 Census (U.S. Census Bureau, February 13, 1981) and the enrollment information presented in Table V-25 indicate that in 1980 there were about 0.2 public school students in the study area for each person who resided there. Applying this same ratio to the projected year 2000 resident population without the proposed Mahukona Resort (see Table IV-17) indicates that already-planned resort development in South Kohala would increase the number of public school students in the study area in the year 2005 by 2,900. Based on the same factor, the Mahukona Resort's secondary growth would add another 760 students to the public school system for a total increase of 3,660 students between now and 2005.

For a variety of reasons, the two most important being a continuing decline in the birth rate and, the fact that a substantial proportion of the resort industry labor force is likely to consist of childless transients, it is expected that the student/capita ratio in 2005 will be no more than two-thirds the present rate, and quite possibly less.

Regardless of the exact enrollment increase that occurs, the relatively small excess capacity possessed by existing facilities indicates that substantial new construction will be required, either on vacant land adjacent to existing schools or on entirely new sites. The Department of Education's present policy is to accommodate growth by expanding existing facilities (rather than by constructing entirely new schools) whenever possible, and we have been told that sufficient vacant land exists on the school sites listed in Table V-25 to accommodate all of the growth that is projected.

Despite the presence of sufficient vacant land on existing sites and the DOE's desire to avoid the establishment of a new school, such a move could become almost inevitable if a large part of the projected secondary growth were to be located in the South Kohala coastal area. Otherwise, the Department would find itself bussing most of the elementary-level students 10 to 15 miles to and from school. This is not only undesirable from an educational standpoint, it would also add greatly to the system's transportation costs.

Mitigation Measures

As noted above, the Department of Education believes that existing school sites have sufficient vacant land to accommodate the facilities necessary to serve the population growth in the region both with and without the proposed Mahukona Resort. Given the long lead time necessary for the construction of hotels and other resort facilities, it will be possible to wait until developers' plans are actually being implemented before beginning construction of new classrooms and other facilities. In short, it seems feasible, in some ways even preferable, for the Department to respond to immediate pressures rather than engage in long-term planning.

The one situation where this is probably not true is if a large portion of the secondary growth were to be centered in the South Kohala coastal area, far from the nearest school. If this were to occur, travel times for students and transportation costs for the Department of Education might well be excessive. In this case, development of a new school would be called for as a means of forestalling these adverse effects.

condition that the growth is distributed geographically in almost exactly the same way that water supply is available, there is a significant possibility this would not occur. In particular, the Mahukona Resort's proximity to existing North Kohala communities suggests that, in the absence of strong control exerted by the County, a substantial proportion of the secondary population growth it would produce might locate there. If this does occur, expansion of the existing county water system there would be required, including new supply wells and greater distribution capacity. It is established that the water resource is adequate for such expansion. It would simply be a matter of making the necessary capital investments.

It is worth noting in passing that the presence of a resort developer at Mahukona could benefit the County if the need to expand the North Kohala system does arise. Without the Mahukona Resort project, the Department of Water supply would probably have to pay for new source development at Kokoiki. With it there is a possibility that the developer could be induced to put up a sizeable portion of the required capital in return for a substantial share of the water, much as has been done with the Lalamilo Water System project in South Kohala.

Cost Considerations

All of the planned and proposed resort projects are being required to develop and/or finance water systems in order to obtain necessary development permits. As a result, the public is being required to finance only a small portion of the capital cost. The Waikoloa, Lalamilo, and Kohala Estates systems, i.e., the three major new water systems expected to serve Kohala development, all utilize deep wells with lifts of from 1,100 to 1,400 feet. Because of this, the cost (per 1,000 gallons) of electricity needed to operate the systems will be significantly greater than the present county-wide average. In fact, electricity costs alone are expected to be greater than $0.50 per 1,000 gallons, or more than the Department of Water Supply now charges users. The Waikoloa and Kohala Estates systems are expected to remain private; owners will undoubtedly recover their costs by charging more than the rates set by the Department of Water Supply. (Waikoloa residents currently pay about $1.00 per 1,000 gallons, or twice the DWS rate.) The Lalamilo system will be a public system however, which means that residents who live in areas with lower water supply costs will subsidize users of water from this source.

IMPACTS ON PUBLIC FACILITIES, SERVICES, AND UTILITIES

The growing population of the North/South Kohala area would require a gradual expansion of the existing public facilities, services, and utilities. While it is not possible, at this time, to project precisely the needs that would exist by the year 2005, it is possible to anticipate the types and approximate magnitude of the demand. This chapter addresses the projected needs for schools, health care facilities, recreational facilities, police and fire protection, electrical power, solid waste disposal, and sewage treatment systems.

SCHOOLS

Existing Facilities

The North/South Kohala impact area is served by three public and three private schools. Kohala High/Elementary serves the North Kohala District, from kindergarten through 12th grade. Waimea Elementary/Intermediate serves South Kohala for kindergarten through 9th grade. South Kohala high school students are bused to Honoka'a High for grades 10 through 12. The private schools are Hawaii Preparatory Academy (grades 1-12), the Parker School (grades 7-12)--both in Waimea, and the Kohala Mission School (grades 1-8) in Hawi. The 1978 enrollment at these three private schools was, respectively, 396, 106, and 22 (Hawaii, State of, Department of Education, December 1978:21).

The capacities, current enrollments, and the Department of Education's projections of year 2000 enrollments in the public schools serving the area are shown in Table V-25. The enrollment projections do not specifically take into account expected resort-related secondary growth. However, the large growth in enrollment foreseen for Waimea Elementary/Intermediate is a projection of current growth trends in the area resulting largely from the impetus of the visitor industry.

Projected Impacts

The Department of Education (Lau, March 24, 1981) does not normally make projections for school enrollment based on the limited information now available about the planned and proposed resorts and related secondary growth. They wait until the plans for projects are much more concrete, usually after zoning approval, to calculate new projections. The DOE's experience with the resort area of Ka'anapali on Maui, where many workers are bused in from the Wailuku/Kahului area, and with Waikoloa Vilage, which has generated very little public school enrollment, leads them to downplay the effect that the planned and proposed resorts will have on the schools.

There are obviously many unknowns which make projections for school enrollment difficult. Among these are:

- the exact demographic makeup (e.g., age, income, family size) of the expected additional families;
- the location of the necessary additional residential areas;
- factors which could cause residents to send their children to private schools.

Still, the impact of the planned and proposed resorts can be roughly estimated.

Table V-25. Capacities, Current Enrollment, and Enrollment Projections for Schools Serving North/South Kohala.

School	Grades	Capacity[1]	Current Enrollment[1]	DOE Projected Enrollment (year 2000)[2]
Kohala	K-12	773	710	630
Waimea	K-9	788[3]	683	1,070
Honoka'a	K-12	1,088	1,037[4]	1,110
	Total	2,649	2,430	2,810

1 Howard Lau, Facilities Branch - DOE, phone conversation March 24, 1981.

2 Ed Matsushige, Planning Branch - DOE, phone conversation March 20, 1981.

3 Capacity as of 1980 (Belt, Collins & Associates: March 1980); four classrooms are now being added.

4 An examination of Waimea Intermediate enrollment by grade (Hawaii, State of, Department of Education, September 1978:11) indicates that about 150 students at Honoka'a High are from South Kohala. Therefore the total public school enrollment of students from North and South Kohala is approximately 1,540.

Source: Compiled by Belt, Collins & Associates based on sources noted in footnotes above.

Results of the 1980 Census (U.S. Census Bureau, February 13, 1981) and the enrollment information presented in Table V-25 indicate that in 1980 there were about 0.2 public school students in the study area for each person who resided there. Applying this same ratio to the projected year 2000 resident population without the proposed Mahukona Resort (see Table IV-17) indicates that already-planned resort development in South Kohala would increase the number of public school students in the study area in the year 2005 by 2,900. Based on the same factor, the Mahukona Resort's secondary growth would add another 760 students to the public school system for a total increase of 3,660 students between now and 2005.

For a variety of reasons, the two most important being a continuing decline in the birth rate and, the fact that a substantial proportion of the resort industry labor force is likely to consist of childless transients, it is expected that the student/capita ratio in 2005 will be no more than two-thirds the present rate, and quite possibly less.

Regardless of the exact enrollment increase that occurs, the relatively small excess capacity possessed by existing facilities indicates that substantial new construction will be required, either on vacant land adjacent to existing schools or on entirely new sites. The Department of Education's present policy is to accommodate growth by expanding existing facilities (rather than by constructing entirely new schools) whenever possible, and we have been told that sufficient vacant land exists on the school sites listed in Table V-25 to accommodate all of the growth that is projected.

Despite the presence of sufficient vacant land on existing sites and the DOE's desire to avoid the establishment of a new school, such a move could become almost inevitable if a large part of the projected secondary growth were to be located in the South Kohala coastal area. Otherwise, the Department would find itself bussing most of the elementary-level students 10 to 15 miles to and from school. This is not only undesirable from an educational standpoint, it would also add greatly to the system's transportation costs.

Mitigation Measures

As noted above, the Department of Education believes that existing school sites have sufficient vacant land to accommodate the facilities necessary to serve the population growth in the region both with and without the proposed Mahukona Resort. Given the long lead time necessary for the construction of hotels and other resort facilities, it will be possible to wait until developers' plans are actually being implemented before beginning construction of new classrooms and other facilities. In short, it seems feasible, in some ways even preferable, for the Department to respond to immediate pressures rather than engage in long-term planning.

The one situation where this is probably not true is if a large portion of the secondary growth were to be centered in the South Kohala coastal area, far from the nearest school. If this were to occur, travel times for students and transportation costs for the Department of Education might well be excessive. In this case, development of a new school would be called for as a means of forestalling these adverse effects.

HEALTH CARE FACILITIES

Existing and Planned Facilities

Three medical facilities are available to North/South Kohala area residents and visitors: Kohala Hospital near Hawi, Honoka'a Hospital, and the Lucy Henriques Medical Center in Waimea. The two hospitals are administered by the State Department of Health. (There are no privately administered hospitals on the island.) The Lucy Henriques Clinic is a non-profit operation, privately owned and administered. The present service capabilities, operating levels and examples of facility utilization at the two hospitals are outlined in Table V-26.

The Lucy Henriques Clinic is the most modern of the three facilities, in both equipment and building design. However, it is not certified to operate as a hospital. Patients can be treated there and kept in the facility's two holding beds for 24 hours at the most. In addition to the two beds, there are four physicians' offices, two dentists' offices, and an examination room. Fluoroscopy and X-ray services are available. The emergency room is open 8 AM to 9 PM, Monday through Friday and from 8 AM Saturday to 9 PM Sunday.

The Kohala Hospital is housed in a structurally sound concrete block building. It presently meets the medical needs of the community satisfactorily. No structural changes to the facility are planned at the present time. However, some acute care beds are being redesignated as skilled nursing beds because the acute care occupancy rate is less than five percent while the skilled nursing (long-term care) beds are full all the time.

The Honoka'a Hospital is housed in a wooden building. In order to comply with Medicare and Medicaid requirements, sprinklers and fire-proofed walls have been installed and the 9-bed wards reduced to 4-bed wards. Due mainly to the resultant poor utilization of space, the State Department of Health has planned a new Honoka'a Hospital on the same parcel, just mauka of the present building. They expect to turn the present facility over for use as a skilled nursing unit or non-patient public health facility. The new hospital is planned to accommodate a small amount of growth in the region resulting from the consolidation of sugar plantations and new macadamia nut orchards in the area (Thompson, March 27, 1981).

Projected Impacts

No plans have been made for a new acute care hospital to serve the projected increase in population due to resort growth. Since the State Department of Health does not know where the residential growth in the region will occur it is not making any plans at this time, but Waimea would be a favored location for a new facility if population growth is concentrated in this area. Since the number of acute care beds at Kohala Hospital are being reduced, a new hospital in the region would provide the impetus to phase out all acute care there and limit that facility to skilled nursing and intermediate care.

The expected population growth in the region would probably necessitate the construction of a new acute care hospital in North or South Kohala. The cost of this facility would fall largely on the State Department of Health. If rapid population increases outstrip the growth in health care facilities, patients would have to seek services in hospitals outside the region--probably in Hilo, Kona, or Honolulu. Patients requiring specialized care are forced to do this now.

Table V-26. Present Service Capabilities and Operating Levels of Hospitals Serving North/South Kohala.[1]

	Kohala Hospital		Honoka'a Hospital	
	Acute Care	Skilled Nursing	Acute Care	Skilled Nursing
Beds	16	10	27	8
Admissions	100	6	530	17
Ave. Daily Census	0.7	10.5	7.7	6.9
Ave. Length of Stay (days)	2.6	549.3	5.3	147.6
Percent of Occupancy	4.2%	105.3%	29%	86%
Examples of Facility Utilization				
Outpatient visits	2,344		2,411	
Emergency room visits	816		799	
Operations	n.a.		138	
Deliveries	n.a.		88	
Radiological exams	1,589		2,000	
Anesthesia	70		141	

[1] All figures are for fiscal year ended June 30, 1980.

Source: Data obtained from State of Hawaii, Department of Health, County/State Hospital Administration Office.

One beneficial impact of the population growth is that it would tend to attract to the area medical specialists, whom the present population cannot support. Then a broader range of medical services would be available in the region.

Mitigation Measures

As mentioned above a new hospital would probably be required to provide adequate health care services to the residents and visitors of North and South Kohala. If a new acute care hospital cannot be built in sufficient time to respond to the area's population growth, expansion of the existing hospitals may be a necessary intermediate step. Once the size and location of the expected secondary growth is more firmly established, planning for a new facility should begin.

RECREATIONAL FACILITIES

Existing Situation

Existing recreational facilities in North and South Kohala include beach parks, school playgrounds, historic sites, gyms, a marina, boat ramps, golf courses, tennis courts, a rodeo arena and race track, a scenic viewpoint, and forest reserve land. The specific recreational facilities are listed in Table V-27 along with the activities available at each; their locations are shown on Figure V-15. There are also several hiking trails in the area.

Hawaii County's recreation plan defines two types of parks. Group 1 includes neighborhood and community type parks, while Group 2 parks serve a larger region or the entire island. Beach parks are classed as Group 2 facilities. For North and South Kohala the amount of park acreage by Group and the ratio of acreage per 1,000 residents is shown in Table V-28.

The recommended standards reported in the County of Hawaii Recreation Plan are five acres per 1,000 population for Group 1 parks and ten acres per 1,000 population for Group 2 parks (Hawaii, County of, Department of Parks and Recreation, 1974:12). The North Kohala District meets the Group 1 standard, and the Group 2 standard is met if total, rather than developed, acreage is computed. The South Kohala District does not meet either standard, even by including two State parks in the Group 2 calculation. An additional 4.7 acres of Group 1 and 8.7 acres of Group 2 park would be required to meet the recommended standards.

Expected Impacts and Planned Mitigation

Since resort developments provide numerous on-site recreational facilities and activities for their guests, the impact of visitor population growth on public recreational facilities, with a few exceptions noted below, is not considered significant. On the other hand, the large amount of resident population growth that is spurred by resort employment will place significant additional demands on the limited recreational resources.

To meet the recommended standards for Group 1 and 2 parks for the expected study area population growth resulting from the planned South Kohala resorts, 72.5 more acres of Group 1 and 145 more acres of Group 2 parks would be required. If the Mahukona resort is developed as well, resultant resident growth in North/South Kohala would require 19 and 38 more acres for Group 1 and 2 parks respectively, in addition to the acreage noted above--for a total of 91.5 additional acres of Group 1 parks, and 183 more acres of Group 2 parks (see Table V-28).

Table V-27. Existing Recreational Facilities in North and South Kohala.

Facility	Area (Acres)	Agency	Activities
North Kohala:			
Camp Koapaka (Old Makalapa School)	3.7	Private	Retreat group activities
Hala'ula School Playground	5.0	State	School playground activities
Kahua Ranch Pavilion	--	Private	Picnicking
Kamehameha Park	18.4	County	Indoor and outdoor recreational activities
Kapa'a Beach Park	26.3	County	Skin diving, fishing, picnicking, camping
Kohala High/Elementary School	4.5	State	Playground & high school athletic activities
Keokea Beach Park	7.1	County	Limited swimming, fishing, picnicking, camping
Lapakahi State Historic Park	--	State	Self-guided tour of remains of fishing village
Mahukona Beach Park/Boat Harbor	3.1	County	Swimming, skin diving, fishing, boat launching, picnicking, camping
Mormon Gym, Hawi	--	Private	Indoor recreational activities
Pololu-Honokane Valley Reserve	--	State	Wilderness, hiking
South Kohala:			
Hapuna Beach Park	65.0	State	Swimming, surfing, camping, lodging
Kahilu Hall	--	Private	Indoor recreational activities
Kawaihae Boat Harbor	10.0	State	Marina, boat-launching ramp, fishing
Kohala Forest Reserve	23,800.0	State	Wilderness, hiking
Mauna Kea Beach Hotel Golf Course and Tennis Courts	400	Private (fee)	Golf, tennis
Puako Boat Ramp	0.5	State	Fishing, boat-launching ramp
Pu'ukohola Heiau National Park	--	Federal	Interpretation of historic sites
Samuel Spencer Beach Park	13.4	County	Swimming, picknicking, camping
Thelma Parker Gym	--	State	County recreational programs in a State-owned facility
Waikoloa Golf Course	--	Private (fee)	Golf
Waimea Elementary/Intermediate School	5.0	State	School playground activities
Waimea Park	10.5	County	Outdoor recreational activities
Waimea Playground (Church row)	2.8	County	Open grassed area, landscaping
Waimea Rodeo and Racetrack	--	Private	Rodeo activities
Waimea Youth Center	--	Private	Indoor recreational activities

Source: Hawaii, County of, Department of Parks and Recreation (1974) and (July 22, 1981), and Hawaii, State of, Department of Planning and Economic Development (December 1975).

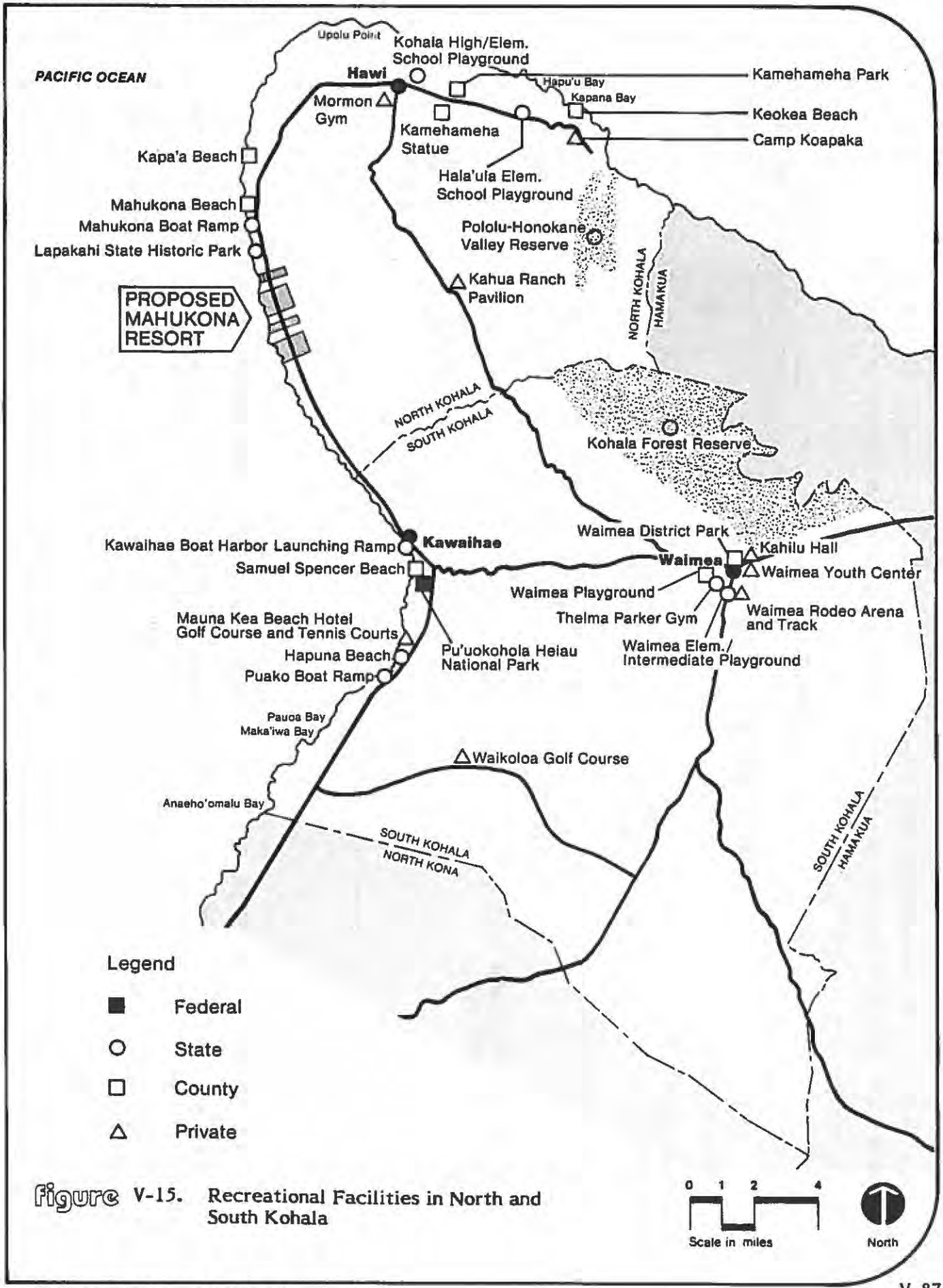


Figure V-15. Recreational Facilities in North and South Kohala

Table V-28. Park Acreages and Ratios to Resident Population in North and South Kohala: 1980 and 2005.

	Existing		Additional	
			North and South Kohala: 2005	
	North Kohala: 1980	South Kohala: 1980	w/o Mahukona	with Mahukona
Resident Population	3,249[1]	4,604[1]	14,500[2]	18,300[2]
Park Area (in acres):				
Group 1	27.9	18.3	—	—
Group 2	36.5[3]	37.4[4]	—	—
Park Acres/1,000 residents:				
Group 1	8.6	4.0	5.0	5.0
Group 2	11.2[3]	8.1	10.0	10.0
Additional acres needed to reach recommended standards:				
Group 1	—	4.7	72.5	91.5
Group 2	—[5]	8.7	145.0	183.0

1 From 1980 Census.

2 From Table IV-17.

3 If only developed park acreage is counted (8.7 acres), then the acreage per 1,000 residents is only 2.7.

4 Kawaihae Boat Harbor and developed portion of Hapuna State Park (14 acres) are included in this figure. Generally, the County Department of Parks and Recreation bases its ratios only on County park acreage.

5 If only developed park acreage is counted, 23.8 more acres need to be developed to reach the recommended standard.

Source: Hawaii County of, Department of Parks and Recreation (1974), and Hawaii State of, Department of Planning and Economic Development (December 1975).

This is a substantial amount of park acreage to acquire and develop in less than 25 years, however, there is a large amount of suitable land in the area. Since almost all of the Group 1 park needs can be met in the subdivision process through the park dedication ordinance, the County need purchase neighborhood park sites only in existing neighborhoods without such a park. For Group 2 type parks a large part of the demand is for beach parks. These resources are limited and therefore, land values are high. The 1974 County recreation plan proposed establishment of recreation reserves at Mau'umae Beach, Kaluhi'ikanu Beach, Wai'ula'ula Point, Kukui Point (these four are between the Mauna Kea Beach Hotel and Samuel Spencer Beach Park), and at Anaeho'omalu Bay, Maka'iwa Bay, and Pauoa Bay. For North Kohala the plan proposed negotiation with landowners for rights-of-way to the coast at Kapana Bay, Niuli'i, and Hapu'u, and development of the Upolu Point Recreation Area. No direct purchase has been undertaken for any of these sites, although negotiations during the development permit process have assured protection of and public access to Anaeho'omalu, Maka'iwa, and Pauoa Bays which front the Waikoloa and Mauna Lani Resorts. The County has also negotiated for a public right-of-way to the beach at Kauna'oa Bay in front of the Mauna Kea Beach Hotel.

While visitors would compete with residents for the limited shoreline resources, it must be recognized that development of the resorts will increase residents' access to these resources. If sufficient beach and shoreline acreage is not available to fulfill all of the Group 2 park needs then there is an abundance of land available to develop other Group 2 type parks which include historic areas, viewpoints, and facilities for indoor sports, spectator sports, or cultural activities.

One beneficial impact that increased growth, especially in the visitor population, might have is to increase interest in and visits to such historic parks as Lapahaki State Historic Park and Pu'ukohola Heiau National Park. The State Department of Land and Natural Resources, Division of State Parks published in 1973 two plans for developing a series of sites in the study area. For North Kohala the concept was to restore sites connected with Kamehameha I's life as a way of promoting North Kohala as a "visitor destination area" and illustrating the culture of the Hawaiian people. For South Kohala there was a plan to develop a shoreline trail system linking historic sites, beach parks, and other recreational areas. The increased resident and visitor census in the area may provide the impetus to develop these historic parks and trail system.

Additional Mitigation Measures

Although the 1974 County Recreation Plan proposed a substantial number of new parks and facilities, especially in South Kohala, no land purchases for these proposed parks have been made (Miyao, March 27, 1981). Purchase of the land designated for regional parks now, before development pressures increase the cost, would help insure an adequate supply of Group 2 park land for the future population. An adequate supply of neighborhood park acreage can be assured by enforcement of the Park Dedication ordinance. A decision by the County Planning Department to restrict new housing developments to a few areas, rather than allowing a scattered pattern of development, would result in neighborhood parks that are larger and easier to maintain than many small, scattered ones.

POLICE PROTECTION

Present Facilities and Staffing

The Hawaii County Police Department currently maintains two stations in the study area. One is in Waimea, South Kohala; the other is situated in Kapa'au, North Kohala. The staffing of these facilities in March 1981 was:

Kapa'au	Waimea
1 Captain	1 Captain
2 Sergeants	1 Lieutenant
9 Police Officers	2 Sergeants
1 Secretary/Stenographer	13 Police Officers
	1 Secretary/Stenographer

Based on 1980 population figures, there are presently 3.7 police officers per 1,000 residents.

According to Chief Guy Paul of the Hawaii County Police Department (March 13, 1981), the present North Kohala staffing is adequate, but the Waimea station has more calls than its staff can adequately handle. Both of the police stations were recently constructed--Waimea's in 1975 and Kapa'au's in 1973--and have the capacity to handle a substantial increase in staffing (Paul, March 13, 1981). Should additional space be required, there is room on the sites of both stations for expansion.

Projected Impacts

The projected future growth in the area's resident and visitor population associated with planned and proposed resort development in the Kohalas would undoubtedly increase the demand for police services. However, the increase in demand would not necessarily be in direct proportion to the increase in population. The extent to which staffing would need to increase is dependent upon numerous factors, many of which are impossible to predict at this time. However, some understanding of the level of staffing increases that might be required may be had by considering four possibilities. In order of increasing requirements they are: (i) estimates made by Chief Guy Paul, present head of the Big Island police force; (ii) estimates made by his predecessor, Acting Chief Martin Kaaua; (iii) estimates based on an extrapolation of the present resident population to police officer ratio; and (iv) estimates based on an extrapolation of the present de facto population to police officer ratio.

When contacted as part of this study, Chief Guy Paul estimated that a 50 percent increase in personnel at the Waimea Station would be required to properly serve growth associated with the planned South Kohala resorts (as shown in Table III-17). If the proposed Mahukona Resort is also built, he projected a need to increase staff at the Kapa'au Station as well, probably by ten to twenty percent. This amount of new personnel could be housed within the existing stations (Paul, March 13, 1981).

When Chief Paul's predecessor, Acting Chief Martin Kaaua, was consulted in December 1979 during the preparation of the Lalamilo Water System EIS, he stated that:

> Development of the North and South Kohala regions at the magnitude projected would require a 100- to 150-percent increase in staffing in the South Kohala district and a 50-percent increase in personnel for North Kohala. The high concentration of resort development in the South Kohala coastal region coupled with the anticipated increase in households in the Puako, Kawaihae and Waikoloa areas may necessitate the construction of a police station in that area.

This estimate does not reflect requirements resulting from population growth due to the Mahukona resort, but only refers to development of the planned South Kohala resorts and their secondary growth. To the extent that the proposed Mahukona Resort resulted in additional population growth in the South Kohala coastal region, it would contribute to the need for additional police facilities there.

A third possibility that was examined assumed that the demand for police services would rise in direct proportion to the increase in resident population and that the number of police personnel would need to be increased proportionately. This is not a "worst-case" scenario because it assumes that an increase in workload that is likely to occur as a result of the substantial visitor population staying at the resorts would be offset by economies of scale possible with the larger population.

A final "worst-case" scenario considered was the possibility that the number of police officers required would rise in proportion to the increase in the de facto population (i.e., residents plus visitors). This assumes that visitors have the same protective requirements as residents and ignores potential economies of scale. On the other hand (and in line with all the other possibilities listed), it also assumes that the projected development will not alter the underlying crime rate that determines, in part, the magnitude of police requirements.

The numbers of police officers and the police/resident ratios for the present and the four possible future situations outlined above are presented in Table V-29. It must be remembered that this kind of ratio is a very crude indicator of the level of service provided, as need or demand for police does not vary directly with population. As a comparison, Oahu as a whole has a ratio of 2.1 police officers per 1,000 resident population, while the North Shore/windward coast area of Oahu has a ratio of only 1.1 officers per 1,000 residents.

The impact of tourism development on crime is discussed under social impacts in Chapter IV of this report. A rough estimate of the economic impacts of the increase in police officers is given in Table V-29.

Mitigation Measures

The size of the police force needed to adequately serve an area is a function of the crime rate, the size of the resident and visitor population, and the geographic distribution of the people who are being served. The crime rate, the forces which affect it and actions which could mitigate resort development's impact on it are discussed in the social impact section of the report. Generally speaking, there are some actions which could be taken by resort operators that may minimize the feeling of alienation which leads to criminal acts against visitors. Other steps can, and will, be taken to provide private security forces that can assist law enforcement agencies in dealing with crimes on resort sites.

Table V-29. Estimated Uniformed Police Officer Requirements for North and South Kohala: 2005.

	1980	Year 2005 Projections[1]							
		Assumption A[2]		Assumption B[3]		Assumption C[4]		Assumption D[5]	
		w/o Mahukona	w/ Mahukona	w/o Mahukona	w/ Mahukona	w/o Mahukona	w/ Mahukona	w/o Mahukona	w/Mahukona
North & South Kohala Population	7,850	22,350	26,150	22,350	26,150	22,350	26,150	35,700	43,300
Number of Police Officers	29	37	39	52 - 61	n.a.	83	97	121	147
Average number of police per 1,000 population	3.7	1.7	1.5	2.3 - 2.7	n.a.	3.7	3.7	3.4	3.4
Number of Additional officers	--	8	10	23 - 32	n.a.	54	68	92	118
Yearly Cost of Additional Officers[6] (in $1,000)		$ 176	$ 220	$506 - $704		$1,188	$1,496	$2,024	$2,596

1 Assumption A, B, and C use resident population figures, while Assumption D uses de facto population figures.

2 Using Chief Guy Paul's estimates (March 13, 1981) of a 50-percent personnel increase at the Waimea Station and a 10- to 20-percent increase at the Kapa'au Station.

3 Using then Acting Chief Martin Kaaua's estimates (December 12, 1979) of a 100- to 150-percent personnel increase at the Waimea Station and a 50-percent increase at the Kapa'au Station. This assumption would involve construction of a new station.

4 Using the present ratio of police officers per 1,000 residents. This assumption would also involve construction of a new station.

5 Based on present police officer:de facto population ratio and projected resident and visitor populations from Table IV-16 and IV-17. This assumption would also require construction of a new station.

6 Based on estimate from Chief Guy Paul (March 13, 1981) that it costs $22,000 to hire and keep one police officer one year. Patrol vehicle costs are included in this figure.

Source: Belt, Collins & Associates based on sources noted above.

With respect to a reduction in the size of the resident and visitor population, only a decrease in the scale of the proposed resorts could accomplish that. Such a reduction would, of course, be accompanied by an equivalent decrease in the direct economic benefits that resort development has been relied upon to provide.

With respect to the effect that the geographic distribution of development could have on the Hawaii County Police Department's work load, Chief Paul has indicated that, from his viewpoint, subdivisions close to the region's main highways are preferable to more isolated developments because the response time to a call is minimized. Concentrating development within areas served by a private security force is also a help.

FIRE PROTECTION

Existing Facilities

The only fire station within the North/South Kohala study area which is manned on a 24-hour per day, 365 days per year basis is in Waimea. The Waimea station, which is approximately 24 road miles and 35 to 40 minutes from the site of the proposed Mahukona Resort, is manned by 13 persons working in three shifts. At present, it is equipped with a pumper, a water tanker, and a rescue van, and can handle rescue operations and emergency medical services as well as fire protection. While it provides good service to Waimea and adjacent areas, it is far too removed from North Kohala and the South Kohala resort areas to provide adequate service to these areas. Other fire protection is provided by:

- a public, one-truck station at Kawaihae that operates eight hours per day with one man supplemented by volunteers;
- a one-truck, eight-hour fire station in Kapa'au that depends on volunteer fire fighters; and
- a one-truck, volunteer fire company in Puako.
- a private fire truck manned by volunteers that is stationed at the Mauna Kea Beach Hotel;
- a private, one-truck facility adjacent to the Waikoloa Village store that is manned by volunteers;

At present, there is no ladder company on the island.

The volunteer nature of most of the fire fighting force, together with the limited equipment and large distances, means that the quality of the fire protection provided outside of Waimea is low. However, because of the dispersed nature of the existing development, it is the best that is practical at present.

Expected Impacts of Future Development

Planned South Kohala Development. The resorts planned for South Kohala involve a large amount of high value construction. Adequate protection of these areas, as well as the support housing and industrial/commercial areas likely to arise in response to the population growth, will require the eventual construction and manning of at least

one, and quite possibly two additional 24-hour fire stations and the upgrading of others. The exact location of these facilities will have to be determined at a later date.

Proposed Mahukona Resort and Secondary Development. The Mahukona Resort site is ten miles from the nearest fire station. Given the nature of the roadway and expected traffic conditions, it would take at least 15 minutes for an engine from Kawaiahae or Kapa'au to reach a fire there. While delays of this magnitude are tolerable in low-density areas, they are unacceptable for facilities such as are being proposed.

Optimal fire protection for the resort would require on-site facilities, particularly since the arid climate makes it susceptible to brush fire hazards. Since the County would almost certainly not provide an on-site fire station during the early stages of the Mahukona development, the developer may need to make provisions for private fire protection services during this period. Moreover, because of the limited on-site population which is expected, a full-time, County-operated fire station may never be warranted. Unless hotel and condominium owners are able to organize their own reliable service, fire protection on the site may always be less than is desirable.

Fire protection for the secondary development that is generated by the Mahukona resort, depending on its location, may or may not require greater increases in Fire Department facilities and/or staffing than would already be necessitated by the South Kohala resorts' secondary growth.

Mitigation Measures

The best way to protect life and property from fire is to insure that all new construction is as fire-proof as possible. Ideally, and especially for the taller resort buildings, this would involve provision of automatic sprinklers and smoke/fire detection systems. As a further preventive measure, all employees of the hotels should be instructed and drilled on how to respond to fire and other emergencies. Beyond that, provision of on-site fire-fighting facilities, both for the South Kohala resorts and Mahukona Resort, is desirable. The three South Kohala resorts could probably be adequately served by one fire station, if properly located. Secondary growth should be directed into areas where 24-hour service could be provided. At present, Waimea is the only town with such 24-hour service. The same goal could be accomplished by allowing substantial growth around Kawaihae or Kapa'au and upgrading these fire stations to full-time status or, alternatively, by clustering growth in areas where a new facility could provide adequate service.

With these measures, the region's projected de facto population of almost 43,000 would be adequately protected from fire hazards.

ELECTRICAL POWER

Existing Facilities

Electrical power on Hawaii Island is provided by the Hawaii Electric Light Company (HELCO), a subsidiary of Hawaiian Electric. The majority of the power is generated in plants utilizing conventional fossil fuels, but about one-fifth of the electricity is obtained by the utility via purchase-power agreements with various sugar companies who generate it using bagasse-fired boilers driving steam turbines (see Table V-30) Total capacity (nameplate ratings of the HELCO turbines plus the amount typically delivered to HELCO by the sugar companies) totals 126,575 KW.

Table V-30. Approximate Capacity of Power Sources Contributing to the Hawaii Electric Light Company Power Distribution Grid.

Facility	Location	Capacity (KW)	Comments
Hawaii Electric Light Co.[1]			
Shipman	Hilo	23,425	4 units, all oil-fired steam turbines
W.H. Hill	Hilo	37,100	2 units, both oil-fired steam turbines
Kanoelehua	Hilo	21,150	1 oil-fired combustion turbine of 11,650 KW 1 2,000-KW and 3 2,500-KW diesels
Pu'u'eo	Hilo	3,000	3 1,000-KW diesels
Waimea	S. Kohala	13,000	3 1,000-KW and 4 2,500-KW diesels
Keahole	N. Kona	5,000	2 2,500-KW diesels
	Subtotal =	102,675	
Sugar Companies[2]			
Papa'ikou Factory	Papa'ikou	150	Bagasse-fired
Pepe'ekeo Factory	Pepe'ekeo	16,000	Bagasse-fired
Honoka'a Factory	Honoka'a	1,000	Bagasse-fired
Laupahoehoe Factory	Laupahoehoe	750	Bagasse-fired
Puna Sugar Co.	Pahala	6,000	Bagasse-fired
	Subtotal =	23,900	
	Total Capacity =	126,575	

1 Based on Hawaiian Electric Company listing dated January 1, 1979 reported accurate as of January 1981.

2 Reported by Murata and Gibson, Energy Inventory for Hawaiian Sugar Factories--1975. Hawaiian Sugar Planters' Association, Volume 59, No. 5, Table 3.

Source: Compiled by Belt, Collins & Associates from sources noted above.

The transmission system, which is shown in schematic form in Figure V-16, consists primarily of 69-KV lines, but two areas, Puna and North Kohala, are served by lines with 34.5-KV capacity. Most areas are served by a looped system so that service can be maintained even if an accident or storm cuts one line. Exceptions to this are along the road to Pahoa in the Puna District and in North Kohala, where only single 34.5-KV lines are provided.

Expected Impacts of Future Development

Based on present rates of energy use by residential, commercial and hotel/condominium units, it is expected that the growth associated with the already-planned South Kohala resorts will require about 105-million kilowatt hours per year (see Table V-31.) This is roughly one-quarter of the amount that was sold by HELCO in 1979 (Hawaii, State of, Department of Planning and Economics Development, November 1980:345).

Meeting this need will require the construction of significant new generating capacity. Of particular concern is the need for additional low-cost base load facilities in lieu of the small diesel units that skyrocketing fuel prices have made so expensive to run. The successful development of a producing geothermal well in the Puna District tapping the Kapoho Geothermal Reservoir, experiments in wind energy at Kahua Ranch in North Kohala, and the OTEC project at Keahole Point in the North Kona District are just the most promising of the natural energy development projects scheduled for the Big Island over the next twenty years. The economics of geothermal energy look particularly attractive, and Dr. Charles Helsley, director of the Hawaii Institute of Geophysics, has estimated that the Kapoho Geothermal Reservoir is capable of producing 500 megawatts of power for one hundred years (Hawaii Natural Energy Institute, 1980:9). Hence, it appears that Hawaii County is in a good position to meet the projected increase in power use from natural energy sources.

With respect to the transmission system, the recent completion of a 69-KV line connecting the Waikoloa substation with the Waimea-Kawaihae line provides looped-service to all of the South Kohala area, significantly increasing the reliability of service to the coastal resort sites.

The proposed Mahukona Resort lies well below and west of the existing 34.5-KV transmission line paralleling the Kohala Mountain Road that provides service to North Kohala. HELCO has indicated that this line would probably be upgraded to 69-KV if substantial new resort and/or residential development were to occur there or elsewhere in North Kohala. The resort site would be fed by a spur line taken off the main transmission corridor. At present, HELCO does not believe that there will be sufficient demand in the North Kohala region to warrant installation of a second transmission corridor into the district that would provide backup service. As a result, power outages may be expected to occur somewhat more frequently than they would in the South Kohala resort area where a service loop has been provided.

The 25-million kilowatt hours per year that would be consumed at the Mahukona Resort are only a third of the amount that would be required by already-planned South Kohala resorts. Overall, the Mahukona Resort project and associated secondary growth would increase energy consumption in the Kohalas by about 34-million kilowatt hours per year, or about five to seven percent of the island's total. This could easily be accommodated by known geothermal sources if those sources can be developed as fully as is now anticipated.

— see file — old p. V-97 was a duplicate table from p. V-95 Pam 6/6/88

Table V-31. Projected Additional Electrical Power Consumption By Planned and Proposed Development Within North and South Kohala: 2005.

Land Use:	Projected Development (in units)[1] Planned Resorts	Mahukona	Total	Projected Energy Use (in million KWH/year)[2] Planned Resorts	Mahukona	Total
On-Site						
Hotel	7,020	1,500	8,520	42	9	51
Condominium	7,500	3,200	10,700	30	13	43
Residential	--	500	500	--	3	3
Commercial (1,000 s.f.)	240	74	314	1.5	0.5	2
			Subtotal	73.5	25.5	99
Off-Site						
Residential	5,100	1,300	6,400	31	8	39
Commercial (1,000 s.f.)	109	28	137	1	0	1
			Subtotal	32	8	40
Total Additional Kohala Electrical Power Use				105.5	33.5	139

1 Unit counts are from Table IV-19 for hotel and condominium units. Residential unit estimates are the sum of figures for resort sites shown in Table III-2 and the off-site development shown in Table IV-19. Commercial floor area shown is the sum of the amounts from Table III-2 (on-site) and from Table IV-26 (off-site).

2 Estimates are based on the following projected design consumption rates:

Hotel Room -	6,000 KWH/year
Condominium -	4,000 KWH/year
Residential -	6,000 KWH/year
Commercial (1,000 s.f.) -	7,000 KWH/year

Source: Belt, Collins & Associates.

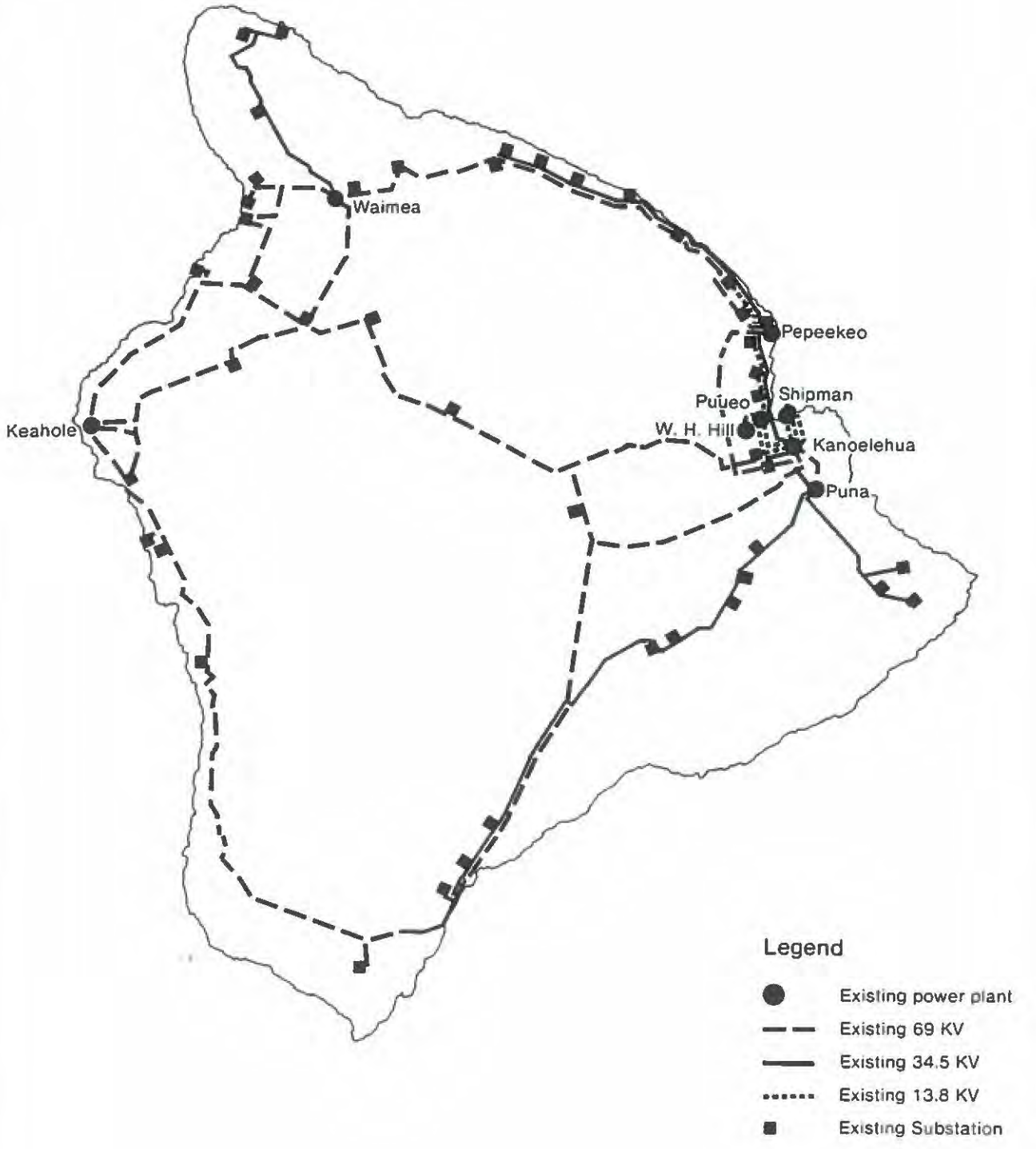


figure V-16. Hawaii County Electrical Transmission System

Mitigation Measures

The electrical power consumption estimates shown in Table V-31 are based on average usage rates at the present time. They do not account for any of a variety of energy-conserving design features that could be incorporated in the project. Use of solar water heating, waste-heat recovery from air-conditioning systems, natural ventilation and lighting, wind-powered generators driving pumps on the deep wells supplying water, and on-site photo-voltaic systems could reduce power consumption from the HELCO grid substantially below the level shown.

SOLID WASTE GENERATION, COLLECTION, AND DISPOSAL

Existing Situation

At present, existing refuse collection and disposal facilities in the study area consist of an open dump near Hawi, a landfill in Waimea, and compactor-transfer stations in Puako and Waimea. At present, Hawaii County does not provide refuse collection services to individual residences or businesses in the study area. Each household must take its refuse to one of the compactor-transfer stations, landfills, or open dumps listed above. Refuse collected by private contractors cannot be deposited in the compactor containers; instead it must be trucked to either the landfill in Waimea or the dump in Hawi. At present, all of the County's solid waste operations in the region are handled by a staff of four persons.

Since the life expectancy of the landfill in Waimea is less than one year, the Hawaii County Sewers and Sanitation Bureau is searching for a new sanitary landfill site near Waimea that will have sufficient capacity to accommodate many years of growth. The Bureau also plans to close the open dump in North Kohala and replace it with a compactor-transfer station (Sugiyama, March 16, 1981).

Expected Impacts of Future Development

Without the proposed Mahukona Resort project, it is expected that the amount of solid waste generated in the Kohalas would amount to approximately 64 tons per day (see Table V-32). This is 42 tons per day more than at present. With the Mahukona Resort it would rise by another 14 tons per day to a total of 78 tons per day. Two additional employees would be required to handle the increased tonnage under either future scenario.

A representative of the Department of Public Works has indicated that the collection procedure would probably remain essentially unchanged under both the with- and without-project scenarios, but that additional compactor-transfer stations would probably be required. The location of these new transfer stations depends upon the growth pattern that emerges. Large new subdivisions will probably be required to set aside space (approximately one acre) for a compactor-transfer station and provide a container.

Mitigation Measures

There is little that resort developers can do to reduce the per capita solid waste generation rate, particularly of the secondary growth that would be stimulated by their activities. Theoretically, the County could influence this generation rate through regulations regarding recycling and packaging; practically, however there are few things they could regulate, and even fewer that could be enforced.

Table V-32. Projected Solid Waste Generation in North and South Kohala With and Without the Proposed Mahukona Resort: 2005.

	No. of Waste-Generating Units	Waste Generated (lbs/day)[1]
Existing Development	--[2]	44,000[2]
Planned South Kohala Development		
Average Visitor Census	8,850[3]	30,975
Commercial Space: On-site (1,000 s.f.)	240.5[4]	2,044
Commercial Space: Off-site (1,000 s.f.)	109[5]	927
Residents	14,500[6]	50,750
	Subtotal	84,696
Proposed Mahukona Resort		
Average Visitor Census	3,800[3]	13,300
Commercial Space: On-site (1,000 s.f.)	74.5[4]	633
Commercial Space: Off-site (1,000 s.f.)	28.5[5]	242
Residents	3,800[6]	13,300
	Subtotal	27,475
Estimated year 2005 Waste Load Without Mahukona =		128,696
Estimated year 2005 Waste Load With Mahukona =		156,171

1 Generation rates used are: 3.5 lbs/person/day (City and County of Honolulu, Department of Public Works, Refuse Division) and 8.5 lbs/1,000 s.f. of commercial space/day (Belt, Collins & Associates, June 1979:IV-101).

2 Not applicable. Estimates of existing waste obtained from County records.

3 From Table IV-16.

4 From Table III-2.

5 From Table IV-26.

6 From Table IV-17.

Source: Compiled by Belt, Collins & Associates from sources noted above.

It is possible to mitigate the impacts of solid waste disposal, however. The County is in the process of selecting a new sanitary landfill site, which will necessitate the preparation of an environmental impact statement. That document will explore the design provisions necessary to avoid or minimize adverse impacts.

SEWAGE TREATMENT AND DISPOSAL

Existing Situation

All sewage in North and South Kohala is handled by individual systems such as cesspools; the only exception is the sewage from the Mauna Kea Beach Resort and from the commercial/condominium area of Waikoloa Village which is collected and treated at private sewage treatment plants. If an owner has any problems with his or her system, a private firm must be contracted for the repairs. If this involves pumping, the sludge is taken by the contractor to the County's sewage plant in Kailua for treatment and disposal.

Expected Impacts of Future Development

As indicated in Table V-21, by the time it is completely developed, the proposed Mahukona Resort would generate nearly two million gallons per day of sewage requiring disposal. This would be collected and carried to a centralized facility for secondary treatment and disposal, primarily through golf course irrigation. The treatment plant will be constructed and operated using private funds. It will meet all State and Federal water quality and public health standards. Hence, the impact on the County and its residents is expected to be negligible.

The situation with respect to the sewage impacts of secondary growth is less clear. The County's present policy is that developers will be required to provide their own sewage treatment facilities. This approach is likely to work reasonably well if most of the residential growth is concentrated in a few master-planned projects where it could be efficiently served by a centralized sewage treatment facility and collection system. Given the present pattern of large landholdings, such a development scenario appears quite feasible, and it is certainly one that is likely to result in adequate treatment for the sewage.

More problems could occur if the secondary growth is scattered. In this eventuality, sewage treatment would presumably be provided by numerous small-scale "package plants" installed by the original developer but operated and maintained by an owners' group. Such facilities perform admirably when new, but they typically receive less-than-optimal maintenance. This, in turn, frequently leads to a high incidence of malfunctions as the systems age. If the difficulties lead to a public health hazard, State and County agencies inevitably become involved.

Mitigation Measures

Since all developers must show evidence of provisions for safe and reliable sewage treatment plants or individual systems before being issued a permit to operate, review by the County and/or State Department of Health at that time can assure that any necessary mitigation measures are made conditions to the permit. Another control the County has which could mitigate impacts, would be to discourage scattered new subdivisions which would require many small package sewage treatment plants. If new development is clustered and shares a smaller number of plants, there could be more supervision and control of sewage treatment and disposal.

chapter six

CHAPTER VI
RELATIONSHIP OF THE PROPOSED PROJECT TO EXISTING LAND USE PLANS, POLICIES, AND CONTROLS AND LOCATIONAL ASPECTS OF SECONDARY GROWTH

INTRODUCTION

This chapter is split into two main sections. The first, discusses the various land use plans, policies, and controls that are applicable to development on the Mahukona Resort site or which would affect secondary growth resulting from the proposed resort project. Its main concern is the extent to which the Mahukona Resort proposal is consistent with established public policy. The second part of the chapter deals with the unresolved policy issue of where secondary growth resulting from planned and proposed resort development in the North/South Kohala study area would/should be located. It outlines several policy options and indicates which of these appear most likely to minimize adverse impacts from resort-related secondary development.

RELEVANT LAND USE PLANS, POLICIES, AND CONTROLS

A number of different plans, policies, and controls are in effect which bear some relationship to the proposed development of the Mahukona Resort. In general, they are of two main types: (1) policy plans and (2) geographically-specific land use plans. The proposed project's consistency with them is discussed below.

POLICY PLANS

The Hawaii State Plan

The 1975 Hawaii State Legislature adopted legislation revising Chapter 225, Hawaii Revised Statutes. This set in motion a series of activities that led to the passage of Act 100 (the Hawaii State Plan) by the 1978 Legislature and its subsequent approval by the Governor in May 1978.

The Hawaii State Plan consists of five basic components:

- An Overall Theme, which sets forth certain principals or values which are an integral part of Hawai'i 's present society.
- Goal Statements, which express desired end-states in the areas of the economy, the physical environment, and social well-being.
- Objectives and Policies regarding population, the economy, the physical environment, facility systems, and socio-cultural advancement.
- Implementation mechanisms designed to carry out the State Plan.
- Priority Directions, which identify areas of statewide concern that merit immediate attention.

The State Plan's statement of goals and objectives (Sections 4 through 28) are the most relevant to the task of judging the consistency of the proposed Mahukona Resort with it. However, they are so numerous and so generally stated that a point by point analysis of each one is impractical here. Instead, we have selected for discussion only those which are most directly related to the proposed resort project.

Section 5(2) and (3). These two objectives call for increasing economic and employment opportunities on the Neighbor Islands consistent with community needs and desires and with the ability to provide adequate support services and facilities.

The proposed Mahukona Resort would increase the number of jobs available to Kohala residents. Moreover, surveys conducted as part of this study (see Chapter IV) indicate that jobs for the community's youth is a major concern. On the other hand, the amount of employment growth likely to result from already-planned development in South Kohala is expected to exceed the labor force that is available locally, thereby necessitating in-migration on a scale not desired by present Kohala residents. By adding to the employment opportunities, the proposed Mahukona Resort would accentuate the potential problems noted above. At the same time, it would create jobs for North Kohala residents within their own district, thereby decreasing the amount of commuting they must do. Given the long lead time necessary for the development of the Mahukona and other resorts, there should be sufficient time to provide adequate support services and facilities for the expected population growth.

Section 6(a)(1) and (2). These objectives call for increased income, job choice, full employment, and a growing and diversified economic base.

Both already-planned and proposed resort developments will at first tend to offer residents an alternative to the present agriculturally-based economy. They will lower unemployment. However, over the long-run the large-scale resort development scheduled for Kohala will leave the region as dependent on tourism and the visitor industry as it has historically been on sugar and ranching. The proposed Mahukona Resort will do nothing to weaken this dependence.

Section 6(b)(9) and (14). These objectives concern the encouragement of economically satisfying, labor-intensive activities that have a favorable financial multiplier within the Hawaiian Economy.

In comparison to agriculture, currently the Big Island's most important industry, resort use is very labor intensive. It also compares quite favorably with all other industries which have significant development potential there. As indicated in the discussion of benefit-cost ratios presented in Chapter IV of this report, it also appears likely to have a favorable financial multiplier.

Section 7. Objectives in this section have to do with encouraging agriculture in the state.

None of the land on which resort development is proposed contains fertile agricultural soils. Secondary growth near Waimea and in North Kohala could exert some development pressure on lands suitable for agricultural use, but it would be very slight in comparison to the amount of land that is available. The presence of resorts would provide an attractive market for locally-grown produce, meat, and dairy products. Hence, from an agricultural viewpoint, the proposed project would appear to be consistent with State policy.

Section 8. This section focuses on policies which would result in a visitor industry that constitutes a major component of steady growth for Hawaii's economy.

Both the proposed Mahukona Resort and the three major resort destination areas in South Kohala are fully integrated resort communities similar to that which exists at Ka'anapali on Maui. Because they would adhere to overall master plans aimed at

providing long-term earnings rather then fast speculative profits, resort growth in the Kohalas is likely to meet this objective. Historically, destination resort areas under unified control have been of a higher quality and have proven more stable than has haphazard growth.

Section 11(a)(2) and (b)(8) and (9). This objective focuses on protection of unique and fragile environments; and recommended policies are aimed at insuring multiple, but prudent and compatible, uses of shoreline resources.

The proposed Mahukona Resort would be designed to harmonize with the existing physical environment. No major changes in the shoreline or topography are envisioned. The biologically rich coastal waters would be used as a recreation area rather than exploited physically. Construction of the resort would open an extensive stretch of shoreline to public use, making it more accessible for recreational, educational, and scientific purposes.

Section 12. This objective concerns the maintenance of Hawaii's scenic and historic resources.

Information obtained from archaeological research commissioned for this study has already enhanced people's knowledge of earlier cultural activities in the area. Present land use controls insure that this information can be put to use in designing a resort project which capitalizes on, rather than destroys, the cultural and scenic resources that are present.

Section 13. This objective focuses on the maintenance of the quality of Hawaii's land, air, and water resources.

The proposed project is consistent with this in that it would not result in a significant degradation of these physical resources and is in an area that is not subject to serious threat of flooding or tsunamis. However, all of Hawaii island is in a zone 3 risk area for earthquakes. This is higher than the remainder of the state, but, to place it in proper perspective, is not as severe as the zone 4 rating given California, the most populous state in the nation.

Sections 14 through 18. These objectives relate to the provision of public facilities (water, waste disposal, transportation, and electrical power) sufficient to meet the needs of a growing population.

Aspects of the proposed Mahukona Resort project aimed at meeting these objectives include the provision by the developer of water and sewerage systems necessary for the resort operation and construction of roadway improvements on portions of the Akoni Pule Highway immediately adjacent to the resort site. Additional improvements to the rest of Akoni Pule Highway may be necessary around 2000, due to traffic increases from the South Kohala resorts as well as Mahukona Resort. Under the without-Mahukona scenario, already-planned resorts will create traffic congestion on the Waimea-Kawaihae Road and on Queen Ka'ahumanu Highway that will require significant roadway improvements. However, if these improvements are made, these roadways would be able to accommodate the additional traffic generated by the proposed Mahukona Resort project without difficulty. The electrical power generation and transmission system serving the Mahukona Resort site will probably have to be upgraded if the project is implemented, but representatives of the Hawaii Electric Light Company have indicated that this would not be difficult.

Section 19. This objective calls for the provision of opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, liveable homes and for orderly development of residential areas that are sensitive to community needs and other land uses.

As currently proposed, the plan for the Mahukona Resort provides for only a limited amount of on-site housing aimed at the local residential market. The Hawaii County General Plan requires that resort developers provide up to one employee housing unit for every two hotel units that are built, the exact number being determined by the County through an analysis of housing needs at the time the project is being implemented. It should be noted that the most vulnerable employees are existing residents because they and their children incur the greatest costs (psychological and social as well as monetary) if excessive housing costs force them to move away from their birthplace. Presumably, potential in-migrants would have to be satisfied that they could find satisfactory housing before they would move to the area. Hence, normal market forces and the developers' self-interest should insure that this segment of employees is accommodated.

Hawaii Coastal Zone Management Plan

The Hawaii Coastal Zone Management Act (Act 188, SLH 1977) establishes basic State policy with respect to actions affecting the coastal zone. The act establishes specific objectives and policies in seven broad categories. The categories, together with brief comments regarding the Mahukona Resort project's relationship to them, are summarized below.

Provision and Protection of Recreational Opportunities. The proposed resort would provide a number of recreational facilities (golf, tennis, riding, etc.). It would not preclude continued recreational use of the shoreline; in fact, by improving access it would enhance the usefulness of this resource for recreation.

Protection and Restoration of Historic Resources. The extensive archaeological surveys that have been conducted of the Mahukona Resort site have added significantly to anthropologists' understanding of cultural patterns along the Kohala coast. The developer has indicated a willingness, and the County has the authority to require, that valuable resources will be salvaged and/or restored.

Improvement of Scenic and Open Space Areas. The project would alter the visual character of the area by introducing urban-type development in an area currently occupied only by scrub vegetation.

Protection of Coastal Ecosystems. Analyses conducted as part of this study indicate that the project would probably not adversely affect coastal ecosystems. Confirmation of this must await engineering designs for the storm drainage and sewage disposal systems.

Provision for Coastal Dependent Economic Uses. Visitor facilities are the only type of "coastal-dependent" use that are economically feasible in this area.

Reduction of Coastal Hazards. The Mahukona Resort would be constructed mauka of areas subject to inundation by storm waves and/or tsunamis.

Improvement of Review Process. The project is a private one that would not affect this public responsibility.

State Functional Plans

The State Plan calls for the preparation of twelve State Functional Plans, each of which concerns itself with one specific functional area, e.g., transportation, tourism, housing, agriculture, etc. These functional plans are to:

> "...contain objectives to be achieved and policies to be pursued in the primary field of activity and such policies shall address major programs and the location of major [State-financed] facilities. The functional plan shall also contain implementation priorities and actions which may include, but not be limited to, programs, maps, regulatory measures, standards, and interagency coordination provisions." (Section 57, Hawaii State Plan)

Under the deadline originally specified in Act 100, the first four Functional Plans were to be ready for consideration by the 1979 Legislature, with the remaining eight due in 1980. Preparation of the plans has been considerably more time-consuming than legislators had envisioned, however, and none of the draft plans submitted for approval thus far has been adopted. The 1981 State Legislature which is now in session had hoped to complete its review this year so that the State Functional Plans could be adopted by late spring. However, as this is written there is increasing evidence that final action will not be taken until 1982.

GEOGRAPHICALLY SPECIFIC LAND USE PLANS

This category includes all those plans which designate specific geographic areas for particular uses. It includes the State Land Use Law, the Hawaii County General Plan, and Zoning.

State Land Use Law

The State Land Use District Regulations are administered by the Land Use Commission of the State of Hawaii, an independent body established by Act 187 of the 1961 State Legislature. In line with its legislative mandate (Chapter 205, Hawaii Revised Statutes), the State Land Use Commission's regulations are intended to:

> "preserve, protect, and encourage the development of lands in the State for those uses to which these lands are best suited in the interest of public health and welfare of the people of the State of Hawaii." (Hawaii, State of, Land Use Commission, December 1975:38)

In accordance with these regulations, all lands in the State have been placed in one of four Land Use Districts: Urban, Agriculture, Conservation, and Rural. General standards for establishing district boundaries are clearly defined in Section II.2.2. of the Land Use District Regulations; Section IV outlines procedures by which District boundaries may be amended.

At present, most of the site of the proposed Mahukona Resort project is in the State Agricultural District. A narrow coastal strip, essentially the area between the upper wash of the waves and the jeep trail which parallels the shoreline, falls within the Conservation District administered by the State Department of Land and Natural Resources. For the most part the strip is about 200 feet wide, but in places it narrows to 100 feet or widens (e.g., at the shoreline promontory in Kaupalaoa) to 800 feet. Hence, reclassification will be required before the project can be implemented. Because consistency with the County General Plan is one of the most important

criteria used by the Land Use Commission in deciding a reclassification request, amendments to the Land Use District boundaries (i.e., reclassification from Agriculture and Conservation to Urban) are normally sought after an appropriate General Plan designation is obtained. If the Hawaii County General Plan amendment now being sought is granted, the developer will petition the Land Use Commission for Urban designation for the site. The project could probably proceed even if the Conservation District Boundary remains unchanged, although this constraint might make optimal design solutions much more difficult to achieve. If the Conservation District does remain, it will be necessary to obtain a Conservation District Use Permit from the Department of Land and Natural Resources. Most of the land adjacent to the Mahukona Resort site is in the Agricultural District. Only along the coast is it designated Conservation; all of the Conservation District land falls into the "R"-Resource subzone.

As indicated in Chapter IV (see especially Tables IV-22 and 23 and associated discussion), secondary growth generated by the planned South Kohala resorts as well as the Mahukona Resort project will almost certainly generate a need for additional land reclassification. Because the Hawaii County General Plan does not specify precisely where secondary growth, spurred by the resort development being allowed, is to occur it is impossible to say where the reclassification would be sought.

Hawaii County General Plan

The Hawaii County General Plan contains both a set of policies and land use maps showing the location of desired land uses for the entire island. The latter, which are referred to as "Land Use Pattern Allocation Guide Maps" (LUPAG maps), designate most of the proposed Mahukona Resort site as "Extensive Agriculture." A narrow coastal strip (basically the area within the State Conservation District) is designated "Open" on the LUPAG map. It is this discrepancy between the present General Plan designation and the proposed resort use that necessitates the amendment petition which this EIS supports.

North Kohala already contains one area with resort designation, a 70-acre site surrounding Mahukona Harbor. That zone is backed by an additional 300-400 acres designated for alternate urban expansion. However, the owner of the property has indicated no interest in developing it for resort use. Nevertheless, the proposal for the Mahukona Resort does not involve a relocation of the resort use now assigned to Mahukona Harbor; it must, therefore, be considered as an additional resort area.

In deciding whether or not to grant the General Plan amendment necessary to permit construction of the proposed Mahukona Resort, the County will judge the project using as criteria the goals, objectives, and policies contained in the Hawaii County General Plan. By their very nature these criteria are rather general and their application will require considerable subjective judgment. As a result, it is impossible to reach irrefutable conclusions regarding the project's consistency or inconsistency with them. Some understanding of the most relevant issues is possible, however, and the remainder of this section briefly explores the points that appear to be of greatest public concern. The headings used correspond to the individual elements that make up the General Plan.

Economic Element. Among the courses of action proposed for the North Kohala District, there are two which are relevant to the proposed Mahukona Resort:

- o "Resort facilities compatible with the physical, social and economic goals of the residents of the district shall be encouraged."

- o "The County shall work closely with the people of the district and with industry to plan alternative uses for the lands affected by the termination of sugar operations."

The proposed Mahukona Resort would provide an important "in-district" economic base for North Kohala to supplement the limited agricultural activity and reduce the exportation of workers to existing resort hotels, particularly the Mauna Kea Beach Hotel. On the other hand, the size that is being proposed is in excess of what would be required if the goal were simply to provide employment opportunities for existing residents and their children. A somewhat smaller project would come closer to the mark in this respect.

Environmental Quality. Chapter 343, Hawaii Revised Statutes, and the Environmental Quality Commission Regulations adopted pursuant to it (and under which this EIS is being prepared) are intended to insure that the environmental consequences of all proposed actions covered by the law are carefully considered before decisions are made. With the information provided by this document and subsequent, more detailed environmental reports, County and State agencies will be in a position to insist on mitigation measures that would provide adequate protection to the environment as a condition of project approval.

Flood Control and Drainage. The Hawaii County General Plan identifies three major potential sources of flooding: surface runoff, high seas, and tsunamis. Because of the site topography, offshore bathymetry, and orientation of the coastline, tsunamis and storm surf do not constitute a significant hazard to any of the types of development that are proposed for the Mahukona Resort. If at any time shoreline changes were to be considered, they would need to be approved by the County and the U.S. Army Corps of Engineers, and a detailed environmental assessment of their impacts would be required at that time.

The parcels that make up the Mahukona Resort site are at the makai end of their respective watersheds. This means that adequate channel capacity must be maintained to allow for continued passage of storm runoff originating in upland areas. However, it also means that there is no danger that urbanization of the project site will adversely affect downstream development.

The storm drainage system on the Mahukona Resort site would be built to meet all applicable standards. It would have sufficient capacity to handle predicted runoff volumes. Where possible, it would employ existing natural channels rather than artificial pipe conduits. Provisions for sediment control and for retardation and infiltration of on-site runoff would be incorporated into the design. The project would conform to all County, State, and Federal regulations.

Historic Sites. The General Plan policies relating to historic sites that are most applicable to the proposed Mahukona Resort project are:

- o "It shall be the policy of the County of Hawaii to require developers of land either public or private to provide a historic survey prior to the clearing or development of land when there are indications that the land under consideration has historical significance."

- o "Public access to significant historic sites and objects shall be acquired."

- o "In the evaluation and protection of the historic sites, it shall be the policy of the County to give preference to sites with the preponderance of original materials in context and to complexes rather than single isolated sites unless they are of great significance."

- o "On private lands, the County of Hawaii shall encourage the restoration of significant sites."

A complete archaeological survey of the Kaiholena parcels and reconnaissance-level surveys of the remainder of the site have already been completed by the Bishop Museum under contract to Mahukona Properties, Inc. Recommendations presented in the study will be used as the basis for further planning. Appropriate mitigation measures, including salvage, restoration, and preservation will be decided upon jointly by the developer, the Hawaii County Planning Department, and the State Historic Preservation Officer and implemented as development of the resort proceeds. Public access to all important sites will be provided.

Housing. The housing element of the General Plan requires that large industries which create a demand for housing provide employee housing based upon a ratio to be determined by an analysis of the community's needs. Like the large resort developments in South Kohala, the Mahukona Resort proposal does not currently provide for on-site employee housing. However, the developer is very experienced in the field of residential development in Hawaii and has indicated its intent to participate in housing developments in the Kohala District to the extent necessary to meet employee housing needs generated by the Mahukona Resort project. To this end, Mahukona Properties, Inc. has held preliminary discussions with the Kohala Corporation, one of the region's largest landowner, regarding the possibility of a housing project on some of their land.

Final decisions regarding the development of employee housing depend upon the housing situation when individual resort units are being constructed. Because of this, a specific housing commitment is premature at this time. Through its zoning process, the County retains sufficient control over development to insure that employee housing is developed as needed.

Natural Beauty. The Kawaihae-Mahukona Road is identified in this element of the Hawaii County General Plan as being an area of particular natural beauty. As indicated elsewhere in this report, the proposed project involves the urbanization of land in the middle of an area that is presently undeveloped. Inevitably it will change the visual character of the area in which it is built. The vast majority of the land along the Kawaihae-Mahukona Roadway would remain wild, however.

Public Facilities and Public Utilities. The General Plan emphasizes the need to insure that public facilities (including recreational facilities) and utility service is available to the community. The effect that the planned and proposed Kohala resort development would have on the need for them is discussed in Chapters IV and V.

Transportation. Complete development of the planned South Kohala resorts will result in severe congestion on Queen Ka'ahumanu Highway's and the Waimea-Kawaihae Road's two existing traffic lanes. The 300-foot wide right-of-way of the former has more than enough room to accommodate the necessary increase in laneage. The General Plan already calls for realignment of the Waimea-Kawaihae Road and the construction of a by-pass around Waimea Village. That leaves as the only major potential problem congestion on the Mahukona-Kawaihae Road (Akoni Pule Highway).

Analyses conducted for this study indicate that the Mahukona-Kawaihae Road could accommodate the traffic generated by the proposed Mahukona Resort so long as other traffic on the highway did not increase substantially. However, if North Kohala were to become a major source of labor for South Kohala resorts, congestion on this highway could become a problem during the later years of the development and improvements could become necessary.

Land Use. The Hawaii County General Plan notes that the North Kohala district "does have potential for the development of small resorts, which would primarily cater to visitors seeking quiet and rest," and that it also contains "areas of historical significance." However, the analysis concludes that "areas of interest to visitors, however, are limited due to inadequate access." Consequently, resort designations in North Kohala are limited to a "retreat resort" area in the Kohala Mountains and a "minor resort" designation at Mahukona Harbor. A minor resort is defined as one that is developed at a density less than or equal to that of an intermediate resort but which has insufficient land area to develop into a self-contained resort destination area.

While the site of the proposed Mahukona Resort is not presently designated for resort use, the General Plan "Land Use Concepts" section recognizes that some flexibility is required to deal with unforeseen circumstances. One method of providing this flexibility is through the establishment of a "Land Zoning Bank." According to the General Plan:

> Of the estimated total urban acreage for the County, 80% will be allocated throughout the districts in a "district bank" and the remaining 20% will be retained in a County zone bank. The district bank totals will be further allocated to the urban centers, industrial, and resort areas. These approximate allocations serve as a guide and should not be construed to be the absolute desired size. Acreage allocations may be shifted within a district from one area to another if the need becomes greater or accelerated within the initial allocation period. Similarly land use may be reallocated within a district...if no appreciable development or change is evidenced or indicated within the initial allocation period. In the event that the allocated acreage is absorbed within the districts, additional allocation may be from the 20% County "Land Zoning Bank."

The General Plan allocated 70 acres to resort use in North Kohala. (Note: this acreage is from page 78 and refers only to the sites actually occupied by resort hotels, not to entire resort acreage that includes many other uses as well.) Assuming that about one-third of this was intended for the "retreat resorts" that the plan imagined developing in the Kohala Mountains (page 79), the remaining 45 acres could accommodate from 900 to 1,500 visitor units depending upon how close to the General Plan's assumed density of 33 units/acre they are developed. Fifteen hundred units is defined in the Plan as an "Intermediate Resort," the designation being sought for the Mahukona Resort site. Hence, simply moving the existing resort designation from Mahukona Harbor to the site of the proposed Mahukona Resort could make the project consistent with this aspect of the General Plan.

In addition to the North Kohala District resort allocation, the county-wide land zoning bank allocation for resort use is 186 acres (page 80), sufficient for over 6,000 units at the specified density. The General Plan allows this to be applied as anywhere on the island that it is needed. Together, the resort zoning available from the district and island-wide land zoning banks is sufficient for 6,800 to 7,500 hotel rooms, or 4.5 to 5 times as much as would be required by the proposed Mahukona Resort.

One way of viewing the proposed Mahukona Resort is as an employment center for North Kohala. Properly developed, it has the potential to supplement the Mauna Kea Beach Hotel as the district's single largest employer. It is much closer to North Kohala's population centers than any of the planned South Kohala resorts, and would, therefore, greatly reduce commuting times and costs. At the same time, it is far enough away from existing towns to keep tourists from making an excessive number of exploratory excursions into residential areas.

Without a doubt the proposed Mahukona Resort would result in somewhat more visitor activity in North Kohala than was envisioned by the General Plan. On the other hand, developers argue that a resort on a smaller scale in North Kohala, i.e., the "minor resort" envisioned in the Plan, is not economically viable. Further financial analysis on the part of the developer and a reconsideration by the County of the implications of fostering resort development only in South Kohala may lead to compromises that satisfy both the proponents of the Mahukona Resort and those concerned with the conservation of North Kohala's present lifestyle.

Zoning

The proposed Mahukona Resort site falls within the County's Unplanned District. This designation is applied to "areas not subjected to sufficient studies to adopt specific district classification" (County of Hawaii Ordinance No. 63). Under this zoning, only single family and agricultural uses are allowed. Each single-family building site must be at least five acres, with a minimum site width of 280 feet. If the site were to be developed under this zoning, approximately 200 lots could result.

OTHER CONTROLS

Special Management Area Regulations

Following the creation of the Federal Coastal Zone Management Program and the subsequent passage of State enabling legislation, the County of Hawaii adopted rules and regulations to preserve and protect the natural resources of the coastal zone. This zone, called the "Special Management Area" is designated on maps filed with the County of Hawaii Planning Commission. For the Mahukona Resort site, the Special Management Area extends from the coast to the Akoni Pule Highway, thereby encompassing about half the resort site. The rules and regulations include the objectives and policies of Chapter 205A, HRS, guidelines to be used in determining desirable uses and adequate protection of significant shoreline areas, and procedures for obtaining permits for development within these areas.

The objectives and guidelines listed below are used by the Hawaii County Planning Commission and Planning Department in deciding whether or not to approve a particular permit application. The brief comments following note the extent to which the Mahukona Resort project is consistent with them.

Objective 1. "Provide coastal recreational opportunities accessible to the public."

Development of the Mahukona Resort would result in increased public access to the coastline and therefore increased recreational opportunities.

Objective 2. "Protect, preserve, and where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture."

The archaeological resources of the site have been identified and analyzed. They offer great information potential that can be realized by selective salvage and preservation work. Further research will be done, and the developer intends to work with Bishop Museum archaeologists to minimize impacts of the proposed development on archaeological sites.

Objective 3. "Protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources."

Open space along the shoreline would be preserved, but since this resort is coastal dependent it cannot be located entirely outside the Special Management Area. The resort would result in a change in the visual environment from a natural to a man-made character. If the golf course and other open landscaped areas are used as a buffer between the highway and the tallest buildings, the visual impact could be mitigated.

Objective 4. "Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems."

The proposed project does not involve any direct physical modifications to the nearshore environment, and natural drainageways would be retained. Erosion would be controlled during construction, and increased landscaping would offset the increase in impervious surfaces. In general, the potential for damage to the marine environment from changes in runoff due to the proposed project is slight. The valuable ecosystem of the waters fronting the Lamalaloa property is assured protection, since it is within the Lapakahi Marine Life Conservation District.

Objective 5. "Provide public or private facilities and improvements important to the State's economy in suitable locations."

Most visitor industry facilities in Hawaii are coastal dependent developments. While the importance of tourism to the State's economy is realized, the importance of minimizing its impacts on the social and physical environment is also recognized in the many State and County development controls.

Objective 6. "Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence."

The Mahukona Resort site is located in an area that is less susceptible to subsidence than most other areas of the island. No development will occur within the zones of flooding from streams, storm waves, or tsunamis. Erosion is not a major hazard in the area now, due to low rainfall, and the extensive landscaping proposed for the site would further ameliorate the situation.

Objective 7. "Improve the development review process, communication, and public participation in the management of coastal resources and hazards."

Preparation of this environmental impact statement has resulted in public participation in the planning and review process, and communicated the potential short- and long-term impacts of this significant coastal development early in the decision-making process.

Guidelines A.1, 2, and 3. These guidelines seek to minimize alterations to any body of water, reductions in any beach or other public recreation area, and restrictions on access.

The project as proposed would not alter the coastline, or reduce beach space. Access to the coast would be made easier, therefore opening up new public recreation areas.

Guideline A.4. This guideline aims at minimizing interference with views of the sea from State Highways and other scenic areas.

While the Mahukona Resort would certainly change the present view toward the coast from the highway, careful siting of buildings and proper landscaping could minimize adverse impacts.

Guideline A.5. This guideline directs authorities to minimize development which adversely affects water, scenic, or wildlife resources, or which adversely affects existing or potential agricultural uses of the land.

No significant adverse impacts on water quality, existing areas of open water, existing and potential fishing grounds, wildlife habitats, or estuarine sanctuaries are expected as a result of the Mahukona Resort Development. The land is not presently used for agriculture, and its potential is limited to grazing; even for this use, the land is relatively unproductive.

Guidelines B.1, 2 and 3. These guidelines state that no development shall be approved unless it has no substantial adverse effects, is consistent with Chapter 205A HRS, and is consistent with the General Plan, zoning and subdivision codes, and other applicable ordinances.

The adverse impacts of the Mahukona Resort would largely result from adding to the great population growth already resulting from the planned South Kohala resorts. These impacts would be minimized to the extent possible and it would be the decision of the Planning Commission, the Planning Director, and other public officials to decide whether the public financial benefits outweigh the public costs. The consistency of the project with Chapter 205A HRS has been discussed under the objectives headings above, and its consistency with the General Plan and zoning code are reviewed earlier in this chapter. Its consistency with the subdivision and other ordinances cannot be discussed until more detailed planning and engineering work is done.

Guideline C.1. Ensure that "adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas, and natural reserves is provided to the extent consistent with sound conservation principles."

Public access to the shoreline will be assured by the developer of the Mahukona Resort.

Guideline C.2. Ensure that "adequate and properly located public recreation areas and wildlife preserves are reserved."

The waters fronting the Lamaloloa property are within the Lapakahi Marine Life Conservation District. Other public recreation areas would be reserved on the site.

Guideline C.3. Ensure that "provisions are made for solid and liquid waste treatment disposition and management which will minimize adverse effects upon Special Management Area resources."

A sewage treatment plant would be constructed to treat liquid waste for the resort. Disposal of the effluent would be largely by golf course irrigation with the excess that cannot be handled that way being disposed of via injection wells. Further studies would be required and permits for these facilities obtained before they could be constructed. Solid wastes would probably be disposed of at the County-operated landfill in Waimea with collection handled by contractors.

Guideline C.4. Ensure that "alterations to existing land forms and vegetation, except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of earthquake."

The Mahukona Resort development does not involve major changes to existing landforms. Extensive new landscaping would be introduced but this would not result in any increase in the hazards listed above.

Guideline C.5. Ensure that "adverse environmental or ecological impacts are minimized to the extent practicable."

Not only is the developer committed to minimizing adverse impacts, the multi-level review and permit process he must undergo prior to development will assure that mitigation measures are made conditions to the resort development.

GEOGRAPHIC DISTRIBUTION OF SECONDARY GROWTH

In discussing the secondary impacts that would be produced by planned and proposed resort development, including the Mahukona Resort, we have referred repeatedly to (i) the effect that the geographic distribution of that growth would have on impacts and (ii) the fact that the exact geographic distribution is impossible to predict at this time. Finding prediction impossible, we are still able to provide some useful insights into the location issue by considering some implications of different possibilities. Because North Kohala appears to offer the clearest situation, we will begin with it. a discussion of South Kohala, where the options are more numerous and the outcomes even less certain, follows.

NORTH KOHALA

North Kohala is a relatively small, socially coherent community that contains a large proportion of long-time residents. In 1975, for example:

- 73 percent of its residents were born on the island and only 5 percent had in-migrated from the U.S. mainland; the comparable figures for South Kohala were 28 and 49 percent, respectively.
- Nearly 70 percent had spent their entire life on the island, and 90 percent had either resided only on the Big Island or in a foreign country and the Big Island for their entire life.
- 90 percent were living in the same house that they lived in a year earlier.
- 90 percent had lived on the Big Island for at least the last 5 years.

Because of the absence of sufficient local job opportunities, many North Kohala residents must commute long distances to jobs in other areas. Moreover, children of North Kohala families find little to keep them there once they have completed high school. As a result, there is a tendency for young persons, expecially males, to leave the district in their late teens or early twenties. Surveys conducted for this and other studies (Public Affairs Advisory Service, 1980; 1979) indicate that this out-migration is a major concern of North Kohala residents and that they would like to see sufficient development (resort or other) to stem it.

Based on the projected natural increase in the North Kohala population of 1,700 between 1980 and 2005 and an assumption that only two-thirds of these people would be in families that, if given a choice, would prefer to stay in the district, it appears that something on the order of 600 additional jobs would be needed. This corresponds to a resident population of about 1,200 persons in 400 households. Allowing for the possible return of persons who have outmigrated over the past decade because of the lack of job opportunities, it appears that it would be wise to plan for half again as much growth, say 1,800 persons in 600 households. This is about half of the projected population impact of the Mahukona Resort as shown in Table IV-17. The remainder of the work force for the resort and related secondary growth would have to come from South Kohala.

In view of the findings reported in the social impact section of this report (see Chapter IV), it appears that the best means of accommodating this 600-unit increase in housing would be as in-fill and/or fringe development of the existing North Kohala towns. The number of units required is sufficiently small, and the amount of readily

developable (but not yet appropriately zoned) land is sufficiently large, for this to be accomplished without reducing the amount of utilized prime agricultural land below its current level. (There would, however, be a decrease in the amount of such land that is available for use.)

A major problem that will have to be dealt with in attempting to limit growth to this level is the effect that this would have on land and housing prices. The housing market's natural response to a supply that is less than the effective demand is to boost prices, thereby decreasing demand to the point where it equals the supply. Unfortunately, such market pressures are non-selective in that they do not distinguish between present residents and in-migrants. As a result, they can have an undesirable effect on the price of rental units (25 percent of the North Kohala total) and on the sale price of homes. While many different techniques aimed at protecting the residents of an area from unwanted housing cost increases have been tested, only one has worked over a long period of time. It involves the construction and operation of rental units by major employers. Unfortunately, this approach also has numerous drawbacks. The most notable of these are the fact that, (i) by tying affordable housing to continued employment with a particular firm, it increases employers' leverage over their employees, thereby tending to depress wage rates, and (ii) it does not satisfy the desire for home ownership or allow people to benefit from the long-term economic advantages that fee-simple ownership can provide.

SOUTH KOHALA

Several options are available for distributing secondary growth in South Kohala. Those which appear most likely and/or desirable involve directing the bulk of secondary growth (i) into the upland areas around Waimea; (ii) onto the resort sites themselves; (iii) into vacant land immediately adjacent to the planned resorts, allowing each developer to establish his or her own support housing area; and (iv) into one, or at most two, support towns--possibly Waikoloa and/or Kawaihae. These options, together with some of their implications and some brief comments regarding their practicality, are discussed below.

Waimea

The town of Waimea has undergone considerable growth over the past 10 years. The population of the area designated as the Waimea CDP (Census Defined Place), which includes the town center, increased from 756 to 1179 (56 percent) between 1970 and 1980. Much more growth has occurred in the area immediately surrounding the Waimea CDP, however, so that the actual increase in the population of the Waimea area has been even greater. The town's position as the cultural and commercial center of the region has also been reinforced by the development of new educational and shopping facilities and the recent completion of a performing arts center. Currently, Waimea is considered by many to be the only real town in the region, and many have argued that this qualifies it to be the focus of continued residential growth supporting the South Kohala resorts. Several factors lead us to believe that such a role may not be appropriate or even possible for Waimea.

First, the area's climate and beauty have made it an active real estate market in recent years. As a result, land prices have risen to the point where development of reasonably-priced community housing is difficult.

Second, the rapid population increase is threatening to destroy the ranch-like atmosphere which has contributed to its popularity. If a good deal of additional

housing is constructed there for resort employees, the town would be inalterably changed.

Third, the town's limited water supply makes it impossible to accommodate the projected growth without a costly new water resources development program.

Finally, establishment of Waimea as the residential base for coastal resort development would result in a daily commute of 30 to 40 miles per day for resort employees. Even if the Waimea-Kawaihae Road is realigned to accommodate the resulting traffic, planning for such a pattern in view of present and projected transportation energy costs would appear unwise.

Accommodation on the Resort Sites

Aside from the fact that the planned and proposed resorts have not been laid out with the needs of a working residential community in mind, there are other reasons why a mixing of resort uses and large-scale residential housing is undesirable. The most important are:

- There are potential conflicts between the activity generated by resort use, particularly in the late evening hours, and the desire for quiet in residential areas.
- The high value of coastal land tends to raise the necessary sales price of residential units constructed there to levels which are not affordable to most resort workers.
- Resort developers need to maintain control over visual and other public aspects of the resort site in order to insure continued quality and marketability; this conflicts with residents' desire to shape the character of the neighborhood in which they live.
- Problems exist in attempting to interface commercial facilities aimed primarily at the visitor market with those designed for permanent residents.

Few persons would recommend that Waikiki be the site of a large-scale residential development aimed at lower- and middle-income workers. We believe it would be unwise to attempt the same mix at the South Kohala resorts.

Because of the multi-parcel arrangement of the Mahukona Resort, it would be possible to designate one of the outlying properties for use by employees. However, the relatively small size of this development would probably not generate sufficient business to support efficient commercial facilities on-site. Hence, it is felt that this solution is less desirable than directing resort-related employees into existing North Kohala communities and support housing areas near the South Kohala coast.

Adjacent Lands

The third and fourth options are to direct development immediately adjacent to each of the resort sites (i.e., mauka of Queen Ka'ahumanu Highway) or to concentrate it at one or two nearby areas such as Waikoloa Village and/or Kawaihae/Kawaihae Village. Because of their similarities, they are discussed jointly.

Of the three major South Kohala resort developers, only Mauna Lani Resort, Inc. does not own the land immediately mauka of the resort site. It is theoretically possible for the other two developers to establish employee housing areas immediately above Queen Ka'ahumanu Highway serving their own developments. This has the advantage

of insuring that each developer remains fully accountable for mitigating his or her own impact. It would also allow the residential areas to tie in with the power, communication, sewerage, and other systems established for the resorts, thereby minimizing duplication. This option is not readily available to the Mauna Lani Resort since the property above it is owned by the Signal Corporation. However, the original master plan for the 3,200-acre resort site envisions the northern half of the property (i.e., the portion inland of the Puako Beach Lots which does not have ocean frontage) being used for a support community.

Both Kawaihae Village and Waikoloa Village were originally touted as support communities for resort developments, the first supporting the Mauna Kea Beach Hotel and the second the Waikoloa Beach Resort. Plans for Kawaihae Village have actually held true to the original concept, although only 130 of the planned 600 units have been constructed to date, and there has been a notable lack of success in marketing them to the intended resort employee market since most of the employees of the Mauna Kea Beach Hotel have been long-time local residents who continue to live in established communities.

The EIS for the Waikoloa Beach Resort concluded that:

> Waikoloa Village is...the non-resort urban center for the entire 30,000 acre Waikoloa project. This community is consistent with the County General Plan's land development philosophy and will contain a wide range of housing opportunities for all employee income levels...The community...provides an attractive living environment that will be convenient to employees working within the Waikolo Beach Resort. (Boise Cascade Home and Land Corp., 1976:369)

To date, however, Waikoloa Village has not played the supporting role that was envisioned for it. Land has been subdivided into relatively large lots and custom homes built on them by individual property owners. Prices have escalated to the point where they appear to be beyond the reach of the great majority of workers. Unless there is a distinct change in the development philosophy that has been practiced to date or additional land that is presently outside the urban zone is reclassified for development of employee housing, Waikoloa Village will not accommodate a large number of resort employees. The County, by taking a tougher stand on the employee housing issue when subsequent building permits are sought by the Waikoloa Beach Resort (WBR) could probably induce the developer to provide substantially more employee housing in Waikoloa Village then would otherwise be the case. Should such pressure be required, however, it would almost certainly not lead to employee housing in excess of that required to support the WBR. Hence, it would not lead to a regional solution.

Just as the developers of the Waikoloa Beach Resort have not been anxious to enter the employee housing market, Mauna Lani Resort, Inc. has not pushed hard yet for its "support community." Presumably, the rise in land values that has been observed in nearby Puako has led to the belief that there might be a "higher and better use" for the land than employee housing. Like Waikoloa, then, the landowners appear unlikely to enter the employee housing market on their own, although they would undoubtedly do so to the extent necesary to obtain the required resort development permits.

This leaves the Signal Oil property mauka of the Mauna Lani Resort as the one area where employee housing might be welcomed. A master plan for just such a development (known as "Aina-Puako") was prepared for 1,000 acres on the northern

side of this land at the direction of its owners. The plan would have accommodated 2,200 housing units on about 500 acres, as well as 125 acres of light industrial uses, 150 acres of intensive agriculture, and over 200 acres of other community and public service facilities. Water was to come from the County's Lalamilo Water System. In the absence of any pretense of resort orientation, development costs and unit sales prices were envisioned as being moderate. Being adjacent to State-owned land in Lalamilo, an opportunity also exists for linking it to assisted public housing there.

Assuming that Aina-Puako could be developed as a major support housing community serving the South Kohala Resorts, it would still be possible to accommodate some of the resort-related work force at Kawaihae Village, Waikoloa Village, and Waimea. Members of this work force would be largely in-migrants; hence, it seems appropriate to direct them into a new community where they would not overwhelm an existing lifestyle or social structure. The overflow of employees from the proposed Mahukona Resort, i.e., the in-migrants who would be needed in addition to the core labor force coming from existing residents, could be accommodated in this new community, as well as other recent South Kohala developments, i.e. Kawaihae Village and Waikoloa Village.

chapter seven

CHAPTER VII
ALTERNATIVES TO THE PROPOSED ACTION

INTRODUCTION

Sub-part E, Section 1:42.g. of the Environmental Quality Commission's Environmental Statement Regulations requires that: "Any known alternatives for the action which could feasibily attain the objectives of the action--even though more costly--shall be described and explained as to why they were rejected."

The intent of this requirement is fairly clear insofar as projects initiated by public agencies are concerned. In contrast, its implications for projects initiated by private organizations, such as Mahukona Properties, are rather vague. Hence, before formulating alternatives to the proposed project, it is first necessary to define two key phrases: (i) "objectives of the action" and (ii) "feasibly attain."

Mahukona Property's primary reason for undertaking the proposed Mahukona Resort project is its desire to earn a reasonable return on its substantial investment in the eight land parcels that are involved. This is its "objective" in pursuing the project. Like any private enterprise, the company also pursues other objectives, both financial and social in nature, in response to explicit and implicit company policies. As used in the EIS Regulations, the term "feasibly attain" means practical or capable of being successfully brought about. Hence, for an action to constitute a genuine alternative to the action now being proposed, it must have a reasonable expectation of meeting the company's obligations to manage its shareholders' investments in such a way as to achieve these objectives. In short, to constitute a viable alternative, a proposed use must be profitable. (Clearly, there are occasions when even the best alternative open to a company involves a loss. However, no individual company can sustain itself for long by engaging in unprofitable actions. Therefore, we have not treated it as a viable alternative.)

In passing, it should be noted that in the context of a private (i.e., applicant) action the requirement "...to discuss any known alternative, even though more costly," means that the EIS may not discuss only that alternative which is most profitable to the developer. Instead it must consider all alternatives that would yield a reasonable return. This fact is the basis for the discussion of the "reduced-scale alternative" found later in this chapter.

ALTERNATIVES CONSIDERED BUT NOT EVALUATED IN DEPTH

As noted above, not all of the "actions" which could be hypothesized with respect to the property are ones that could "...feasibly attain the objectives of the action, i.e., they would not provide the return on investment or the financial security that is necessary. There are, however, some alternatives which cannot be dismissed out of hand, and these are discussed below.

Sale of the Property

Sale of the Mahukona Resort site to another party is always an option. In buying the property, however, Mahukona Properties paid a premium price that it believed was justified by the site's potential as a resort site. To recover its investment, it would probably be necessary to sell to an individual or organization having the same intent.

In such an instance, the eventual impacts would probably be much the same as those described herein. Failing to do this, Mahukona Properties would probably have to sell the parcels at a loss to someone intending either to simply hold the property in the hope of long-term appreciation or to use it for extensive agriculture, principally grazing. In essence, this would result in the same impacts as the "no-project alternative" discussed throughout this report as well as later in this chapter.

Alternative Types of Urban Development

Resort use is obviously not the only use to which urban-zoned land could be put. However, given the property's location and other factors, the alternatives--industrial, institutional, residential, or commercial--do not appear to be practical.

- Transportation costs and the site's distance from Kawaihae Harbor and potential consumer markets rule it out as an industrial area capable of competing effectively with land already set aside for that purpose at Kawaihae.

- There is insufficient population in the area to support significant commercial or institutional uses.

- The site's distance from the planned South Kohala resort developments makes it unsuitable as a location for the large-scale development of employee housing at the same time that high infrastructure costs make anything but large-scale development impractical.

Recreational Use

The site lacks sufficient natural attractions to make recreation a commercially viable use. Similarly, it is so isolated from potential markets that development of intensive-use recreational facilities such as a theme park are impractical. The property could be bought for public park use, of course, but it has little to distinguish it from other nearby areas, is far too large for the present or projected population of the area, and has not been identified as a potential park site in any of the plans that have been prepared for the region. Consequently, this possibility must be discounted as unrealistic.

Agricultural Use

The soils on the Mahukona Resort site are not suited to any kind of intensive agricultural use. The high cost of water (energy costs alone for pumping groundwater of suitable quality would run over $.50 per thousand gallons and the total cost higher than that) makes hydroponics (where soil is not the growing medium), irrigation, and/or aquaculture financially infeasible.

Grazing is a possible use, but the very low rainfall makes the area relatively unproductive as rangeland. The University of Hawaii Land Study Bureau (November 1965:32), for example, rates its carrying capacity at thirty acres per animal unit year (AUY), or about nine pounds gain per acre per year. Mr. Yanemura, an assessor for the State Department of Land and Natural Resources, Division of Land Management (July 18, 1979) estimated that a 10 AUY rating might be more appropriate than the 30 AUY rating given by the Land Study Bureau.

Using the higher productivity rating of 10 AUY, an average price per pound for live range beef of 51.5 cents (U.S. Department of Agriculture, June 1980:67), and an

average annual gain per range-fed animal of 300 pounds, it is estimated that one AUY is worth approximately $150 and the 1,050 acres of pasture on the Mahukona Resort site are capable of producing about $16,000 worth of beef per year.

Heady and Dillon (1961:599 to 605) report on two production function studies for dry-land cattle ranching. These studies suggest that about 20 percent of the cost of production in a cattle ranching operation can be attributed to the land resource. This is very close to the figure estimated by Garrod and Miklius (August 1977) for Big Island ranchers and to the 25 percent rate used by the State of Hawaii Department of Land and Natural Resources Land Management Division in establishing the upset price on leases of State-owned land. Based on this 20 to 25 percent range, it appears that the theoretical annual agricultural income that could be derived from the land resource on which the proposed Mahukona Resort would be built is $3,000 to $4,000 per year, or three to four dollars per acre. Even using the lowest rate of return now considered reasonable for leasehold land (four percent), this would justify a land price of less than $100.00 per acre--far less than Mahukona Properties has invested in the land. In view of this, agricultural use does not appear to be an economically viable alternative to the proposed resort use.

Alternative Patterns of Resort Use

Any land use plan is defined in terms of a number of parameters. The most important of these include the type of use (e.g., grazing, intensive agriculture, detached residential, mid-rise apartment, recreation, commercial, etc.), the spatial arrangement of the uses, the scale and density of each of the uses, and the implementation timetable. Mahukona Properties' believes that non-resort use of the project site is infeasible for them on any substantial scale (i.e., would result in a loss of money). Evidence cited above supports that conclusion. However, within the limits of resort and resort-related use many combinations of the other factors (physical layout, number and type of hotel and condominium units, etc.) are theoretically possible.

The Mahukona Resort project as now proposed contains 3,200 condominium units and 1,500 hotel rooms, a ratio of 2.13:1. It goes without saying that other ratios are possible and that a change in the ratio would have some effect on the project's impacts. Some of the directions that these changes could take, as well as a review of practical considerations that limit the range of ratios are discussed in the next five paragraphs.

Present tourism planning theory holds that resort condominiums generally lack the full range of commercial, recreational, and entertainment facilities found in good quality resort hotels. This is acceptable from a marketing standpoint when there are nearby resort hotels whose facilities the condominium users can utilize. However, the Mahukona Resort site is too far from the South Kohala resort hotels to rely on them. Hence, an all-condominium development at it is not feasible.

It is difficult to specify exactly what is a realistic minimum for the number of hotel rooms, given a 4,700-unit total, but several factors lead to the belief that it is probably in the 800 to 1,500 range. First, the Kauai Surf in Lihue, Kauai operates successfully near the lower end of that range. Second, two hotels are generally considered more desirable than one because of the variety of entertainment options that this provides, and the minimum efficient size is now set by hotel operators in the 300- to 500-room range. Finally, hotel marketing experience has shown that a resort must have from 800 to 1,500 rooms in order to support an adequate sales program. In

view of the above, we may take 800 to 1,000 hotel rooms as the minimum size for a viable resort operation at the Mahukona Resort site.

The developers of the Mahukona Resort believe that the 4.9:1 condominium unit-to-hotel room ratio that would exist if only 800 hotel rooms are developed is too high to insure the marketability of the entire resort project. The 3:1 ratio that would exist if there are 3,500 condominium apartments and 1,200 hotel rooms is workable. However, such a mix differs only marginally from the 3,200:1,500 hotel room/condominium mix now proposed and on which this EIS is based. Because of this, the impacts of such an alternative would be essentially the same as those we have described herein.

The possibility of having a higher proportion of hotel rooms than in the present proposal was also considered. However, the fact that already-planned Kohala resorts appear likely to result in an oversupply of hotel rooms means that there is no justification for increasing the hotel room count above 1,500.

In view of the above, a discussion of the effects of altering the condominium unit: hotel room ratio while holding the total number of units constant would be unproductive.

It would also be possible to examine the impacts of a denser project, i.e., one with more hotel and condominium units and/or increased commercial floor area. However, given that the developer is satisfied with the project at its present scale and that there appear to be no overriding public benefits (e.g., creation of jobs for residents, attainment of some minimum size that allows efficient provision of public services, etc.), that would accrue from doing so, it seems unproductive to consider a proposal involving a greater number of hotel and/or condominium units.

With respect to other possible variables, the timing of the project could be accelerated or held up, but the effects that such alternatives would have can be readily understood from the data already given. Because the impacts likely to result from the proposed Mahukona Resort are related principally to its scale and to the land uses that are being proposed, analysis of alternatives differentiated only by varying spatial arrangements does not appear useful at this time. If General Plan and State Land Use designations are obtained which would permit the proposed project in concept, more detailed planning will be undertaken and the details of the design worked out. At that time various land use layouts will be investigated and their relative desirability and impacts assessed.

In reviewing the discussion of the "no-project" alternative which follows, it should be remembered that this alternative would definitely not meet the objectives of the proposed action and would leave Mahukona Properties with a significant loss on its investment. It is discussed here not because it is believed to be feasible, but because Section 1:42.g. of the EIS Regulations requires it.

Whether or not, and under what conditions, a "reduced-scale" project would be financially feasible is not known with certainty at this time. While the developer has indicated serious doubts about the financial viability of a smaller project both from the viewpoint of its effect on the marketability of the resort and because it would adversely affect the project's ability to recover high front-end infrastructure costs, no definitive financial and operational analysis of such alternatives is available. Hence, our discussion of the "reduced-scale" alternative is necessarily speculative.

NO-PROJECT ALTERNATIVE

The impact of the Mahukona Resort project can only be understood if one first knows what the future will be like without it. Because of this a detailed discussion of the "without-Mahukona" scenario has been woven into the main body of the EIS. This "no-project" alternative incorporates the assumption that large scale-resort development will occur in South Kohala as now planned regardless of what happens on the Mahukona site. It involves a great deal of secondary growth and, in our opinion, a major transformation in the physical and cultural character of the district. These changes are documented in Chapters III, IV, and V of this report, and we will not repeat them here. There are, however, a few points that help put some of the differences between the "with-project" and "without-project" scenarios into proper perspective.

First, without the Mahukona Resort, the Kohala visitor industry is likely to have fewer available facilities than would otherwise be the case. While this could affect the overall dollar volume of business that is done, it should not adversely affect the viability of the region's resort industry except insofar as it leads to fewer advertising dollars being spent promoting the Kohala coast with a consequent decrease in its popularity.

Because the number of jobs that would be generated by planned growth of the visitor industry would far surpass the number needed by persons who now reside in the region, failure to implement the proposed Mahukona Resort project would probably not lead to significantly higher unemployment there--it would simply reduce the amount of in-migration from other areas. On a more local scale, of course, failure to proceed with the Mahukona Resort project would insure that many North Kohala residents would remain dependent on employment situated far from their homes. North Kohala would, in effect, be forced to serve as a bedroom community with most of its workers employed elsewhere.

REDUCED-SCALE ALTERNATIVE

At present, the "intermediate resort" proposed for the Mahukona Resort site involves only slightly fewer units than the major resorts proposed at Mauna Kea, Mauna Lani, and the Waikoloa Beach Resort. Unlike them, it is spread over four non-contiguous properties that are split into eight parcels by the main coastal highway. Intervening land is owned by the State, and on several occasions the developer has indicated an interest in a land exchange that would allow their land holdings to be consolidated. However, no concrete steps have been taken in this direction, and the possibility of it occurring must be considered remote. Because of this physical arrangement, it is conceivable that the project could be altered to include land in only one or two of the four properties that it now encompasses. Because of its size and configuration, the Kaiholena property would almost certainly have to be utilized for at least part of the resort.

The exact land use mix of a reduced-scale project (i.e., the relative proportions of hotel rooms, condominiums, commercial space, and other units) is difficult to determine. Reducing the number of hotel rooms would be the most direct means of lessening the project's employment and population impact, and resort condominiums provide positive cash flow early in the project's life when it is often most vital to its financial success. This might lead one to believe that the hotel-room component is the most amenable to reduction. Unfortunately, it is the hotels that support a disproportionate share of the recreational and entertainment facilities that are vital to the long-term success of the resort.

All things considered, the most likely possibility for a reduced-scale project appears to be that it would contain all of the types of uses as the plan on which this EIS was based, but that it would have fewer units of each type. Based on the size of the parcels and other considerations, it appears that a reduction to about 1,000 hotel rooms and 2,000 condominiums (i.e., to two-thirds of the present size) would work from a design standpoint (but not necessarily from the financial viewpoint of the developer).

Reducing the scale of the Mahukona Resort project by this much would obviously eliminate the physical impacts on sites which would remain undeveloped as a result. The reduction in visitor-oriented units is so small, 1,500 out of a total of 19,000 in North/South Kohala (i.e., only eight percent), that it would not substantially alter the regional impacts. What the reduction in size would accomplish would be to bring the labor force requirements of the Mahukona Resort and related secondary growth more in line with the need for employment generated by natural increase in North Kohala's population. There would be less encouragement of in-migration and the visitor/resident ratio in North Kohala would be lower, thereby providing a somewhat greater level of protection against adverse social impacts.

chapter eight

CHAPTER VIII
SUMMARY OF UNRESOLVED ISSUES AND OF NECESSARY APPROVALS

UNRESOLVED ISSUES

As we have repeatedly noted in this report, planning for the proposed Mahukona Resort is still in the conceptual stage; there is a huge amount of other resort development planned for the North/South Kohala study area over the next 25 years; and there are no specific plans concerning the pattern of secondary growth that the County will foster and/or permit. Together, these facts make it impossible to reach definitive conclusions at this time regarding many of the potential impacts and other items that have been identified in the preceding chapters. While it would be redundant to re-state all that has been said previously, it is useful to highlight the major unresolved issues with respect to the Mahukona Resort project.

Site Layout and Scale

As is obvious from the absence of a detailed site plan for the proposed resort, no definitive layout for the project has been developed as of this date. A quick site plan could have been drafted and used as the basis for an analysis. However, it would necessarily have been based on a very preliminary engineering analysis, on an incomplete marketing strategy, and on the assumption that County and State land use designations would be granted exactly as requested by the developer. Equally important it would have tended to shift attention to details that are more appropriately dealt with at a later stage in the planning process. Because of this, we have chosen to focus our discussion primarily on the regional issues that are most relevant to a General Plan amendment petition. If the concept of the resort is approved and the General Plan amendment being sought is granted, site planning will proceed, and issues related to the spatial relationship of land uses to one another on the resort site will be dealt with in the rezoning. Included in this will be the question of how the separate parcels can best be made into one coherent development.

Regional Land Use Pattern

The present resident population of the North/South Kohala study area is nearly 8,000. Forty percent of these persons reside in North Kohala and sixty percent in South Kohala. By the year 2005, the resident population is projected to rise to 22,000 without the Mahukona Resort and 26,000 with it, increases of 185 and 235 percent, respectively. New residential development on a very large scale will be necessary to accommodate this growth, and existing County plans do not specify exactly where it should go. Until the desired regional land use pattern has been decided upon, the locationally dependent secondary growth impacts of both the proposed Mahukona Resort and planned South Kohala resort developments cannot be accurately determined and effective mitigation programs cannot be finalized.

Employee Housing

While this report has defined the magnitude of the need for housing that would be generated by the proposed project, no specific employee housing developments have been committed to at this time. It is expected that requirements for employee housing will be better defined at such time as plan approval is sought for individual development projects. Formal commitments from the developer will need to be obtained at that time.

Public Utilities and Facilities

The developer is committed to supplying the on-site utility needs of the proposed project (water, sewerage, electrical power, etc.). However, the manner in which the utility needs of secondary development and the demand for public services of all development will be met remains uncertain at the present time. The considerations that affect the satisfaction of these needs are discussed in Chapter V, but definitive solutions must await more concrete proposals for development of support housing.

Social Impacts

This study has included as thorough a study of potential social impacts of the proposed project as is possible at the present time. However, so many variables influence the nature and magnitude of social impacts (including the way that already-planned South Kohala resorts are developed) that many questions remain unanswered. As planning for the Mahukona Resort proceeds it will be necessary to pinpoint potential problem areas (e.g., housing, job training, etc.) and to implement specific programs needed to deal with them.

Highways Act of 1892

As indicated in the main body of this report, a number of trails are present on the property that have been used by residents of the area. The extent to which this use may have created a public claim to the rights-of-way under the terms of the Federal Highways Act of 1892 has not been resolved at this time.

NECESSARY APPROVALS AND PERMITS

As noted above, because the Mahukona Resort project is in its early planning stages, many issues concerning accommodation of the growth which it and other resort projects would generate remain unresolved. Acceptance of this EIS is only the first step in a long approval process that the project must navigate before it can be implemented. Other steps in this process are outlined below. They are designed to insure that all of the issues which remain unresolved at the present time are satisfactorily dealt with before approval to proceed with the project is granted.

APPROVAL NEEDED	APPROVING AGENCY OR BODY
General Plan Amendment	County Planning Department/County Planning Commission/County Council
Rezoning	County Planning Department/County Planning Commission/County Council
Special Management Area Use Permit	County Planning Department/County Planning Commission/County Council
Plan Approval	County Planning Department
Planned Development Permit	County Planning Department/ County Planning Commission
State Land Use District Amendment	State Land Use Commission
Subdivision Approval	County Planning Department

APPROVAL NEEDED	APPROVING AGENCY OR BODY
Building Permit (incl. electrical & plumbing)	County Department of Public Works
Access to/Work on State Highway	State Department of Transportation
Sewage Treatment Works	
Authority to Construct & Operate	State Department of Health
NPDES Permit	State Department of Health/U.S. Environmental Protection Agency
Approval of Private Treatment Works	State Department of Health
Approval of Private Sewage Disposal Systems	County Department of Health
Historic Site Review	State Department of Land & Natural Resources
Grubbing, Grading, Excavation, and Stockpiling Permits	County Department of Public Works
Installation of Utilities in County Highways	County Department of Public Works
Outdoor Lighting Permit	County Department of Public Works
National Flood Insurance Program Conformance	County Departments of Planning and Public Works
Sign Permit	County Department of Public Works
Building Plan Approval-Fire	County Fire Department
Park Dedication	County Planning Department
Water System Approvals	County Department of Water Supply and State Department of Health
Conservation District Use Application (possibly)	State Department and Board of Land and Natural Resources
Use of State-owned land for well sites (possibly)	State Department and Board of Land and Natural Resources

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CHAPTER IX
ORGANIZATIONS AND PERSONS CONSULTED AND THOSE WHO PARTICIPATED IN THE PREPARATION OF THIS EIS

CONSULTED PARTIES

An EIS Preparation Notice for the proposed Mahukona Resort project was first published in the April 8, 1980 edition of the Environmental Quality Commission Bulletin. Requests for comments were sent to all parties expressing an interest in the project. The persons and organizations on the following list were consulted in the preparation of this EIS. Letters received from these groups and individuals are reproduced in Chapter X.

Federal Agencies

National Park Service

State Agencies

Department of Education
Department of Hawaiian Home Lands
Department of Health
Department of Labor and Industrial Relations
Department of Land and Natural Resources
Department of Social Services and Housing
Department of Transportation
Office of Environmental Quality Control
Third Circuit Court, Hilo
University of Hawaii at Hilo, Center for Continuing Education and Community Service

Hawaii County Agencies

Department of Housing and Community Development
Department of Parks and Recreation
Department of Personnel Services
Department of Public Works
Fire Department
Office of Aging
Office of Manpower Resources
Planning Department
Police Department

Elected Officials

Mayor Herbert Matayoshi
Representative Minoru Inaba
Representative Yoshito Takamine
Councilman Tashemi Sameshima
Former Councilman Ikuo Hisaoka

Public Utilities

Hawaii Electric Light Company
Hawaiian Telephone

Community Organizations

Hui Mamalahoa
Kawaihae Village Association
Kohala Casting Club
Kohala Community Association
Kohala Hawaiian Civic Club
Kohala School PTSA
Kohala Senior Citizens' Club
Kohala Trollers
Kohala Women's Center
North Kohala Community Association
Puako Community Association
Waikoloa Village Community Association
Waimea-Kawaihae Community Association

Major Landowners, Developers, Resort Operators

Hilton Head Co. (Kohala Estates)
Kohala Corporation (Castle & Cooke)
Mauna Kea Beach Hotel
Mauna Kea Properties, Inc.
Mauna Lani Resort, Inc.
Sheraton Hotels
Waikoloa Beach Resort, Inc.

Other Kohala Businesses

Bank of Hawaii, Kohala branch
First Hawaiian Bank, Waimea branch
Hawaii Preparatory Academy
Jardine Real Estate
Kohala Federal Credit Union
Kohala Health Center
Kohala Nursery
Lucy Henriques Medical Center
Real Estate Works Hawaii, Inc.
Sandalwood Properties and Ilihai Reforestation
Sunshine Hardware

Public Interest and Other Groups

Alu Like
Environmental Law Center of the Pacific
Family Crises Shelter (Hilo)
Hawaii Hotel Association
Hawaii Leeward Planning Conference
Imiola Congregational Church
International Longshoremen and Warehousers Union
Kohala Episcopal Mission
Kohala Urban Projection Association
Legal Aid Society of Hawaii
Na Ala Hele
West Hawaii Today

Kohala Residents and Other Individuals

Glenn R. Bauer
Rosalind Costello
Graciano Elarco, Jr.
V. Lani Eugenio
John K. Gamman
Michael Gomes
Judith Graham
Gretchen Grove
David Kobzev
Jon Kobzev
Eleanor Laszlo
Joseph R. Laszlo
Mr. & Mrs. John Moreno
Paulette T. Playford
Glenn Yamasaki

ORGANIZATIONS AND INDIVIDUALS WHO ASSISTED IN THE PREPARATION OF THIS EIS

Belt, Collins & Associates

Perry J. White - Project Manager and Principal Author
Jan Staniszkis - Project Planner
Thomas F. Nance - Contributor (Water Resources)
Ann K. Yoklavich - Contributor, Editor
Leland Lee - Sanitary Engineering Research
Dan Jones, Mary Alice Sinton, Jan Olin - Graphics
Georgia Sakai, Violet Porras, Linda Tajiri - Word Processing
Ken Watanabe, Dennis Takushi - Reproduction

Sub-Consultants/Sub-Contractors

Bernice P. Bishop Museum - Archaeology
Phillip Bruner - Wildlife
Erin Hall and Margaret Elliott (Earthwatch) - Vegetation
Darby-Ebisu & Associates, Inc. - Noise
James W. Morrow - Air Quality
Dr. John A. Mapes - Agricultural Economics
Steven J. Dollar and Lisa M. Boucher - Marine Biology

chapter ten

CHAPTER X
COMMENTS AND RESPONSES DURING THE CONSULTATION PERIOD

The following individuals and groups requested consulted party status during the preparation of this environmental impact statement. Copies of their letters are preceded by copies of the Environmental Assessment/Preparation Notice and the standard transmittal letter requesting comments. A few of these consulted parties wrote again with comments to be addressed in the EIS. These letters and individualized responses to them are reproduced in the last part of this chapter.

LETTERS RECEIVING INDIVIDUAL RESPONSES

ENVIRONMENTAL ASSESSMENT

Applicant: Mahukona Properties
Mun On Chun, President
P. O. Box 3979
Honolulu, HI 96813

Approving Agency: County of Hawaii through
the Planning Commission
and the Planning Department

Class of Action: General Plan Amendment

Proposal - The applicant has submitted a petition to amend the County of Hawaii General Plan by a) the addition of an Intermediate Resort designation for the North Kohala District and b) a change in the General Plan Land Use Pattern Allocation Guide Map from an Extensive Agriculture designation to a Medium Density Urban and Resort designations.

I. Description of the Proposed Project:

Kawaihae Development, Inc. (KDI), a development arm of Mahukona Properties, Ltd. proposes to develop a planned resort/residential complex in lands of North Kohala.

The development proposal calls for the construction of five (5) hotel structures housing a total of 1,500 rooms; 3,465 medium density condominium apartments and 500-600 single-family dwellings.

The entire complex is to be developed in four (4) phases over a period of twenty (20) years. It will also offer other facilities, services and activities related to the hotels, condominiums and single-family dwellings. These include an area for commercial services/facilities, an eighteen (18) hole championship golf course with a planned expansion to thirty-six (36) holes, tennis and swimming facilities, horseback riding and hiking trails, and an inland lagoon. Additionally,the developer anticipates that other recreational activities such as deep sea fishing, sailing and water skiing will be available in the area.

The developer plans the proposed resort/residential complex as a high quality development, stressing visual and functional integration with the surrounding landscape. The overall development is intended to be distributed over eight (8) non-contiguous parcels of land totaling 1,045 acres. Kawaihae Development, Inc. also hopes to lease six (6) parcels of State lands which lie between these parcels. The applicant proposes to include these parcels in the overall development concept to be used as open space and for active/passive recreational uses.

The parcels owned by Mahukona Properties, Ltd. which are included within this General Plan amendment petition are described as follows:

TMK:	5-7-01:20	36 acres	Lamaloloa, N. Kohala
	5-7-01:23	57 acres	Lamaloloa, N. Kohala
	5-8-01:11	266 acres	Kaiholena, N. Kohala
	5-8-01:16	262 acres	Kaiholena, N. Kohala
	5-8-01:10	63 acres	Kaupalaoa, N. Kohala
	5-8-01:17	45 acres	Kaupalaoa, N. Kohala
	5-8-01:9	166 acres	Kehena, N. Kohala
	5-8-01:18	160 acres	Kehena, N. Kohala

As the petition which has been submitted is for a General Plan amendment, the proposed development is presently at a conceptual stage. Specific details have not yet been established except for the maximum limits.

II. Description of the Affected Environment:

A. The Leeward Kohala region: The region which includes portions of both North and South Kohala stretches from Upolu Point on the north to Anaeho'omalu on the south. The area is characterized by low rainfall, approximately ten (10) inches per year along the coastal section to approximately fifty (50) inches along the mauka belt road.

Mean temperature ranges from greater than 76^{o} at the coast to 70^{o} at the mauka road.

Geologically, the area is built from volcanic flows of both the Kohala mountains and Mauna Kea.

On the north leeward side, the geologically older Kohala Mountains have been eroded to form slopes ranging from 6% to 20%. The overall, relatively gentle slopes and rounded topography are dissected by many small, deep gulches. None of these gulches, however, retain perennial streams.

The geologic substrate of the Kohala Mountains extend into the South Kohala district to Makeahua Gulch in the ahupua'a of Kawaihae. Mauna Kea volcanic flows are present south of this gulch to and beyond the boundary of the South Kohala/North Kona districts near Anaeho'omalu.

Slopes in this section of South Kohala range from 6% to 10%, and are also dissected by gulches, which though not perennial, are subject to occasional flash flooding.

Soils of the leeward North and South Kohala districts include those of the Mahukona, Hawi, Pu'u Pa, Kamakoa and Kawaihae series.

The coast within the North Kohala district is characterized by cliffs of varying heights with either soil layers underlain by lava or bare rock. Numerous small bays indent the coastline. These are characterized by either water-worn boulders and/or pebble ('ili'ili) beaches.

The coast along the South Kohala district is similar, however, it is along this coast that some embayments are formed with white sand beaches. These include pockets at Kawaihae, Hapuna, Kaunaoa, Wailea, Honokaope and Anaeho'omalu.

Coastal waters are classified A with the exception of Kawaihae and Mahukona harbors wich fall within the Class B category. A marine preserve has been established at Lapakahi State Park and a second marine preserve has been recommended for Keaweula Bay.

Historically, both North and South Kohala have played an important role. In particular the area is associated with the life of Kamehameha from birth through the post-contact period with the attainment of the unification of the Island of Hawaii. Many of the

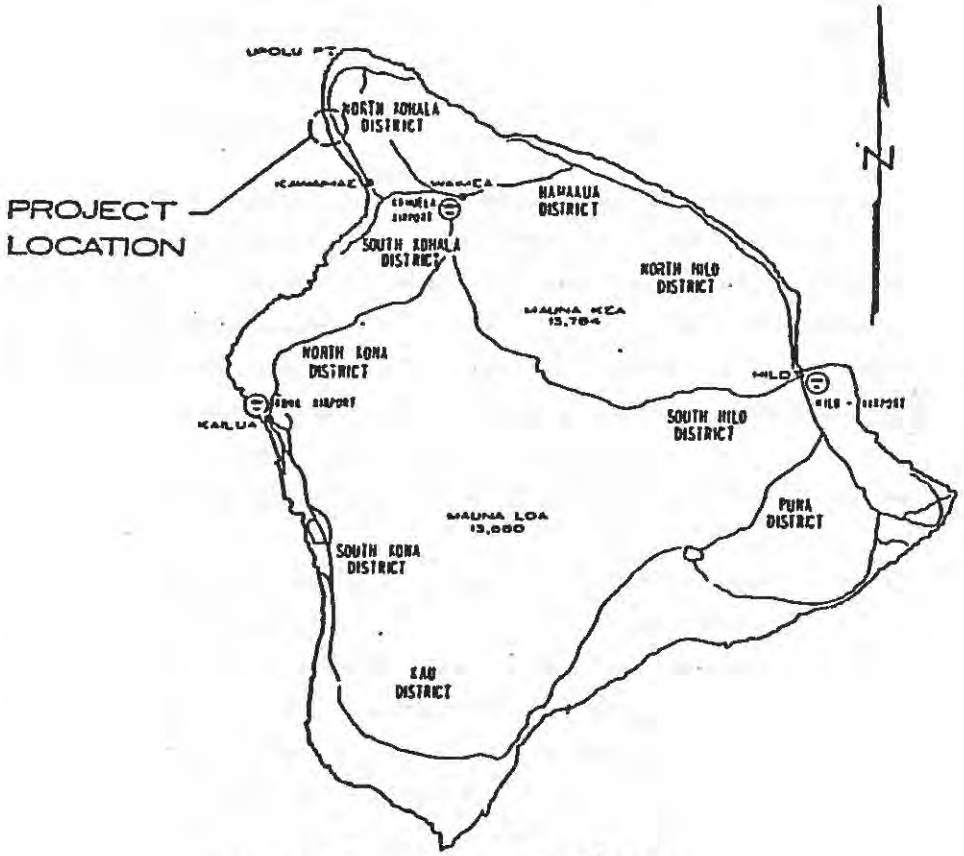
archaeological and historic sites are associated with his life. However, there are also numerous sites associated with the fishing and farming aspects of the Hawaiian culture. Post-contact period (after 1778) sites are associated with the sugar industry and the early missionary beginnings.

B. The project site: The eight non-contiguous parcels are located approximately a half mile south of Lapakahi State Historic Park and two miles south of Mahukona Harbor. The southern limit of the project site is located at Keawanui Bay in the ahuapua'a of Kehena. The total area spans a distance of approximately four (4) miles.

In addition to being separated by State-owned parcels, four of the parcels are separated from the others by the Akoni Pule Highway (see location maps).

The elevations of the parcels range from sea level to approximately 600 feet above sea level. All, however, are situated within the ten (10) inch rainfall belt and in a mean temperature belt of greater than 76^{0}.

Soils on the subject parcel as identified through low intensity surveys by the U. S. Department of Agriculture Soil Conservation Service are classified as Kawaihae extremely stony, very fine sandy loam. The series is described as being somewhat excessively drained stony soils which formed in volcanic ash. In representative profile, the surface layer is dark reddish brown. Below this layer is dark reddish brown and dusky-red stony silt loam. Bedrock strata include both pahoehoe and/or fragmental a'a lava. These soils are used mostly for pasture, wildlife habitat or recreation, as there are severe limitation to the cultivation



ISLAND OF HAWAII

MAHUKONA RESORT/RESIDENTIAL DEVELOPMENT
PROJECT LOCATION

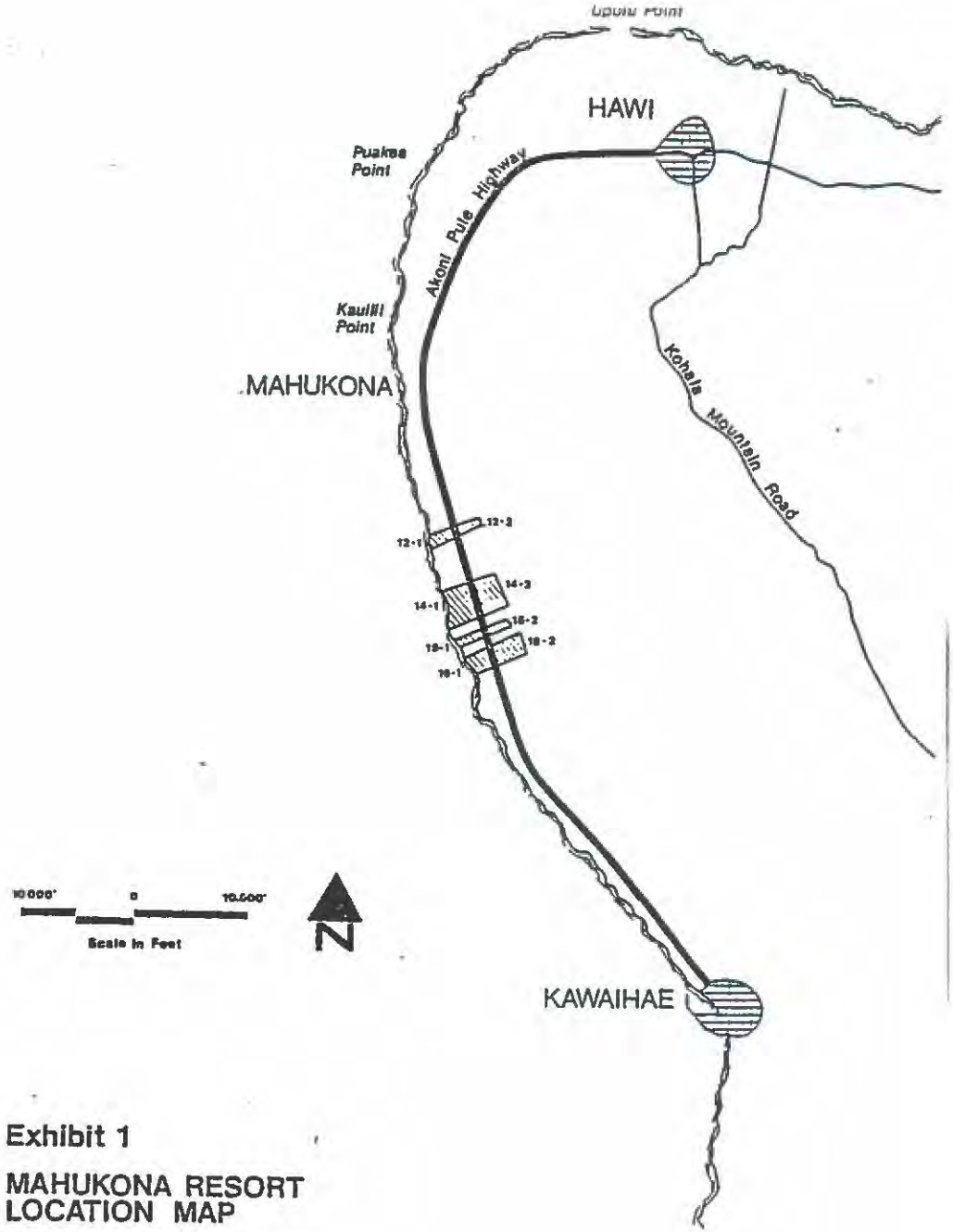


Exhibit 1

MAHUKONA RESORT LOCATION MAP

X-6

potential due to the shallow and stony nature of the soil layers. The area has not been classified as agricultural lands of importance by the State Department of Agriculture.

Vegetation zones include a relatively dense kiawe (Prosopis pallida) coastal band, with some klu (Acacia farnesiana) and ekoa (Leucaena glauca). The coastal vegetative band is followed with a band of less dense and relatively open area. Species are similar to that found along the coast except that they occur in sparser populations, are less tall, and with a ground cover of grass. Herbs include 'ilima (Sida fallax), pili grass (Heteropogon contortus) and other exotics. The next vegetative band, which parallels the highway, is composed again by similar species, however with a general open character.

Endangered plant or animal species are not known to exist in the area.

The project site does not fall within a tsunami inundation area; nor are there flood hazard designations.

An archaeological survey conducted by the Bishop Museum identified nineteen sites within the project area. Although most of the sites were previously identified through the Statewide inventory of Historic Sites, none of these have been recertified for placement on the Hawaii Register of Historic Places, nor have they been nominated or included on the National Register of Historic Places.

III. Socio-economic Setting:

The project site lies in an area which is presently undeveloped and uninhabited. The parcels lie approximately seven miles from Hawi in North Kohala as the nearest settled area and approximately ten miles from Kawaihae Harbor in South Kohala.

North Kohala, including the settlements of Hawi, Kapa'au, Makapala and other dispersed agricultural areas along the mauka road had an estimated population of 3,500 in 1977. The concentrated population areas were established through the development of the sugar industry while the dispersed populations have had a diversified agricultural foundation in ranching or family (see economic section).

Since the closing of the Kohala Sugar Company in 1975, sugar no longer supports the community. Rather a number of other diversified agricultural projects have been introduced into the area.

Most government services both on the State and County levels for the North Kohala district are located in Kapa'au, approximately ten (10) miles distance from the project location. These include a library, hospital, police, fire, social services and judicial courts.

Private commercial services and facilities are located mainly in Hawi and Kapa'au. These are limited to a convenience shopping scale, and a major portion of the shopping done by the North Kohala residents is conducted either in Waimea (South Kohala) or in Hilo.

South Kohala had an estimated population of 3,500 in 1977. Residential areas are located at Kawaihae Village, Puako, Waikoloa and a sizable urban area at Kamuela (Waimea). Economic support for the communities in South Kohala is diverse in comparison to that of North Kohala. These include the traditional support from ranching, truck farming, urban commercial and governmental services. Within the past decade there has been a growth in the tourism industry, education, industrial and research sectors (see economic section).

Most of the government and urban commercial services in the South Kohala district are located in Kamuela, a distance of some twenty miles from the project site. These include a library, police and fire services, a private hospital, public and private schools and district court. Commercial services are located primarily in the Parker Ranch shopping center which includes, a bank, savings and loan, supermarket, drug store, a five and ten, and specialty stores such as bakery, western riding outfitting, restaurant, ice cream parlor, and bookstore.

Transportation access points occur at Kawaihae, where the harbor serves as one of two deep draft harbors on the Island of Hawaii. Airports are located at Kamuela and Keahole, approximately 23 and 37 miles, respectively, south of the project site. A small craft airport is located at Upolu approximately 11 miles north of the project site.

Access to the project site is via the Akoni Pule Highway which serves as the coastal link between North and South Kohala.

There are no water or sewer systems servicing the project area. Telephone and electrical services are available.

IV. Existing Land Use Policies, Statutes, Patterns:

All eight (8) parcels, either wholly or in part, fall with the State Land Use Agricultural district. Coastal portions of the four (4) parcels lying makai of the Akoni Pule Highway lie within the State Land Use Conservation District (see attached Land Use Map). Those areas of the project development which fall within the Agricultural District are further zoned "Unplanned" by the County of Hawaii. The County General Plan Land Use Pattern Allocation Guide Map designates the area for "Extensive Agriculture" with a coastal

band, coterminous with the Conservation District boundary, designated as "Open."

The proposed resort community is not a permissible use under any of the above land use designations.

In addition to the General Plan amendment which is presently being sought, the proposed development would require a Land Use Boundary amendment from an Agricultural District to an Urban District. Should this boundary amendment be granted by the State Land Use Commission, subsequent change of zone requests are necessary. These change of zone petitions from an "Unplanned" designation to other appropriate zones as may be required by varying portions of the proposed development, fall ultimately under the jurisdiction of the County.

Should any use be proposed for those areas falling within the Conservation District, a Conservation District Use Application is necessary. Approvals for use within this District are under the jurisdiction of the State Board of Land and Natural Resources. An alternative course of action for uses which may be proposed within the Conservation District would be to petition for a Land Use Boundary Amendment from Conservation to Urban.

In addition to these land use designations, four of the parcels lying makai of the highway lie within the Special Management Area, established as part of the State's Coastal Zone Management program. Permits for all uses within this area will require approvals through the County of Hawaii Planning Commission.

The General Plan land use designations of Intermediate Resort and Medium Density Urban which are being sought with this amendment petition are defined in the General Plan as follows:

"Medium density: Village and neighborhood commercial and residential and related functions (3-story commercial; multiple residential-35 to 11.6 units per acre; single family residential-5.8 units per acre).

"An intermediate resort area is a self-contained resort destination area which provides basic and support facilities for the needs of the entire development on a smaller scale than a major resort area. Such facilities shall include sewer, water, roads, employee housing and recreational facilities, etc."

Standards which are applicable to the intermediate resort designation are:

"Maximum visitor units: 1,500 room

Resort acreage: 45 acres

Active and passive recreation areas: 25 acres

Accessory uses within hotel and resort zoned area shall be based on 50 square feet of floor area per hotel room.

A maximum of 320 acres for residential use when other zoned lands are not available in close proximity for support use.

Employee housing shall be provided at a maximum ratio of one employee unit to every two hotel units built. The required ratio shall be determined by an analysis of housing needs of each district or relative area."

Surrounding Land Use:

Nearly the entire North Kohala District lies within the State Land Use Agricultural District. Exceptions to this designation are coastal bands and forest reserves which are designated for Conservation. Urban designations occur at Hawi, the settlements of

Honomakua to Kapaau, Halaula and Makapala, and a small portion of the coastal area of Kahua ahupua'a from Waikailio Bay to the boundary between North and South Kohala. The South Kohala district, although largely within the Agricultural District, includes Urban designations at Kamuela, Waikoloa, Kawaihae to Hapuna, Puako, Anaeho'omalu, Kalahuipua'a. Conservation Districts occur along a coast band. (For an overall perspective see Land Use Map).

Specific zoning designations are also illustrated on the accompanying zoning map. However, it should be noted that in the area immediately surrounding the project sites the zoning designations are basically Agriculture twenty (20) acres, Unplanned and Open along the coast.

Resort zoning designations now occur in South Kohala at Ouli, Puako, Kalahuipua'a and Anaeho'omalu.

General Plan land use designations for the leeward Kohala region include a coastal bank designated "Open" and Extensive and Intensive Agriculture designations for the major portions of North Kohala.

A Resort designation surrounded by an Alternate Urban Expansion designation occurs at Mahukona Harbor, which is approximately two miles from the project site.

Other Resort, Alternate Urban Expansion, Industrial, Low and Medium Density Urban designations occur in South Kohala beginning at the North/South Kohala boundary along the coast and stretching to the boundary between South Kohala and North Kona.

Major portions of the slopes to Kamuela are in Extensive and Intensive Agriculture. Low and Medium Density Urban designations occur at Waikoloa and Kamuela (see General Plan Land Use Pattern Allocation Guide Map).

In the evaluation of the proposed General Plan amendment, the goals, policies and objectives of all elements of the General Plan will also be considered.

Economic Setting:

"The economy of North and South Kohala can be geographically divided into four somewhat distinct sub-regions. First is the coastal zone of South Kohala where present and future resort activities draw upon the climate, white sand beaches, and airport access. Second is the area in proximity to Kawaihae harbor. In addition to freight transportation and storage, the Kawaihae area is presently zoned for industrial use and this use can effectively provide the support facilities anticipated for future growth of North and South Kohala. The third economically distinct region is centered around Waimea. This area serves as the economic hub of ranching and small scale farming in South Kohala, as well as providing a logical urban base for future growth of supportive commercial and governmental services. The forth distinctive area is historically defined by operations of the [old] Kohala Sugar Company."

"Agriculture. Recent agricultural production in North and South Kohala can be aggregated into four major groupings: (1) former sugar cane areas in North Kohala, (2) vegetable farming near Waimea in South Kohala, (3) pasture lands in both districts, generally confined to the higher elevations, and (4) about 390 acres of macadamia plantings on North Kohala lands not suitable for sugar."

"As early as 1976, there were 4 major enterprises in North Kohala engaged in innovative agricultural activities. Despite considerable governmental assistance, only one (ornamentals

production) held out considerable promise, in the long run, of offering a substantial number of jobs to former sugar plantation employees."

Other innovative agricultural projects which are either in operation or being proposed for the North Kohala area within the past year have included aquaculture (prawn farms), and a tannery.

"Agriculture in South Kohala basically consists of vegetable and livestock production.

Vegetables are produced in Puukapu (300 acres) and on the Lalamilo Farmlots (550 acres). A wide variety of crops are produced, but cabbage, Chinese cabbage, daikon, head lettuce, Romaine lettuce, celery and burdock are by far the most important in terms of both acreage and value."

"Most agricultural land in South Kohala is used for grazing purposes. Operations largely involve beef cattle production, but some replacement heifers are raised for Oahu dairymen. Parker Ranch and Kahua Ranch are the major ranches, and about 53 smaller ranchers typically run 40 to 60 animal units each. Much of the area is unimproved pasture, but in the higher elevations where there is a sufficient rainfall, pastures have been improved and planted."*

Tourism:

As the proposed development involves the establishment of a resort community, existing conditions of the tourism industry within the County, and region will be discussed.

*Quotations in this section are from the Draft Kohala Community Development Plan.

The Island of Hawaii has experienced positive growth in its hotel inventory. In 1965 the island had 865 hotel units, or 7% of the State's total. In 1979 there were 5,979 units on the island, accounting for 12% of the Statewide plant totals.

Traditionally, the principal visitor destination areas on the Island of Hawaii have been in Kona and Hilo. In 1968, Kona had 1,074 hotel rooms, or 49 percent of the island total while Hilo accounted for 39 percent with 850 rooms. By 1979, Kona's hotel room count had grown to 3,525 rooms, or 59 percent of the island total while Hilo had 1,956 rooms, or 33 percent of the total. Thus, while both areas have increased the visitor plant size, Kona has improved its position relative to Hilo.

The principal remaining resort area has been the South Kohala coastal area. Currently, only the 310 unit Mauna Kea Beach Hotel and the twenty-four (24) unit Puako Beach Resort Apartment condominium are operating in this area. However, in addition to these facilities, substantial expansion along the coast has been planned for many years and in part zoned for development.

As noted in the land use section of this environmental assessment, this expansion is primarily situated within three master planned resort destination areas; the Waikoloa Beach Resort (WBR) at Anaeho'omalu, Mauna Loa Land Inc.'s at Kalahuipua'a and Mauna Kea Land Corporation's development at Ouli and Kawaihae 2nd which includes the Mauna Kea Beach Hotel.

These three developments have been designated as Major Resort areas by the County of Hawaii General Plan. This designation is applied to those areas suitable for the provision of a self-centered resort destination area which provides the basic and support facilities for the needs of the entire development. A maximum of

3,000 hotel units per area is allowable under this designation along with a maximum of 640 acres for residential use.

Thus, the General Plan would allow a maximum of 9,000 hotel units and 1,920 acres of residential uses in the three (3) major resort areas designated along the South Kohala coast.

In addition, there is a Minor Resort area designated by the General Plan around the Mahukona Harbor area. Such a designation would allow a resort destination area with a maximum of 1500 hotel rooms. It should be noted at this point that the proposed development and General Plan Amendment would be an additional Resort designation for the North Kohala District. Thus, should the General Plan amendment be approved, the total number of hotel rooms allowable in the North Kohala District would be 3,000 rooms.

The Big Island's share of the tourism market has shown a decline over recent years. According to the market analysis submitted by the applicant, the island's share of westbound visitors to the State declined from 41 percent in 1968 to 32 percent in 1977. The eastbound visitor share declined from 31 percent in 1973 to 22 percent in 1977. It should be noted however that while the island's share of the State visitor market declined, in terms of westbound visitor counts, the number visiting the island increased from 412,000 to 890,000 during the years from 1968 to 1977. No data was available for 1968 eastbound visitors.

IV. Impact Assessment:

The introduction of a resort community involving 1,045 acres of land and containing 1,500 hotel rooms, 3,500 condominium units and between 500 to 600 single-family residential units into an area which is presently uninhabited and into a district with a residential population in 1977 of 3,500 will have significant direct impacts.

Additionally, indirect effects of a potentially significant scale may be felt on regional and islandwide levels.

The areas of major impacts both direct and indirect can be identified as follows:

A. Land Use Policies and Patterns: The proposed resort community is not a permitted use under both present State and County land use classifications. All parcels fall within the State Land Use Agricultural District, and portion of the four shoreline parcels fall into the State Land Use Conservation District. Surrounding lands also are situated in the two districts and follow similar patterns, i.e., coastal areas in Conservation with mauka lands in Agriculture. Urban designated lands are located approximately 7 miles miles to the north and 4 miles to the south.

Applicable County General Plan Land Use Pattern Allocation Guide Map designations are Open along the coast and Extensive Agriculture for the remainder of the parcels. In assessing the proposed amendments to Resort and Medium Density Urban Designations, both the policies of the General Plan as well as the overall pattern of land use may be significantly affected.

In relation to urban centers, (Medium Density Urban) the County of Hawaii General Plan states that:

"The creation of new urban centers should be initiated only when it is in the public interest and they must be accompanied by commitments for current development of basic community and public facilities and services.

"The location of urban uses should be evaluated from the standpoint of how each use services existing and future uses of

the surrounding area. The direction and form of growth in accord with future demand will be influenced by many factors."

In relation to Resort designations, the General Plan in its discussion of the North Kohala profile, recognizes that "The district does have potential for the development of small resorts, which would primarily cater to visitors seeking quiet and rest. There are also areas of historical significance in North Kohala. Areas of interest to visitors, however, are limited due to inadequate access."

Courses of action for the district are:

"Possible development of small resort facilities at Mahukona;

"Encourage the development of small family-type hotels;

"Encourage small-scale retreat resort development."

The proposed resort development is not entirely in conformance with these General Plan statements in that 1) the scale of the total development is not of family or retreat resort scale, but rather in intent and density of an intermediate resort development; 2) surrounding land uses are primarily vacant, or are in open space type agriculture or park use and are not serviced by basic public facilities; and 3) there is an existing General Plan minor resort designation for the area surrounding Mahukona Harbor. As the proposed resort community and General Plan amendment is a request for an additional intermediate resort designation in North Kohala, there are potential impacts from both a land use and economic standpoint of this proposal on the existing resort designation at Mahukona.

In terms of the overall pattern of land use designation, the effective of addition of an Urban and Resort designation along the coast has the potential of stretching existing urban and resort designations from the North/South Kohala Boundary through to Mahukona. This cumulatively linear resort pattern will result in the commitment of the coastal resources from Mahukona to Anaehoo'malu. In the recent 5-year General Plan Land Use Pattern Allocation Guide Map review, the Planning Department did review the possibility of expanding the geographical scope of the Resort designation at Mahukona Harbor. In it's final recommendation the Department did not recommend an expansion of the Mahukona resort designation. Rather a revision was made to the Alternate Urban Expansion designation near Kawaihae to reconfigure this designation from a linear form north along the coast to a rather semi-circular core around Kawaihae Harbor. This revision along with others proposed through the 5-year review was adopted by the County Council on July 16, 1979. Thus the proposed resort community may not be in conformance to the land use concept of centralizing urban/resort uses close to Kawaihae.

B. Support Infrastructure: Implementation of the proposed resort community will require major improvements to infrastructure systems. Both a sewage treatment plant and system and the development of a water source and system to service the entire development are needed.

There are at present and within the twenty-year framework for development no plans by the County of Hawaii to install sewage treatment systems within the area. Thus as noted in the policies of the General Plan, "Where major resort complexes and other developments along the shoreline are contemplated, private systems shall be installed by land developers."

Since there are no plans to extend municipal water systems into the area, development of a water source and system for the development has been proposed by the developer.

No information however is presently available to assess impacts of this portion of the development.

In addition to potential impacts generated by traffic vehicular increase along Akoni Pule Highway, impacts to other highways from points of entry (airports, harbor) are also likely. Moreover, since all eight parcels are non-contiguous, separated by both Akoni Pule Highway and other State-owned parcels, it will not be possible to develop an internal traffic circulation system within the entire development. Rather internal systems for each of the eight parcels must be developed, each with separate entry/exit points to the highway. Thus there will be added traffic impacts to this controlled access highway.

Implementation of the resort community may require the expansion of other government services such as schools, police and fire services in both North and South Kohala. In particular, fire services which are presently operating at minimum levels may be significantly affected. The existing Mauna Kea Hotel and residential areas of Puako and Waikoloa depend inpart on volunteer fire services. Moreover, the area from Mahukona through Puako is subject to occasional extensive brush fires during the dry summer month.

Other government agencies have not projected major increases in services.

C. Socio-economic: The General Plan Economic element notes for the North Kohala district that "Resort facilities compatible with the physical, social and economic goals for the residents of the district should be encouraged."

Although portions of the population of North Kohala have direct experience with the tourism industry through employment in the resort area in South Kohala and through visitor traffic in the communities, nevertheless the communities have been basically agricultural and rural in character.

Since the closure of the Kohala Sugar Company, the district of North Kohala has been undergoing a social and economic transition. The 1970 census listed the resident population at 3,326. Since 1975, however, there has been an outmigration of some residents through job transfers to other sugar companies on the island or through independent seeking of jobs elsewhere. At the same time, as is indicated by the population estimate in 1977 of 3,500, there has also been an immigration, some associated with new agriclutural enterprises which have been recently established or independent movements into the area.

There has been however, no survey or census of the extent, type or degree of this change in population. Thus, although it is anticipated that the introduction of a resort community of the scale being comtemplated will have significant impacts upon the North Kohala communities, it is not possible to determine whether these impacts will be perceived as beneficial or adverse. Nor is it possible to determine whether the type of resort community being proposed is compatible with the physical, social and economic goals of the residents.

Impacts to Agriculture: Although soils of the project area have been ranked as being severely limited for agricultural suitability and potential, nevertheless, implementation of the proposed resort

community would be a direct commitment to the loss of 1,045 acres of agriculturally classed lands. Indirect commitments of further loss of surrounding lands is also a potential impact.

Further, while the soil classification for agricultural suitability is poor, there is still the possibility that the lands may be used for agricultural operations not requiring native and in-situ planting media (such as potted plants and aquaculture).

Impact to the tourism industry: As all projections indicate continued growth in visitor arrivals, it is anticipated that substantial resort development will occur on the Big Island and more particularly in West Hawaii. With planned development being initiated within the three South Kohala coastal resorts, this sub-area is expected to absorb much of the resort plant expansion.

Further, the current General Plan Land Use Pattern Allocation Guide Map designates ten (10) intermediate and retreat resort areas along the West Hawaii coastline with potential for maximum of 22,500 hotel units plus related residential recreational facilities.

As the applicant's proposed resort community is small in comparison to on-going and planned developments along the South Kohala and Kona coasts, it is anticipated that the construction of the proposed development will not increase the overall magnitude of the resort market to the West Hawaii region. Rather, the primary and major impact will be a redistribution of the projected plants and market from existing and planned resort locations to a new resort destination area.

Further although the applicant has submitted a market analysis for visitor accommodations which projects the market conditions for the State, island and various sub-regions on the island, more recent data has become available and should be incorporated into an analysis of the overall impacts. Likewise, the projections, including the attendant parameters should be re-evaluated and adjusted if necessary, based on the more recent data.

Concomitant impacts related to the redistribution impact are also anticipated to be significant. These impacts may be identified as a redistribution of job opportunities, non-hotel visitor related services such as retail outlets, restaurants, labor force availibility, household formulation and residential settlement patterns.

Other impacts to the environment can also be identified. These however, though they may be generally assessed, nevertheless cannot specifically be addressed at this stage of the proposed development. Further refinements of the proposed project, in terms of parcel/site design and use, are necessary. It should be noted that there are other future review and evaluation opportunities through the sequence of permit requirements. At appropriate points, these impacts may again be addressed at a more specific level.

Still, an identification and general discussion of these impacts are warranted. These include, potential impacts to archaeological resources, coastal waters and shoreline resources, including public access to the shoreline, landforms, visual and aesthetic resources.

V. Determination:

Based upon the discussion included within the preceding section, it is determined that a full Environmental Impact Statement is warranted.

VI. EIS Informational Requirements:

In addition to the content requirements as outlined in Section 1:42 of the Environmental Quality Commission's Regulations and also as presented in the Environmental Assessment which was submitted as part of the General Plan application, the Environmental Impact Statement shall incorporate in detail the following descriptions, discussions and alternatives.

Land Use: The EIS shall describe the effects of the proposed resort community with its attendant and appropriate land use designations on the existing patterns in terms of both the State Land Use designations as well as the General Plan Land Use Pattern Allocation Guide Map designations. Effects to the State Land Use designations should include direct and indirect effects on the coastal Conservation lands, including that portion of Lapakahi State Historical Park; Agricultural Districts surrounding the parcels in question and the more distant Urban designations at Hawi and Kawaihae.

In terms of the General Plan Land Use designations, the EIS shall describe how the proposed uses shall service and impact existing and future uses of the surrounding area. Additionally, the EIS shall describe and compare and contrast the proposed resort community in relation to the General Plan goals and policies for a retreat or small-scale resort in the North-Kohala community. This discussion/comparison shall be done in terms of density, acreage, maximum number of hotel units, the overall intent and objective and location. In particular the EIS shall also discuss the effects of the proposed resort designation on the existing General Plan Land Use Pattern Allocation Guide Map Resort designation at Mahukona.

In terms of the overall land use pattern, the EIS shall discuss the potential indirect effect of the proposed development of creating a linear Urban/Resort designation along the coast of Kohala from Mahukona to Anaehoomalu, as opposed to a centralized pattern within the South Kohala coastal area.

In terms of the General Plan policies, although the Environmental Assessment identified some of the General Plan policies, nevertheless, the EIS shall discuss and consider the proposed resort community against all elements of the General Plan.

Infrastructure: The EIS shall describe the sewage treatment system which would be required for the proposed community. The description shall include the type, size (capacity) and general location of the system; whether one will be centralized for the entire development or whether individual parcels will be serviced by separate units. Additionally, the effects of the sewage treatment effluent (if any) on coastal and ground water resources shall be discussed. In particular, effects to the proposed marine sanctuary at Keaweula Bay and the existing Lapakahi Marine Sanctuary shall be considered.

Effects to the overall transportation network should be described, including effects to airport facilities at Keahole, Waimea and Upolu; harbor facilities at Kawaihae; and to ground transportation systems between these facilities and the project site. The EIS should also contain a description of a proposed internal traffic circulation system and possible alternatives. Impacts of this system to the traffic conditions on the Akoni Pule Highway shall be discussed.

As there is no municipal water system presently serving the area, the EIS shall discuss various alternatives for the provision of water. This discussion should also include a description of potential impacts (if any) to existing water systems in terms of capacity and potential competitive uses. If known, other direct impacts to the environment should be discussed in terms of source location and pipeline systems. These should include impacts to landforms, endangered species and archaeological sites.

The EIS shall discuss impacts of the proposed resort community on governmental services and facilities in both North and South Kohala, in particular for police and fire services. The discussion should also prepare mitigation measures to these impacts.

Socio-economic: In describing the impacts of the proposed resort community in the North and South Kohala communities, and more specifically the North Kohala community, the EIS shall describe the proposed resort community in terms of its overall development and marketing concepts, anticipated market areas for the sales of condominiums and houselots, estimated prices of condominiums and houselots, and whether there will be provisions for employee housing within the project area.

As there are indications of changes within the socio-economic fabric of both North and South Kohala, the EIS should attempt to document the extent, type and degree of these changes. Moreover it should attempt to identify the goals and perceptions of these Kohala communities with respect to resort development in general and specifically with relation to the proposed resort community in scale and concept.

Agriculture: The EIS shall discuss both the direct and indirect impacts of the proposed development on agriculture, including the commitments of lands to non-agricultural use should the proposed project be implemented and considerations for non-traditional agricultural pursuits.

Tourism: Basing its information on an updated market analysis, the EIS shall discuss impacts to tourism and the resort industry by describing and comparing two alternate scenarios. The first shall represent the probable development pattern based on the existing General Plan Land Use Pattern Allocation Guide Map. The second, shall represent the probable pattern based on the existing General Plan with the addition of the proposed amendment.

As the primary impact of the proposed development is anticipated to be one of the redistribution of the market and resort plants, a comparison of the two alternatives will describe the net impact of the applicant's proposal. The alternatives shall include but not necessarily be limited to the following areas of discussion:

1. Resort plant: The distribution of visitor accommodations by major destination areas in West Hawaii shall be described along with the related implications for developing non-hotel based visitor services such as restaurants, shops and recreational activities. The distributions should then be evaluated as to their ability to provide for an array of visitor services and activities in convenient locations not only as project sites but also within the existing communities and thus their cumulative attractiveness to the visitor on both the individual and regional scales.
2. Job Generation: In addition to the overall estimation of resort-related and construction jobs created, the alternatives shall describe the locations at which these

jobs would occur over time. Particular attention shall be paid to job skill requirements in relation to the presumed skills of the resident labor force.

3. Labor force availability and net-migration: The distribution of resort job opportunities shall be reviewed against projected labor force availability to determine net-migration requirements, if any. Particular attention is to be paid to variations in inter-area, home to work commuting for the two scenarios.
4. Household formation and population: Based on the projected labor force requirements the extent and distribution of household formation and population change shall be projected. The projections should also be broken into assumed resident and migrant housing and population changes. Major infrastructural development which maybe needed in the various communities shall also be addressed.
5. Housing cost ability to pay: The overall housing market will be projected in relation to the household income distribution. These projections will be generally distributed over the region and indicative of the need, if any, for special housing programs by general location.

In addition, the total impacts attributable to the proposed will be presented.

The overall discussion should then present both the total impacts attributable to the proposed development as well isolate and identify the projected net impact of the proposed General Plan amendment.

Alternatives: The EIS shall discuss, but not necessarily be limited to, the following alternatives:

1. Development concepts, strategies and/or phasing should the State-owned parcels not be available for lease.
2. Variable hotel to condominium unit ratios, for example 1:0.5, 1:1, 2, 3, for the project area.
3. Delays in the development schedule.
4. Optional development concepts such as a minor resort, retreat resort, resorts which caters to special interests/markets such as a dive lodge or resort.

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
5th Floor Hawaii Bldg. 745 Fort Street Honolulu, HI 96813 Telephone (808) 521-5361 Telex (723)8732

DATE

_____
_____
_____

Dear _____:

I am in receipt of your letter dated _____ in which you request to be a consulted party during the preparation of the Mahukona Resort Development Environmental Impact Statement (EIS).

Enclosed for your review is a copy of the Environmental Assessment (EIS Preparation Notice), which was submitted to the Environmental Quality Commission by the Hawaii County Planning Department. If you have any comments or concerns after having reviewed the EIS Preparation Notice, please let me know. Thus, if there are issues that you would like addressed within the EIS, but which are not mentioned in the enclosed document, this is the time to let us know. This way, we will be able to consider your comments during the preparation of the Draft EIS.

I appreciate your interest in this project, and look forward to your input into the EIS process.

Sincerely,

Jan Staniszkis
Project Planner

JS/cmw

cc: Mr. Sidney Fuke, Director
Hawaii County Planning Dept.
Mr. Wellington Chu, Mahukona Properties

File #933-62

P. O. Box 3415
Honolulu, Hawaii 96801
April 16, 1980

Mr. Jan J. Staniszkis
Belt, Collins and Associates
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. Staniszkis:

I would like to be a consulting party to the Environmental Impact Statement being prepared by Belt, Collins and Associates for the resort community, North Kohala, Hawaii.

Thank you for the opportunity to comment.

Sincerely yours,

Glenn R. Bauer
Geologist

MAIL TO
HAROLD W. ADAMS
PRESIDENT - PUAKO COMM. ASSN.
158 PUAKO BEACH DR.
KAMUELA HI 96743
PH 882-7876

Public comment invited on Kohala resort plan

FILE #933-62

An Environmental Impact Statement on a proposed resort development in Mahukona, North Kohala, is now in the process of being prepared.

West Hawaii residents have until this Thursday (May 8) to mail in requests to be consulting parties in the preparation of this EIS. Requests must be postmarked on or before May 8.

Requests should be mailed to the project consultant, Belt, Collins & Associates at 745 Fort St., Honolulu, 96813, attn. Jan J. Staniszkis.

The property is located just south of the Lapakahi State Historical Park, both mauka and makai of the Mahukona-Kawaihae Road.

The 528-acre development plans, proposed by Mahukona Properties Ltd., includes a hotel, townhouses, single-family residences, a golf course, health spa, tennis courts, and racquetball courts.

IMIOLA CONGREGATIONAL CHURCH
United Church of Christ

Box 582
Kamuela, Hawaii 96743

Phone: 885-4987

12 April 1970

Belt, Collins & Associates
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. Jan. J. Staniszkis

I would like to be one of the consulted parties on the Environmental Impact Statement that you will be preparing for the Resort Community, North Kohala, Hawaii, Kahuku Properties, Ltd.

Thank you.

Sincerely,

Donald S. Daughtry

I would like to know more about the proposed development in Kohala and the EIS now being prepared

Ronald Costello
Box 746
KAPAAU, HI 96755

FILE# 933-62

X-20

Graciano Elarco, Jr
P.O. Box 170
Hawi, HI 96719

Mr. Stanioszkis

I have just read about your Mahukona Resort development for North Kohala, in the Kamehameha Times.

I have lived here all my life and have seen my good times and also my hard times.

Your project is just what Kohala needs to boost its economy and raise its standards of living. At one point I thought Kohala was dying, so I moved to Honolulu for four years, but Kohala is home for me and my family so here we are. I don't really know what an Environmental Impact Statement is all about, but if I can help you push this project to reality, with this letter or if I can help in any other way, let me know.

Good luck!!

Graciano Elarco, Jr

P.O. Box 671
Eugene, Kohala, Hawaii 96755
May 3, 1980

Belt Collins and Associates
745 Fort Street
Honolulu, Hawaii 96813

Attention: Mr. Jan J. Stanioszkis

Dear Sir:

I am interested in being consulted in the Environmental Impact Statement for the Mahukona (North Kohala, Hawaii) Project. Please inform me of its progress.

Sincerely,

V. Lani Eugenio

File # 933-62
JS

KOHALA EPISCOPAL MISSION

P. O. BOX 220
KAPAAU, HAWAII 96755

4-12-80

Mr Jan J. Staniszkis
Belt, Collins & Associates
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr Staniszkis:

In the latest issue of the EQC Bulletin, you are the contact person for the proposed resort community at Mahukona. Since I have served this mission for the past five years, I feel that I have some idea of what the people can cope with.

Accodringly, I hereby ask that my name be added to your list of consulting parties to this project while you are in the process of writing the EIS.

Faithfully yours,

Rev John A. Filler
Rev John A. Filler
Vicar

RECEIVED
APR 15 1980
BELT, COLLINS & ASSOCIATES

Environmental Law Center of the Pacific

250 South Hotel Street 2nd floor Auditorium Honolulu Hawaii 96813

April 13, 1980

Route to:	
Belt, R. M.	
Lyon, F. E.	
1 Belt, J. R.	JRB
Hirota, P.	
Beck, V. L.	
Ng, W.	
Vierra, J.	
Wallsteinstein, P.	
Cain, R.	
2 Haslett, M.	MH
Helber, I.	
3 Staniszkis	JS
HAO	
CAO	
File	Job #933-62

Belt, Collins and Associates
745 Fort Street
Honolulu, HI 96813

Dear Sirs

The Environmental Law Center of the Pacific would like to be a party, consulted pursuant to Environmental Quality Commission Regulation 1:41, to the preparation of the Environmental Impact Statement for Mahukona Properties, Ltd, proposed resort community in N Kohala, Hawaii.

Please send any assessment or other documents relied upon, or submitted to the Hawaii County Planning Department in determining an impact statement is necessary directly to me at P.O. Box 5097, Kailua Kona, HI 96740.

Malama ma loa

Timothy Fitzpatrick
President / ELC

808 533 7491

cc: Planning Dept
County of Hawaii
[illegible]

University of Hawaii at Hilo
CENTER FOR CONTINUING EDUCATION
AND COMMUNITY SERVICE

RECEIVED
MAY 8 1980
BELT, COLLINS & ASSOCIATES

Route to:
Bell, J. F.
Cole, P.
[illegible]
Staniszkis
Library
File Job #933-62

5/7/80

Belt,Collins and Associates
745 Fort St.
Honolulu,Hi. 96813

Dear Ms.Staniszkis:

The University of Hawaii Center for Continuing Education and Community Service,Kona Branch hereby requests to be a consulting party in the preperation of the EIA and EIS for the proposed development in North Kohala and Mahukona by Mahukona Property Ltd. Please send us the necessary information so we may activiely participate in this process.

Mahalo,

Robert L. Fultz
Community Service Coordinator

Box 156
Kealakekua,HI. 96750
~~HILO~~, HAWAII ~~96720~~ TEL: (808) 322-2151 ~~961-9555~~
An Equal Opportunity Employer

File# 933-62

May 7, 1980

Michael Gomes
PO Box 562
Kapaau, Hawaii
96755

Dear Jan Staniszkis,

I have recently become aware of your preparation work on the EIS of the proposed resort at Mahukona, Hawaii. As an interested citizen, and until May 8 Kohala Community Ass'n President I wish and our organization, by unanimous vote, wishes to be consulted during your preparation of this document.

Sincerely,

Michael G. Gomes

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MAY 1 1980
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Route to:
Bell, J. R.
Stanislzkis, J.
Library
File Job #933-62

Box 155
Hawi, Hawaii 96719
April 30, 1980

Belt, Collins and Associates
745 Fort Street
Honolulu, HI 96813

Gentlemen:

I would like to be a consultant on the Environmental Impact Statement for the Mahukona (North Kohala, Hawaii) Project.

I am somewhat concerned that the preliminary EIS may not reach this area in time to be given thoughtful consideration by myself and other persons. This has happened frequently in the Kona area due to slow-ups in the public library processing of these materials.

I would be grateful if you could ensure that 2 weeks time would be given to study the material before response is due; if you like, I would be happy to hand-deliver a copy to the Kohala Library and to the university office (Project Learn) in Kohala.

Thank you.

Sincerely,

Judith Graham

Judith Graham

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MAY 8 1980
BELT, COLLINS & ASSOCIATES

GRETCHEN GROVE
PO BOX 5[illegible]
KAPAAU, HI 96755

BELT, COLLINS & ASSOC.
745 FORT ST
HONOLULU, HI 96813

SIRS —

PLEASE INCLUDE MY NAME AS WANTING TO BE CONSULTED RE THE ENVIRONMENTAL IMPACT OF THE PROPOSED RESORT CONDO DEVELOPMENT IN NORTH KOHALA.

THANKS,

Gretchen Grove

Route to:
Bell, J. R.
Cain, R.
Hastert, M.
Helber, L.
Stanislzkis
Library File# 933-62

HAWAII PREPARATORY ACADEMY
KAMUELA, HAWAII 96743

Business Office

April 21, 1980

Belt, Collins & Associates
745 Fort Street
Honolulu, Hawaii 96813

Attention: Mr. Jan J. Staniszkis

Gentlemen:

Please send me a copy of the Environmental Impact Statement on the Resort Community, North Kohala, Hawaii, planned by the Mahukona Properties, Ltd./Planning Dept., County of Hawaii, as listed in the Environmental Quality Commission Bulletin dated April 8, 1980, Volume VI, No. 07.

Thank you.

Sincerely yours,

Will J. Hancock
Business Manager

WJH:gb

[illegible], 1980

Belt, Collins and Associates
745 Fort Street
Honolulu, Hawaii 96813

Attn: Mr. Jan J. Staniszkis

Dear Sir:

The Kohala Urban Projection Association requests to be a consulting party in regards to the planned development of the Mahukona Resort/Residential Development.

Thank you for your consideration.

Respectfully yours,

[illegible]
President, K.U.P.A.
P.O. Box [illegible]
Hawi, Hawaii 96719

Jardine Real Estate, Ltd
P. O. Box 696 Kamuela, Hawaii 96743 Ph. (808) 885-7434

BLA-File# 933-62

TO
Mr. Jan J. Staniszkis
Belt, Collins & Associates
745 Fort Street
Honolulu, Hawaii 96813

SUBJECT: E.I.S. Report DATE 4-24-80

I noticed in the E.O.C. Bulletin that your firm was doing an invironmental impact statement for a project in North Kohala for Mahukona Properties, Ltd. I was wondering if you would send me a copy of the report. I am very active in real estate in the area and belong to the Exchange Club of Waimea, an organization which is extemely active in community affairs in the Kohala area.

sincerely
SIGNED William Jardine

DATE: SIGNED

CASCADE® L1-C2374

X-26

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MAY 5 1980
BELT, COLLINS & ASSOCIATES

KOHALA COMMUNITY ASSOCIATION
P.O. Box 608 • Kapaau, Hawaii 96755

Route to:
L. Bell, J. R.
Cain, R.
Hastert, M.
Hatfield, L.
Kutsunai, A.
Panandrew T.
Van Horn, R.
White, P.
T. Staniszkis
Library
X File Job #933-62

May 1, 1980

Bell Collins and Associates
745 Fort St.
Honolulu, Hawaii 96813
Attn: Jan J. Staniszkis

Dear Sir,

At our recent Executive Board meeting, a discussion of the proposed Mahukona Development and it's current step to develop their Environmental Impact Statement, was held.

It was unanimously agreed upon that the Kohala Community Association take an active role in helping to develop and lending whatever assistance for the Environmental Impact Statement.

We would appreciate to be kept abreast of all information and new developments concerning this Proposed Development that you may have, and trust that we may enter a relationship that is concerned for the betterment and need of the entire community of North Kohala.

Sincerely,
Mary Kinoshita
Corresponding Secretary
Kohala Community Association

Dear Sirs

I WISH TO PUT ON THE ENVIRONMENTAL IMPACT BOARD FOR THE PUAKO BEACH RESORT IN THE WAIPIKANI AREA OF N. KOHALA ALSO THE REZONING OF N. KOHALA FROM AGRICULTURE TO MODERATE DENSITY HOUSING — RESORT.

THANKS

PETER KOBZEV
BOX 9
HAWI, HI
96719
889-6868

Dear Sirs:

I WISH TO BE CONSULTED RE THE ENVIRONMENTAL IMPACT STATEMENT for the RESORT COMMUNITY PLANNED FOR MAHUKONA, NORTH KOHALA, HAWAII.

Don Kilgore

FILE# 933-62

P.O. Box 416
Kapaau, Hawaii 96755
May 7, 1980

Belt, Collins and Associates
Honolulu, Hawaii 96813
Attn.: Mr. Jan Staniszkis

Dear Mr. Staniszkis,

I wish to be a consultant on the Environmental Impact Statement for the Mahukona (North Kohala, Hawaii) Project.

Among questions I have regarding this resort development is this: exactly how do the developers plan to dispose of the dry waste and the sewage?

Thank you
Joseph R. Laszlo

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MAY 9 1980
BELT, COLLINS & ASSOCIATES

P.O. Box 416
Kapaau, Hawaii 96755
May 7, 1980

RECEIVED
MAY 8 1980
BELT, COLLINS & ASSOCIATES

Belt, Collins and Associates
Honolulu, Hawaii 96813
Attn.: Mr. Jan Staniszkis

Dear Mr. Staniszkis,

I wish to be a consultant on the Environmental Impact Statement for the Mahukona (North Kohala, Hawaii) Project.

Among questions I have regarding this resort development are:

1) who exactly are the developers for this project; where is the money coming from?

2) what plans have the developers made for fire and police protection in their area? At present, our police department is strained and our fire protection relies on volunteers. What happens with the new development?

Thank you,
Eleanor Laszlo

PO Box 703
Ko[illegible] Hawaii 96755
May 1, 1980

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MAY 5 1980
BELT, COLLINS & ASSOCIATES

Belt, Collins and Associates
Dear Sirs:

Please include me as a consultant on the Environmental Impact Statement for Mahukona. My husband John wishes to be one too. This is very important to us for we love our community. Thank you.

[illegible] Moreno

Route to:
x Belt, J. P. [initials]
Cris, R.
Hamil, A.
McTyre, L.
Kotomai, A.
Pacandrew, T.
Van Horn, R.
White, P.
x Staniszkis [initials]
Library
[X] File Job # 933-62

File# 93562

Charles R. Morin, M. D.

Frances Woollard, R. N.

KOHALA HEALTH CENTER
P. O. BOX 440
KAPAAU, HAWAII 96755

April 14, 1980

Belt, Collins & Assoc.
Honolulu, Hawaii

Dear Mr. Jan Staniszkis:

This is in reference to the Environmental Impact Statement for the proposed Mahukona Project in North Kohala.

In the Enveironmental Quality Commission Bulletin, April 8, 1980, Vol. VI, # 07, the development is described and it states that requests can be made to be consulting parties within 30 days.

I request to be a consulting party in the preparation of the E.I.S. for the Mahukona development.

Sincerely,

Charles Morin

Charles Morin, M.D.

May 8, 1980

Dear Sirs:

We are requesting to be consulting parties in the preparation of the EIS on a proposed resort development in Mahukona, North Kohala.

RECEIVED
MAY 9 1980
BELT, COLLINS & ASSOCIATES

Mahalo,

NA ALA HELE
P.O. BOX 1628
Kealakekua, Hi. 96750
Ph: 324-1759

File# 93362

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
OFFICE OF THE GOVERNOR
550 HALEKAUWILA ST
ROOM 301
HONOLULU HAWAII 96813

RECEIVED
APR 30 1980
RICHARD O'CONNELL
BELT, COLLINS & ASSOCIATES
TELEPHONE NO
548-6915

Route to:
Bell, J. R.
Cain, R.
Hastert, M.
Helber, I.
Kutsunai, A.
Papandrew, T.
Van Horn, R.
White, P.
J. Staniszkis
Library
File Job # 79362

April 25, 1980

Mr. Jan Staniszkis
Belt, Collins & Associates
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. Staniszkis,

We wish to be a consulted party in the preparation of the EIS for the Resort Community, North Kohala. Please provide us with a copy of the EIS Preparation Notice for our review and comment.

Your assistance in this matter is appreciated.

Sincerely,

Richard L. O'Connell
Director

cc: Planning Dept. County of Hawaii

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APR 30 1980
BELT, COLLINS & ASSOCIATES

Paulette T. Playford
P.O. Box 107
Hawi, Hawaii 96719

Route to:
Bell, J. R.
Cain, R.
Hastert, M.
Helber, I.
Kutsunai, A.
Papandrew, T.
Van Horn, R.
White, P.
J. Staniszkis
Library
File Job # 79362

April 25, 1980

Mr. Jan J. Staniszkis
Belt, Collins and Associates
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. Staniszkis:

After reading the April 25, 1980 issue of The Kamehameha Times regarding the Mahukona Resort Development, I am writing to let you know that I am very much interested in becoming a consultant on the Environmental Impact Statement for the Mahukona (North Kohala, Hawaii) Project.

Thank you for your attention in this matter.

Sincerely,

Paulette T. Playford

Paulette T. Playford

BELT, COLLINS & Assoc.
745 Fort St.
Honolulu, 96813
ATTN: JAN J. STANISZKIS

I WANT TO BE A CONSULTANT ON THE MAHUKONA ENVIRONMENTAL IMPACT STATEMENT.

THANK YOU

DAVID Rotstein
PO Box 784
KAPAAU, HI. 96755

WEST HAWAII today

JAN J. STANISZKIS
BELT, COLLINS & ASSOCIATES
745 FORT ST.
HONOLULU, HI. 96813

MR. STANISZKIS:

WEST HAWAII TODAY NEWSPAPER, LOCATED IN KAILUA-KONA ON THE BIG ISLAND, WOULD LIKE TO BE LISTED AS A CONSULTING PARTY IN THE PREPARATION OF THE ENVIRONMENTAL IMPACT STATEMENT FOR THE MAHUKONA PROPERTIES LTD. RESORT COMMUNITY, NORTH KOHALA.

ALL CORRESPONDANCE CAN BE DIRECTED TO: WEST HAWAII TODAY, C/O SHARON SAKAI, P.O. BOX 789, KAILUA, 96740.

THANK YOU VERY MUCH.

SINCERELY,

Sharon L. Sakai
WHT STAFF REPORTER

P.O. Box 789 • Kailua-Kona, Hawaii 96740 • 808-329-9311
A member of the Donrey Media Group

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BELT, COLLINS & ASSOCIATES

REAL ESTATE WORKS
HAWAII, INC.

Route to:
Belt, J. R.
Cain, R.
Haskett, M.
Hallam, L.
Kutsunai, A.
Pagenkopf, T.
Van Horn, C.
Wilkie, P.
I Staniszkis JS
Library
File Job #733-62

May 7, 1980

Belt Collins & Associates
745 Fort St.
Honolulu, Hi. 96820

Attn: Jan J. Staniszkis

I would like to be a consulting party in the preparation of the EIS for the proposed Mahu Kona Development.

Sincerely,

REAL ESTATE WORKS HAWAII, INC.

Wendy Van Vechten

Wendy Van Vechten
Realtor Associate

ga

76-5722 Kuakini Highway Kuakini Tower Suites 203 & 204 Kailua-Kona, Hawaii 96740 (808) 329-6488

X-32

NDALWOOD PROPERTIES, a di sion of
Box 200, Hawi, Hi. 96719

Iliahi Reforestation Society • Box 4964, Kamuela, Hawaii 96743 (808) 889-6832
(808)889-5161

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MAY 9 1980
BELT, COLLINS & ASSOCIATES

May 5, 1980

Belt, Collins and Associates
745 Fort St.
Honolulu, Hawaii 96813

Attention: Mr. Jan J. Staniszkis

Dear Mr. Staniszkis,

In regards to the proposed actions to require environmental impact statements on the RESORT COMMUNITY, NORTH KOHALA, HAWAII, MAHUKONA PROPERTIES, LTD./PLANNING DEPT., COUNTY OF HAWAII, I would like to be consulted in these matters. I live just above said Resort, and also have my real estate business here in Hawi, Hawaii, just 6 miles from the proposed Resort.

Please send me any information and determination in the preparation of the EIS. I would like very much to be a consultant in this matter.

Mahalo pumehana,

Chela Wakefield

Chela M. Wakefield, R.
Sandalwood Properties and Iliahi Reforestation

Route to:
Belt, J. R.
Cain, R.
Haskett, M.
Hallam, L.
Kutsunai, A.
Pagenkopf, T.
Van Horn, C.
Wilkie, P.
I Staniszkis JS
Library
File Job #733-62

SANDALWOOD
PROPERTIES
CHELA M. WAKEFIELD, GRI
REALTOR
Bus. 889-5161
Res. 889-6832

Kohala Corp. Bldg., P.O. Box 200 Hawi, Hi. 96743

BELT, COLLINS AND ASSOCIATES
514 HAWAII BUILDING
HONOLULU, HAWAII 96813

RECEIVED
JUN 10 1980
BELT, COLLINS & ASSOCIATES

JUNE 9, 1980

YOUR PROPOSED HOUSING AND RESORT DEVELOPMENT; IS A DEVELOPMENT THAT WILL CREATE ALOT OF JOBS; ONE QUESTION - WHERE FROM will this new population of people migrate from?

IN my OPINION before such A CONSTRUCTION DEVELOPEMENT CAN be STARTED., THE SECURING OF sufficient WATER SOURCES by MEANS OF PRESERVATION AND CONSERVATION planning OF All OF NORTH KOHALA; This MEANS the PROTECTIONS OF TREES; FOR WATER shed purposes; building OF DAMS to STORE Rain and SPRING WATERS.

SECONDLY; THE ESTABLISHING OF ADEQUATE FARMING - Crops INCREASE AND TO WORK TOWARDS THE STATE OF HAWAII to BECOME SELF-SUSTAIN AS TO FOOD COMMODITY. THERE is sufficient Geological FARMABLE LAND IN NORTH KOHALA THAT will PRODUCE the NEEDS OF THE people OF STATE OF HAWAII. With the implementation OF PROPER TECHNIQUES THE WIND FACTOR CAN BE OVERCOME.

ESTABLISHING AND SECURING OF WATER SOURCES; FARM PRODUCTION FIRST; THAN plans to RELOCATED Wildlife; VEGETATION AND TREES IN THE AREA PLANNED FOR Housing AND RESORT. Following this GENERAL PLAN Will MEAN PROPER CARE AND PLANNING OF THIS LAND WE LIVE ON.

COPY:

SINCERELY
GLENN YAMASAKI

RECEIVED
MAY 7 1980
BELT, COLLINS & ASSOCIATES

Sunshine Hardware
BUILDING SUPPLIES
P. O. Box 144 Kapaau, Hawaii 96755

May 5, 1980

Belt & Collins Assoc

Gentlemen -

I wish to be a consultant for the EIS regarding the Mahukona (North Kohala, Hawaii) Project. You may contact me at my business phone 889-5371 or home phone 887-5686 for an appointment.

Mahalo

Doug Klemmer

455-62

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MAY 23 1980
BELT, COLLINS & ASSOCIATES

Route to:
Staniszkis
Library
File Job #

BROCK AND ASSOCIATES
SURVEYORS · ENGINEERS

48 MARKET STREET
WAILUKU, MAUI, HAWAII 96793
TELEPHONE [808] 244 7464

FILE: 7000
May 22, 1980

Mr. Jan J. Staniszkis
Belt, Collins, and Associates
745 Fort St.
Honolulu, Oahu, Hi. 96813

Dear Mr. Staniszkis,

On April 29, 1980 I sent you a letter asking if it would be convenient for your firm to mail us a copy of your Environmental Impact Statement entitled Resort Community, North Kohala, Hawaii. I presume my letter was accidently waylaid somewhere. We would be happy to pay any costs you incur in sending this document, or if you find it preferable, obtain the document through the Environmental Quality Commission. Thank you.

Very truly yours,
BROCK AND ASSOCIATES

Julie R. Abramson

Julie R. Abramson
Planner

June 6, 1980

Ms. Julie R. Abramson
Brock and Associates
48 Market Street
Wailuku, Maui, Hawaii 96793

Dear Ms. Abramson:

Per your request, I am enclosing a copy of the Mahukona Environmental Assessment/Preparation Notice.

We will forward to you the Draft EIS when it is completed. Should you have any questions or need any further assistance, please do not hesitate to contact me.

Sincerely yours,

Jan Staniszkis
Project Planner

JS/cmw

enclosure

MAY 30 1980
BELT, COLLINS & ASSOCIATES

na Ala Hele
P.O. Box 1628
Kealakekua, HI. 96750
May 28, 1980

Jan Staniszkis
Belt, Collins & Associates
514 Hawaii Bldg.
745 Fort St.
Hon. HI. 96813

Dear Jan Staniszkis:

The following issues should be addressed in the Mahukona Resort Development Environmental Impact Statement (EIS):

1. What effect would this Mahukona development have on hotel occupancy rates which have shown a decline as the supply of hotel rooms increases for Hawaii Island?

2. The major resort areas at Anaeho'omalu and Kalahuipua'a (Kauna Loa Land Co.) are presently under construction. Twelve hotels and over six thousand condominium units have been approved for these resort developments. Their initial increments have not yet opened for business, and it is not known if these developments will themselves constitute an oversupply of hotel units for the Island. Will these developments further reduce occupancy rates by increasing the competition for tourist traffic which is on the decline? Is an ever increasing supply of hotel units in the interest of the Big Island's tourist industry?

3. In the Mahukona Properties and State land in question are shoreline jeep trails, used by residents regularly for many years. The public's right to use these jeep trails and any other traditional trails that may be on the affected lands needs to be addressed.

4. How would this totally new urban area affect the local business centers in North and South Kohala? Community input should be obtained to determine if this would be a desireable development to residents of North and South Kohala. Care must be given to the method of obtaining this input. In North Kohala the community association is usually not well attended and thus not representative of the majority of the community. It is recommended that a survey be used whereby participants are randomly selected and interviewed.

Other concerns have been briefly mentioned in the EIS Preparation Notice, and it is assumed that they will be analyzed further in the EIS: historic site preservation, cost of water and sewer development to be borne by the developer, the impact on presently strained government services and the plan to create an inland lagoon.

Mahalo for this opportunity to participate in the EIS process.

He ka pono,
Deborah Chang Abreu
President, NA ALA HELE

Enclosed please find a copy of a May 28, 1980 letter which addressed certain concerns regarding the proposed Mahukona Resort Development. In June we were informed by a long distance phone call from your husband (?) that we would receive a copy of the resulting EIS study. What is the present status of this EIS study? Can we assume that a copy will be mailed to us?

We appreciate your consideration of this matter.

RECEIVED
MAR 27 1981
BELT, COLLINS & ASSOCIATES

Deborah Chang Abreu, President
Na Ala Hele -Trails

X-35

March 30, 1981
81AJ-154

Deborah Chang Abreu, President
Na Ala Hele-Trails
P.O. Box 1628
Kealakekua, Hawaii 96750

Dear Ms. Abreu:

Mahukona Resort EIS

Your note of March 24, 1981 regarding the environmental impact statement being prepared by Belt, Collins & Associates for the proposed Mahukona Resort project just arrived on my desk. Jan Staniszkis, to whom your letter was addressed, has left Hawaii, and I have taken over responsibility for the EIS. Hopefully, I will be able to clarify a few matters that Mr. Staniszkis appears to have left hanging.

First, a draft of the EIS for the proposed resort project is nearly completed, and I expect it to be ready for in-house review shortly. If all goes well, the EIS will be ready for submission to the Environmental Quality Commission (EQC) within about six weeks. As you know, interested parties will have 30 days from the date that notification of the EIS's availability is published in the EQC Bulletin in which to submit comments.

The way the EIS Regulations are structured, all persons and organizations who have requested consulted party status do not automatically receive a copy of the document. Instead, 60 copies are submitted by the proponent to the EQC. It, in turn, distributes the copies to various government agencies, citizen groups, and public libraries. Unless NA ALA HELE is on the EQC distribution list, it is possible that you will have to read the copy of the EIS that is sent to your local library.

The questions raised in your original letter of May 28, 1980 are being addressed in the EIS to the extent possible with the available data. You should realize, however, that answers to some of the issues you have mentioned would require us to make value judgments that we believe are out of place in an EIS. On these you will still need to draw your conclusions.

Sincerely,

Perry J. White

PJW:ghs
cc: Sonny Chu

158 Puako Beach Dr.
Kamuela, Hi. 96743
May 14 1980

RECEIVED
MAY 22 1980
BELT, COLLINS & ASSOCIATES

Belt, Collins and Associates.
745 Fort St. Hono.Hi.96813

Attn:- Jan Staniszkis

Gentlemen:-

Thank you for the opportunity to comment on the E.I.S. for the Mahukona Resort Development. Our principal comments are as follows:-

1. We see no objection to resort development in this area. Pg.18 of the Environmental Assessment mentions a revision of the Land Use Pattern to change from a linear form along the coast to a semi-circular core around Kawaihae Harbor. This semi-circular pattern may be realistic for commercial development, but resort development is certainly more likely along the coast than inland from a commercial harbor.

2. Page 75 of the E.A. discusses the water system including possible impacts to existing water systems. Our experience along the West Coast is that the present systems are already badly overloaded in dry years. In the last few years 2 water emergencies have been declared, during which we were told that we could not water our lawns. In this area of 10" per year rainfall and hot sunny days, this means a dead lawn in a few weeks and much expense and many months to recover. Thus we believe that a water system that makes no drain on the present Waimea system or the Lalamilo wells is mandatory.

3. Page 74 of the E.A. asks for a study of the effects to the overall transportation network and impact to traffic conditions on the Akoni Pule Highway. We believe that the most critical highway problem, by far, is on the Kawaihae Road between Kawaihae and Waimea. There are only 2 outlets from the entire West Coast. The Southern route is used by traffic going around the island. Kawaihae Road is used for all other traffic, including Kona and Kohala residents going to Waimea, Honokaa, Hamakua, and Hilo, as well as round the island traffic. Kawaihae Road is even the preferred route for Kona residents visiting the Volcano area. At present, Kawaihae Road is highly dangerous even at it's present traffic level. In the past 5 years there have been 181 accidents with 143 injuries and 7 deaths on this 8 mile road. Since it is a steep, winding two lane road, carrying a great deal of slow truck traffic, the temptation to pass on uphill curves is great. There are many culverts without guard rails and single car accidents are common.

As a minimum, we feel that Kawaihae Road should be improved immediately, widened in critical spots, guard rails added, and turnouts provided at frequent intervals for trucks traveling uphill. The proposed by-pass highway appears to be several years in the future, and by that time there will be enough traffic for both roads, so the safety of Kawaihae Road will still be important. With the added traffic from the Sheraton Keikolon, Mauna Loa Land, the Mauna Kea addition and Mahukona Resort, This road will become intolerably dangerous.

Yours, Harold W. Adams Jr. V.P. Puako Community Assn.

X-36

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects

April 13, 1981
81AJ-180

Mr. Harold W. Adams
President, Puako Community Association
158 Puako Beach Road
Kamuela, Hawaii 96743

Dear Mr. Adams:

On May 14, 1980 you wrote to Mr. Jan Staniszkis of this office commenting on the environmental assessment for the proposed Mahukona Resort and identifying issues you believed should be discussed in the EIS for the project. Subsequently, Mr. Staniszkis moved to the mainland without having answered your letter. This oversight was discovered only today when we began final assembly of all the material that will be included in the EIS scheduled for publication next month. I hope you will forgive our delay in responding to your letter.

Urbanization Pattern

We concur with your observation that development stretched along the coastline is a more realistic pattern for resort development than is a semi-circular one around a commercial harbor. It should be noted, however, that the "alternate urban expansion" designation is not limited to resort use, and it could be that it was the County's intention to concentrate resort development in the coastal areas south of Kawaihae Harbor while permitting industrial, commercial, and, possibly, residential uses around and inland of the harbor.

Water System

Water impacts of the proposed resort will be discussed in the EIS. The Mahukona Resort will have its own water system and will not draw from the same source used to supply Puako. Some of the secondary growth generated by the resort, e.g., residences of resort workers, probably will be in Waimea or within the service area of the Lalamilo water system. However, the County has the power to control this development in such a way as to insure that the capacities of these water systems are not exceeded.

Transportation Effects

We recognize the hazards that exist on the Waimea-Kawaihae Road even with the present traffic volume. Increased traffic generated by the proposed Mahukona Resort would tend to increase the risk if no improvements were made. However, already-planned South Kohala resorts at Mauna Kea Beach, Anaeho'omalu

(Waikoloa Beach Resort), and Maka'iwa Bay (Mauna Lani Resort) will necessitate improvements to the roadway long before the effect of the Mahukona Resort is felt. As you know, responsibility for these improvements lies with the State rather than private developers. However, increased use of the road will probably result in a higher priority on the State's CIP Budget for the Waimea-Kawaihae Road project that has been in the talking stage for many years.

Thank you again for your letter concerning the proposed project. I look forward to any further comments you may wish to make once the EIS has been circulated.

Sincerely,

Perry J. White

PJW:ghs
cc: Wellington Chu

P. O. Box 3415
Honolulu, Hawaii 96801
May 15, 1980

Mr. Jan Staniszkis
Project Manager
Belt, Collins and Associates
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. Staniszkis:

Thank you for your letter of May 1, 1980, and for sending me a copy of the Environmental Assessment for the planned resort development near Lapakahi, North Kohala.

At this time I have only a few general comments concerning the Assessment. There are also several points in the Assessment which need detailed discussion in the EIS.

My comments are as follows:

Pages 3-5, IIA. Description of Affected Environment:

What is the area being discussed? Is it Kohala Mountain, or is it the districts of North and South Kohala? Part of the discussion found in pages 3-5 relates only to the North Kohala District and the Kohala Mountains. While other parts include South Kohala District and Mauna Kea. It is confusing. Therefore, will this project affect the environment all the way to Anaeho'omalu Bay?

On page 3, last paragraph, it states "...the geologically older Kohala Mountains have been eroded to form slopes ranging from 6% to 20%". Stream erosion incised gullies into the leeward slopes of the Kohala volcano, but the more viscous lava flows representing the younger Hawi Volcanic Series, dip at a greater angle than the older Pololu Volcanic Series, and therefore account for slopes of up to 20 per cent.

Page 5, B. The Project Site:

It should be mentioned in the third paragraph that the project site is partially situated below the 10-inch isohyet. In the EIS, there should be a very complete discussion of the climatology of the area, including pan evaporation and wind velocity/direction data. These data should be integrated into a section on the hydrologic cycle and a hydrologic water budget.

Page 6, Third Paragraph:

"The project does not fall within a tsunami inundation area..." Macdonald and Abbott (Volcanoes in the Sea, 1970, p. 258) indicate that during the April 1, 1946 tsunami, sea level rose 14 feet above normal at Mahukona and 12 feet above normal at Kawaihae.

Pages 24-25, B. Infrastructure:

In addition to the points stressed in the Assessment, several important factors should also be considered:

1) Sewage Treatment: If injection wells are considered, the EIS should address the problem of clogging. In a recent University of Hawaii study (Petty and Peterson, 1979, WRRC Technical Report 123), it was shown that all injection wells will eventually fail. Also, what effects, if any, would the injected effluent have on groundwater and ocean water if it discharges as coastal springs.

2) Water system: The EIS should investigate the hydrological effects and stresses on a thin basal lens if a water source is obtained in the vicinity of the project site. There should also be a complete discussion of the hydrologic cycle as it occurs west of the crest (northern rift zone) of the Kohala Mountains. This should include a detailed hydrologic budget of the mean annual precipitation with estimates of infiltration, evapotranspiration, and runoff. An estimate of sustainable yield for the area should then be assessed. In determining sustainable yield for groundwater development, the hydrologic parameters of transmissivity, storage volume, and area of the aquifer must be estimated from available data. Water quality and water levels (head) should be listed. There should be a detailed discussion of the subsurface geology and its relationship to the movement and behavior of groundwater. In other words, all geohydrologic data must be examined.

Sizing of the water system ought to show a breakdown of the calculations used to arrive at the quantities needed, and how the water will be distributed within the resort. The water system should show the number of wells that are needed and their capacities. This data must be based upon the hydrologic information presented.

If desalinization is considered, there should be an assessment of the energy requirements and the environmental impacts of brine disposal.

Pages 27-28, Alternatives:

I hope that the EIS will also consider the alternative of "no development." This alternative becomes viable if the project demands far exceed availability of resources.

Thank you for the opportunity to comment on this Assessment, and relay to you my concerns about the demands this project will place on the available groundwater supplies and the effects subsurface sewage disposal will have the remaining marginal groundwater resources.

Sincerely yours,

Glenn R. Bauer
Geologist

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April 13, 1981
81AJ-178

Mr. Glenn R. Bauer
P.O. Box 3415
Honolulu, Hawaii 96801

Dear Mr. Bauer:

EIS For the Proposed Mahukona Resort

On May 15, 1980 you wrote to Mr. Jan Staniszkis of this office commenting on the environmental assessment for the proposed Mahukona Resort and identifying issues you believed should be discussed in the EIS for the project. Subsequently, Mr. Staniszkis moved to the mainland without having answered your letter. This oversight was discovered only today when we began final assembly of all the material that will be included in the EIS scheduled for publication next month. I hope you will forgive our delay in responding to your letter.

Description of the Affected Environment

As indicated on the maps following page five of the Environmental Assessment, the Mahukona Resort site is in North Kohala. However, substantial secondary growth may occur in South Kohala as well. Your observation that the differences in slope are partly the result of differences in the viscosity of the Hawi and Polulu Volcanic Series is correct, and any statement regarding this matter will be clarified in the EIS.

The Project Site

It is our intent to provide information regarding the climatology and hydrology of the area necessary for an understanding of the significant impacts of the proposed resort project. Much of the data you appear to be interested in will be contained in the report. However, we believe that some of the items mentioned in your letter are not really relevant to a discussion of significant impacts, and this extraneous data will not be presented in the EIS.

Tsunami Inundation

Any parcel which abuts the ocean is subject to some inundation by tsunamis. Our statement that the proposed project does not fall within a tsunami inundation area is based on the fact that the coastline consists of a wave-cut cliff backed by sloping land. Because of this, the inland movement of water from a tsunami would be extremely limited. Mention of this fact will be included in the EIS.

Infrastructure

The EIS will contain a discussion of the effects of sewage treatment and disposal and of water withdrawals. The depth of information which will be presented will be limited because development plans are now at a conceptual stage and no detailed engineering studies have been undertaken.

Alternatives

The report will indeed evaluate the "Without Mahukona Resort" alternative. In fact, this alternative will be analyzed in parallel with the proposed resort project to provide a ready basis for comparison between the two.

Thank you for your comments. Once again, I apologize for the delay.

Sincerely,

Perry J. White

PJW:ghs
cc: Wellington Chu

933-62
do
File

GAMMAN AND ASSOCIATES
Trust Building 105 Soquel Avenue P.O. Box 914 Santa Cruz, CA 95061

June 3, 1980

Mr. Jan J. Staniszkis
Belt, Collins and Assoc.
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. Staniszkis:

I am a land owner on the island of Hawaii, and would like to be a consulted party for the EIS on the Resort Community, North Kohala, Hawaii, Mahukona Properties Ltd.

Very truly yours,

John K. Gamman

JKG:mdr

LAND USE PLANNING, AND ENVIRONMENTAL COUNSELING
408.426.0866

June 9, 1980

Mr. John K. Gamman
Gamman and Associates
Trust Building
105 Soquel Avenue
P.O. Box 914
Santa Cruz, California 95061

Dear Mr. Gamman:

I am in receipt of your letter, dated June 3, 1980 in which you request to be a consulted party for the Mahukona Resort EIS. While I appreciate your interest in this project, I am sorry to inform you that the deadline for requesting to be a consulted party for this EIS was May 9, 1980. Consequently, while I will certainly welcome any comments which you may have concerning this project, these will not be incorporated officially into the body of the EIS. I trust you will understand that it is not possible for me to make an exception at this stage of the EIS process. Once again, I will be glad to hear your concerns and will do my best to address these to the extent possible within the EIS.

Sincerely yours,

Jan Staniszkis
Project Planner

JS/cmm

Box 155
Hawi, HI 96719
May 27, 1980

Mr. Jan Staniszkis, Project Planner
Belt, Collins & Associates
514 Hawaii Building
745 Fort Street
Honolulu, HI 96813

Dear Mr. Staniszkis:

Thank you for your note of May 1 and a copy of the Environmental Assessment, prepared by the Hawaii County Planning Department, for one of several resort developments projected in the Mahukona area.

I am grateful for the opportunity to let Mahukona Properties know of my concerns at this early stage, but also look forward to participating in the EIS process at a later date.

The Environmental Assessment seems a fine one.

My further concerns as a resident of Kohala are as follows. I hope the EIS will address them.

1) Labor Immigration

The Environmental Impact Statements for nearby Boise Cascade and Mitsubishi projects (mentioned in the Assessment) both cover this subject, under the wording worker in-migration as I recall. Both their projects will require labor immigration; please consult the County Planning Department's revision of their submitted EIS figures, upped by several thousand in each case.

It is my understanding that these folks, coming ahead of the Mahukona Properties applicant, have spoken for all the available labor in the North and South Kohala and Waimea districts. This being the case, all employees of the Mahukona Properties development must be figured as labor immigration, or the other fellows' EIS's are invalidated. Would the Mahukona Properties EIS please address this issue.

2) Public Services for Introduced Population

The complete Mahukona Properties project, consisting of 1500 hotel units, 3,465 condominium apartments and 500-600 single family homes, will introduce a constant population of, conservatively, 8,000. This is about the population of North Kohala and Waimea combined, the main urban centers in the district. Therefore it would appear that services such as police, libraries, medical facilities, will have to be duplicated, although the wealthy elderly Caucasian population likely to purchase the condominiums may lower the school-needs figure. As the Assessment indicates, the EIS would discuss Mahukona Properties' provision for these services and not expect current resident taxpayers to bear the load for services not for themselves.

Specifically, I am interested in libraries. The current population of Waimea/Kohala is serviced by two libraries. My own experience of three years in the Kona area indicates that a relatively well-educated condominium-type population uses libraries heavily, is articulate in making its expectations felt, and dictates a different type of book purchasing than the local population. The staffs of the libraries are already "scrambling" and the county-wide system is seriously underfinanced. Can Mahukona Properties show that its introduced population will not divert staff attention and book purchases away from the needs of longtime local residents, and importantly, local children.

3) Co-option of the Last Resident-Oriented Boat Harbor in West Hawaii

There are three popular boat harbors in West Hawaii: Honokohau, Kawaihae and Mahukona. Resorts have been announced around the edges of Honokohau, which is located next the resort town of Kailua-Kona. Twelve hotels are scheduled in the vicinity of Kawaihae, and a large primarily Caucasian newcomer population is expected for some 6,000 condominium units already approved. At present, Mahukona is still a rural harbor popular for weekend outings by local, usually Japanese, Filipino and Hawaiian families and men.

Specifically, I am concerned that Japanese men will no longer be able to do recreational fishing on weekends out of West Hawaii because there are no longer boat harbors which have not been co-opted by wealthy introduced newcomer Caucasians who will intimidate them. I would like the EIS to address the psychological and sociological effects on Japanese men of this loss of their weekend recreation, and the effect on their families.

4) Water

I trust that the final EIS will give a specific plan for water provision, in addition to citing conflicts foreseeable for other uses of this same water. I would like to know if the diverted Kahena Ditch is intended for this resort. I had thought it was intended for nearby Hilton Head.

5) Developer on Nearby Land

The Assessment, thorough as it is, does not mention the real estate and resort plans of Hilton Head five minutes to the south. Hilton Head has acquired approximately 4,000 acres. This winter, Hilton Head advertised on the inside front cover of United Airlines' inflight magazine, announcing resort property for sale makai and estate land for sale mauka. It is my understanding that the EIS must cover adjacent land use. Therefore, would you ascertain the plans of Hilton Head and include them.

6) Good Cause for General Plan Amendment?

The Mahukona Properties project will entail a General Plan amendment. The General Plan was prepared by former County Planning Director Raymond Suefuji and won several prizes. Can Mahukona Properties show good cause why it should be amended and why there should be in effect now a major resort designation at Mahukona?

The General Plan has already given 1500-unit intermediate resort designation nearer Mahukona. This, as the Assessment says, still stands. Together, we have 3,000 hotel units, equivalent in volume to major resort.

7) Socioeconomic--Employee Housing

One point in the Assessment seems lenient to me, that is, that the EIS should include "whether there will be provisions for employee housing within the project area." I had thought that the issue was not whether, but exactly what employee housing will be provided. I hope that the County will insist upon this.

8) Ownership and Backing

I would like to see included in the EIS a statement of principal owners and board of directors of Mahukona Properties, as well as large financial backers whose interests may be being represented.

I ask this because the style of the resort plan--located so close to Lapakahi State Historical Park, and with its hope of leasing intervening State land for the recreational pursuits of guests--seems familiar to me.

Thank you.

Sincerely,

Judy Graham

Judy Graham

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April 13, 1981
81AJ-177

Ms. Judy Graham
Box 155
Hawi, Hawaii 96719

Dear Ms. Graham:

EIS for the Proposed Mahukona Resort

On May 15, 1980 you wrote to Mr. Jan Staniszkis of this office commenting on the environmental assessment for the proposed Mahukona Resort and identifying issues you believed should be discussed in the EIS for the project. Subsequently, Mr. Staniszkis moved to the mainland without having answered your letter. This oversight was discovered only today when we began final assembly of all the material that will be included in the EIS scheduled for publication next month. I hope you will forgive our delay in responding to your letter.

Labor Immigration

The proposed Mahukona Resort will add to the amount of in-migration already projected as the result of the various South Kohala resort projects that are now planned. The magnitude of the increase, together with its qualitative implications, will be discussed in the EIS.

Public Services

The Mahukona Resort project will increase the resident population of the North/South Kohala area. The impact that this will have on the need for public services will be discussed in the EIS. However, the way in which the Sate and County will respond to the increase--in terms of both staff and facilities--cannot be determined at this time. Hence, it will not be possible to provide the kind of guarantee you have requested.

Co-Option of Mahukona Harbor

The proposed Mahukona Resort is not situated at Mahukona Harbor. Rather it is several miles farther south. Hence, the comparison to Honokahau and Keahou is inappropriate. However, some effect on recreational activities is expected, and this topic will be discussed in the EIS.

Water

The EIS will outline the plans that have been made for the provision of water. While these plans are not definitive, they are indicative of the course of action which will almost certainly be followed. At present they do not include use of any water from the Kehena Ditch.

Principals and Associates: James R. Bell, Paul M. Hirota, Frank E. Lyon, Jr., Raymond F. Cain, Paul P. Waltrabenstein, Jr., Joseph Vierra, Jr., Gordon W. Bradley, Verden L. Beck, Richard S. Abe, Lawrence S. Agena, Allen S.C. Chu, Donald H. Chang, Clifford E. Hansen, Edward H. Iida, Farid Kamal, Alan Y. Kutsunai, Michael J. Lemewelber, Thomas F. Nance, Thomas P. Papandrew, Perry J. White

Nearby Development

In assessing the impacts of the proposed Mahukona Resort project, the EIS will take into consideration other developments that are also planned. At present, Hilton Head does not have concrete plans for resort use, although it is actively pursuing the development of large agricultural lots on its mauka lands.

Cause for General Plan Amendment

In order to obtain an amendment to the General Plan, Mahukona Properties will have to justify the project in terms of the General Plan. It is not the purpose of an EIS to put forward an argument for or against the amendment, but the subject of the project's consistency with the General Plan will be discussed.

Socioeconomic-Employee Housing

The County General Plan calls for an analysis of employee housing need before final plan approval is given for a specific resort project. Employee housing requirements vary from project to project, and the requirement for the analysis is designed to insure that these variations are taken into account in the conditions that are attached to plan approvals that are given for specific resort facilities. The General Plan does not stipulate any minimum level of housing that must be provided, and it does not require that it be on the resort site.

Ownership and Backing

Mahukona Properties, Inc., the owners of the subject property and developer of the resort, is a limited partnership. Kehena Beach, Inc. is the general partner. The officers of the corporation are: Mr. Munon Chun, President; Mr. Wellington Chu, Vice-President; Patrick Chun, Vice-President; Mr. Wendell Pang, Secretary; and Mr. Jerold Chun, Treasurer. The company is registered with the State of Hawaii Department of Regulatory Agencies, and further information is available from that source.

Sincerely,

Perry J. White

PJW:ghs
attachment
cc: Wellington Chu

X-44

Wendy Van Vechten (RA)
Res. 883-9323

REAL ESTATE WORKS
HAWAII, INC.

75-5722 Kuakini Highway
Kailua-Kona, Hawaii 96740

Kuakini Tower Suites 203 & 204
(808) 329 6488

Wendy Van Vechten
P.O. Box 3123 WVS
Kamuela, HI 96743

May 21, 1980

Mr. Sidney Fuke
Planning Department
25 Aupuni Street
Hilo, HI 96720

Dear Mr. Fuke:

In the Mahukona Resort Development Environmental impact statement I received May 19th, there is a statement that "the Big Islands' share of the tourism market has shown a decline over recent years". I realize that the number of visitors has increased despite these figures, but I am curious where this developer expects his market to come from.

With the rapid growth of Kona and South Kohala, without any apparent rise in visitors, I would like to see along with this statement, a break-down of who will be using this facility and where they are from.

Sincerely,

Wendy Van Vechten

Wendy Van Vechten

ga

X-45

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April 13, 1981
81AJ-179

Ms. Wendy Van Vechten
P.O. Box 3123 WVS
Kamuela, Hawaii 96743

Dear Ms. Van Vechten:

Mahukona Resort EIS

On May 21, 1980 you wrote to Mr. Sidney Fuke of the Hawaii County Planning Department commenting on the environmental assessment prepared for the proposed Mahukona Resort project in North Kohala. A copy of that letter was forwarded to Belt, Collins and Associates because we are preparing the environmental impact statement for the project. However, due to a change in the project manager of the study, your letter was never answered. This oversight was discovered only today when we began final assembly of all the material that will be included in the Environmental Impact Statement (EIS) for the resort that is scheduled for publication next month. I hope you will forgive our delay in responding.

Your letter expresses concern over the market viability of resort development in Kohala, particularly at Mahukona. Specific reference is made to "...the rapid growth of Kona and South Kohala, without any gain in visitors." As I am sure you realize, Mahukona Properties, the developer of the proposed resort, has more than an academic interest in its marketability. It is simply not in its interest to develop facilities for which there will be no demand. Because of this, the market research firm of Hastings, Martin, Hallstrom and Chew, Ltd. was engaged to conduct a market analysis for the project. Results of their study indicate that sufficient demand is present to support the proposed Mahukona Resort as well as other planned South Kohala resorts. It should be noted that their projections of visitor activity are consistent with those developed by the State of Hawaii Department of Planning and Economic Development and used as the basis for the State Plan and the Hawaii State Functional Plans. A summary of the market study findings will be presented in the EIS.

Sincerely,

Perry J. White

PJW:ghs
cc: Wellington Chu

chapter eleven

CHAPTER XI
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chapter twelve

CHAPTER XII
COMMENTS AND RESPONSES REGARDING THE ENVIRONMENTAL IMPACT STATEMENT

The Environmental Impact Statement (EIS) for the Mahukona Resort project was submitted to the Environmental Quality Commission on June 22, 1981. Letters commenting on the EIS were received from the agencies, organizations and individuals listed below. Their comment letters and the responses to these are reproduced on the following pages.

Federal Agencies

State Agencies

County of Hawaii Agencies

Organizations

Individuals

DEPARTMENT OF THE AIR FORCE

DEEV (Mr Shiroma, 449-1831)

27 JUL 1981

Draft EIS, Mahukona Resort, North Kohala, Hawaii

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

1. This office has reviewed the subject EIS and has no comment to render relative to the proposed project.

2. We greatly appreciate your cooperative efforts in keeping the Air Force apprised of your project and thank you for the opportunity to review the document.

WILLIAM T. MORIOKA
Chief, Engrg & Envmtl Plng Div
Directorate of Civil Engineering

Cy to: Mahukona Properties
c/o Belt, Collins & Associates
745 Fort Street, Suite 514
Honolulu HI 96813

XII-3

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
5th Floor Hawaii Bldg. 745 Fort Street Honolulu HI 96813 Telephone (808) 521 5361 Telex (723)8732

August 12, 1981
81AJ-440

Mr. William T. Morioka, Chief
Engineering & Environmental Planning Division
Directorate of Civil Enginering
Department of the Air Force
Headquarters 15th Air Base Wing (PACAF)
Hickam Air Force Base, Hawaii 96853

Dear Mr. Morioka:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 27, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We understand you have no comments to offer. Thank you for the time spent by you and your staff reviewing the EIS.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858

PODED-PV

17 July 1981

Mr. Sidney M. Fuke
Director, Planning Department
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

Dear Mr. Fuke:

Thank you for the opportunity to review the Environmental Impact Statement (EIS) for the Mahukona Resort. Based on this review, we provide the following comments:

a. From the information provided, it cannot be determined whether there will be activities in the waters of the United States which will require a Department of the Army Permit.

b. Based on the preliminary federal Flood Insurance Study for the Island of Hawaii, the proposed Mahukona Resort site is not situated within any designated flood plain. The area is designated Zone C, or minimal flooding area.

Sincerely,

KISUK CHEUNG
Chief, Engineering Division

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects

August 27, 1981
81AC-1442

Mr. Kisuk Cheung
Chief, Engineer Division
Department of the Army
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

Environmental Impact Statement for the Proposed Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 17, 1981 to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We appreciate the time you and your staff spent reviewing the EIS and preparing your comments.

At this time no development or other activities are planned in ocean waters which would require a Department of the Army permit. Should this change, application would be made for such a permit.

Thank you again for your comments. Should you desire any additional information, please call me at 521-5361.

Sincerely,

Perry J. White

PJW:gba

cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
FORT SHAFTER, HAWAII 96858

RECEIVED
JUN 29 1981
BELT, COLLINS & ASSOCIATES

[illegible]

26 JUN 1981

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Gentlemen:

The Environmental Impact Statement (EIS) for the Proposed Mahukona Resort, North Kohala, Hawaii has been reviewed and we have no comments to offer. No Army installations or activities will be adversely affected by the proposed project.

Thank you for providing us the opportunity to comment on the EIS.

Sincerely,

Original signed by

RAY H. JYO
Acting Director of Engineering and Housing

Copy Furnished:
Mahukona Properties
c/o Belt, Collins and Associates
745 Fort Street, Suite 51
Honolulu, Hawaii 96813

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
5th Floor Hawaii Bldg. 745 Fort Street Honolulu, HI 96813 Telephone (808) 521-5361 Telex (7236732

August 12, 1981
81AJ-444

Mr. Ray H. Jyo
Acting Director of Engineering
and Housing
Department of the Army
Headquarters USASCH
Fort Shafter, Hawaii 96858

Dear Mr. Jyo:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your June 26, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We understand you have no comments to offer. Thank you for the time spent by you and your staff reviewing the EIS.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

HEADQUARTERS
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR HAWAII 96860

RECEIVED
JUL 1 - 1981
BELT, COLLINS & ASSOCIATES
IN REPLY REFER TO:

002A:amn
Ser 1211

30 JUN 1981

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Gentlemen:

Environmental Impact Statement
Mahukona Resort

The Environmental Impact Statement for the proposed Mahukona Resort, forwarded by the Environmental Quality Commission, has been reviewed and the Navy has no comments to offer. By copy of this letter, per the Commission's request, the subject EIS is being returned.

The opportunity to review the subject EIS is appreciated.

Sincerely,

R. D. EBER
CAPTAIN, CEC, U.S. NAVY
FACILITIES ENGINEER
BY DIRECTION OF THE COMMANDER

Copy to:
Makukona Properties
c/o Belt, Collins & Associates
745 Fort Street, Suite 514
Honolulu, HI 96813
State EQC (w/EIS)

XII-6

Belt, Collins & Associates
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5th Floor Harrison Bldg. 745 Fort Street Honolulu, HI 96813 Telephone (808) 523-5361 Telex (723) 8732

August 12, 1981
81AJ-446

Captain R.D. Eber
Facilities Engineer
Headquarters, Naval Base Pearl Harbor
Box 110
Pearl Harbor, Hawaii 96860

Dear Captain Eber:

Environmental Impact Statement for the Proposed Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your June 30, 1981 (reference no. 002A:amn Ser 1211) letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We understand you have no comments to offer. Thank you for the time spent by you and your staff reviewing the EIS.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

cc: Mahukona Properties

United States Department of Agriculture
Soil Conservation Service
P. O. Box 50004
Honolulu, Hawaii
96850

July 16, 1981

Mr. Sidney Fuke
Director, Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Fuke:

Subject: Environmental Impact Statement for Mahukona Resort
North Kohala, Hawaii

The above-mentioned document was sent to us for review and comment by the Hawaii State Environmental Quality Commission. As requested by the Commission, the following comments are submitted for your consideration:

General Comments:

The preface of the environmental impact statement states that the development plans at this time are extremely conceptual and that no site plan has been developed nor onsite engineering studies performed. As a result, it is difficult to assess or evaluate the potential effects of this proposal.

There are many potential problems associated with this proposal from a soil erosion, sedimentation, and water quality standpoint.

Without engineering studies to verify that there is a reliable source of water available, there is no way to insure that wind and water erosion problems can adequately be dealt with. A previous development in the same general area resulted in severe wind erosion problems because of inadequate water supply. A detailed onsite study will assist in predicting accurately what problems may evolve and in formulating solutions for them.

As stated in the EIS, the major soil in the area is Kawaihae very fine sandy loam. Specifically, this soil is classified as extremely stony very fine sandy loam. Because of the shallow depth to bedrock and the numerous large stones on the surface and in the profile; it has severe limitations for the following uses: septic absorption, sewerage lagoons, shallow excavation, lawns and landscaping, roads, reservoirs, and embankments. Grading and construction operations under these conditions will be difficult.

SCS-AS-1
10-79

Due to the low strength of the soil, buildings will need extensive footings. Roads will be more expensive to build and maintain. Sewerage lagoons and ponds will need to be lined. The soil takes water well, but it has a low moisture-holding capacity; therefore, irrigation systems will need to be designed for low volume, frequent water applications.

Specific problems that should be addressed:

I-2 - The soil is very susceptible to wind erosion. No shaping or grading should be started until a water system is developed and installed so disturbed areas can be sprinkled during shaping and re-establishment of vegetation. The area cannot be revegetated without irrigation; therefore, the irrigation system and water source should be included in the first increments of the development.

The natural drainageways must be maintained to carry runoff water from the mauka areas, and outlets must be established to safely carry storm-water runoff from the site and into gulches.

V-16 & 17 - The vegetative cover list does not mention buffelgrass which is one of the major ground cover species present on the site.

V-23 - This section notes that the existing vegetation on the site is xerophytic. However, it does not point out that the plants to be established are mesophytic (require more water). As previously stated, the existence of a reliable water source has not been established.

V-33 - The recognition of the pristine and diverse conditions of the Mahukona Reef Community in this section should also indicate the very real potential for degradation of the reef community.

The use of "normal precautions" during grading and site preparation will not necessarily protect water quality; specific erosion control measures will need to be utilized. Because of the previously mentioned soil problems and water supply uncertainty, adequate erosion control will be difficult. More specific attention should be directed toward the possibility of sewage injected into wells, finding its way into the reef community area.

V-64 - Introduction - It is recognized that storm runoff will be increased as a result of the proposed development. The capability of existing drainageways to tolerate the increased runoff without causing erosion and sedimentation in the ocean needs to be addressed.

V-64 - Water Supply - There are no known potable water wells in the area that have been pumped to determine their sustained yield. This type of information is essential to ascertain the feasibility of the project.

The other alternative mentioned is to tap the Kokoiki well field close to Hawi. The Hawi area is rapidly developing into small agricultural lots. There is increased demand for both irrigation and potable water. The Kohala Ditch which supplies most of the irrigation water is in poor

Mr. Sidney Fuke 3

repair. At present there are times when little or no water is available from this source. To make agricultural units feasible, a dependable water supply is needed.

V-67 - Drainage Structures - The shallow depth to bedrock and numerous large stones may limit the use of this practice. Concentrating the runoff into receiving gulches may increase erosion and may cause sediment deposit into the ocean. In all likelihood, the reduction in runoff from landscaping would be minimal.

Thank you for the opportunity to review this document.

Sincerely,

JACK P. KANALZ
State Conservationist

cc:
Mahukona Properties
c/o Belt, Collins & Associates
745 Fort Street, Suite 514
Honolulu, HI 96813

Environmental Quality Commission
550 Halekauwila Street, Room 301
Honolulu, HI 96813

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5th Floor Hawaii Bldg. 745 Fort Street Honolulu HI 96813 Telephone (808) 521-5361 Telex [illegible]

August 27, 1981
81AC-1455

Mr. Jack Kanalz
State Conservationist
U.S. Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Kanalz:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort, a copy of your July 16, 1981 letter to the Hawaii County Planning Department regarding the document has been forwarded to us for a response. We appreciate the time you and your staff spent reviewing the EIS and preparing your comments. The remainder of this letter addresses each of the specific points you raised.

General Nature of Plans for the Project

As noted in the preface to the report, this Environmental Impact Statement (EIS) was prepared to accompany a request for an amendment to the Hawaii County General Plan. Because of this, much of the discussion which it contains deals with the fundamental land use and environmental issues raised by the possibility of large-scale resort development in North Kohala. Specific physical impacts were explored in sufficient detail to determine whether or not it is likely that they could be effectively mitigated by proper engineering and design techniques. We believe it is that type of information which is most appropriate for consideration at this very early stage in the development process. More detailed environmental studies will be prepared when exact site layouts and infrastructure plans are available. These will be submitted in support of applications for zoning changes, SMA permits, and other necessary governmental approvals, and will be subject to public review and comment at that time.

Water Supply Limitations

In order to prove beyond a doubt that adequate supplies of potable groundwater are available in the area mauka of the resort site, it would be necessary to drill an exploratory well and to conduct pumping tests on it. The well would need to be at least 1,350 feet deep, and it would normally be at least 16 inches in diameter. This would allow it to be used (with the addition of pumps, storage and transmission facilities, and other appurtenances) for production if the well proved successful. The estimated cost of drilling a well of this sort and of conducting the necessary tests is about $400 per foot.

Hence, a 1,350-foot test well would cost over one-half million dollars. It is simply not feasible to make this kind of investment before receiving some assurance (in the form of General Plan designation for the proposed resort) that there will be an economic use for the water.

Fortunately, test data from other wells in the same general area, including well No. 6549-01 in Kohala Estates about 3.5 miles south of the proposed supply area for the Mahukona Resort, provides a reasonable indication that wells drilled in the "Deep Well Exploration Area" shown on Figure V-10 (page V-65) of the EIS would be successful. In view of the available test results, your fear that a water shortage would exist that would lead to underwatering of landscaping and a consequent erosion problem appears unfounded. Comments received from the Hawaii County Department of Water Supply indicate that they concur with the statements made in the EIS (see attached letter).

You refer to "a previous development in the same general area [that] resulted in severe wind erosion problems because of inadequate water supply, but did not give the project name. Without that information it is impossible for us to determine the cause of the problem or the likelihood of a similar situation occurring on the Mahukona Resort site.

Soil Suitability

Kawaihae very fine sandy loam is widespread throughout the coastal areas of Kohala. The Mauna Kea Beach Resort is built on it, and no serious difficulties have been encountered there. The Mauna Lani Resort and the Waikoloa Beach Resort are both being carved out of much more difficult lava land, and engineers have been able to deal quite effectively with conditions there. Because of this, we do not believe that the stoniness, shallow bedrock, or other features of the soil on the Mahukona Resort site will make it unusually difficult to deal with.

Specific Problems

I-2. Brackish water wells will be drilled to supply irrigation water to the golf course. Up until now, golf course grading at resorts in this state has normally been done for the entire course at one time. Only after the course has been completely graded has an irrigation system been installed and the course seeded. As a result, wind erosion has occasionally been severe for short periods of time.

The present Hawaii County Grading Ordinance limits the amount of land that can be exposed at one time during grading operations to 20 acres. This would make it impossible to follow past practices. Instead, the irrigation system and grass would need to be installed as work on the course progresses. As a result, wind erosion of this area is expected to be quite limited.

It is the developer's intent to maintain the drainageways which carry runoff from mauka areas through the resort site in their present form. The outlets carrying runoff from the site into the gulches will be carefully designed to minimize their erosion potential.

V-16 & V-17. Both Buffelgrass and feathery pennisetum are referred to as a single species--Pennisetum setosum--in the original vegetation list for Mahukona Properties. While some taxonomists prefer to use this convention, others prefer to divide the grasses into two distinct species--Pennisetum setosum (feathery pennisetum) and Cenchrus ciliaris (Buffelgrass). The confusion arises from the fact that Cenchrus ciliaris may be a taxonomic link between the genera Cenchrus and Pennisetum. As such, it is very similar to Pennisetum setosum. Both species will be included in the plant species list contained in the revised EIS. However, since the issue of nomenclature is not yet resolved among taxonomists, the choice of names seems largely preferential.

V-23. The plants that would be used in landscaping the project site are, as you point out, likely to be mesophytic. They would, therefore, require more water than the existing xerophytic species. An attempt is being made to minimize the impact of the resulting irrigation requirement by using non-potable water (brackish well water and effluent from the wastewater treatment plant) for golf course irrigation.

The question of water availability is discussed above under the "Water Supply Limitations" heading.

V-33. The EIS did state that the reef communities offshore of the Mahukona Resort site were "relatively sensitive" and that altering such conditions as sediment load, turbidity, and salinity factors "beyond the normal range... could produce a relatively large change in the structure of the biological community." To avoid this a specific erosion control plan for the project will be prepared and submitted for public review during the engineering design phase of the project if the development is approved. Mr. Steven J. Dollar, the marine biologist who conducted the marine survey reported in the EIS, concluded that, "if grading practices are designed to preclude episodes of intense sediment runoff it is anticipated that the proposed development will cause no significant adverse environmental effects".

It is not the developer's intent to use injection wells to dispose of a significant amount of treated sewage effluent. Instead it would be applied to the golf course. Injection wells would be used solely as a back-up in the case of a temporary suspension of irrigation due to equipment failure or heavy rains.

V-64. As you know, the cross-section and profile of a stream channel are determined in part by the volume of water which it carries. Because it almost certainly would increase the peak runoff from the site, the Mahukona Resort project would eventually result in some increase in the rate of erosion of the sides of the gullies into which the on-site drainage system would discharge. However, there will be a reduction in the amount of sediment originating on the more gently sloping surfaces between the gullies that is deliverd to the shoreline by wind and water erosion. This would result from the replacement of exposed soil patches and xerophytic scrub with landscaped cover which will more effectively stabilize the soil.

V-64. The water supply question is discussed above.

V-67. The effect of the project on erosion/sedimentation is discussed above.

Thank you for your comments. If you wish any additional information, please call me at 521-5361.

Sincerely,

Perry J. White

PJWighs
Attachment
cc: Habukona Properties
Hawaii County Planning Department
Environmental Quality Commission

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P O BOX 50167
HONOLULU, HAWAII 96850

RECEIVED
JUL 9 1981
BELT, COLLINS & ASSOCIATES
Room 6307

JUL 8 1981

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Re: EIS-Mahukona Resort
North Kohala,
Hawaii County, Hawaii

We have reviewed the subject Environmental Impact Statement (EIS) and offer the following comments.

The description of the fish and wildlife resources in the project area and the discussion of the expected impacts is adequate, therefore we have no additional comments at this time.

We appreciate this opportunity to comment.

Sincerely yours,

Lucian Kramer

Lucian Kramer
Acting Project Leader
Office of Environmental Services

cc: NMFS
HDF&G
EPA, San Francisco
Mahukona Properties

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects

Sth Floor Hawaii Bldg. 745 Fort Street Honolulu, HI 96813 Telephone (808) 521-4361 Telex (723) 8732

August 12, 1981
81AJ-439

Mr. Lucian Kramer
Office of Environmental Services
Fish and Wildlife Service
P.O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Kramer:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 8, 1981 letter (your reference no. ES:6307) to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We are pleased that you found the discussion of impacts on fish and wildlife resources adequate. We understand you have no additional comments to offer at this time. Thank you for the time spent by you and your staff reviewing the EIS.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
Sth Floor Hawaii Bldg. 745 Fort Street Honolulu, HI 96813 Telephone (808) 521 5361 Telex (723) 8732

August 12, 1981
81AJ-442

(P)1529.1

JUN 30 1981

Mr. Rikio Nishioka
State Public Works Engineer
Department of Accounting and
General Services
1151 Punchbowl Street
Honolulu, Hawaii 96813

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Nishioka:

Gentlemen:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Subject: Mahukona Resort

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your June 30, 1981 (reference no. (P)1528.1) letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We understand you have no comments to offer at this time. Thank you for the time spent by you and your staff reviewing the EIS.

We have reviewed the Environmental Impact Statement Notice and have no comments to offer at this time.

Thank you for the opportunity to review this document.

Very truly yours,

Sincerely,

Perry J. White

RIKIO NISHIOKA
State Public Works Engineer

/jnt

PJW:ghs

cc: Mahukona Properties

cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

GEORGE R. ARIYOSHI
GOVERNOR

JOHN FARIAS, JR.
CHAIRMAN, BOARD OF AGRICULTURE

RECEIVED
JUL 31 1981
BELT, COLLINS & ASSOCIATES

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
1428 SO. KING STREET
HONOLULU, HAWAII 96814

July 27, 1981

MEMORANDUM

To: Mr. Sidney Fuke, Director
Planning Department
County of Kauai

Subject: Mahukona Resort Environmental Impact Statement

The Department of Agriculture has reviewed the subject environmental impact statement and offers the following comments.

We are primarily concerned with the impact of the proposed development on agricultural water resources and with the secondary impacts on agricultural land. We appreciate the in-depth discussion of the potential impacts on agricultural land and the possible need for strong County policy to avoid conversion of productive agricultural land.

We note that the Kohala ditch is one of the alternatives for providing water to the project. This alternative could result in a shift of 1 to 4 mgd (according to page V67 of the EIS) of water away from existing and potential agricultural production.

We would also like to point out that the subdivision request for Kohala Estates Phase II was made with the justification that the principal reason is to establish affordable agricultural parcels in the area. Agricultural development in this area will require abundant water. Since Hilton Head's request for water from Kehena Ditch was denied by the Department of Land and Natural Resources, the water from the wells would have to be used for agricultural as well as domestic uses to make the agricultural development of Kohala Estates possible unless other arrangements can be made. Additional residents settling in the area to utilize the water source (as discussed on page V77) could have serious impacts on the Kohala Estates project, if it is indeed intended to provide affordable agricultural plots.

We are very concerned with the possibility that secondary growth from the resorts may locate on prime agricultural land, as has been proposed

(Oceanic Properties 141-acre proposal in Kapaau which has since been withdrawn). We firmly believe that employee housing for this project should be located in proximity to the proposed development on land which is not suited to agricultural use.

Thank you for the opportunity to comment.

JOHN FARIAS, JR.
Chairman, Board of Agriculture

cc: Mahukona Properties
c/o Belt, Collins & Associates

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
[illegible]

August 27, 1981
81AC-1451

Mr. Jack Suwa
Chairman, Board of Agriculture
State of Hawaii
1428 South King Street
Honolulu, Hawaii 96814

Dear Mr. Suwa:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of the Department of Agriculture's July 27, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. Thank you for the time that was spent reviewing the EIS and preparing your comments. We are pleased to know that our extensive discussion of potential impacts on agricultural lands was appreciated. The remainder of this letter provides additional information regarding the specific points you have raised.

Use of Water From the Kohala Ditch

Since the EIS was written, further investigation of the water supply alternatives has shown that the use of Kohala Ditch water by the resort is not a viable option. Hence, the Mahukona Resort will not compete with present or potential agricultural users of water from this source.

Kohala Estates

As you stated in your letter, agricultural use of the Kohala Estates Subdivision will require an adequate source of irrigation water. Water in the existing Kohala Estates well, No. 6549-01 as shown in Table V-19 and on Figure V-10 of the EIS, is 1,450 feet below the ground elevation. The cost of energy required to lift this water to the surface is such that it is not economically practical to use it for agricultural irrigation, and it has always been envisioned as a source of potable water for domestic use.

Realistically, water for agricultural use in Kohala Estates will have to come from one of two possible sources other than the Kohala Estates deep well. The first is mid-level wells; the second is the Kehena Ditch. Water that is of less than potable quality but which is adequate for irrigation use in Kohala Estates could be available within the subdivision by drilling wells at elevations of 400 to 500 feet. Water from this source will still be reasonably expensive, but it is within the range that is practical for irrigation of at least some high-value crops.

The parcels that lie much above 500 feet in elevation cannot be economically served by wells tapping the basal lens because the cost of pumping the water to the surface is too great. Hence, agriculturalists on these parcels must look to an alternative source of irrigation water.

Because of this, the Hilton Head Company, developer of Kohala Estates, has applied to the State Department of Land and Natural Resources for permission to utilize surface water from the Kehana Ditch for irrigation purposes. On February 25, 1981 the request was denied by the Department. The denial stated in part:

> After giving your request serious consideration, we have decided that it would not be in the best interest of the State to sell the use of this resource either by revocable permit or water license to a single large land developer.... We believe that the benefits from the use of the State's water resources and State funds expended should be shared by many and that the best course of action currently would be to defer any action leading to a long-term commitment of this valuable resource.

Based on this, it appears that the primary reason for the rejection is the fact that the request came from a single developer. An application for agricultural use of Kehena Ditch water might be looked upon more favorably if it can be shown that the actual beneficiaries will be individual farmers.

The point to the preceding discussion is that it is extremely unlikely that water from the Kohala Estates high-level well will be used for other than domestic purposes. Hence, its output of approximately 1.0 million gallons per day will be available to support an increase in the resident population of the region as depicted in Figure V-14 on page V-78 of the EIS.

Thank you for your comments. I hope the information provided above clarifies the situation with respect to the use of water for secondary growth. If you have additional questions, please contact me at 521-5361.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

RECEIVED
JUN 29 1981
BELT, COLLINS & ASSOCIATES

State of Hawaii
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 Diamond Head Road
Honolulu Hawaii 96816

26 JUN 1981

NIENG

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Gentlemen:

Mahukona Resort
North Kohala, Hawaii

Thank you for providing us the opportunity to review your proposed project, Mahukona Resort Environmental Impact Statement.

We have completed our review and have no comments to offer at this time.

Yours truly,

signed

JERRY M. HATSUDA
Captain, HANG
Contr & Engr Officer

cc: Mahukona Properties
Env. Quality Commission w/EIS

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
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5th Floor Hawaii Bldg. 745 Fort Street Honolulu, HI 96813 Telephone (808) 521-5361 Telex (723)8732

August 12, 1981
81AJ-445

Captain Jerry M. Matsuda
Hawaii Air National Guard
State of Hawaii, Dept. of Defense
Office of the Adjutant General
3949 Diamond Head Road
Honolulu, Hawaii 96816

Dear Captain Matsuda:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your June 26, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We understand you have no comments to offer at this time. Thank you for the time spent by you and your staff reviewing the EIS.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

July 29, 1981

RECEIVED
AUG 31 1981
BELT, COLLINS & ASSOCIATES

GEORGE R. L. YUEN
DIRECTOR OF HEALTH

JOHN P. CHALMERS, M.D.
DEPUTY DIRECTOR OF HEALTH

HENRY N. THOMPSON, M.A.
DEPUTY DIRECTOR OF HEALTH

MELVIN K. KOIZUMI
DEPUTY DIRECTOR OF HEALTH

ABELINA MADRID SHAW, M.A., J.D.
DEPUTY DIRECTOR OF HEALTH

In reply, please refer to:
File: EPHS-SS

MEMORANDUM

To: Mr. Sydney Fuke, Director
Department of Planning, County of Hawaii

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Mahukona Resort, N. Kohala, Hawaii

Thank you for allowing us to review and comment on the subject EIS. We submit the following comments for your information and consideration:

1. Municipal drinking water and wastewater treatment systems or their equivalents are recommended as the most appropriate alternatives because of the magnitude of the proposed project. The maintenance of the water quality of the receiving waters is our primary concern.

2. The County Environmental Assessment and Policy Guideline Consistency Determination Form needs to be completed for all proposed subdivisions, and land developments where sewage concerns are projected for the potable groundwater sources, unstable groundwater tables and surface receiving waters. This form is available at the Hawaii District Health Office, Environmental Health Section.

3. Fugitive dust and solid waste disposal during grubbing and grading activities need to meet the requirements of Public Health Regulations, Chapter 43, Air Pollution Control, and Chapter 46, Solid Waste Management Control. The incorporation of a dust and erosion control plan in the construction plans is recommended.

Please be advised that Public Health Regulations, Chapter 49, Potable Water Systems, sets forward requirements for "public water systems" as defined. Public water systems are defined as those systems serving 25 or more persons a minimum of 60 days per year or has a minimum of 15 service connections. Clearly, the size and nature of the Mahukona Resort Project would qualify the water system developed for the project as a public water system.

Section 29 of Chapter 49 requires that all new sources of water intended to serve water to a public water system must be approved by the Director of Health prior to its use to serve potable water. New sources would include, but not be limited to, new wells, new stream or ditch intakes, and new water catchment systems. In addition, new sources would include such facilities if they already exist but have never before been used to serve potable water to a public water system. The approval is based primarily on the submission of an engineering report which

satisfactorily addresses all concerns contained in Section 29. This report must be prepared by a registered professional engineer and bear the engineer's seal upon submittal.

In addition, Section 30 of Chapter 49 requires Director of Health approval of the plans and specifications of new or substantially modified distribution systems. This requirement applies to all modifications not approved by the appropriate County Department of Water or Water Supply. These agencies have been delegated approval authority for all Section 30 work done for them or done to their specifications under their supervision. Approval in this case would require submittal of the plans and specifications of the distribution system. Again, the distribution system for the Mahukona Resort Project as described will be required to conform to the requirements of Section 30, Chapter 49.

If you should have any questions regarding the requirements of Chapter 49, please contact the Drinking Water Program at 548-2235.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

For MELVIN K. KOIZUMI

cc: OEQC
Chief Sanitarian, Hawaii
Mahukona Properties

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
5th Floor Hawaii Bldg. 745 Fort Street Honolulu HI 96813 Telephone (808) 521-5361 Telex 7238712

August 27, 1981
81AC-1443

Mr. Melvin K. Koizumi
Deputy Director for Environmental Health
Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Koizumi:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project the Hawaii County Planning Department has sent us a copy of your July 29, 1981 letter to them (reference No. EPHS-SS). We appreciate the time you and your staff spent reviewing the EIS and preparing your comments.

Your comments contain no objections to the analyses presented in the EIS. Hence, we assume that the report adequately describes the health-related effects of the proposed project.

We share your concern for the maintenance of air and water quality, and appreciate the references to the provisions of relevant chapters in the State Public Health Regulations that you provided. Mahukona Properties has assured us it will conform to all the requirements laid out in your letter. Further information will be submitted for your review and approval as plans for the project evolve.

Thank you for your comments. If there is any additional information that we may provide, please call me at 521-5361.

Sincerely,

Perry J. White

Perry J. White

PJW:gha

cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

RECEIVED
JUL 27 1981
PBR COMM. & ASSOCIATES

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

ELWARD A. HANSEN
DEPUTY TO THE CHAIRMAN

DIVISIONS:
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

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

July 20, 1981

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Gentlemen:

We have reviewed the draft Environmental Impact Statement (EIS) for Mahukona Resort.

Our records show that two parcels (TMK 5-7-01:20, 23) lie directly adjacent to the Lapakahi State Historical Park (site #2245), which is one of the most significant historic areas within the State. The other six parcels, though not completely contiguous to one another, are within the immediate area which contains associated sites.

This archaeological complex is significant for a variety of reasons:

1. It contains a series of complete native land divisions. The sites within these land divisions reflect a social commonality of the inhabitants.

2. These land divisions span a series of diverse ecozones. Extensive archaeological remains make it possible to determine the manner in which Hawaiians interacted with their environment and its resources.

3. The remains within the complex are generally in good to excellent condition, and it would be relatively easy to interpret for the public.

4. Current and ongoing research have generated a large volume of scientific information about the area as a whole and, also, individual sites.

5. An interpretive picture can be made about the life of the Hawaiian commoner who tilled the soil and fished. In this view, the Lapakahi Complex has much information to offer the general public as well as the social scientist.

Our records further show that this section of North Kohala contains many known and associated archaeological sites. In this light, we concur with the applicant's statement that "the archaeological resources of the Mahukona Resort site are highly significant for their potential to yield information on prehistoric cultural patterns (EIS, June 1981, p. I-3)."

We would recommend that all of the parcels be studied as intensively as the Kaiholena parcels (TMK: 5-8-01:11 and 16) with consideration of mitigation or preservation measures for each site (see EIS, June 1981, Appendix D and p. I-3). We further suggest that the methodology for mitigation or preservation measures be included and implemented prior to any construction activity. The final report of this research should be forwarded to our historic sites office (Phone 548-6408) for review and evaluation. At such time, determination can be made on the measures to mitigate or negate adverse effects.

Sincerely,

Susumu Ono

SUSUMU ONO, Chairman
Board of Land and Natural Resources
and
State Historic Preservation Officer

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
[illegible] Bldg. 715 [illegible] Street Honolulu, HI 96813 Telephone (808) 521-5361 [illegible]

August 27, 1981
81AC-1439

Mr. Susumo Ono, Chairman
Board of Land and Natural Resources
State Historic Preservation Officer
Dept. of Land & Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 20, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We appreciate the time you and your staff spent reviewing the EIS and preparing your comments.

As stated on page V-41 of the EIS:

> "...no definite archaeological program has been set, both because further research work is necessary and site-specific development plans have not been decided upon. The developer intends to work with the Bishop Museum archaeologists to minimize impacts of the proposed development on archaeological resources."

The further studies and mitigation measures would be implemented prior to any construction activity affecting such sites. Any reports resulting from further archaeological research on the Mahukona Resort site will be forwarded to the Historic Sites office of the Department of Land and Natural Resources. A copy of the Bishop Museum report covering the archaeological work completed thus far is attached for your use.

Thank you for your comments. If there is any additional information that we may provide, please have one of your staff members call me at 521-5361.

Sincerely,

Perry J. White

PJW:ghs
attachment
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

RECEIVED
JUL 1 0 1981
DIV. FISH & GAME

July 10, 1981

Ref. No. 3356

COPY

Mr. Sidney Fuke
Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Fuke:

Subject: Environmental Impact Statement for the Proposed Mahukona Resort, North Kohala, Hawaii

We have reviewed the subject draft environmental impact statement and offer the following comments with respect to the relevant objectives and policies of the Hawaii Coastal Zone Management Program, as well as other planning considerations.

Recreational Resources (IV-68)

CZM Policy:

Provide coastal recreational opportunities accessible to the public.

Comment:

Fishing constitutes the primary recreational use of the rocky shoreline in the project area, with access limited to a jeep trail and hiking. Access to the shoreline for recreational purposes could be improved depending upon the design of the project. Increased demand for beaches resulting from added resident population generated by the project would require expansion of public beach park facilities in or around the project site. The project should be coordinated with the appropriate State and County agencies relative to developing shoreline recreational opportunities to meet the increased demand generated by the project.

Historic Resources (V-35 to V-41)

CZM Policy:

Protect, preserve, and, where desirable, restore these natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Comment:

Since the Kaiholena site is scheduled for development in the first phase of the 20-year development schedule, an intensive archaeological survey was performed, which showed an abundance of significant archaeological resources in the project area. The developer should continue to consult with the State Department of Land and Natural Resources Historic Preservation Office to ensure that the project is designed to preserve individual sites and groupings of archaeological resources and to perform research and salvage excavations where appropriate. Research and salvage should be performed as appropriate, and similar archaeological resource mapping should be done for the remaining parcels prior to the design phases of these portions of the project.

Scenic and Open Space Resources (V-42, VI-11)

CZM Policy:

Protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources.

Comment:

The project site is noted for its natural features, consisting of vast open grasslands and scattered kiawe. As stated in the EIS, the proposed project would transform at least a 5-kilometer stretch of the North Kohala coast from a natural to a man-made character. The secondary urbanization impacts would further alter natural landforms and existing public views. The makai parcels, which fall within the Hawaii County Special Management Area, include ocean views. The EIS states, "Open space along the shoreline would be preserved, but since this resort is coastal dependent it cannot be located entirely outside the Special Management Area." (VI-11) It is not clear that the project is coastal-dependent. Although the portion of the project consisting of 1,500 hotel rooms for visitors constitutes resort development, the bulk of the project consists of 3,200 medium-density condominium apartments and 500 single family homes apparently for residential use and commercial development serving both the residential and visitor

portions of the project. Overall, there is an apparent conflict with CZM policy to encourage inland location of non-coastal dependent structures. The urbanization of agricultural land along the Kawaihae-Mahukona roadway appears to conflict with State land use policy to restrict housing and resort development to existing urban districts. Since the land parcels are non-contiguous, with large State-owned parcels between them, this would add to the scattered development effect of the proposed project and increase the effect on Hawaii County's valuable scenic and open space resources.

Coastal Ecosystems (V-33,34)

CZM Policy:

Protect valuable ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.

Comment:

Direct impacts on nearby coastal ecosystems can be mitigated by careful design of the project. On the other hand, it is not clear that secondary urbanization impacts on coastal ecosystems can be adequately mitigated. Since the four makai parcels are located in the Special Management Area, the secondary growth induced by the project should be addressed relative to cumulative effects on coastal ecosystems and water quality from storm runoff, sewage disposal, petrochemicals, etc.

Economic Uses (VI-11)

CZM Policy:

Provide public or private facilities and improvements important to the State's economy in suitable locations.

Comment:

The nearest existing visitor industry facilities are in South Kohala. The Mahukona Resort project would be located on pasture land lacking existing infrastructure for water supply and sewage disposal as well as government services to accommodate growth (hospitals, schools, police, fire, etc.). Since the proposed Mahukona Resort would generate nearly 2 million gallons per day of sewage requiring disposal as well as secondary sewage disposal needs, the sewage disposal system should be discussed in more detail. The sewage system proposed involves disposal of treated sewage "primarily" for golf course irrigation, with surplus sewage to be disposed through injection wells. Should it be determined in the design phase

that an ocean outfall is required to dispose of sewage, a permit would be required under the Federal Water Pollution Control Act of 1972 as well as a Federal consistency determination in accordance with the Coastal Zone Management Act of 1972.

General Comment

The draft EIS points out that the proposed development will require a district boundary amendment. However, page VI-6, inaccurately states that reclassification requests are normally sought after an appropriate General Plan designation is obtained. On the contrary, most district boundary amendment petitions are sought before a General Plan amendment.

Thank you for the opportunity to review and comment on this EIS.

Sincerely,

Hideto Kono

cc: Mahukona Properties
c/o Belt, Collins & Associates
Office of Environmental Quality Control

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers - Planners - Landscape Architects - Architects
5th Floor Hawaii Bldg. 745 Fort Street Honolulu, HI 96813 Telephone (808) 521-5361 Telex: 723-8430

August 27, 1981
BIAC-1471

Mr. Hideto Kono, Director
Dept. of Planning and Economic
Development
State of Hawaii
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Kono:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 10, 1981 letter (Reference Number 3356) to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We appreciate the time you and your staff spent reviewing the EIS and preparing your comments. The remainder of this letter responds to the issues you raised on a point-by-point basis.

Recreational Resources

As noted in your letter, public recreational use of the proposed resort is presently constrained because of the limited access that is available. Several jeep trails exist and are used by local residents, but they must trespass on private property to do so. The proposed resort would increase accessibility and, therefore, the potential for beneficial use by making it easier for the public to reach the coastline. At the same time, it would alter the character of the shoreline experience by increasing the number and type of people who use it. It is worth noting that these changes would affect not only the frontage of the resort site itself, but also the shoreline fronting the parcels adjacent to the four properties which the Mahukona Resort would occupy.

The EIS acknowledges the fact that the residents and visitors who would be attracted to the area by both South Kohala resorts and the proposed Mahukona Resort will increase the need for public recreational areas (see, for example, pages V-85 through V-89). Mahukona Properties intends to work with public agencies to insure that the recreational needs of persons associated with the project are adequately met. Nevertheless, the changes will be perceived as adverse by some residents.

Historic Resources

Mahukona Properties has expressed its intention to continue to consult with the State Department of Land and Natural Resources' Historic Preservation Office and to seek its approval for mitigation measures aimed at protecting the site's significant archaeological resources. Additional survey work will be conducted on its properties within the ahupua'a of Lamalolos, Kaupalaoa, and Kehena 2 before any development activities are begun on them.

Scenic and Open Space Resources

As stated in the EIS, the medium-density apartment units that are proposed as part of the project are resort-oriented, i.e., they would be used largely by transients in much the same manner as hotel rooms (see, for example, page II-5). Because of this, they do derive much of their value from a coastal location.

It is also worth noting that half of the project area is mauka of the Akoni Pule Highway (see page II-1), i.e., is more than one-half mile from the shoreline. It is not clear that the CZM policies are intended to discourage "non-coastal dependent" development from areas so far removed from the water unless that development appeared likely to have substantial adverse impact on important coastal areas. Results of the analyses reported in the EIS indicate that no such adverse effects would occur.

The land in and around the Mahukona Resort site is designated for agricultural use on the Hawaii County General Plan and is in the State Land Use Commission's Agriculture District. However, as pointed out in the discussion on pages VII-2 through VII-3 and elsewhere in the report, the extremely low agricultural productivity of the soil makes this use impractical.

It is not clear what the source is for your statement that it is "...State land use policy to restrict housing and resort development to existing urban districts." Section 2-2(1) of the State of Hawaii Land Use Commission State Land Use District Regulations establishes standards for determining Urban District Boundaries. They state that:

> "In determining urban growth for the next ten years, or in amending the boundary, lands contiguous with existing urban areas shall be given more (my emphasis) consideration than non-contiguous lands, and particularly when indicated for future urban use on State or County General Plans."

While this policy suggests a preference for contiguous development, all other things being equal, it is by no means absolute, and the regulations contain numerous other passages which the Commission could use to justify urbanization of the site.

The fact that the parcels proposed for development are non-contiguous does result in the urbanization extending over a greater distance than if it were concentrated. This is the result of the land ownership pattern and the scale of the proposed project. If the size of the project were reduced and/or a land exchange arranged that would consolidate the land, a more efficient land use pattern would result which would have fewer impacts on open space and scenic resources.

Coastal Ecosystems

Your observation that direct impacts on nearby coastal ecosystems can be mitigated by careful design of the project matches our own conclusions. On page V-27, the EIS points out that secondary growth generated by resort-related employment also has the potential for affecting the marine environment. However, it also notes that the absence of any knowledge regarding the exact location of this secondary growth, its physical layout, the nature of the storm drainage facilities which it would utilize, and other factors that would determine its impacts, makes it impossible to discuss these concerns at this time.

The EIS discusses the secondary growth that the proposed Mahukona Resort would generate in considerable detail. However, before this growth can actually occur, it will be necessary for prospective developers to obtain numerous permits and land use approvals from State and County agencies. Careful review of these secondary development proposals will be conducted at that time. Those which would result in unacceptable adverse impacts need not be approved. Taken to an extreme, the refusal to grant the approvals necessary to permit secondary growth, particularly housing, would eventually limit the labor force available to the resorts. This, in turn, would force them to curtail their expansion plans. In short, while a more specific discussion of impacts on coastal waters is impossible at this time, existing controls provide assurance that unacceptable adverse effects from this source can be prevented.

Economic Uses

The North and South Kohala Districts are still a sparsely populated, agriculturally oriented area. Until coastal resort developments began to be proposed for South Kohala early in the 1960s, the coastal area had a very small population and no significant economic activity. The Mauna Kea Beach Hotel complex, the Mauna Lani Resort, and the Waikoloa Beach Resort have all been carved out of an arid region whose primary assets are a great deal of sunshine and a beautiful ocean. The developers of those resorts, together with State and County agencies, have had to build virtually everything that now exists--Queen Ka'ahumanu Highway, water systems, jet airport, internal roadways, storm drainage structures, power lines, sewage collection, treatment, and disposal facilities, and the rest. The developer of the Mahukona Resort will also have to provide all the necessary on-site infrastructure, as well as a water source.

The EIS contains discussions of the proposed on-site sewerage system on pages V-64 through V-71, II-8 through II-9, and elsewhere. It states that a private secondary treatment facility using golf course irrigation for effluent disposal would be used. (Disposal wells would be used only as a back-up when the irrigation system is not functioning and during the relatively rare rainy periods when golf course irrigation is not feasible.) The analysis was carried sufficiently far for us to conclude that it will be possible to provide a level of treatment consistent with State and Federal requirements. Determination of the specific pieces of equipment that will be used to attain this goal will require a detailed and expensive engineering study. Such a study is not justified until there is some assurance that the concept of a resort project on the Mahukona site is acceptable to State and County planning agencies. Hence, it is not normally undertaken until appropriate General Plan and State Land Use designations have been obtained. A detailed environmental assessment/EIS will be prepared for the sewerage facilities when design work for them is underway.

We understand that use of an ocean outfall would require a permit under the Federal Water Pollution Control Act of 1972 as well as a Federal consistency determination in accordance with the Coastal Zone Management Act of 1972. At present it seems highly unlikely that an outfall would be employed. Should one be necessary, all permit requirements would be followed.

General Comment

When the State Land Use Law was first put into effect, it was the custom for developers to seek necessary State Land Use District boundary amendments before applying for the desired General Plan designation. Since 1976, however, the State Land Use Commission has given County desires as expressed in their General Plans a great deal of weight in deciding whether or not to grant Urban District boundary changes. In view of this and the fact that the time horizon of the Hawaii County General Plan is twenty years (versus the ten used by the State Land Use Commission in establishing its the Land Use District boundaries) there is an increasing tendency for developers to seek County support for their projects through the General Plan amendment process before pursuing redistricting from the State Land Use Commission.

Thank you for your comments. If there is any additional information that we may provide, please have one of your staff members call me at 521-5361.

Sincerely,

Perry J. White

Perry J. White

PJWigha
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

GEORGE R. ARIYOSHI
Governor

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY
P. O. BOX 17907
HONOLULU, HAWAII 96817

RECEIVED
JUL 24 1981
BELT, COLLINS & ASSOCIATES

PAUL A. TOM
Executive Director

IN REPLY REFER

TO 4-105/2000

July 21, 1981

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Gentlemen:

Subject: Mahukona Resort
Environment Impact Statement

We have reviewed the request for comments on the subject project and offer the following comment:

Because of the size of the projected resort development and lack of affordable housing in the Kohala area, it is extremely important that provisions for employee housing be made mandatory with the proposed project.

Thank you for the opportunity to comment on this matter.

Sincerely,

Paul A. Tom

PAUL A. TOM
Executive Director

cc: DSSH
Mahukona Properties

XII-24

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects

Suite [illegible] 345 East Street Honolulu HI 96813 Telephone (808) 533 3646 Telex 723 8735

August 27, 1981
81AC-1452

Mr. Paul A. Tom
Executive Director
Dept. of Social Services & Housing
Hawaii Housing Authority
P.O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Tom:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the Mahukona Resort project, a copy of your July 21, 1981 letter (reference number 4-105/2000) to the Hawaii County Planning Department concerning that project has been forwarded to us. The issue raised in your comment is addressed below.

As noted in the Housing Costs subsection of the EIS (page IV-39), supplying affordable housing for resort workers in the area will be a difficult and challenging task. Measures which may help mitigate the problem are discussed on pp. IV-42 and IV-43. They include such things as assuring sufficient land with appropriate zoning is available, relaxing County development standards to lower costs for developers of low- and moderate-cost units, and expanding governmental housing assistance programs for homeowners (Hula Mae, Opportunity Allowance Program, etc.) and tax relief measures.

The Hawaii County General Plan (page 95) stipulates that "employee housing shall be provided at a maximum ratio of one employee unit to every two hotel units built." It goes on to indicate that the exact number of employee housing units that will be required in any given instance is to be determined "by an analysis of housing needs of each district or relative area." Based on this General Plan requirement, the Hawaii County Planning Department has made the provision of employee housing a condition of approval for many of the resort rezoning applications on which it has acted. Based on this historical record and on informal conversations with the Planning Department staff, it appears likely that an employee housing requirement would be attached to any zoning approval that is granted for the Mahukona Resort. However, the Planning Department, Planning Commission, and County Council will ultimately decide this question, and you should continue to make your views known to them.

Thank you for your letter. If there is any further information we may provide, please call me at 521-5361.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

STP 8.7469

JUL 27 1981

Mr. Sidney Fuke, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Fuke:

Environmental Impact Statement
Mahukona Resort, North Kohala, Hawaii

Thank you for the opportunity to comment on the subject environmental impact statement.

We have reviewed the subject report and suggest the following changes:

1. Channelized intersection with acceleration-deceleration and left-turn storage lanes would be required. Street lights would also be required (II-5).

2. Easements are not required for private line crossings. Private utility lines are also not allowed longitudinally within the highway right-of-way (II-9).

3. Realignment of roadways should not be considered as a mitigation measure for by-passing the proposed urban areas unless the cost is borne by the developer (V-14).

Very truly yours,

Ryokichi Higashionna

Ryokichi Higashionna
Director of Transportation

cc: Mahukona Properties
OEQC

XII-26

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August 27, 1981
81AC-1444

Dr. Ryokichi Higashionna
Director, Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, the Hawaii County Planning Department has forwarded a copy of your July 27, 1981 letter (reference No. STP 8.7469) regarding the document. Point-by-point responses to your comments are presented below.

1. The discussion of "Access" presented on page II-5 of the EIS has been changed in response to your comments to read as follows:

> Access to each of the parcels from Akoni Pule Highway would be limited to one roadway (possibly two for the largest parcels). The access points for mauka and makai parcels in each ahupua'a would be opposite one another, and each pair would be a minimum of 1,500 feet apart. Channelized intersections with acceleration/deceleration and left-turn storage lanes would be provided. Street lights would also be provided as necessary. Internal roadways would be to County standards.

2. The reference to easements across Akoni Pule Highway has been deleted, and the revised EIS notes that an easement would be required from the State of Hawaii, owner of the land separating the various parcels that make up the Mahukona Resort.

3. The Department's position with regard to highway realignment as a mitigation measure is clear. The following statement has been added at the bottom of page V-14:

The State Department of Transportation has stated that the cost of realigning roadways would have to be borne by the developer in order to be considered an acceptable mitigation measure.

Thank you for the time you and your staff spent reviewing the document. If any additional information is needed, please call me at 521-5361.

Sincerely,

Perry J. White

PJW:gha
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

GEORGE R. ARIYOSHI
GOVERNOR

TELEPHONE NO.
548 6915

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
550 HALEKAUWILA ST.
ROOM 301
HONOLULU, HAWAII 96813

July 22, 1981

Sidney Fuke, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

SUBJECT: Environmental Impact Statement for Mahukona Resort

Dear Mr. Fuke:

We have reviewed the subject statement and offer the following comments:

Use of State Lands.

Large parcels of state owned lands lie in between the proposed project's parcels. We note that the EIS preparation notice states that use of the state owned parcels would be sought by the applicant. However, we find no discussion of this topic in the statement. Any proposed use of state land would necessitate further compliance with Chapter 343, HRS when the applicants requests such use from the Department of Land and Natural Resources.

P. II-7.

It appears that two 150-unit resort hotels are being proposed on the smaller parcels. This appears to conflict with the statement (p. VII-3) that "... the minimum efficient size is now set by hotel operators in the 300- to 500- room range." Also the acreage to be devoted to golf courses and the parcels which are involved should be shown.

P. II-8.

The landowners where the wells are proposed should be stated.

Any resort units on the makai parcels could not employ gravity sewers if the line is placed along the highway, force mains may be needed.

P. II-11.

The figure for hotel rooms in 1990 is 15,200 on this page, and 10,600 for p. II-13. We also point out that the draft of the State Tourism Plan has a revised figure of 13,200 for 1990 (p. 42). There is a large difference in these figures. These figures may not be realistic when one takes into account a potential tripling of jet fuel costs by then. Air fares to Hawaii may skyrocket and further depress the present tourism figures.

P. III-1.

The basis on which the statement is made that "... long range development scenarios is further complicated by the absence of any well-defined governmental policies with regard to the places where secondary growth will be allowed to occur," should be disclosed.

P. III-5.

Other potential industries in the Kohala region include aquaculture, electronic plants or a manganese nodule processing facility. None of these possibilities are discussed in the statement.

P. IV-1.

The impact of an action is the extent to which the environment is altered, not the future.

P. IV-5.

No mention is made of the present and potential development of the substantial Hawaiian Home lands in Kawaihae.

P. IV-6.

Queen Ka'ahumanu Highway is a two lane facility at present, not four as stated.

P. IV-34.

The Hawaiian Home lands should be included in the discussion of lands available for housing.

P. IV-68.

Crime at the existing parks is an increasing social impact at present.

P. IV-68.

Fishing is one of the primary recreational uses of this biologically rich area.

P. V-7.

Strict measures will have to be taken to mitigate the potential wind erosion of soils from the construction sites.

P. V-13.

Consideration should be given to what the noise and air quality impacts would be if the proposed Mud Lane to Kawaihae Highway is constructed. The alignment of this highway is not shown on figure V-9.

P. V-55.

The estimated cost to the public of widening ten miles of Akoni-Pule Highway to four lanes should be given.

P. V-67.

Please define what area is being referred to in the section on ground water withdrawal.

P. V-89.

The recreational needs of this project are not discussed in relation to the State Comprehensive Outdoor Recreation Plan.

P. V-94.

Mention should be made of the existing high fire hazards along this coastline.

P. VI-3.

The entire Big Island is subject to serious earthquakes as indicated in its classification as a Zone 3 area.

The additional needs for police and fire protection, schools and medical facilities should also be discussed.

P. VI-4.

The section on special management area controls should be combined with pages VI-10 to VI-13. This project does not appear to be coastal dependent.

P. VI-5.

We note no attempt to compare the project with the draft State Functional Plans.

P. VI-6.

The conservation district subzones of the site's parcels and their potential use should be discussed.

It is clear that the project will not make maximum use of existing utilities and facilities. The project as proposed is in an isolated location. The on-site amenities which make these parcels ideally suited for resort-condo development should be discussed.

P. VI-7.

The relationship of the proposed project to the state's environmental policies as set out in Chapter 344, HRS should be discussed.

P. VI-8.

The statement, "the vast majority of the land along the Kawaihae-Mahukona Roadway would remain wild ..." is unsubstantiated.

P. VIII-3.

Approval of the Department of Health is necessary for any drinking water sources. Also, the possible use of state land would require approval of the Board of Land and Natural Resources.

We trust that our comments will be helpful in the preparation of the revised statement. Thank you for the opportunity to review the EIS.

Sincerely,

Melvin Koizumi
Deputy Director
Department of Health

cc: Mahukona Properties
c/o Belt, Collins & Associates
745 Fort Street, Suite 514
Honolulu, Hawaii 96813

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August 27, 1981
81AC-1473

Mr. Melvin Koizumi, Deputy Director
Office of Environmental Quality Control
Department of Health
State of Hawaii
Room 301
550 Halekauwila Street
Honolulu, Hawaii 96813

Dear Mr. Koizumi:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

As you know, Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project. Because of this, the Hawaii County Planning Department has sent us a copy of your letter dated July 22, 1981 regarding the document and asked us to respond to the comments contained in it. To simplify your review of this letter we have organized it as a series of point-by-point responses to the issues you have raised.

<u>Use of State Lands</u>

Because of uncertainty regarding the availability of the State-owned land that separates the various parcels which constitute the Mahukona Resort site, Mahukona Properties asked that we exclude the possibility of their use from consideration in the EIS. Should initial land use approvals be granted and should it appear desirable to consolidate the project, the Department of Land and Natural Resources will be contacted.

It is understood that additional environmental work will be required in order to comply with Chapter 343, Hawaii Revised Statutes, before use of State lands would be allowed. Legally, of course, this would be a "State action" and any official environmental reports and/or impact assessments/statements would have to bear the signature of the chairperson of the Board of Land and Natural Resources.

<u>P. II-7.</u>

In the absence of a specific site plan for the resort, the unit distribution between parcels shown in Table II-2 is somewhat arbitrary. However, the 150 hotel units shown for the smallest parcels does reflect a desire to appeal to specialty markets. The 300- to 500-room size cited in the EIS as being necessary for efficient operation is an estimate based on experience with typical chain hotels. The Kona Village Resort is evidence that smaller hotels are possible in special circumstances, however, and the developers of the

Mahukona Resort hope to tap a similar market. Because the 150-room hotels would be built in a later increment of the resort development, after the other amenities such as the recreational facilities are in place, the developer feels the smaller-sized hotels may be viable at that stage. Should it prove impossible to attract operators for two small hotels, it is likely that an attempt would be made to consolidate the rooms into one 300-unit facility.

It is anticipated that the first 18-hole golf course would be 180 acres and the second 18-hole golf course would be approximately 150 acres. There is no definitive site plan but Kaiholena and Kehena 2 are the only properties large enough to accommodate a golf course.

<u>P. II-8.</u>

The potential well sites identified immediately mauka of the proposed Mahukona Resort are on land owned by Richard Smart, Bishop Estate, and the State of Hawaii.

Your observation is correct. The statement that "the sewage would be collected by a series of gravity mains serving each of the sites" (page II-8, paragraph 3) is applicable to the parcels mauka of Queen Ka'ahumanu Highway and to the initial stages in the collection of wastewater from the makai parcels as well. However, at least one sewage pump station and force main would be required for each makai parcel; these would return the sewage delivered by the gravity system to each parcel's lower end to the proposed wastewater treatment plant near Akoni Pule Highway. The EIS is being modified to clarify this point.

<u>P. II-11.</u>

The 10,600 hotel room figure shown in Table II-6 on page II-13 is for <u>occupied</u> rooms in 1990. Over the long run, experts estimate that annual occupancy rates for Big Island hotels will average approximately 70 percent. At this rate, 10,600 occupied hotel rooms implies the presence of about 15,200 hotel rooms for the visitor market. This distinction is most clearly seen by comparing the second- and third-from-last lines of Table II-5 on page II-12.

Tourism projections, especially for a period of twenty or twenty-five years, involve at least as much art as they do science. Those presented in the EIS were made by Hastings, Martin, Hallstrom & Chew, Ltd., the same consulting firm responsible for the tourism demand analysis in the draft of the <u>State Tourism Plan</u>. We have nothing better on which to base our investigation.

With respect to the concern you expressed over the reasonableness of the estimates in view of rising fuel costs, there are several points to be made. A study of tourism demand conducted for the City and County of Honolulu by

Donald Rugg and Lon Polk and reported in The Economy of Oahu, a 1977 report published by the Department of General Planning, concluded that tourism demand "is very sensitive to changes in (real) air fares." Presumably, it is this sensitivity, combined with the dramatic jumps in fuel costs/airfares that occurred in 1974 and in 1979-80, that are responsible in part for the present softness in the tourism market. In the eight years that have passed since the 1974 oil embargo signaled the beginning of the end of the era of cheap petroleum, the cost of crude oil has increased from about $3.00 per barrel to about $35.00 per barrel, an eleven-fold increase. Discounting this by the change in the consumer price index that has occurred during the same years, we find that the price of petroleum has shown an increase in real terms of over 500 percent. Despite this, visitor arrivals in Hawaii increased by 50 percent over that same period.

The most informed analyses that I have seen in recent months conclude that oil prices have now risen to the point where alternative energy sources are competitive with them. This means that further attempts by OPEC to raise prices can be met by a switch to alternative fuels. Hence, it is unlikely that real aircraft fuel prices will rise a great deal over the next ten years (although they may grow slightly faster than the general price level). I have no idea as to the basis for the "tripling of jet fuel costs" mentioned in your letter and believe that any discussion of the effects of such an increase would be overly speculative.

This does not mean that the projections reported in the EIS are very certain. On the contrary, market "experts" have historically been much better at explaining why changes in the average visitor census have occurred than at predicting them in advance. We are the first to admit the possibility that the projections may be substantially high or low. However, we do believe it is important to avoid jumping to the conclusion that the changes in relative prices that has affected all fuels invalidates previous visitor arrival projections.

P. III-1.

To assess the impacts of the proposed Mahukona Resort and planned South Kohala resorts we examined governmental plans to determine where secondary growth was to occur. After studying the State Plan, the State Land Use Districts maps, and the Hawaii County General Plan, we concluded that firm policies regarding the location of secondary growth were lacking.

The State Plan is not geographically specific. The State Land Use Commission's Urban District boundaries are, but most of the vacant Urban Distict land in North and South Kohala is in parcels makai of Queen Ka'ahumanu Highway that have been earmarked by their owners for resort and resort-residential development rather than for homes for working families. An extensive tract of land at Waikoloa is in the Urban district, but the sales price being asked puts lots there beyond the reach of most working residents, i.e., of the very population secondary growth generates. Hence, we believe it will not be used for most of the employment-generated secondary growth that is projected.

If Waikoloa is excluded, there is far too little land designated for residential use on the Hawaii County General Plan to accommodate the projected population growth. Alternate urban expansion areas could conceivably accommodate much of this growth, but landowners of these parcels do not appear to be prepared to undertake it at this time. In view of these various factors, we concluded that the County has not yet reached any implementable policies with regard to the location of secondary growth.

P. III-5.

Our discussion does take into account the possibility that employment in other primary industries will grow along with that in tourism. To quote from page III-5, paragraph 4 of the EIS:

> The visitor industry is not the only potential source of additional primary employment in the Kohalas, but it is by far the most important. Agriculture may expand somewhat, and it is even conceivable that a few relatively small manufacturing enterprises may become established. We do not believe this employment base will grow at a rate greater than 10 to 15 workers per year, or about 300 workers between now and 2004.

Aquaculture and electronic plants of the type which might reasonably be expected to be established in Kohala are not labor intensive. Manganese nodule processing is not particularly labor-intensive either, but, because of the huge scale of the operation, establishment of such a facility would probably create at least 500 jobs.

Discussions with Mr. Keith Kent, deputy director of the State Department of Planning and Economic Development who has been involved with the State's manganese mining program for a number of years, indicate that the land north of Kawaihae is one of the areas that is being investigated as a potential plant site. According to Mr. Kent, the plant itself would occupy several hundred acres. If land, rather than ocean, disposal of the tailings were employed, an additional one to two square kilometers would be needed for that purpose. At present, questions over legal ownership of seabed resources are holding up commercial development of the manganese nodule resource, and these questions must be answered to the satisfaction of potential operators before they will proceed with the huge capital investments that are required. Assuming these legal questions are resolved, Kawaihae still must compete with a number of other attractive areas (including Hilo/Puna on the Big Island) in order for the facility to be built there. All things considered, we believe that at this time that the probability of a manganese nodule processing facility being constructed in Kohala is still so low that it would be unreasonable to base growth projections on it. In view of the above, we believe that the potential industries you wished to see discussed (aquaculture, electronic plants, and manganese nodule processing) do not deserve special emphasis.

P. IV-1.

An action "alters the future" in the sense that it alters the conditions that will exist at some future point in time. This is the same as altering the environment. A discussion which may help clarify our intent may be found in the first paragraph on page III-1.

P. IV-5.

Table IV-1 on this page lists the principal existing communities of North and South Kohala. The present development in the "old" area near Kawaihae Harbor is mentioned, although not the fact that most of the land is owned by Hawaiian Home Lands.

This table was not intended to discuss potential future development. However, since receiving your letter we have examined the available Department of Hawaiian Home Lands (DHHL) plans for their Kawaihae holdings and discussed their present and future status with Mr. Stanley Wong of DHHL. In the Land Inventory and Land Use Study for the Department of Hawaiian Home Lands (Akinaka, Arthur Y. and James M. Dunn, 1972) the land use plan for the Department's Kawaihae lands was to continue to lease most of this land (approximately 10,000 acres) to Kahua Ranch for pasture use, to encourage lease of the 57 then-vacant acres in the industrial park, and to encourage use of the remaining portion (about 40 acres) along the shoreline for house lots. The Hawaiian Home Lands General Plan, adopted by the Department of Hawaiian Home Lands in 1975, is a policy document which states that due to water availability problems, it is unlikely that the Kawaihae acreage could be used for homesteader agriculture. "Accordingly no major change in land use is recommended at this time." The plan also stated that "opportunities to increase commercial/industrial income should be pursued here."

Mr. Wong of DHHL informed us that all but one of the lots in the Kaei Hana II industrial area mauka of the highway in Kawaihae are currently leased out. There are still about 20 undeveloped acres of commercial-zoned land. Engineering and subdivision plans have been drawn up for 43 house lots to be developed on the 40 acres makai of the highway designated by tax map keys 6-1-04:3, 4, 8 through 20 and 6-1-05:1 through 7. These lots will be a minimum of 15,000 square feet. Currently, there are 51 persons on the waiting list for these parcels. Mr. Wong also indicated that a comprehensive development plan study for the DHHL Kawaihae lands is expected to be started shortly and should be available in about eighteen months.

P. IV-6.

Queen Ka'ahumanu Highway is indeed a two-lane highway, not a four-lane facility as mistakenly stated in Table IV-2. The reference will be corrected. The discussion in the "Transportation Impacts" section of the EIS (see, for example, the last full sentence on page V-49) correctly describes it as a two-lane facility.

P. IV-34.

The vacant Hawaiian Home Lands in South Kohala which are within the State Urban District were included in our analysis and indirectly referenced on p. IV-34 and Table IV-22. Most of the land listed for Kawaihae Harbor on Table IV-22 is Hawaiian Home Lands. The only residential-zoned land there (14.5 acres with multi-family zoning) is not owned by them, however.

The Department of Hawaiian Home Lands has no plans to develop agricultural homesteads for native Hawaiians on the Kawaihae lands due to water availability problems (see discussion under P. IV-5 heading above). However, as we also noted under that same heading, DHHL does have plans for 43 single-family residential lots along the shore.

When the 1976 Hawaiian Home Lands General Plan was prepared, it was "expected that Waimea will be an increasingly attractive area." Most of the Department's land there is planned for pastoral use, but some housing on farm lots and rural house lots has also been proposed. As with the Kawaihae lands, DHHL expects a detailed development plan to be available for these lands within two years.

Generally, the Hawaiian Home Lands in South Kohala are not any more available for housing than are other vacant lands. Although DHHL does not need to obtain State Urban or County Residential zoning in order to develop housing for native Hawaiians, the Department currently has no large-scale housing development planned for this district. Even if these plans change, it is unlikely that many units would be constructed since those eligible for such housing have to be at least 50 percent Hawaiian. If DHHL were to lease land to someone intending to construct housing for other than native Hawaiians, the developer would have to follow normal procedures in seeking rezoning and other permits. For these reasons the Hawaiian Home Lands do not merit special attention in the discussion of lands available for housing.

P. IV-68.

The problem of crime in existing parks is discussed in the fifth paragraph on page IV-74 rather than on page IV-68.

P. IV-68.

As a result of yours and other related comments, the text under the subheading Fishing and Food Gathering on page IV-68 is being changed to read as follows:

> Fishing and Food Gathering. The "dry side" of the Kohalas is not as bountiful an area for fishing and food gathering as is the "wet side." However, the weather is generally better on the "dry side," and the marine resources off the dry North Kohala coast were found to be more abundant than areas surveyed along the Kona coast.

Both solitary fishermen and family groups frequently take jeep trails to and along the coast for fishing and picnics. Some dislocation of such activities is to be expected from development of the planned South Kohala resorts. It is difficult to predict how much effect these South Kohala developments will have, or how much more effect the Mahukona Resort would have, because the impacts will arise more from induced residential growth than from tourist activities. As previously noted, the timing, distribution, and composition of residential growth generated by the South Kohala resorts all remain unknown, hampering assessment of the effects of the proposed Mahukona project.

The Mahukona Resort site itself, i.e. the land, is of limited value as a food gathering site, and the developer intends to provide public access to the shoreline as required by law. With the influx of people expected as a result of both the Mahukona Resort and already-planned South Kohala resorts, access to both the shoreline and "wet-side" mountain areas is likely to become a more volatile issue. Some of the currently used access trails are not for legal entry except with permission of property owners, and so public rights-of-way provided by the new resorts would actually increase legal accessibility to the coast from the highway. At the same time, the nature of the shoreline experience may change from its present, relatively solitary character, and fishing--already considered in some decline by local fishermen due to greater numbers of persons fishing--would probably suffer some further decline in terms of the available stock.

P. V-7.

As noted in the EIS, soil erosion is a potential problem if soils are left unvegetated for a substantial length of time during construction. The County grading ordinance stipulates that the maximum area that may be exposed at one time is 20 acres. This, together with the fact that wind erosion of the same soil type at the Mauna Kea Beach Resort has not been a significant problem, lead us to believe that excessive soil erosion can be avoided.

P. V-13.

Noise and air quality impacts resulting from construction of the proposed Mud Lane to Kawaihae Highway have already been assessed in the EIS prepared by the State Department of Transportation for that project. The alignment was not shown in Figure V-9 because that drawing was intended to portray only existing facilities.

P. V-55.

Based on recent construction costs for road work on the Big Island, it is estimated that widening of 10 miles of the Kawaihae-Mahukona Highway would cost about $8.5 million (in 1980 dollars). This is only an order-of-magnitude

estimate and would have to be confirmed with a detailed engineering study. Moreover, there is no certainty that such widening would actually prove necessary.

P. V-67.

The potable water wells would affect groundwater flows (primarily between them and the coastline) whether they are located mauka of the Mahukona Resort site or at Kokoiki. Disposal wells and/or golf course irrigation (including the brackish water wells) would affect groundwater flux between their location and the coastline. The general location of these areas can be seen on Figure V-10.

P. V-89.

It is difficult to know from your comment exactly what type of discussion you wished to see included in the EIS. Information contained in SCORP, as well as County of Hawaii Recreation Plan, was used in our impact analysis. Additional discussion of the Mahukona Resort's relationship to SCORP is presented below. Because the recreational needs of the visitors and the residents generated by the Mahukona Resort project are different, they are discussed separately.

Visitors. The Mahukona Resort would offer many recreational opportunities and facilities for its guests, including golfing, tennis, and swimming. The 1975 State Comprehensive Outdoor Recreation Plan (Hawaii, State of, Department of Planning and Economic Development), commonly referred to as the SCORP report, states that "the vast majority of recreational activities pursued by visitors is concentrated in relatively few activities, principally swimming and sunbathing, driving and walking for pleasure, and attending outdoor events." Driving for pleasure is an activity which does not require a recreation facility; walking for pleasure would be accommodated primarily on the resort site; and attending outdoor events is an activity which would take place on the resort site or at other private facilities.

Since the shoreline of the proposed Mahukona Resort is rocky, most visitors staying here will either utilize on-site pools and poolside areas or drive to beaches elsewhere in the region. Hapuna Beach Park, Kauna'oa Beach in front of the Mauna Kea Beach Hotel, and Spencer Beach Park would probably be used most frequently. However, given the distances to the beach parks listed above and the likelihood that tourists who want to spend a large portion of their time on the beach will not stay at the Mahukona Resort, the great majority of the visitors' swimming and sunbathing, at least 75 percent, will occur at the Mahukona Resort's swimming pools.

To estimate the impact of the Mahukona Resort's guests on beaches in the region, several calculations have to be made. First, the number of swimming and sunbathing occasions generated by Mahukona Resort visitors must be calculated. Data in the 1975 SCORP provide only the total peak-day visitor

swimming/sunbathing occasions for Hawaii County for 1975. This number (5,637) should be divided by the peak day visitor census for the island to calculate the participation rate for visitors for this activity. However, only average, not peak, visitor census figures for Hawaii County in 1975 are available. Therefore, the average number of visitors (6,496) in 1975 must be divided by 60%/90% (i.e., by the average 1975 hotel occupancy rate divided by the peak 1975 occupancy) to obtain a peak figure. The calculation of a peak-day visitor participation rate for swimming/sunbathing on the Big Island was made as follows:

$$S_{ppr} = \frac{Sp}{V_a \div O_p/O_a}$$

S_{ppr} = Peak day swimming/sunbathing participation rate (in activity occasions per visitor)

S_p = Peak day swimming/sunbathing occasions by visitors in 1975.

V_a = Average number of visitors on Hawaii Island in 1975.

O_a = Average hotel occupancy rate (in percent) on Hawaii Island in 1975.

O_p = Peak hotel occupancy rate (in percent) on Hawaii Island in 1975.

Substituting the values given in the paragraph above:

$$S_{ppr} = \frac{5,637}{6,496 \div (60\%/90\%)} = 0.579$$

SAY 0.58 swimming/sunbathing activity occasion/visitor/day.

This means that on a peak activity day 580 out of every 1,000 visitors present on Hawaii Island either swim or sunbathe. Applying this factor to the projected average visitor population at the Mahukona Resort in 2005 (3,800) gives the number of peak-day swimming/bathing occasions generated by the resort's average guest population--2,200. If the peak participation rate day coincided with the peak visitor census (7,150) then the number of such activity occasions would be about 4,150.

The next step in determining the proposed resort's impact on beaches is to multiply the expected peak number of swimming/sunbathing occasions of Mahukona Resort guests by the maximum percentage of visitors who are expected to drive to a beach on any given day (25 percent). The calculation indicates the number of visitors from the Mahukona Resort at the region's beaches on a peak activity day would be about 550, although it could be higher if the peak participation rate day coincided with the period of peak hotel occupancy.

The capacity rate for beaches on Hawaii Island was reported in 1975 SCORP (p.66) as 1,320 individuals per acre. Application of this rate to the 550 peak-day activity occasions figure means the Mahukona Resort visitors would utilize 0.4 acres of beach.

Residents. The secondary growth induced by the Mahukona Resort would impact other recreational facilities as well as beaches. The peak activity participation rates for Hawaii County residents were multiplied by the 3,800 additional North/South Kohala residents that the Mahukona Resort is expected to generate to obtain additional activity-occasion numbers. These activities were translated into facility needs by applying County-specific factors from the 1975 SCORP report. The calculations are shown in tabular form on the following page. Comparison of the "Additional Facility Needs" column with the 1975 Deficit/Excess figures for Kohala shows that the facilities which are already in short supply are those which would be most adversely impacted by the additional population growth. Other activities could be accommodated by the present facilities.

Conclusion. The information above confirms the analysis presented in the EIS. It shows that Mahukona Resort visitors will create a need for additional developed beach recreation area and that residents supported by the resort will create a demand for additional beach areas or pools, camp sites, picnic areas, and hiking trails. All of these except beach areas could be easily included in planned future parks. Since the number of beaches in Hawaii County are limited, there will be an increasing strain put on these resources by the projected population increase. Some of the resident demand for swimming and sunbathing activities could be met by building pools, but this is only a partial solution to the problem.

P. V-94.

Mention of the site's arid climate and resulting susceptibility to brush fires is being inserted in this section of the EIS.

P. VI-3.

Section 13. The hazard from earthquakes is accurately portrayed on page V-4 of the EIS. However, the discussion on page VI-3 under the heading "Section 13" could be considered misleading. Because of this, it is being changed to read:

> "...is in an area that is not subject to serious threat of flooding or tsunamis. However, all of Hawaii Island is in a zone 3 risk area for earthquakes. This is higher than the remainder of the state, but, to place it in proper perspective, is not as severe as the zone 4 rating given California, the most populous state in the nation."

IMPACTS ON RECREATIONAL FACILITIES FROM ADDITIONAL RESIDENTS SUPPORTED BY THE MAHUKONA RESORT

Activity	(1) Hawaii County Peak Activity Participation Rate (in activity occasions per 1,000 people)[1]	(2) Additional Activity Due to Mahukona Resort Secondary Growth[2]	(3) Daily Capacity Rate of Facilities, Hawaii County[3]	(4) Year 2005 Additional Facility Needs[4]	(5) 1975 Deficit/Excess in Kohala's Hawaii County[5]
Swimming (Beach)	136.0	517	1,320 ind./Acre	0.39 ac. beach	0.45+
Swimming (Pool)			4,350 ind./Acre	or 0.12 ac. pool	0.06+
Tennis	15.0	72	35 ind./court	2 courts	11.50+
Camping	39.0	148	4 ind./site	37 campsites	114.50+
Picnicking	107.0	407	80 ind./Acre	5 acres	0.53+
Golf	10.0	38	400 ind./Course	0.1 golf course	1.50+
Hiking	20.3	77	31.5 ind./Mile	2.5 miles	11.17+
Boating (Trailer)	25.5	97	105 ind./Lane	1 lane	0.02+
Boating (Moorages)			4 ind./Slip	or 24 slips	34.5+
Field Games	14.96	56	21 ind./Acre	2.7 acres	19.92+
Court Games	14.96	56	2,176 ind./Acre	0.24 acres	

1. 1975 SCORE, p. 44.
2. Column 1 x 3.6 = Column 2
3. 1975 SCORE, p. 66.
4. Column 2 ÷ Column 3 = Column 4.
5. 1971 SCORE, p. 294.
6. Participation rate listed for "Game Playing" was 29.8; it was assumed that half would be for field games and half for court games.

Source: Belt, Collins & Associates.

Sections 14 through 18. These sections of the State Plan refer only to solid and liquid waste, water, transportation, and energy/utilities systems. Because of this, police, fire, schools, and medical services were not discussed. The impacts of the with-Mahukona and without-Mahukona alternatives on these services are discussed on pages V-80 through V-85 and on pages V-90 through V-94 of the EIS.

P. VI-4.

Section on Special Management Area Controls. Page VI-4 and page VI-10 were inadvertently switched when the report was being paginated and assembled. This error will be corrected in the final EIS.

Coastal Dependence of Project. Every resort area in this state is located along the coast. While this does not prove that a resort located inland is not viable, it does demonstrate that developers perceive a coastal location as a necessary ingredient of a successful resort operation in Hawaii.

P. VI-5.

Because the State Functional Plans are as yet unofficial, no attempt was made to compare the proposed project with them. However, the information provided in the EIS, particularly in the impact section, allows responsible public agencies to draw their own conclusions concerning the project's consistency with the draft Functional Plans and to provide these as part of the EIS review process. To the extent that this is done, their judgements will be reflected in the comment/response portion of (Chapter XII) the revised EIS.

P. VI-6.

All of the land in the Conservation District on the Mahukona Resort site is in the "g"-resource subzone. This information will be added to page VI-6. The plans for the resort are not firm enough at this time to discuss the uses that might occur in the Conservation District areas. However, since the Conservation areas are fairly extensive, it is unlikely the entire zone would remain in permanent open space. The owner realizes that if resort uses are proposed for Conservation areas either a district boundary change or a Conservation District Use Permit will be required.

The proposed Mahukona Resort, like the resorts planned for South Kohala, is not located near existing utilities and facilities. The developers of those resorts, together with State and County agencies, have had to build virtually everything that now exists--Queen Ka'ahumanu Highway, water systems, jet airport, internal roadways, storm drainage structures, power lines, sewage collection, treatment, and disposal facilities, and the rest. The developer of the Mahukona Resort will also have to provide all the necessary on-site infrastructure, as well as a water source.

The views and the climate make the site suited for resort-condominium development. There is a very substantial amount of other land in North and South Kohala which is equally well suited for such development.

P. VI-7.

Chapter 344, Hawaii Revised Statutes, establishes environmental policies and guidelines intended to:

> "...encourage productive and enjoyable harmony between man and his environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man, and enrich the understanding of the ecological systems and natural resources to the people of Hawaii."

The policies and guidelines are so broad that it is impossible to address them in a comprehensive way here. However, it is our belief that the information provided in the body of the EIS covers all of the topics mandated by the law. If you have specific questions related to this issue, we would be happy to discuss them with you.

P. VI-8.

As shown in Figure II-2 in the EIS, there is virtually no urban development between Kawaihae and Hawi, a distance of 17.5 miles. The Mahukona Resort site affects between 10 and 18 percent of this frontage, depending on whether just the frontages of the resort's lots are counted, or also the intervening state-owned lands. Since no other development along this corridor would be necessitated by construction of the proposed resort, we concluded that it would "remain wild." This is not to say that it would not be developed, simply that it need not be developed. Ultimately, economics and the County Council's control over land use will determine what happens.

P. VIII-3.

The State Department of Health is already listed under "Water System Approvals." Since the Mahukona Resort's potable wells could possibly be located on State-owned land the Board of Land and Natural Resources approval of this possible use will be added to this page.

Thank you for your comments.

Sincerely,

Perry J. White

PJW:ghs
cc: Hawaii County Planning Department
Environmental Quality Commission
Mahukona Properties
Community Resources

COPY

DEPARTMENT OF PARKS & RECREATION
COUNTY OF HAWAII
HILO, HAWAII 96720

RECEIVED
JUL 24 1981
BELT, COLLINS & ASSOCIATES

July 22, 1981

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

SUBJECT: Mahukona Resort - EIS

The subject report has been reviewed and we offer the following:

Table V-27 should be revised to read as follows:

North Kohala		
Kamehameha Park	18.4 ac.	Indoor and outdoor recreational activities
Kapa'a Beach Park	26.3 ac.	Skin diving, fishing, picnicking, camping
Keokea Beach Park	7.1 ac.	Limited swimming, fishing, picnicking, camping
Mahukona Beach Park/ Boat Harbor	3.1 ac.	Swimming, skin diving, fishing, boat launching, picnicking, camping
Pololu Valley Lookout		County proposal to develop area did not materialize
South Kohala		
Samuel Spencer Beach Park	13.4 ac.	Swimming, picnicking, camping
Thelma Parker Gym		County recreational programs being run in State-owned facility
Waimea Park	10.5 ac.	Outdoor recreational activities
Waimea Playground (church row)	2.8 ac.	Open grassed area, landscaping

Table V-28 should also be revised to reflect the above described acreage revisions.

Thank you for the opportunity to review the document.

Hilton T. Hakoda
Director

enc. - EIS returned to EQC

cc: Mahukona Properties
c/o Belt, Collins & Assoc.

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
[illegible]

August 27, 1981
81AC-1440

Mr. Hilton T. Nakoda, Director
Department of Parks and Recreation
County of Hawaii
Hilo, Hawaii 96720

Dear Mr. Nakoda:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort, a copy of your July 22, 1981 letter to the Hawaii County Planning Department concerning the document was forwarded to us for a response. We appreciate the time you and your staff spent reviewing the EIS and preparing your comments.

Data for Table V-27 was obtained from the 1974 County of Hawaii Recreation Plan and the 1975 State Comprehensive Outdoor Recreation Plan. Thank you for providing updated information. This will be used to revise Table V-27. Polulu Valley Lookout will be deleted from this table of existing recreational facilities since the County proposal to develop the area did not materialize; it will also be deleted from Figure V-15. Table V-28 will be amended to reflect the acreage revisions in Table V-27.

Thank you again for your comments. If there is any additional information that we may provide, please call me at 521-5361.

Sincerely,

Perry J. White

PJW:gls
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

XII-38

RECEIVED
JUL 10 1981
BELT, COLLINS & ASSOCIATES

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII
HILO, HAWAII

DATE July 8, 1981

Memorandum

TO : Planning Department

FROM : Chief Engineer

SUBJECT: MAHUKONA RESORT

We have reviewed the subject application and our comments are as follows:

1. Clearing and grubbing material should be disposed of on-site, none of the municipal operated disposal sites will accept such waste.
2. The proposed development should be required to provide solid waste facilities for the development.
3. Will drainage through the Mahukona Resort site be designed for the present or for future zoning?
4. Traffic Circulation - The State lands make this a dichotomous development with a heavy dependence on the Akoni Pule Highway.
   a. Provide one major mauka-makai road that could be extended by future development to the Kohala Mountain Road.
   b. Provide interior roadway systems that parallel the Akoni Pule Highway that can be tied together in the future.
   c. Limit one access per parcel.
   d. Location of access on both sides of the road shall be directly opposite each other.
   e. In lieu of a plethora of turning/storage lanes, we suggest that the Akoni Pule Highway be widened to four lanes throughout the length of the development.

EDWARD HARADA
Chief Engineer

cc: Mahukona Properties
Sewers & Sanitation
Traffic Safety & Control
Plans and Surveys

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
5th Floor Hawaii Bldg 745 Fort Street Honolulu HI 96813 Telephone (808) 521-5361 Telex (723)8712

August 27, 1981
81AC-1454

Mr. Edward Harada
Chief Engineer
Department of Public Works
County of Hawaii
Hilo, Hawaii

Dear Mr. Harada:

<u>Environmental Impact Statement for the Proposed Mahukona Resort Project, North Kohala, Hawaii</u>

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort, a copy of your July 8, 1981 memorandum to the Hawaii County Planning Department concerning the project was forwarded to us for a response. We appreciate the time you and your staff spent reviewing the document and preparing your comments. The remainder of this letter responds to them on a point-by-point basis.

1. <u>Disposal of Clearing and Grubbing Material</u>

It is not intended that waste material produced by clearing and grubbing operations would be disposed of at municipally operated disposal sites. Instead it will be deposited in a suitable location on-site or on such other nearby lands as may be agreed upon by its owners.

2. <u>Provision of Solid Waste Facilities</u>

It is understood that the County of Hawaii will not be responsible for the collection of solid waste generated on the resort site. Current plans call for individual developers of hotels and residential projects on the Mahukona Resort site to make provisions for private solid waste collection service. Depending upon then-current regulations governing use of public disposal facilities and upon the availability of privately-operated solid waste disposal facilities, the solid waste that is produced on the Mahukona Resort site may or may not find its way into County disposal facilities.

3. <u>Adequacy of Drainage System</u>

The Mahukona Resort's on-site storm drainage system will be designed to accommodate the runoff that would occur if the parcels were developed to the maximum density permitted by the zoning that is eventually sought. As indicated in the EIS, the primary purpose of the system will be to move runoff laterally, i.e., cross-slope, for discharge into the major gullies that are present. The gullies themselves have a high discharge capacity, and no drainage structures or improvements in them are needed or planned.

The capacity of the gullies is such that almost complete urbanization of the upstream portions of the drainage basins would have to occur before the channel capacity on the Mahukona Resort site would be exceeded. Given the nature of the land, economic constraints, and the absence of sufficient water to serve such large-scale growth, it is inconceivable that this would occur.

4.a. Mauka-Makai Connector Road to Kohala Mountain Road

The mauka boundary of the proposed Mahukona Resort site is only 2,000 feet above the Akoni Pule Highway (Kawaihae-Mahukona Highway); the Kohala Mountain Road is a further five miles inland. Hence, while it would be possible to design one of the collector roads in the mauka half of the resort such that it could eventually be extended to the Kohala Mountain Road, the likelihood that such an improvement would ever be made appears to be extremely remote. Nevertheless, the possibility will be considered when site-specific plans for the resort are prepared, and engineers will meet with you to discuss the matter at that time.

4.b. Provide Inter-Connected Interior Roadway Systems

Land in between the four parcel-pairs that comprise the Mahukona Resort site is owned by the State of Hawaii. While either consolidation of the State's land holdings with those of Mahukona Properties or some form of land exchange would enhance the value of both owners' land, numerous obstacles would have to be overcome before this could occur. Should a joint development agreement be negotiated, consideration will be given to interconnecting the road systems.

4.c. Limit the Project to One Access Point Per Parcel

As you know, Akoni Pule Highway is a controlled-access facility. Hence, access points from the proposed resort onto the highway must be at least 1,500 feet apart. Two of the four parcel-pairs that compose the Mahukona Resort site--Lamaloloa and Kaupalaoa, have less than 1,500 feet of frontage on the highway and would necessarily have only one access point per parcel. Kehena 2 has about 1,000 feet of frontage, enough to allow two access points, but the cost of constructing them would probably lead to the use of only one access point per parcel there as well.

With a full mile of road frontage, Kaiholena is the only parcel-pair where the use of two access points per parcel is a strong possibility. A final decision regarding that will be made in conjunction with responsible government officials at such time as specific site plans and engineering master plans are being prepared.

4.d. Opposing Access Points onto Highway

Both good highway design practices and construction economics dictate that access points from mauka and makai parcels onto the Akoni Pule Highway be directly opposite one another. Such an arrangement will be provided when specific site-engineering plans are proposed.

4.e. Continuous Widening to Four Lanes

We understand your preference for a four-lane roadway rather than a series of turning/storage lanes. However, cost factors make it doubtful that this will be practical. From the north side of Lamaloloa to the south side of Kehena 2 is a distance of about 3.2 miles; only 2.0 miles front the Mahukona Resort site. If discontinuous highway widening is undertaken, (i.e., if only turning/storage lanes are constructed) the amount of four-lane roadway required would be as little as 6,000 feet, or about one-third the length needed if a continuous four-lane roadway were to be constructed. In terms of cost, this gives the discontinuous alternative a cost advantage of approximately $1.5 million.

It should also be noted that interconnected internal roadways (comment 4.b.) would probably be an unnecessary duplication if Akoni Pule Highway were widened throughout the resort frontage area. Should the application for the General Plan amendment be approved, planners and engineers for the project will meet with State and County transportation officials to reach a design solution that is satisfactory to all parties.

Thank you for your comments. If there is any additional information we may provide, please call me at 521-5361.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII

July 21, 1981

TO: Planning Department

FROM: Manager

SUBJECT: MAHUKONA RESORT
NORTH KOHALA, HAWAII
ENVIRONMENTAL IMPACT STATEMENT

We have no objections to the subject Environmental Impact Statement. The availability of water is addressed adequately.

H. William Sewake
Manager

QA

cc - Mahukona Properties, c/o Belt, Collins & Associates.

Water brings progress...

XII-41

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
Sth Floor Harrow Bldg 745 Fort Street Honolulu, HI 96813 Telephone (808) 521-5361 Telex (723)8733

August 12, 1981
81AJ-441

Mr. H. William Sewake, Manager
Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Sewake:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 21, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We are pleased that you have no objections to the EIS and that you found the water availability topic adequately addressed. Thank you for the time spent by you and your staff reviewing the EIS.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

KOHALA COMMUNITY ASSOCIATION
P.O. Box 451 • Kapaau, Hawaii 96755

RECEIVED
1981

July 22, 1981

Mr. Sidney Fuke
County of Hawaii Planning Department
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Fuke:

MAHUKONA RESORT
ENVIRONMENTAL IMPACT STATEMENT

The Planning and Land Use Committee has reviewed the Mahukona Resort Environmental Impact Statement. Because of the size and depth of the document, several members of our community were asked to review it in more detail than we were able to do in the short time frame. Their reports to our committee have been reviewed and are enclosed for your consideration.

Sincerely,

Susan L. Wells, Secretary

Collins Kuhale, Chairman

CONCERNING MAHUKONA RESORT

The following discrepancies or errors in the Mahukona Resort EIS have come to our attention. We respectfully request that they be corrected in the final version.

1. Condominium residents not counted in population summaries.

On page IV-18 the EIS refers to two effects of resort communities on population. They are support workers, and retirees/wealthy persons who live in residential condo units. The EIS says, "For the purposes of this report, we have neglected the latter influence."

We do not understand the logic of the omission and wish to see population statistics on condominium dwellers given in the report. These statistics have been omitted not only for Mahukona Resort's 3,200 condos, but for the over 6,000 condos already approved for South Kohala. The information should appear on page IV-18 and in related figures and tables.

2. Apparently inaccurate "Labor Force" Table IV-14.

This Table on page IV-24 indicates the labor force deficit in coming years, showing a 5,370 deficit in the year 2,000. Notes below the Table indicate that this figure assumes all available locally-born workers are employed in tourism. This is unrealistic. Resort work is not the preference of all. Therefore, if you like, assume that half of the locally-available 1,700 persons will opt for the industry, and adjust other figures accordingly in the table.

In general we believe this labor deficit figure may be too low since Hawaii Tourism Impact Plan (State of Hawaii, 1972) shows a labor force requirement for the Waikoloa project alone of over 9,000 persons. The Impact Plan also says, "Massive immigration of labor will be required if the growth of West Hawaii reaches projected levels." (pages 38, 52)

We are grateful for your regional approach but would like to request the County, a consulted party, to offer alternative labor-force-needs figures, to cover both the region and the Mahukona Resort. We would like to have these figures included in the final EIS also.

3. Access.

Access is discussed on page II-5 in four sentences. This is an important concern for residents of North Kohala, and we

request a lengthier treatment. In particular, we are concerned not only for highway-to-shoreline access, but for north/south access, since the shoreline here is rocky and difficult to hike.

Note that the shoreline trails organization Na Ala Hele requested that "The public's right to use . . . jeep trails and any other traditional trails that may be on the affected lands needs to be addressed." (page X-35) We request same.

4. Inaccurate Jeep-Trail Map.

This is a related concern.

The number of shoreline access trails, departing the highway, from Kahuna 2, south, to Lapakahi on the north, gives a total of 8 and there may be more.

The EIS map on page 11-4 shows only 4.

In addition the north/south shoreline jeep trail is in actuality much more complex than shown on the map.

We request that all actual jeep trails and traditional trails on the property be shown on the map.

5. Hawaiian Groups Not Consulted.

On page V-39 the rich archaeological resources of Kaiholena ahupuaa are described. They are said to equal those at Lapakahi and, furthermore, to be pre-contact remains--especially valuable. We simply wish to note for the record that Hawaiian historical groups and figures in North Kohala have not been notified of these findings and have not been consulted for their views on resort development of the site.

Thank you for the opportunity to offer these comments.

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
Pacific Guardian Center, Mauka Tower, 737 Bishop Street, Honolulu, Hawaii 96813 Telephone (808) 521-5361 Telex 723-8430

August 27, 1981
81AC-1447

Mr. Collin Kaholo, Chairman
Planning and Land Use Committee
Kohala Community Association
P.O. Box 451
Kapaau, Hawaii 96755

Dear Mr. Kaholo:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project a copy of your July 22, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. Thank you for the time spent by you and members of the community reviewing the EIS. The remainder of this letter responds to each of the concerns you expressed.

1. Condominium Residents Not Counted In Population Summaries

The condominiums that are proposed for the Mahukona Resort and for other, already-planned resort projects in South Kohala are intended principally for use by visitors, and the analysis presented in the EIS assumes that this will be the case. We made this assumption for two main reasons. First, we believe that it is the one most likely to occur. Second, it is the assumption that produces the most severe impact projections.

If the condominium units are not used by visitors, two alternative uses for them exist. They could be used either as residences for persons who do not have to work, i.e., for retirees or the independently wealthy, or as domiciles for persons who are employed somewhere in the region. Experience in other resort areas, as well as the obvious economics and demographics of the situation, suggests that relatively few retirees are likely to settle in a high-priced coastal resort development on an island with relatively high living costs. A limited amount of this will occur, of course, but each resort condominium unit occupied by a retiree means one fewer condominium unit available for use by transients and, therefore, a decrease in the secondary growth that would be generated. Because of this, the effect of retirees is likely to be marginal.

A second, and more likely, possibility is that some of the condominium units would be purchased and/or rented by persons who hold jobs within the North/South Kohala impact area. The EIS assumes that no workers will be accommodated in the resort areas. To the extent that they are, fewer condominiums would be available for use by visitors, and the employment/secondary growth effects would be lessened. At the same time the need for worker-housing off-site would also be decreased. In short, if

permanent residents occupy the condominium units, then the actual impacts would be lower than those we have reported.

2. Apparently Inaccurate "Labor Force" Table IV-4

We are in complete agreement with your statement that "resort work is not the preference of all." Footnote 1 in Table IV-14 does not, as you state in your memorandum, "...assume(s) all available locally-born workers are employed in tourism." In concluding that it does, you appear to have overlooked two important facts. First, the table applies only to the increase in the labor force; the large number of existing non-resort-related jobs which presently exist in the region were assumed to continue to be available to prospective workers. In 1975, the latest year for which data is available, this amounted to 1,500 to 1,600 jobs. The number is even higher if we consider jobs outside the Kohalas held by Kohala residents. Second, the number of jobs shown in the table represents those resulting from secondary growth as well as direct visitor industry employment. Many of the jobs that would be created are related to the visitor industry only indirectly, i.e., they are jobs that are supported primarily by the permanent residents of the area. Examples of these include school teachers, store clerks, government workers, truck drivers, employees of banks and other financial institutions, etc.

While I believe the preceding explanation responds to the specific technical issues raised in your letter, I would like to take this opportunity to re-emphasize a point made in the EIS that appears to underlie the concerns you expressed. Already-planned resort projects in South Kohala will generate a need for workers well in excess of the needs of the existing resident population of the Kohalas, and the proposed Mahukona Resort project would add to this labor force deficit. In order to staff the jobs that are expected to be created, large scale in-migration will be necessary. This impact is identified quite clearly in the EIS (see, for example, Table IV-17).

Hawaii Tourism Impact Plan Projections: The labor force projections presented in the Hawaii Tourism Impact Plan: West Hawaii are now a decade old. They are based on development proposals that were being put forth at that time. Significant changes have been made to those plans since then that make the projections contained in the Hawaii Tourism Impact Plan obsolete.

I was unable to determine exactly where in that document you obtained 9,000 persons as the estimated labor force requirement for the Waikoloa project alone. Page 52 does state:

> Of the ultimate (Waikoloa) population of 29,300 persons, 9,968 will be workers and their dependents (emphasis added) supported by employment opportunities generated in Boise's resort area.

Please note that the 9,968 figure refers to workers and their dependents, i.e., to the total resident population, not just to employees.

3. Access

The heading titled Access on page II-5 falls under the higher-level heading on page II-1 titled "PROPOSED ON-SITE DEVELOPMENT." Thus, these four sentences refer only to the future access roads which would be developed for the resort. Existing conditions, such as the jeep trails, were not addressed in this chapter which describes the proposed project.

Since development plans are at such a conceptual stage, it is not possible to fully determine the impact of the resort on jeep trails and other traditional trails. However, it is almost certain that existing jeep trails on the resort site would be changed or eliminated as a result of proposed development. Until construction starts on each parcel, use of present access points and trails would be permitted. It may also be worth noting that the early design concepts for the resort provided for connecting all the resort properties to the Lapakahi State Historic Park with a north-south coastal pathway or roadway. However, nothing can be finalized until further discussion are held with the State regarding lease of the intervening lands and a definitive design concept for the resort itself is adopted.

Several additional factors will help mitigate the impact of the proposed Mahukona Resort project on the existing jeep trail system and present users. First, the trails in the State-owned parcels between the Mahukona Resort properties will remain to provide access to the coast for those who do not wish to drive on the roads through the resort. Second, the County Planning Department has been requiring the resorts in Kohala to provide public access both to and along the shoreline as a condition of development permits. Since the Mahukona Resort will have to apply for many approvals and permits (see Chapter VIII of the EIS), there will be opportunities to resolve the access issues.

4. Inaccurate Jeep Trail Map

The figure on page II-4 was based on the U.S. Geological Survey 7.5-minute quadrangle map of the area. This is the most detailed official topographic map available. The main purpose of this figure was to show the parcel boundaries of the Mahukona Resort site, and the U.S.G.S. map seemed appropriate to use as a base. There was no intention of misrepresenting the complexity of the jeep trail network. In response to several comments received, we have improved the figure by adding the few additional jeep trails which are visible on a 1" = 1000' aerial photo of the area taken in 1970. We realize that some trails might still be omitted either because they are more recent than 1970 or because vegetation obscures them on the photo.

5. Hawaiian Groups not Consulted

We forwarded this comment to the Bishop Museum for a response since they were the archaeological subconsultant for this project. Their reponse follows:

At present the Bishop Museum does not impose a general policy regarding interaction with local individuals, groups, or organizations during the conduct of contract archaeology. However, we are and always have been flexible and open in this respect. In areas where controversy regarding a specific project is known from the outset, we make every effort to cooperate and work closely with local groups. Some current examples are the Waimea-Kawaihae Road Corridor Project on Hawaii Island, the Kawela Project on Molokai Island, and the Kawainui Marsh Project on Oahu Island. However, in all of the examples and all contract projects, public meetings and interactions are conducted in conjunction with the contractors. Unlike pure research projects, during the conduct of a contract project, the museum as consultant or sub-contractor does not have the sole authority to conduct public meetings, etc. We have attended many public meetings, testified at hearings, and undertaken to inform interested parties regarding our work and the resulting recommendations and evaluations on other projects.

Normally, local individuals and groups are contacted during the conduct of intensive historical research involving informant interviews, etc. and also prior to conducting archaeological fieldwork in areas with minimal or no previous documentation. Specifically, in the case of Mahukona, a large number of archaeological remains were already documented with most of them included in the Statewide Inventory Site Files at the Historic Sites Section of the State Department of Land and Natural Resources. The major source of the background material for these files were obtained from our Department of Anthropology files, thus the Museum's field team was quite familiar with the area and its numerous sites.

As evident in our Limited Phase I report, even the tentative kinds of evaluations and recommendations presented are contingent on detailed analyses and interpretation of the data during the laboratory phase of the project following the fieldwork phase. The preservation as well as mitigation recommendations and the criteria used to evaluate specific sites can seldom be made in the field. Thus we feel that public input and discussions would be more appropriate to all parties involved, not during the fieldwork portions of the preliminary phases of the project, such as the subject Limited Phase I Project, but at the completion of the report when detailed recommendations and evaluations based upon thorough analysis and interpretation can be presented. Also as mentioned in the archaeological portion of the EIS as well as in the conclusions of the Phase I Report, the preliminary nature of the completed work only allowed for tentative kinds of recommendations and evaluations. As further more intensive phases of work are completed, the dispositions of specific sites will be finalized. During the upcoming more intensive phases, the opportunity to acquire verbal or oral information from local residents will not be neglected.

The Bishop Museum welcomes and indeed acknowledges the value of public input and discussions with interested individuals and groups pertaining to the local history. However, it has always been the policy of the museum to reserve the right to evaluate information obtained in the course of informant interviews, public discussions, etc. for inclusion in a report or publication.

Thank you for your comments. If there is any additional information that we may provide, please call me at 521-5361.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission
Bishop Museum, Department of Anthropology
Henry Ross

Na Ala Hele
P.O. Box 1572
Kealakekua, Hi. 96750

July 22, 1981

County of Hawaii Planning Dept.
25 Aupuni St.
Hilo, Hi. 96720

Re: Comments on the Mahukona Resort EIS

To whom this concerns:

Members of the Na Ala Hele non-profit organization who are residents of North and South Kohala have submitted the following information to me after considerable study of jeep trails in the areas to be effected by the proposed Mahukona resort:

1. The map on pg. II-4 showing existing jeep trails is erroneous. (Figure II-3)

2. In Kaiholena there are three highway-to-shoreline trails not shown on the map.

3. A well-used dirt jeep trail is also not shown on the map. It is in Kehena 2 and leads directly to Keawe'ula Bay. Another old, grassy jeep trail is in Kehena 2 and is perpendicular to the shore at the middle of the property. The jeep trail which follows the shoreline in Kehena 2 continues further south than is shown in Figure II-3. Another jeep trail enters Kehena 2 from the next ahupua'a to the south, Puanui. A long-time kama'aina resident of Kohala believes there is a mauka-makai ancient Hawaiian foot-trail on the north side of Kehena 2. However an on-site inspection is needed to confirm this.

4. In general the jeep trail network is much more complex with overlaps and parking areas than is indicated in the over-simplified Figure II-3.

Why is this information significant? The assertions made on pg. IV-68 that a) the "dry side" of Kohala is not a prime area for fishing and that b) "some" dislocation of such activities may be expected with development, and further that c) rights-of-way through the resort development will "actually increase the accessibility of many areas", are seriously inaccurate! The presence of well-traveled and extensive jeep trails in the subject areas is ample evidence that the public relies on the fishing and camping available along the numerous coves and inlets to be found between Mahukona and Kawaihae. Having lived most of my life in North and South Kohala I know from personal experience that these jeep accessways are honeycombed with families on weekends and that the fishing is excellent when you know where the good spots are. There are nicknames for almost every fishing and camping spot along that coast. The accessibility of these areas is presently extensive, and private developments would inevitably curtail current use of these jeep trails by the public. Incidentally some of the jeep trails along the shoreline are successors to ancient Hawaiian foot trails which kama'aina remember were once easy to follow prior to kiawe infestation. I am told that

sections of the ancient trail occasionally can be seen where the jeep trail did not obliterate it. How does the Highways Act of 1892 affect the disposition of the jeep trail which follows the ancient trail?

Unfortunately I have been much too busy to be able to examine the EIS in as much detail as it deserves. On pg. VII-4 appears the admission that "already-planned Kohala resorts appear likely to result in an oversupply of hotel rooms." Is yet another major resort such as this Mahukona proposal in the best interest of Hawaii County's tourist industry and economy as a whole? The major resort areas already approved in Kalahuipua'a and Anaeho'omalu could be more than sufficient to accommodate tourist traffic which has been on the decline. It seems that with the increase in hotel room inventories, we have seen hotel occupancies plunge to their lowest levels in 10 years. (See "Hawaii in 1980 - A Recap", First Hawaiian Bank's Economic Indicators, April 1981) Poor hotel occupancies lead to poor quality employment for our residents. Condominiums offer even less significant employment opportunities than hotels. Is it possible that condominiums are competing with hotels by offering an attractive alternative living arrangement and investment to the visitor?

Could the report entitled, Potential Social Impacts and Social Management Issues Arising from Development of a Proposed Resort Complex at Kahukona, North Kohala, Island of Hawaii be shared with the County office in Kona? I would like very much to review that report which utilizes research studies written by me.

Mahalo for this opportunity to participate in the EIS process.

Sincerely,

Deborah Chang Abreu

Deborah Chang Abreu
President, NA ALA HELE

cc: Mahukona Properties

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
5th Floor Hawaii Bldg. 745 Fort Street Honolulu HI 96813 Telephone (808) 521-5361 Telex [illegible]

August 27, 1981
81AC-1472

Ms Deborah Chang Abreu
President, Na Ala Hele
P.O. Box 1572
Kealakekua, Hawaii 96750

Dear Ms Abreu:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 22, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us. We appreciate the time you and members of your organization spent reviewing the EIS and preparing your comments. The remainder of this letter responds to the concerns you expressed.

Jeep Trails (Figure II-3)

This figure was based on the U.S. Geological Survey 7.5-minute quadrangle map for the area, the most detailed official topographic map available. The main purpose of the figure was to show the parcel boundaries of the Mahukona Resort site, and the U.S.G.S. map seemed appropriate to use as a base. There was no intention of misrepresenting the complexity of the jeep trail network. In response to your comment we have improved the figure by adding the few additional jeep trails that are visible on a 1970 aerial photo of the site (scale 1" = 1000'). We realize that some trails might still be omitted either because they are more recent than 1970 or because vegetation obscures them on the aerial photo. These will be identified and mapped as planning for the project continues.

Ancient Hawaiian Foot Trail

Further archaeological work will be done on the Kehena 2, Lamalaloa, and Kaupalaoa properties. The existence of a mauka-makai ancient Hawaiian foot trail on the north side of Kehena 2 could be confirmed at that time.

Fishing Along the Dry-Side of the Kohalas

The statement on page IV-68 of the EIS that "the 'dry side' of the Kohalas was not a prime area for fishing" was not intended to misrepresent the quality of the fishing there. The statement was based on information which Community Resources, our social impact subconsultant, obtained from fishermen in North Kohala who had noted a decline in fish populations in this area and who considered the "wet-side" fishing much better.

The marine research consultant's report, however, indicated that the dry coastline of North Kohala has more abundant food and aquarium fish than the Kona Coast. Therefore, to give readers of the EIS a better perspective on the quality of fishing here, the first sentence on page IV-68 will be changed to read as follows:

> **Fishing and Food Gathering.** The "dry side" of the Kohalas is not as bountiful an area for fishing and food gathering as the "wet side." However, the weather is generally better on the "dry side," and the marine resources off the dry North Kohala coast were found to be more abundant than areas surveyed along the Kona coast.

Changes in the remainder of this subsection are discussed below.

Present and Future Access to and Use of the Coast

As you know, the legal issues surrounding access to the coast are complex. While it is difficult to succinctly summarize all the issues, we do not believe the statements in the EIS were "seriously inaccurate." However, to help review the concerns you expressed we asked John Knox of Community Resources, our social impact subconsultant, to assist us in replying to the comments regarding the quotes labeled "(b)" and "(c)" in your letter since these are contained in the section of the EIS summarizing his report.

Our statement that shoreline access would be increased by development of planned and proposed resorts was made after careful study. Presently, access to most of the dry-side Kohala coast is limited to those who walk from the highway or who have four-wheel drive vehicles; moreover, it generally involves crossing private property. Construction of the planned and proposed resorts would eliminate both these physical and legal barriers.

After receipt of your letter questioning our access statement, Mr. Knox discussed the matter with you by telephone. It is my understanding from him that you agreed that access to certain points on the coast might be increased by development of the planned and proposed resorts, in the sense that these particular sites would no longer be restricted to people with jeeps, or those willing to make long hikes. At the same time however, you pointed out that the current informal and relatively isolated nature of fishing and recreational use of the area would probably change. We agree that this is an important impact, and it was noted on page IV-66 of the EIS that the increased congestion in parks and other public areas resulting from the increased *de facto* population of the districts "would tend to interfere with the kind of leisure-time socializing that now occurs."

In your letter, you also objected to the sentence in the EIS regarding the dislocation of fishing and food gathering activities (page IV-68), especially the use of the word "some" to describe this dislocation. The word was not

used, as you apparently thought, as the opposite of extensive, but simply as an adjective meaning an unknown amount. Certainly, fishing along the shoreline could not be banned by adjacent landowners since the area up to the vegetation line is considered public. Development at the South Kohala resorts and the Mahukona Resort, depending on the specific design, could discourage some current fishermen and other shoreline users for whom relative seclusion, especially from curious tourists, is a psychological, if not physical, necessity. The direct impact of resort development on current users of the North Kohala shoreline would be limited since there would still be a large amount of undeveloped shoreline; however, the increase in resident population expected from the Mahukona and South Kohala resorts would probably increase competition for use of this shoreline and thus affect the present isolated nature of coastal recreational uses.

In order to clarify the statements regarding these issues, the paragraphs under the Fishing and Food Gathering heading will be changed to read as follows (after the first paragraph quoted above):

> Both solitary fishermen and family groups frequently take jeep trails to and along the coast for fishing and picnics. Some dislocation of such activities is to be expected from development of the planned South Kohala resorts. It is difficult to predict how much effect these South Kohala developments will have, or how much more effect the Mahukona Resort would have, because the impacts will arise more from induced residential growth than from tourist activities. As previously noted, the timing, distribution, and composition of residential growth generated by the South Kohala resorts all remain unknown, hampering assessment of the effects of the proposed Mahukona project.
>
> The Mahukona Resort site itself, i.e., the land, is of limited value as a food gathering site, and the developer intends to provide public access to the shoreline as required by law. With the influx of people expected as a result of both the Mahukona Resort and already-planned South Kohala resorts, access to both the shoreline and "wet-side" mountain areas is likely to become a more volatile issue. Some of the currently used access trails are not for legal entry except with permission of property owners, and so public rights-of-way provided by the new resorts would actually increase legal accessibility to the coast from the highway. At the same time, the nature of the shoreline experience may change from its present, relatively solitary character, and fishing--already considered in some decline by local fishermen due to greater numbers of persons fishing--would probably suffer some further decline in terms of the available stock.

Highways Act of 1892

Belt, Collins & Associates did not undertake any research concerning the implications of the Highways Act of 1892 as part of its work on the EIS. A representative of the owner (Mahukona Properties) indicated that the exact status of old Hawaiian Trails is still a subject of legal debate and that the State Department of Land and Natural Resources has not taken a firm position on the matter. It is his expectation that this land tenure question will be brought under more careful scrutiny if the General Plan amendment being requested for the project is granted.

Visitor Accommodation - Supply and Demand

In preparing the Mahukona Resort EIS we have sought to explore the major issues surrounding development of the proposed project in as thorough and objective a manner as possible. Hence, we view the passage indicating that "already-planned Kohala resorts appear likely to result in an oversupply of hotel rooms" as a simple, straightforward statement of fact; it was most certainly not an "admission" made grudgingly by us. The figures presented in the EIS (see pages II-9 to II-15 as well as page VII-4) do indeed show a probable surplus of hotel rooms. At the same time they are equivocal with respect to the overall (i.e., hotel room and condominium) supply/demand picture. There could be a surplus, a rough balance, or a deficit depending upon which assumptions prove to true.

Role of EIS in the Decision-Making Process

Your question, "Is yet another major resort such as this Mahukona proposal in the best interest of Hawaii County's tourist industry and economy as a whole," is, of course, the central issue that must be decided by the County in determining whether or not to grant the General Plan amendment that Mahukona Properties has requested. The EIS has not attempted to provide a single answer to that question because to do so involves value choices that can only be made legitimately by responsible County officials; it has sought to present the factual material on which these decision-makers could base their judgements.

Hotel Occupancy

With respect to the hotel occupancy issue raised in your letter, we can only state that the market analysis prepared for the project by the firm of Hastings, Martin, Hallstrom and Chew, Ltd. has convinced the investors in Mahukona Properties that an adequate market exists for the development they are proposing. Hotel occupancy rates on the Big Island are, as you noted in your letter, quite low at the present time, however. If this situation were to continue for an extended period of time, I am sure that the market forecasts would be revised. Until that time, the present problems are being treated by resort developers as a temporary lull that will disappear as general economic conditions improve and as the construction of new facilities on the Kohala Coast makes that area a stronger competitor for tourism dollars.

Competition of Condominiums With Hotels

Currently available data suggests that condominium apartment units are, to a certain extent, competitive with resort hotels when the apartments are put into rental pools marketed to transients. They do attract some persons who would not come if they were forced to stay in a normal hotel room without cooking facilities or who find a two-bedroom apartment more economical for their group than typical hotel rooms. But there is clearly a great deal of overlap; hence, many visitors who now use condominium apartments would use hotel rooms if the apartment alternative were not available. If the County wished to protect hotel owners from the effects of free competition, prohibiting construction of additional condominium units would definitely aid in this effort. It would have a number of other very significant effects as well, however, especially on the availability of capital needed for visitor accommodation development, and the issue should be carefully examined before taking such an action.

Social Impacts Subconsultant Report

Since the Hawaii County Planning Department forwarded us this letter, we hope they have responded to your request to review the social impact report, a copy of which is in their possession. All the supplementary studies submitted to the Hawaii County Planning Department in support of the General Plan amendment request are available from them.

Thank you for your comments. If you have additional questions, please call me at 521-5361.

Sincerely,

Perry J. White

Perry J. White

P.JW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission
Community Resources

July 21, 1981

Dr. Sidney Fuke
Planning Director,
County of Hawaii
Hilo, HI 96720

Aloha Sydney:

After careful examination of the Mahukona Resort, Environmental Impact Statement, I must express my sincere opposition to the proposed project. Fundamentally, the proposal in its present form is contrary to the economic and social commitment of the North Kohala community, as it creates a precedent for continued hotel development which will adversely impact on a substantial portion of the North Kohala area and its corresponding agricultural activity.

Furthermore, it is my sincere belief that agriculture and broad-based hotel development are incompatible in the ongoing competition for natural and human resources. Unless there are substantial reasons or explanations to the contrary, I will maintain such a contrary position on the issue.

Sincerely yours,

Dr. A.L. Solomon

XII-50

567 So. King St. Suite 100
Honolulu, Hawaii 96813
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August 27, 1981
81AC-1441

Dr. A.L. Solomon
Office of Hawaiian Affairs
567 South King Street
Suite 100
Honolulu, Hawaii 96813

Dear Dr. Solomon:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 21, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us. A primary purpose of any EIS is to provide the factual information decision-makers need, and we are pleased that our report assisted you in formulating a position with respect to the proposed project.

If the EIS is accepted as an accurate and complete description of the project's probable effects, the County will continue to process the General Plan amendment petition that has been submitted by Mahukona Properties. I am sure that your views, as well as others who have participated in the EIS process, will be taken into consideration by the Hawaii County Planning Department, Planning Commission, and County Council as they review and act upon the request.

Thank you for your letter and for the time you spent reviewing the EIS. If you have additional questions, please call me at 521-5361.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 • 2540 Dole Street
Honolulu, Hawaii 96822

2 July 1981

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Gentlemen:

Subject: EIS Mahukona Resort, North Kohala, Hawaii,
June 1981

We have reviewed the subject EIS and have no comment to offer. This material was reviewed by WRRC personnel; we thank you for the opportunity.

Sincerely,

Edwin T. Murabayashi
EIS Coordinator

ETM:jm

cc: H. Gee
Y.S. Fok
Mahukona Properties

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
5th Floor Hawaii Bldg. 745 Fort Street Honolulu, HI 96813 Telephone (808) 521 5361 Telex (723)8733

August 12, 1981
81AJ-443

Mr. Edwin T. Murabayashi
EIS Coordinator
University of Hawaii at Manoa
Water Resources Research Center
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Murabayashi;

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 2, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We understand you have no comments to offer. Thank you for the time spent by you and other WRRC personnel reviewing the EIS.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

RECEIVED
JUL 27 1981
BELT, COLLINS & ASSOCIATES

P.O. Box 821
Kapaau, Hawaii 96755

July 18, 1981

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Sirs:

I have read with interest and distress the Environmental Impact Statement prepared by Belt, Collins, and Associates for Mahukona Properties, Inc. concerning the latter's plans for a resort development in North Kohala. A resident of the district, I treasure the humanistic and spiritual values that typify North Kohala's citizenry. I should hate intensely to see our community transformed into another Waikiki, Kaanapali, or Kihei. I therefore urge you to pass unfavorably on Mahukona Properties' request for the zoning change that would permit their proposed development.

The E.I.S. glosses over some most import issues that must be considered when assessing the impact the Mahukona development--or any resort development--would have on North Kohala. The probable social and economic effects are dealt with cursorily at best. Neither are the questions of where the resort's water is to come from or how its effluence will be disposed of addressed at all satisfactorily.

In Chapter IV the statement predicts, among other results of the development's realization: the probable formation of an upper middle class in the area, a considerable increase in the "haole" population of the district, a decrease in "old timers'" political power, a takeover of local citizen organizations by "more verbally assertive newcomers" (i.e. immigrant haoles), and "interference with the leisure time sociology" that now obtains in the area. These prognostications are then dismissed as inevitable byproducts of the proposed development, as are the issues of value changes (from a spiritual, neighborly rural ethic to that embraced by a more impersonal, materialistic "urban" or "resort" culture) and probable increases in crime and other forms of family and societal disruption. Contrary to what Mahukona Properties and Belt, Collins principals apparently believe, the above issues are critical ones that imply probable drastic changes in the lifestyle of the several thousand North Kohala residents.

The summariness with which the problems of water supply and sewage disposal have been investigated by the developers is appalling. While they propose drilling a well at the 1200-foot level inland of the resort, they have yet to determine if, in fact, there is water there to be pumped or, if there is, what effect withdrawing it at that point will have on the area's already marginal ground water reserves. Offered alternatives (similarly uninvestigated)

are to draw water from Hawi's well system or from the Kohala ditch, thus coopting sources heavily depended upon by current North Kohala residents. Sewage disposal injection wells, the developers assert, will work fine as long as nothing goes wrong. But what if something goes awry? Experience with injection wells in other areas has demonstrated that such wells, indeed, often do clog, pollute ground water supplies and in general are a less than reliable method of sewage disposal.

A serious defect in the format of the E.I.S. is that the only alternatives considered by its preparers assume Kohala districts with the proposed Mahukona development or without Mahukona but with all other proposed resort projects completed as planned. The possibility of no further or minimal resort development was not even considered. Gentlemen, I do not accept it as inevitable that North and South Kohala--or any area in Hawaii, for that matter--must be developed as resorts. Neither, I believe, should you. As Mayor Matayoshi has admitted to me in person, there are alternatives. Among them I propose:

Diversified agriculture - Hawaii island could easily become the breadbasket for the whole state and, if necessary, for all or most Pacific island communities.

Energy - As you know, our island abounds with potential for developing renewable biomass, geothermal, and solar energy sources.

Education and research - Hawaii island is an ideal site for education and research dealing with geophysics; tropical meteorology; astronomy; marine and nautical science; tropical, mediterranean, and desert agriculture; and Pacific area humanities. Hawaii might become one of the world's great learning centers.

There may be other plausable alternatives, but the ones I have posited would do everything for the people of Hawaii that resort development would and a great deal more. Yet they would avoid many if not most of the serious drawbacks inherent in the monomaniacal plunge toward resort development Hawaii seems to be taking.

I again urge you to reject Mahukona Properties' request for a zoning variance. Please help preserve the spirits of aloha and aloha aina that still prevail among the people of Kohala and our island.

Mahalo and aloha,

[signature]

Kendall Ellingwood, Jr.
Hawi small farmer

P.S. [illegible]

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
5th Floor Hawaii Bldg. 745 Fort Street Honolulu, HI 96813 Telephone (808) 521-5361 Telex [illegible]

August 27, 1981
81AC-1446

Mr. Kendall Ellingwood, Jr.
P.O. Box 821
Kapa'au, Hawaii 96755

Dear Mr. Ellingwood:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 18, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. Thank you for the time you spent reviewing the EIS. The remainder of this letter responds to the specific comments you have made.

Social and Economic Effects

Your letter asserts that "...the probable social and economic effects (of the proposed project) are dealt with cursorily at best." You summarize some of the EIS's discussion of possible social impacts dealing with political and social-class effects and then write:

> These prognostications are then dismissed as inevitable byproducts of the proposed development, as are the issues of value changes...and probable increases in crime and other forms of family and societal disruption. Contrary to what Mahukona Properties and Belt, Collins principals apparently believe, the above issues are critical ones that imply probable drastic changes in the lifestyle of the several thousand North Kohala residents.

While it is to some extent a subjective matter as to whether effects are considered to be thoroughly assessed or whether they are felt by the reader to have been too readily "dismissed," a careful reading of the EIS turns up some points relevant to your contention:

o The social portions of the EIS stress that many of the impacts referred to in your letter are not considered "inevitable," but rather are subject to some degree of control through various management activities.

o A major theme in the EIS is that the future of North Kohala without the Mahukona project may involve sweeping socio-economic changes from residential growth induced by South Kohala resort developments which have already been approved but are not yet built. Thus, many of the potential changes discussed in the EIS are "by-products" more of these South Kohala resorts than of "the proposed development" (by which, I assume, you mean the Mahukona Resort).

While this viewpoint, i.e., that the real impetus for social change has already been generated by the approvals granted to South Kohala resort development, may at first strike you as a subterfuge designed to lessen the apparent impact of the Mahukona Resort project, this is most definitely not the case. Had we wished to de-emphasize the changes that are likely to occur it would have been simple to ignore the other projects. By so-doing it would have appeared that the Mahukona Resort's labor force requirements could be met without in-migration, the greatest potential cause of adverse social impacts. In fact, such a narrow approach would have made it seem that the jobs that the resort would create are essential if the needs of the local youth entering the labor force are to be met. It was our desire to avoid such a gross distortion that led us to the approach that was used.

o There is no statement in the EIS that the social effects you mentioned are unimportant. To the contrary, such topics are not often considered in Hawaii EISs, and their very inclusion is indicative of the great importance which we attach to them. However, the EIS does note the difficulty in measuring such effects, in making precise and accurate predictions about changes, and in drawing conclusions about the separate effects of the proposed Mahukona Resort above and beyond the changes that may be produced by the already planned South Kohala resorts and the associated residential growth which they would stimulate.

Water Supply

The exact means by which water would be supplied to the proposed resort project has not been fixed at this time. However, that does not mean that the vital water supply question has been investigated "summarily" by the owner. It is true that it is impossible to prove beyond a doubt that wells inland of the resort will work until a test hole is drilled. However, test data is available from other wells in the same general area, the most indicative of which is well No. 6549-01 in Kohala Estates about 3.5 miles south of the proposed supply area for the Mahukona Resort. These provide a reasonable indication that wells drilled in the "Deep Well Exploration Area" shown on Figure V-10 (page V-65) of the EIS would be successful.

As indicated above, in order to confirm the availability of adequate supplies of potable water at this location it would be necessary to drill an exploratory well and to conduct pumping tests on it. The well would need to be at least 1,350 feet deep, and it would normally be at least 16 inches in diameter. This would allow it to be used (with the addition of pumps, storage and transmission facilities, and other appurtenances) for production if the well proved successful. The estimated cost of drilling and testing a well of this sort is about $400 per foot. Hence, a 1,350-foot test well would cost on the order of one-half million dollars. It is simply not feasible for the developer to make this kind of investment before receiving some form of assurance (in the form of General Plan designations that would permit the proposed resort use) that there will be an economic use for the water if it is found.

While the probability is high that wells mauka of the resort site will prove a satisfactory source of potable water, there is some chance that they will not. In that case, wells west of Hawi but east of the Kohala Mountain rift zone would be used. Groundwater in adequate quantities is present there; it is presently unused, and its withdrawal for resort use would not conflict with County Department of Water Supply plans. Moreover, wells in this area could easily be used to serve the residents of Hawi and other North Kohala communities as well.

Sewage Disposal

The sanitary engineers who developed the conceptual plans for the sewage treatment plant and disposal system described in the EIS believe that your doubts regarding its long-term viability are unfounded. In support of this contention they cite a number of factors that you may not have been aware of when you wrote your letter. The most important of are summarized below.

As discussed on pages IV-64 through IV-70 of the EIS, the primary means of effluent disposal would be via golf course irrigation. Injection wells would serve only as a back-up system for use during very rainy periods when golf-course irrigation is not possible and/or in the event of equipment failure that temporarily prevents use of the irrigation system.

The fact that the effluent disposal wells would be used only intermittently, rather than continuously as has been the case with nearly all the injection wells that have experienced problems, will greatly reduce the likelihood of their becoming clogged. They will be less likely to fail both because the drastic reduction in the volume of effluent that passes through them and the more than sufficient "off-duty" time for conducting proper maintenance of the wells.

Finally, knowledge of the behavior of injection wells has improved markedly in recent years so that the wells now being built incorporate technical features which allow them to be regularly cleansed of the solids which tend to accumulate in them and in the surrounding geologic material. This, in turn, forestalls the kind of clogging which has led to many of the failures that have been experienced in the past with this kind of disposal system.

Alternatives Considered

Your observation that the EIS did not discuss a "no further Kohala resort development scenario" as an alternative is correct. In preparing any EIS it is necessary to bound the problem in some fashion. If this is not done, one is left with a nearly infinite number of alternatives, and the analyses of these becomes an impossible task. Our decision was to assume that large-scale resort development would occur in South Kohala regardless of what transpired on the site of the proposed Mahukona Resort. This judgment was based on the fact that, (i) the South Kohala resort development is shown on the Hawaii County General Plan, (ii) that the concept of multiple resort uses along the

South Kohala coastline continues to be supported by State and County governments, and (iii) that public agencies and private developers have already invested tens of millions of dollars in the transportation systems, utilities, and other infrastructure needed to support that development, and that reversal of the existing development policies would have severe financial implications for all concerned.

This is not to say, of course, that it would be impossible to reverse existing policies which support resort expansion. It simply means that this appears so unlikely to occur that it would have been inappropriate to speculate on its implications in the EIS. It is true, however, that a periodic reevaluation of the direction that the citizens of the Big Island wish the County to take is desirable. Periodic review and updating of the General Plan (most recently in 1978-79) is mandated by ordinance for the specific purpose of insuring that this occurs.

Final Remarks

Your letter was both thoughtful and well-written, and you need make no apologies for the quality of the typewriting. I understand that you oppose and will continue to oppose the proposed project on broad philosophical grounds and do not believe that its approval would be in the best long-term interests of the County. However, I hope that the responses that we have provided above convince you that the EIS adequately addresses the technical issues that are involved and will assist County decision-makers in their work. Thank you for your concern.

Sincerely,

Perry J. White

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission
Community Resources

Box 155
Hawi, HI 96719
July 23, 1981

Planning Department
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

Dear Planning Department:

Please find below my comment on the Mahukona Resort EIS.

PUEO - HAWAIIAN OWL

I am enclosing a picture of the owl whose habitat includes this region. It should be listed on page V-24. Endemic is the word appropriate here, referring to a species or subspecies that evolved in Hawaii and occurs naturally nowhere else in the world. However, the owls are considered numerous on this island.

I have observed the owl in the region, and Mr. Sam Hook of Waimea, seventy years of age, a lifelong resident, of Hawaiian ancestry, is also familiar with the pueo here. The pueo may have been overlooked in the EIS because it is not a vocal bird, and birds are often identified by their vocalization. Mr. Hook reports seeing a pueo in the ahupuaa south of Kehena 2 on the weekend of July 18, 1981. Mr. Hook finds not too many pueo recently although there "used to be a lot." He describes this warm coastline region as "all owl area."

Preferably the EIS will mention that the owl will here lose several miles of preferred open grassland habitat. The bird is considered endangered on Oahu primarily because of loss of habitat. It can be noted that the pueo was an aumakua or guardian ancestor spirit for certain families or ohana in old Hawaii.

UNDESCRIBED ARCHAEOLOGICAL FEATURES

The handbook of EIS Regulations specifies (E:1:42:c) that the EIS shall "describe" archaeological features of rare or unique value. Most serious is the fact that only one of four ahupuaa sections has received a thorough archaeological survey, with a general focus on the makai portions, in this EIS.

In addition the "Limited Phase 1 Survey of Mahukona Properties, North Kohala, Island of Hawaii" (1980) by Rose Schilt and Aki Sinoto is not available at Kohala library and is not in the State microfilm or microfiche--that is, not listed in the state collection. Thus the discovery of the remarkably rich Hawaiian ruins on these properties has not been shared.

The EIS is to be commended for stating: "Since there are so many archaeological sites of considerable value, if great care is not taken in the design of the project to preserve not only individual sites but also groups and relationships, the impact of the proposed Mahukona Resort on archaeological resources could be highly adverse."

Notwithstanding the reputation of Belt Collins which prepared the EIS, there is nothing in the "Articles of Incorporation" of Kehena Beach, Inc., the general partner and owner, which should lead the County or Hawaiian civic groups to suppose its interests are other than sheerly making money. I am sending a copy of this document under separate cover to the Planning Department.

The "reconnaissance surveys" of Kehena 2, Lamaloloa and Kaupalaoa ahupuaa were admittedly cursory. Let me describe an archaeological complex in Kehena 2 which, to the best of my understanding, does not appear in the EIS. Mr. Hook viewed these ruins at Kehena 2 also, and concurred in the general descriptive conclusion.

On two adjacent bluffs separated by a gulch are cairns or burial mounds. In the gulch may be found a series of shelter caves, some shell debris, and a natural rock pool. A walled enclosure with a partial waterwashed-pebble floor occurs perhaps 50 feet from one of the cairns, which itself is surrounded by a rock wall, not in good preservation, however.

The southern cairn complex is larger. There are two substantial squared cairns while clustered nearby are five or six rock mounds which may or may not also be burials. One of these has been rifled, and lehu seashell litter is strewn about.

This complex appears well above the shoreline.

CONCLUSION: It would appear a serious policy mistake to accept as final an EIS which does not provide more thorough archaeological documentation on all affected properties, particularly since the area, as the EIS itself states, is strikingly rich not only in early Hawaiian artifacts but in pre-contact artifacts. The "Articles of Incorporation" of Kehena Beach, Inc., the general partner, are of so entirely mercenary a character that mere expressions of good intentions in the EIS will probably not suffice in securing numerous archaeological remains of as yet unassessed value.

RARE CORAL - PALYTHOA TUBERCULOSA

In Proceedings of the Symposium on Status of Resource Investigation in the Northwest Hawaiian Islands (Sea Grant Misc. Report, UNIHI SEAGRANT-MR-80-04, August 1980), Richard W. Grigg and Steven J. Dollar write, ". . . the soft corals Palythoa tuberculosa and Sinularia abrupta are both very abundant at Nihoa Islands but are rare or absent on all other islands" (page 110).

Steven Dollar also provided the study of the coral and marine community on which the EIS description, beginning on page V-27, is based.

Palythoa tuberculosa is not mentioned in the body of the EIS, but only in the Appendices, page C-1. It is listed as being "common" among reef coral species present in these waters.

Since it is rare or nonexistent on all main islands, yet commonly occurs here, it falls under EIS Regulations requirement Ei:42:c, and according to the requirement should receive special emphasis, presumably in the main text.

REEF FISHES AND DEGRADATION OF MARINE COMMUNITY

The EIS reports that "The reef communities at Mahukona represent some of the most pristine and diverse invertebrate and fish assemblages in the Hawaiian Islands" (page V-33).

Thus the reef community would appear to be a unique resource in quality as a whole, and therefore fall under regulation Ei:42:c, deserving special emphasis.

However reef fishes are given only two paragraphs. I feel the reef fishes deserve more careful attention.

The EIS states, "The proposed project does not involve any direct physical and chemical modifications to the near shore environment" (page V-33). However, in a comparable EIS, that for Boise Cascade cited in the bibliography, matters of fertilizer runoff and seepage were discussed, if briefly. So they should be here.

It is further not to be supposed that the ultimate introduction of a constant nearby population (including tourists figured as a constant presence) of at least 5,000 persons over several miles, will not dramatically impact this marine resource, particularly since, as the EIS states, "the biological communities present in the offshore areas along the resort site are highly adapted to relatively stable and benign environmental conditions (e.g., low sedimentation . . .)" (page V-33).

Windblown sedimentation should be discussed since the slope of the land is all downhill to water in the region; since strong offshore winds are common; and since the soil is very dry and dusty, resembling red dust.

Urbanization also merits discussion in this regard.

Due to the very poor soil, fertilizer concentrations would need to be especially high, as might be noted.

Many residents care about the survival of this marine community.

Sincerely,

Judith Graham

Judith Graham

Under separate cover:

"Articles of Incorporation, Kehena Beach, Inc., June 2, 1971"
"The Status of Reef Studies in the Hawaiian Archipelago," article

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
[illegible]

August 27, 1981
BIAC-1470

Ms. Judith Graham
Box 155
Hawi, Hawaii 96719

Dear Ms. Graham:

Environmental Impact Statement for the Proposed
<u>Mahukona Resort Project, North Kohala, Hawaii</u>

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 23, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We appreciate the time you spent reviewing the EIS and preparing your comments. The remainder of this letter answers each of the concerns that you expressed.

<u>Pueo - Hawaiian Owl</u>

The Pueo (<u>Asio flammeus sandwichensis</u>) <u>is</u> listed on page V-24 (see the fourth paragraph entitled "Resident Indigenous Birds"). Although Mr. Bruner did not observe any Pueo during his study, it was noted in the last paragraph of page V-26 that Pueo have been sighted "in similar habitats elsewhere in the region." A sentence to this effect will be added to page V-24. As you noted, endemic is the more appropriate word for describing Pueo, so that adjective will be added on page V-24.

Mention of the habitat loss that will result from resort development on the Mahukona Resort site will be made more specific with respect to the Pueo. This will be accomplished by adding the following statement after the second paragraph under the Impacts on Wildlife heading (page V-26):

> While no Pueo were recorded on the site, it is a likely foraging area for this species, especially considering the large number of rodents (the Pueo's primary food) that were observed there. Development on the approximately two square miles of the Mahukona Resort site would reduce the Pueo's habitat, and perhaps population, as would new housing areas resulting from resort-related population growth. However, it should be noted that the habitat range of the Pueo is extremely broad as it "appears to be tolerant of wide climatic extremes" (Berger, 1972:93) and that the overwhelming majority of its Big Island habitat would remain.

Pueo were indeed considered aumakua for certain families. However, aumakua could take the form of <u>many</u> animals including sharks, owls, mud hens, lizards, eels, field mice, and caterpillars (see, for example, <u>Nana I Ke Kumu - Look to</u>

<u>the Source</u> by Pukui, Haertig, and Lee: p. 36). Because of this, we do not believe that the Pueo deserves special mention in this regard.

<u>Archaeological Features</u>

Thorough Survey: Additional survey work will be conducted on Mahukona Properties' land within the ahupua'a of Lamaloloa, Kaupalaoa, and Kehena 2 before any development activities are begun on them.

Availability of Survey: At the time the EIS was written it was our belief that a copy of the Bishop Museum's archaeological survey report was on file with the Hawaii County Planning Department. On July 14, 1981 we received a telephone call from the Planning Department informing us that they did not have a copy of the study. As a result of that call, a copy of the survey report was forwarded to them immediately. It was always intended that the information on these valuable resources should be shared. Copies of the Bishop Museum survey report are also being sent to the State Libraries in Kohala and Kamuela.

Securing of Remains: We have not had cause to read the Articles of Incorporation of Kehena Beach, Inc. as part of our work. However, given the private, profit-making nature of that business organization, I am neither surprised nor troubled that the document makes it sound "mercenary." Most landowners are strongly influenced by the profit motive, and even the tax laws of the State and County tend to encourage the "highest and best use" of land (which they define as the use providing the highest <u>monetary</u> return rather than the greatest spiritual or cultural value). In recognition of this, the citizens of Hawaii (the island and the state) have established agencies whose project review and approval powers enable them to insure that development respects those sites and artifacts which are considered important. Hence, the Hawaii County Planning Department and the State Department of Land and Natural Resources have the power to effectively represent the public's interest in these matters.

<u>Rare Coral - Palythoa Tuberculosa</u>

A copy of your letter was sent to Mr. Steven J. Dollar, the marine biologist who conducted the biological survey of the waters off the Mahukona Resort site and who is a co-author of the Sea Grant report cited in your letter. His response reads as follows:

> The data presented in "The Status of Reef Studies in the Hawaiian Archipelago" by Dr. Richard Grigg and myself is based only on 25 meter long quantitative transects at only one depth (10 meters) at the same exposure on each island. The mention of rare or absent status is thus not representative of whole islands, but just one habitat. Examination of qualitative survey notes indicates that this species commonly occurs on all islands in the Hawaiian Archipelago.

Since it is not a rare species, it does not deserve special emphasis, but Palythoa Tuberculosa will be added to the list of coral species occuring on the reef platform that appears on page V-30.

Reef Fishes

In response to your comment regarding the limited number of words devoted to a discussion of reef fishes, Mr. Dollar offered the following explanation:

> "The benthic (bottom-dwelling) communities are the focus of the marine assessment since they are much better indicators of stressful conditions than organisms with a high degree of mobility, such as fish. Also, the scope of the marine study was entirely qualitative; therefore the comprehensive species list and abundance estimates, along with descriptive paragraphs seems adequate to describe the fish populations. I would more than welcome any specific suggestions...on additional data to supplement the section on reef fish."

Degradation of Marine Community

Effects of Fertilizer Runoff and Seepage: As noted in your letter, the potential impact that fertilizer runoff and sewage effluent seepage might have on water quality was discussed in considerable detail in the Environmental Impact Statement for Boise's Waikoloa Beach Resort project. An even more extensive analysis of this phenomenon is contained in the Kalahuipua'a Environmental Impact Statement that was prepared for the Hauna Lani Resort. Belt, Collins & Associates prepared both of these analyses and is, therefore, intimately familiar with the conditions of which you spoke.

The reason that these two documents gave such in-depth treatment to water quality effects is that both resort sites lie behind anchialine ponds. (Anchialine ponds are shoreline pools that lack a surface connection to the sea but which contain water of measurable salinity and show tidal fluctuations.) Such ponds have slow turnover and mixing rates, and they constitute an ecosystem with an extremely delicate ecological balance. Hence, even relatively minor changes in the nutrient content of the groundwater which flows into them is considered to be of potential concern.

The Mahukona Resort site does not contain anchialine ponds such as are present at the two South Kohala resort sites mentioned above. Instead, the land ends in low cliffs at the shoreline. Hence, any additional nutrients which do enter the groundwater will be discharged directly into the ocean. As demonstrated in the two EISs cited above, relatively rapid mixing of the nutrients with the seawater takes place once this occurs. This mixing lowers their concentrations to the point where the marine impact is negligible.

Population Impact: As stated in the last paragraph on page V-34, the most probable effect on marine resources resulting from a larger population using this shoreline would be the increased exploitation of the desirable food and

commercial species. While the improved accessibility would be viewed favorably by those who benefit from these marine resources, others will view the decline in population of certain species as adverse.

Windblown Sedimentation: Since the Hawaii County Grading Ordinance limits the amount of land that can be exposed at one time during grading operations to 20 acres, the irrigation system and grass would be installed as work on the resort progresses. As a result, wind erosion from the site is expected to be quite limited.

Urbanization: Erosion resulting from development of the site and the possibility of impacts on the marine environment are discussed in the first full paragraph on page V-34. The conclusion that "the potential for damage to the marine environment from the proposed project is slight," is based largely on the fact that sedimentation rates are unlikely to increase significantly. In fact, the project could result in a long-term decrease in the amount of sediment reaching coastal waters because erosion from landscaped areas will be less than from existing xerophytic scrub.

Survival of the Marine Community: As planners and as residents of this state, we share your concern for this and other marine communities that inhabit island waters. The studies conducted for the EIS were expressly designed to gain an understanding of the composition of the marine community that would be affected by the proposed Mahukona Resort project, to identify the development actions which might be expected to affect it, to determine whether or not these actions might have a serious detrimental effect, and, where necessary, to suggest mitigation measures that could reduce the magnitude of the impacts. Based on the results of his survey, Mr. Dollar concluded, "if grading practices are designed to preclude episodes of intense sedimentation runoff, it is anticipated that the proposed development will cause no significant adverse environmental effects." Because of your interest in the biology of the area, I am attaching a complete copy of the Dollar report for your use. (Please excuse the poor quality of the pictures in that report. We do not have additional prints of the photographs, and their blue tint results in a poor Xerox copy).

Thank you for your comments. If there is any additional information we may provide, please call me at 521-5361.

Sincerely,

Perry J. White

PJW/AKY:ghs
attachment
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission
Steven J. Dollar

Belt, Collins & Associates
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August 27, 1981
81AC-1450

Ms Gretchen Grove
P.O. Box 523
Kapa'au, Hawaii 96755

Dear Ms Grove:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 7, 1981 letter to Hawaii County Planning Department concerning the project was forwarded to us. Based on the absence of any specific reference to the contents of the EIS, your letter appears to be a position statement regarding the General Plan amendment request rather than a set of comments on the EIS report.

As you may know, it is not the purpose of an EIS to argue for or against a proposed project. Instead, it is intended to faithfully describe the probable effects of all reasonable alternatives, including one where no action is taken. We believe the Mahukona Resort EIS has done this.

The information provided in the EIS will assist the County in deciding whether or not to grant the General Plan change that Mahukona Properties is seeking for its North Kohala land. In making their decisions, I am sure that the Planning Department, Planning Commission, and County Council (the bodies that must act on the General Plan amendment request) will weigh the value of limiting resort development to existing resort areas such as Kailua-Kona.

Thank you for your letter. I hope our response has clarified the role of the EIS in the General Plan amendment process. We appreciate the time you spent preparing your letter, and would be happy to answer any further questions you may have.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

Gretchen Grove
P.O. Box 523
Kapaau, HI 96755

County Planning Dept.
25 Aupuni St
Hilo, HI 96720

July 7, 1981

Dear Sirs —

I wish to make known my feelings on the proposed Mahukona Resort. As a resident and active community participant, I feel qualified that the proposed project would be detrimental to the social environment as well as the ecological environment of not only Kohala, but also of the County, possibly even the State.

I believe there is a need for such resort complexes but I believe they should be kept localized, such as Lahaina area for the island of Maui, Waikiki for Oahu, Kailua Kona for Hawaii. This allows the beauty and the charm of our islands to be maintained while these areas are still very accessible to kamaainas and visitors alike.

Please consider this matter carefully, for us, for our children, for our children's children.

Mahalo,
Gretchen Grove

July 10, 1981

Hawaii County Planning Dept.
25 Aupuni St.
Hilo, Hawaii 96720

Dear Members,

I am writing concerning the proposed Mahukona Resort. The Mahukona Resort Proposal Impact Statement contains a table showing over 50% of North Kohala residents surveyed favored the development. Asked was: are you in favor of a development like Keauhou, Kona?

I was never polled nor do I know any other person in Kohala who was polled. I strongly question the validity of this survey.

Where are these developers going to get their water? Are they going to wastefully water their golf courses in mid-day as I have seen other hotels in So. Kohala do?

It has been an uphill struggle for isolated No. Kohala to have any local fire department and equipment at all. Is our volunteer fire dept. due any consideration? Will the state or can the state afford to pay for this protection? Will the developers back these services financially?

Who is going to stay in these 4 hotels---each roughly the size of Mauna Kea Beach Hotel? Are tourists really going to desire the often windy, dusty and beachless Mahukona area? There are two new hotels one-half hour away with beaches nearby. Newspapers and television constantly remind us of the low occupancy rates of Big Island hotels.

Furthermore, I would be dead against these hotel rooms being converted into condominiums. I fear this could happen. It often does.

I would like to see all lawmakers actually represent the people. I would like to see the planning dept. survey Kohala fairly and listen to the community here. Please don't ask us to drive to Hilo.

Personally, as a macadamia nut grower, I pray Kohala remains rural and agriculture will be revived here.

Sincere aloha,

Dorothy Metzler
P. O. Box 617
Kapa'au, Hawaii 96755

XII-60

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August 27, 1981
81AC-1469

Ms Dorothy Metzler
P.O. Box 617
Kapa'au, North Kohala, HI 96755

Dear Ms Metzler:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort, a copy of your July 10, 1981 letter to the Hawaii County Planning Department concerning the project was forwarded to us for a response. We appreciate the time that you spent reviewing the document. The remainder of this letter addresses the concerns that you expressed.

Resident Survey

The survey referred to in the EIS was conducted by Public Affairs Advisory Services, Inc. (PAAS). A summary of the survey report is presented on pages IV-78 through IV-84 of the EIS. A copy of the complete survey results is on file with the Hawaii County Planning Department. The sample size of 521 represents approximately 6.5 percent of the total 1980 population of the North and South Kohala Districts.

The PAAS survey report does not describe the sampling methodology that was used. However, a description of the proposed methodology was contained in the proposal for the work that PAAS submitted to Belt, Collins & Associates on July 31, 1979. Since this proposal was the basis for our legal contract with them and we were never notified of their desire to use an alternative methodology, it was used as the basis of the description presented in the EIS. Subsequent to receipt of your and other letters, the PAAS officials who designed and supervised fielding of the survey, Dr. Daniel W. Tuttle and Mr. Walter Osakoda, were contacted. We then learned that PAAS had altered its sampling approach when in the field in an attempt to provide a more extensive sample. Therefore, we are making the following changes to the current description under the Survey Methodology heading on pages IV-78 and IV-79 of the EIS:

o The first full paragraph on page IV-79 will be replaced with:

Public Affairs Advisory Services originally planned a pinpoint sampling technique, which would have involved intensive door-to-door personal contact procedures only in selected geographical areas. However, to improve the representativeness of the sample, the company instead chose to attempt to reach every residential

housing unit in North and South Kohala. Inevitably, some households could not be approached because they were too isolated to find or because some threat to a survey worker's personal safety (e.g., guard dog) was present.

- The following will be substituted for the second sentence in the second full paragraph on page IV-79:

  The refusal rate among residents who were contacted was estimated to be approximately eight percent. However, no record was kept of the number of households at which nobody was home. In such cases, no survey instrument was left, and no return visits were made.

- A new final paragraph under this heading will be added to page IV-79:

  The 1980 U.S. Census reports the population of North Kohala was 3,249 and the population of South Kohala was 4,607. Thus, the sample of 261 North Kohala residents represents eight percent of the total population of that district, and the sample of 260 South Kohala residents represents nearly six percent of the total population of that district. The sample thus represents even higher percentages of the adult population of Kohala, although exact percentages cannot yet be determined because the Census Bureau has not reported any age breakdown for Hawaii's population.

Since PAAS went out of business in early 1981, their company records are no longer available. Thus, the descriptions of the actual methodology used are based on Dr. Tuttle's and Mr. Ozukoda's memories.

Water Resources

The potential sources of water for the proposed resort development are discussed in the EIS on pages II-5 through II-9 and on pages V-64 through V-79. In all likelihood, deep wells immediately mauka of the resort site would be used.

As you know, good water is quite precious in the arid Kohala coastal area. Because of this none of the golf courses that have been constructed use potable water (i.e., water that is suitable for drinking) for irrigation. Instead, they use brackish water that has too high a salt (chloride) content to be fit for human consumption. The system at the Mauna Kea Beach Hotel is constructed so that even the plants immediately around the hotel can be irrigated with brackish, rather than potable, water. Part of the irrigation water used on the golf course is treated effluent from the MKBH wastewater treatment plant. Because of this, mid-day golf course irrigation does not result in an unnecessary depletion of potable water supplies.

As indicated in the EIS, the Mahukona Resort would at first use brackish water for golf course irrigation. Even this would cease as soon as sufficient treated effluent becomes available from the resort's wastewater treatment plant to meet its needs.

Fire Protection

Fire protection, which is a County, rather than a State, function, is discussed on pages V-93 and V-94 of the EIS. The fiscal impact discussion presented on pages IV-48 through IV-54 of that document indicates that the project is likely to have a positive effect on the financial position of County government, i.e. that it would generate more revenues than costs. This increased income could be used to expand fire protection services in North Kohala. Whether or not it would be used for this purpose will depend upon the priority that County government attaches to it relative to other public needs.

Marketability

A market study conducted by the consulting firm of Hastings, Martin, Hallstrom and Chew, Ltd. concluded that there was sufficient demand for resort hotel and condominium units in the Kohalas to warrant development of the proposed project. There is always the possibility that this assessment will prove wrong, of course. However, so long as public investments in support of infrastructure are delayed until the viability of the project has been demonstrated, the risks that are associated with the undertaking are assumed almost entirely by the developer.

Thank you for your letter. If there are any further questions we can answer, please contact us.

Sincerely,

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

P.O. Box 703
Kapaau, HI 96755
July 20, 1981

Planning Department, County of Hawaii
25 Aupuni Street
Hilo, HI 96720

Dear Planning Department:

I am happy to be able to participate in the EIS process for Mahukona Resort.

In looking at the EIS prepared by Belt Collins, I was disturbed by the table represented on page IV 84, which was entitled "Kohala Residents' Reaction to Proposed Mahukona Resort Development."

Having lived in Kohala for some years, I was aware that most people here thought of only "one hotel" at Mahukona. The news of 1,500 hotel units and 3,200 [illegible] units, as reported in the local newspapers, came as a shock to many of us. I do not believe that over 50 percent of Kohala residents support a project of this size, as the table asserts. Further, it appears that the question asked of residents was seriously misleading, which has given the false percentages of the table.

THEREFORE I REQUEST either that this table be struck from the EIS, or that a new survey of residents be taken and its results included in the final version.

Why is the question misleading?

1) The question refers to a hotel-resort development like Keauhou. The word hotel is used in the singular, indicating one hotel. This was the understanding of Kohala residents who were asked the question. I have discussed the matter with some of them.

2) The question does not refer to condominiums. Most Kohala residents are opposed to condominiums here. This view was strongly expressed in a letter by Richard Santiago, president of the Kohala Community Association, to Mayor Herbert Matayoshi on March 16, 1981. Mr. Santiago, giving the views

of the community, wrote:

> "We definitely do not need sudden influxes on this island of people who would occupy the many condominiums that are planned in resort areas. These are permanent new residents, which the Hawaii State Plan forbids, and they provide no jobs for our people. They vegetate on our resources and greatly at our expense."

3) Although the question does not refer to condominiums, it might be argued that there are condominiums at Keauhou. Yes, but certainly not 3,200 condominiums as in this project. And indeed, there were fewer condominiums at Keauhou in early 1980, when this Kohala survey was conducted, than there are today.

Please find enclosed samples from a survey which I conducted from the time of learning of the Mahukona Resort project, early in July, until this date. My survey shows that residents almost uniformly oppose this development.

In summary, please omit from the EIS the table which appears on page IV-84. It falsely purports to show that the majority of Kohala residents support this large development.

Thank you.

Sincerely,

Bobi Moreno

Bobi Moreno

Enclosures

MAHUKONA DEVELOPMENT: VOICE YOUR OPINION

PUBLIC INFORMATION SURVEY

(to be submitted to County Planning Department)

EXPLANATION OF SURVEY: The Mahukona Resort EIS (environmental impact statement) says that over 50% of Kohala residents favor the large development below.* This Public Information Survey seeks to find out whether that statement is accurate.

PROJECT:	1,500 hotel rooms (about 5 times size of Mauna Kea) 3,200 resort condo units 500 single family residences
WHERE:	begins 2 miles south of Mahukona
DEVELOPER:	Mahukona Properties

Please express your opinion.

SUMMARY

Responses	Number	% of All Respondents
"Favor"	6	5
"Opposed"	126	95
"Don't Care"	0	0
	132	100

---

* Note by Belt, Collins & Associates. The EIS presents data from a 1979 survey as one indicator of public sentiment at that time. It does not, as stated here, argue that "over 50% of Kohala residents favor" the Mahukona Resort project.

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
Suite [illegible] Building, 733 Bishop Street, Honolulu, Hawaii 96813 Telephone (808) 521-5361 Telex 723-8432

August 27, 1981
81AC-1445

Ms Bobi Moreno
P.O. Box 703
Kapa'au, Hawaii 96755

Dear Ms Moreno:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 20, 1981 letter to the Hawaii County Planning Department regarding the document was forwarded to us for a response. We appreciate the time you spent reviewing the EIS. I am sorry that the table on page IV-84 of the EIS disturbed you and hope that the discussion which follows clarifies the issues you raised.

The exact wording of the question on which Table IV-40 was based was:

> Do you favor or oppose the building of a major hotel-resort development like Keauhou in the area between Lapakahi State Park and Kawaihae?

The term "hotel-resort" is used in the question as an adjective modifying the noun "development." To call it a "hotels-resort" development would have been grammatically incorrect. In formulating the question an attempt was made to be as clear and precise as possible so that the results would provide a valid indication of public sentiment at that time. It was for this very reason that the phrase "like Keauhou" was incorporated into it. Our fear was that persons might otherwise base their answer on their knowledge of the more luxurious and very much smaller Mauna Kea Beach Hotel. We considered using other resort areas as examples--Ka'anapali and Wailea on Maui, for example--but decided that too many Kohala residents might be unfamiliar with these projects to make this a valid comparison. It was not the intention that persons respond thinking there would be only one hotel and, while it is likely that some may have done so, I do not believe that this was a major source of survey error.

There are a substantial number of existing condominiums at Keauhou, the resort area which respondents were given as a reference point, but the number is far below the 3,200 that are proposed for the Mahukona Resort. In retrospect, I would agree that the condominium aspect of the project might have been underemphasized in the question.

This brings me to an important point regarding the survey results. They were neither intended nor reported as evidence that Kohala residents were actively supporting the proposed project. Instead they were offered only as one of several indications of public sentiment, and their limitations were made clear. Hence, we believe that the results have a place in the EIS.

Ms Bobi Moreno
August 27, 1981
Page Two

The survey was conducted early in the planning process. It seems to us that this was advisable since one of its functions was to measure public attitudes towards resort development so that plans for the project would be able to address potential problem areas. However, this timing also carried with it the disadvantage of measuring residents' opinions before they were completely aware of the project and of its potential impacts. In view of this, it might be both appropriate and informative to conduct a second survey now that the EIS has been circulated and residents have had an opportunity to consider the project in light of its probable effects. In the event the EIS is accepted by the County Planning Department, this follow-up survey could be conducted between the date of acceptance and the date the Department must act on the General Plan amendment petition.

With respect to the "Public Information Survey" which you attached to your letter, it provides an interesting glimpse of how at least one segment of the Kohala public viewed the Mahukona Resort proposal in mid-summer, 1981. Without information regarding the survey methodology that was used, it is impossible to determine the extent to which its results are representative of the citizenry as a whole. Nevertheless, a summary of the results is being included in the EIS as an attachment to your letter (see attachment).

Thank you for your comments. If there is any additional information that we may provide, please feel free to call me at 521-5361.

Sincerely,

Perry J. White

PJWghs

attachment

cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

XIII-64

July 13, 1981

RECEIVED
JUL 20 1981
BELT, COLLINS & ASSOCIATES

Hawaii County Planning Dept.
25 Aupuni Street
Hilo, Hawaii 96720

Gentlemen:

This is a letter of protest regarding the Mahukona Resort Proposal. There are several considerations that need to be weighed here, the foremost being the welfare of the local residents, the environmental impact on the community and the long-range effect of such a development.

With tourism in Hawaii reported on the decline, the developing of 4 hotels with 1,[illegible] rooms and 3,200 condo units is not feasible. In addition, since there is a severe drought affecting the Kohala region, where do the developers and contractors intend to get the water needed for this project without taking existing water away from the community?

The developers are clearly shirking from their responsibility toward the community and its residents. While this project may offer short-term employment for carpenters, plumbers, electricians etc. during the construction phase, the long-term effect would clearly be undesirable, bringing with it among other things the high crime that follows projects of this kind. A good example is Kona, where crimes against tourists and local residents alike are increasing at an alarming rate and on a daily basis.

Too many liberties are being taken here which need to be very closely examined. What is the developers' intent with regards to the huge increase of sewage and garbage a development of this sort would create? Will the community really benefit by its residents being offered long-term employment as servants - maids, busboys, waitresses, and dishwashers?

There are enough hotels in this area already. The Sheraton (which just opened) and the Mauna Kea accommodate all the tourists in this area quite adequately. The Hawaii County Planning Dept. must be capable of creating more beneficial developments for its communities than a string of hotels and condos which will eventually line all the coasts and take away from the local residents their God-given access and pleasures of the few beaches on this island, as well as upsetting the delicate environmental balance.

We should strive to keep Hawaii and Kohala beautiful; its beaches and swim areas available and accessible to <u>all</u> the people, not just those who pay for this privilege when they pay for their hotel room. Discouraging projects of this kind should be a responsibility for all permanent residents on this beautiful island!

Cordially,

O.C. Nichols
P.O. Box 1054
Kapaau, HI 96755

CC: MAHUKONA PROPERTIES / C/O BELT, COLLINS ET AL

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects

9th Floor Hemmeter Bldg. 745 Fort Street Honolulu, HI 96813 Telephone (808) 521 5361 Telex 7238732

August 27, 1981
81AC-1456

Mr. O.C. Nichols
P.O. Box 1054
Kapa'au, Hawaii 96755

Dear Ms./Mr. Nichols:

Environmental Impact Statement for the Proposed Mahukona Resort Project, North Kohala, Hawaii

Because Belt, Collins & Associates prepared the Environmental Impact Statement (EIS) for the proposed Mahukona Resort project, a copy of your July 13, 1981 letter to the Hawaii County Planning Department regarding the project was forwarded to us for a response. Your letter is, as you noted in your first sentence, intended as a protest against the proposed resort rather than as a set of comments on the document made as part of the official EIS review process. Nevertheless, there are several points which we would like to make in order to clarify the purpose of the EIS and to correct some misunderstandings that are reflected in your letter.

Purpose of the EIS

The Mahukona Resort EIS was written as a result of an application by Mahukona Properties, owners of the site of the proposed resort, for a change in the General Plan designation of the property. However, the document's purpose is not to argue for or against the project. Rather, it is intended primarily to identify potential environmental and social effects of the proposal by comparing conditions that will exist in the future without the project with the situation likely to exist if it is implemented. It is hoped that such an objective analysis will provide much of the factual information necessary for the Hawaii County Planning Department, Planning Commission, and County Council to make a reasoned judgement as to the project's desirability and appropriateness.

Market for Resort

Obviously, Mahukona Properties does not wish to invest in a money-losing venture. Market research studies conducted by Hastings, Martin, Hallstrom and Chew, Ltd. lead them to believe there will be a growing demand for resort facilities in the region over the next 25 years and that they can capture a portion of that demand. A summary of the market study findings are presented on pages II-9 through II-11 of the Environmental Impact Statement for the Mahukona Resort project.

Principals and Associates: James R. Belt, Paul M. Hirota, Frank E. Lyon Jr., Raymond F. Cain, Paul F. Wallenstein Jr., Joseph Vorera Jr., Gordon W. Bradley, Verdon L. Beck, Richard S. Abe, Lawrence S. Agena, Allen S.C. Chun, Donald H. Chung, Clifford E. Hansen, Edward H. Ide, Farid Kamal, Alan Y. Kobayashi, Michael J. Leinweber, Thomas F. Nance, Thomas P. Papandrew, Perry J. White

Water

A new water suppy source will have to be developed by Mahukona Properties for the proposed resort. No diversion of water from existing uses in the community would occur. The water supply issue is discussed on pages II-5, II-8, and V-64 through V-71 of the Mahukona Resort EIS.

Short-term and Long-term Effects

Employment opportunities generated by the proposed resort for both construction (short-term) and operation (long-term) phases are presented in Table IV-15 of the EIS. The total number of jobs created includes both direct, on-site employment and indirect, off-site employment. The extent to which employment and other long-term effects are desirable or undesirable is a matter of public values. It is our belief that these values will help determine the decision made by the Planning Department, Planning Commission, and County Council as they consider the General Plan change requested.

Sewage and Solid Waste

The developer's plans with regard to sewage treatment and disposal are discussed on pages II-8 and II-9. It is planned that the solid waste generated by the resort will be collected by private contractors and disposed of at a County landfill.

Employment

Your letter lists only a few of the kinds of job opportunities that would be created by development of the Mahukona and other resorts. An impartial assessment would recognize that other types of jobs will be created as well. Resort employment and jobs created indirectly by the resorts will offer residents opportunities in addition to existing ones. In general, it will neither displace existing economic opportunities nor eliminate the kinds of jobs which they offer. In the long run, resorts will need to compete with other businesses for their labor force. If they do not offer sufficiently attractive working conditions or pay, residents will exercise the other employment options that are available to them, and the resorts will be unable to staff themselves adequately. Should this occur, we may expect that their expansion plans would be curtailed.

Tourism in the Area

As stated above, studies by the market research firm of Hastings, Martin, Hallstrom and Chew, Ltd. conclude that there is sufficient market demand to warrant development of the proposed resort. The basis for your statement that, "The Sheraton (which just opened) and the Mauna Kea [Beach Hotel] accommodate all the tourists in this area quite adequately," is unclear. Granted, no tourists are forced to sleep on the beach because accommodations

are unavailable, but this is because they have the good sense not to arrive without advance reservations. Marketing experts would argue that a far larger number of people would choose to come to the area for their vacations if additional facilities were constructed. It is this latent "unmet demand" that developers are relying upon to fill their resort units.

Beach and Shoreline Access

The proposed Mahukona Resort is not located along a shoreline with beaches. Access to this shoreline would be increased by development of the resort, just as access to the South Kohala shoreline has been improved by the resort development that is occuring there (for example, at Anaeho'omalu Bay and Maka'iwa Bay.) An increase in the number of beach users will occur due to the visitor and resident population growth stimulated by the resorts, and this will affect the character of the shoreline experience, but access will not be limited to "those who pay for this privilege when they pay for their hotel rooms."

I hope our response has clarified the role of the EIS in the General Plan amendment process. It will be up to the Hawaii County government to decide on the project's acceptability. We appreciate the time you spent preparing your letter; if there are any further questions we can answer, please contact us.

Sincerely,

Perry J. White

Perry J. White

PJW:ghs
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

CERTIFIED MAIL

HENRY A. ROSS
p.o. box 969 kapaau - hi - 96755

RECEIVED
JUL 30 1981
BELT, COLLINS & ASSOCIATES

To the County Planning Department
25 Aupuni Street, County Building,
HILO, HI, 96720

22 July 1981

Re, Environmental Impact Statement
MAHUKONA RESORT
North Kohala, Hawaii

This letter covers a review and comments on the above mentioned draft E.I.S. by Belt Collins & Ass. done for Mahukona Properties.

The draft was discussed in the regular meeting of the Planning & Land Use Committee of the Kohala Community Association.

Wellington Chu was present in that meeting to represent the developer and gave a presentation. He invited the Committee and all present to scrutinize the draft in order to obtain a complete and representative picture of everything that will be involved or impacted by such a resort complex.

There were also other matters on the agenda, but at the end of the meeting after several members had already left, I was asked by Collin Kaholo, the Chairman and another member if I would endeavor to review this draft, which would be impossible to do for the Committee because of its workload and the time restraints set for this review.

As I was planning to do this anyway on my own behalf, I agreed, with the reservation that I could not promise to do an exhaustive job of it in so short a time. All I can say is that I did my best.

So what follows is a review and criticism on my own behalf as well as on behalf of the Kohala Community Association and specifically its Planning and Land Use Committee Chairman.

I consulted many North Kohala people about this subject and feel that it is a proper presentation which reflects the majority views of the population.

For assiduous reasons I attach Exhibits "A" and "B" which is the work of others but which I incorporate in my review and opinion. I also want to thank the people who helped me put this together who want to remain anonimous.

Henry A. Ross

I acknowledge the above and want to express my appreciation for the great effort that went into this very important review.

Collin Kaholo, Chairman,
Planning & Land Use Committee.

cc. Richard Santiago
President of the
KOHALA COMMUNITY ASSOCATION

XII-67

REVIEW OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT AS PREPARED BY BELT COLLINS & ASS. FOR MAHUKONA PROPERTIES FOR A PROPOSED MAHUKONA RESORT IN NORTH KOHALA, DATED JUNE 1981.

1) Mahukona Properties was a limited partnership that requested Belt Collins to prepare an EIS for 8 non-contiguous parcels of land in North Kohala. AS THE STATEMENT IS NOT COMPLETE YET, it obviously is only a "draft" EIS and should be marked as such on the cover and title page and on down. It is presumptious and misleading, especially when used later in libraries and the like, to have an incomplete document that on its surface pretends to be the ultimate one.

2) It is stated on page 17 in the Preface that Mahukona Properties is the owner of the parcels in question. This is untrue. THE OWNER OF ALL THE MENTIONED PARCELS IS NOT MAHUKONA PROPERTIES BUT INSTEAD A COMPANY BY THE NAME OF KEHENA BEACH, INC. This latter company is the sole title holder to the properties and pays the property taxes for same. It is incomprehensible that a reputable firm like Belt Collins would have missed the fact that they were preparing a document for someone other than the real owner. How would anyone like it if a stranger went to the County and applied for rezoning of their property? It is clear that henceforth agencies should require proof of ownership before they accept such applications.

3) MAHUKONA PROPERTIES IS DEFUNCT, it does not exist anymore, as we have been informed by phone on July 20, 1981, by the Department of Regulatory Agencies in Honolulu. It most apparently ceased to exist; the partnership expired on June 3, 1981 as we were told and the file has been pulled from active files. (The founding date was June 3, 1971).

This, after confirmation in writing to the County Planning Department, of course renders the application for an amendment to the General Plan moot and also the draft EIS.

4) Inasmuch, however, as this draft EIS might be purchased by someone else out of the probated estate of Mahukona Properties, we have still endeavored to phrase our objections to the draft. IT MUST BE NOTED, THOUGH, THAT WE DO NOT FEEL LEGALLY BOUND TO THE 30 DAY REVIEW PERIOD ANY MORE. We are doing this in case a court might find differently and rule us out of standing at a later date if it comes to such a stage.

5) As is mentioned in the Preface and confirmed by Mr. Wellington Chu on July 7, the plans are so vague that nothing else is there to be worked with than numbers of hotel rooms, condos and dwellings. We are of the opinion that such a vague projection is totally insufficient to base an EIS on. We are all talking in the air. On that basis, the EIS must be rejected as ill-defined, fantasied and perfunctory. How can anyone make a judgment or a projection on such evidence? The developer wants to have a free hand after he gets his GP amendment and zoning, etc.; he is then free to deviate from his original data with only the constraints of the County Zoning Code. In other words, he might then, for example, build 5,000 condos instead of the projected 3,200, or 2,500 luxury villas instead of 500.

The EIS must of necessity be based on a preliminary plan, site plan, buildings, height, density in building areas, commercial details, price projections and intended markets for every item singularly, etc., which Mr. Chu indicated is too expensive for them at this stage. This is not so. The great cost of architectural and engineering plans are the working drawings which are time consuming. All that is required now are some sketches, and any architect will gladly make these at a minimal cost for a prospective customer of this scope.

And talking about monetary considerations, we do not want to see the horse behind the cart. In Chapter 7 of the draft which deals with alternative uses, Belt Collins handles the subject as if the fact that a speculator (whoever that may be legally at this stage) paid so many millions (about ten if we are not mistaken) for 1000 acres of land (that would be $10,000 per acre) must now count with the agencies as a sound reason to rezone the land so dearly bought.

They mention a value of the land based on the lowest return at $100 per acre. We do not agree. We think that a reasonable market value of this land, the intrinsic value lies around $200 per acre. And Belt Collins' figure about beef production on that land of a total of $16,000 per year would then result in an 8% return on assets per year in perpetuity, which is not bad, especially if one regards the potential of raising beef production by water improvement for agricultural purposes as treated later in this review. Speculators are just that. If they want to pay exorbitant prices for agricultural land then they are stuck with an investment that renders only 16/100 of one percent income per year. NOBODY FORCED KEHENA BEACH, INC. TO BUY THIS LAND WITH ITS PRESENT ZONING, THEY DID IT OF THEIR OWN FREE WILL.

Another issue in this chapter is that Belt Collins is discussing the potential alternatives of this land as if it were already zoned "urban" by the Land Use Commission, which is another horse behind the cart because we are of the opinion that the County cannot initiate any rezoning away form its consistency with the state designation because of state law, see chapter 226 HRS, in effect by January 1992 the General Plans of the counties must conform with State land use designations, and definitely not vice versa.

All of Chapter 7 seems to be refutable one way or another and it is full of contradictions in terms.

But back to the general tenet of tis item about the vagueness of the proposed development.

We must conclude that the vagueness is on purpose and thus misleading in the EIS in its entirety. We believe that we can make this stick in court.

6) Most of the Preface is objected to. We do not have the time to go over the points one by one. The applicant may consult with us about the details of our objections.

7) On page I-1 it is stated that an intermediate resort designation is sought. The General Plan defines an intermediate resort as allowing 1,500 maximum visitor units. This would then preclude that the proposed condos are intended for transient visitors. Thus, they can only be meant for permanent residents and thus would not create any jobs for local people. In-migrants generally are discouraged by the State Plan, especially their importation.

Further items here are: Apart from the fact that the General Plan needs, requires and is in the process of being updated after running ten years, it states on page 13 for North Kohala: "There are several sites in this district with the potential of becoming <u>small</u> resort areas." On page 95 a small (minor) resort area is defined as allowing a hotel of, say, 450 rooms (economically feasible as regards size) and antecedent resort facilities such as golf course, shopping arcade, equestrian facilities and the like. Mr. Wellington Chu was informed that this community would not object to such an alternative. This, however, is insufficiently treated in the draft EIS.

When the General Plan was written there were hardly any condos on this island and thus they do not figure at all in the General Plan and may not be interpreted into it. As is all too well known from what is presently orchestrated for the North Kona and South Kohala areas of this island, condos are a subject to themselves and have a totally different impact

from other projects. When this General Plan was written by Planning Director Raymond Suefuji, it did not address itself to the condo impact or projections because the problem did not exist. The applicant must of necessity tread on virgin terrain here, and be far more explicit in the handling of this issue, instead of treating it throughout the draft as something that speaks for itself. This is practically the first time that the public is addressing itself to the issues of an EIS of this nature on this island, and thus the public must be provided better information than the draft provides.

The statement of the applicant, dated January 28, 1980, says that a small resort area will be included in his intermediate resort application. Also Belt Collins in its "Assessment" of November 1979 tells us that the developer intends to develop a "major resort/residential complex" (page 1). What are we to believe? Are we to suppose that this confusion is on purpose, to throw people off-base? The draft as a whole is full of confusing and slanted statements.

One example is the treatment of the Mauna Kea Beach Hotel for comparison purposes. It cannot serve as such because it is merely a resort hotel of a scope that people here would not mind having as close as Mahukona Harbor because it creates employment closer to home but still far enough away as not to overly bother them in other respects. When you wait on tables and sweep rooms for hotel guests who pay $200 per night for a room, while you work for a wage of some $5 per hour, you do not want your children to see this wealth that you cannot give them, and which might lead to disconcert in your family and to increased crime rates later. And the children of these people do not want (if they have a choice) to go in the footsteps of their parents, they want something better. This social aspect is not treated in the draft at any respectable length. It may follow from some tables but one has mostly to read between the lines.

And the same goes for luxury condos. The wealth spread out

there for everyone to see leads to crime rates of a factor two in Kona compared to North Kohala. We do not find these statistics, which are readily available from the County, presented clearly enough in the draft EIS.

8) We are not sure about the legal implications of the applicant going for a General Plan amendment first, before going to the Land Use Commission to get a change of boundary. The County, of course, leans to being number one to decide on such things but as the General Plan and Land Use designations are in accordance with each other, why should the General Plan be changed and become different from the Land Use designation if State law (HRS 226) requires the counties to bring their General Plans in line with the Land Use boundaries? Most apparently, the land use boundaries of the State come first. This subject should have been treated in depth of the draft EIS.

9) Unfortunately, because of lack of time we could not go through the draft page for page, but the following items will show that browsing through brings forward so many objections as to its being incomplete, confusing, slanted or down-right untrue, that we may safely suggest that this draft must be done over. We will follow up with more detailed incongruities after the filing date of this letter.

On page II-9, for example, it is stated under "Utilities" that most lines will be underground. We understand this for water and gas and perhaps for electric lines in the project because it enhances it. But what about the electric feeder lines? Nowhere do we find anything to the effect that these will be underground. Also, we do find that an alternative feeder system from Kawaihae along the Akone Pule road might be the choice of HELCO, and what would this do to the scenic beauty of the coastal road which is lauded in the draft?

So we turn to page V-94: Electrical Power. And if the

main feeder is going along the coast highway, then by HELCO procedures it is a new line and the developer pays the entire cost. If, however, as is proposed here, the main feeder is branched off the 34.5 KV line on the Mountain Road at about Kahua Ranch, that would mean that the line on the Mountain Road, at least from Kamuela to Kahua Ranch, would have to be improved and upgraded to 69 KV, and that under the PUC regulations is at the expense of HELCO, and thus the public. The cost of such a boost would run close to $3 million (as per HELCO). Although bonds may be floated, the interest on such bonds is calculated into the cost of supplying power to the whole island of approximately 34,000 users and thus would cost each user an estimated $200, and what for? To permit a developer from outside to make a profit on his land speculation. And on top of that, the Mountain Road happens to be the premier "scenic route" on the island, and the new line would run along the road instead of through adjacent pastures, as is now the case, and thus spoil the scenic beauty with poles fifty feet high (as per HELCO) and a multitude of wires dangling from them.

Finally, does the developer plan on having his branch-off line run overhead through the scenic landscape or in the ground? And last, would HELCO, instead of only boosting the line up to Kahua Ranch, have to upgrade the whole line to Hawi for contingency purposes, which would then cost the unaware consumers up to $6 million, where non-Mahukona Resort scenarios would cost nothing?

The draft should treat things like this in depth. They impact some 34,000 electric customers.

10) Likewise Health Care Facilities as mentioned on page V-83 are improperly treated. How can it be stated that the facilities of North Kohala "meet the needs of the community satisfactorily"? Everyone knows that many people go to Honolulu

for anything more serious than day-to-day medical problems. We also request to see included in the EIS a letter of May 5, 1980, in the applicant's file in the County Planning Department from the Kohala Health Center where Charles Morin, M.D., says that the Kohala Community Association met with Wellington Chu and others "last year," with the result that the proposal was deemed unsatisfactory.

11) This brings us to a related point: Why was John Farias, Chairman of the Department of Agriculture in the State, not consulted? He wrote a letter to the Planning Department, which is in this file, expressing concern about the water issue. Conversely, why did the County not pass on to Belt Collins, for inclusion in the EIS, such comments by agencies and individuals?

With regard to the water problem:

We would like to see Belt Collins openly discuss an exploratory deep well for their client's use as located on someone else's property. The water issue might be the most important of the whole project (see page V-64 and figure V-10). We want in-depth treatment of all water options and their legal implications. Pumping of ground or basal water is a tricky business, and water that will be necessary for future agricultural purposes must be conserved. The issue is: what (and where and by whose authority) is the developer specifically planning in the way of drilling wells for potable water? North Kohala's agricultural water will not be available for such purposes as watering hotel lawns if there is no surplus from producing agricultural units in North Kohala.

The ramifications of these issues are gone over superficially in the EIS, yet this is a matter of utmost importance, as these times of drought demonstrate. If the developer would propose to repair the Kohona Ditch, for example, to an extent where

everyone including himself might benefit, we would be favorably inclined to look at his figures but such projections are lacking. In the "Cost Considerations" they do not treat any projections for North Kohala, etc.

12) About schools on pages V-81 and 82 everything mentioned about Waimea and Honokaa is irrelevant because of districting and we feel that phone conversations with people in the DOE are not a basis for reliable forecasting. The DOE will not back up anything that the authors have not in writing from them. The DOE does not project into the year 2005, they are glad to stay with projections for the next few years only. The information is thus misleading.

Further any projected increase of 760 students for this project would imply that the condominiums are for permanent residents if one goes by statistics that the DOE has about similar projects. This fact is scarsely mentioned if anywhere at all and must be treated in its impacts on the present community with its particular lifestyle. These students as projected by Belt Collins would have to attend the North Kohala school and reliable sources in the community deny that there would be sufficient land available around the existing school for such an expansion of facilities. Now, does the developer wish to donate land for the required expansion or for yet another school at their resort, as has been requested elsewhere? The cost of agricultural land as projected by Mr Wellington Chu for another project in the vicinity (and schools require urban zoning) is $25,000 per acre. The school in North Kohala uses appr. 25 acres of land. The public would be paying for the buildings because in Hawaii unfortunately developers cannot be told to put up the necessary school buildings. All these impacts on the taxpayers and the community for clashes of an ethnical nature in the school as has happened elsewhere in this state, are not treated in the draft EIS.

13) Regarding "Recreational Facilities": the chapter as a whole has faults, but just to touch on some obvious mistakes: Figure V-15 shows"Kapaa Beach"and"Mahukona Beach" while there are no beaches there. The "reserves" mentioned in the figure are virtually inaccessable. The few trails leading to them are padlocked off and one is only accessible by helicopter.

14) Police Protection (page V-90) is sufficient for the present time, but with increased crime rates who is going to pay for the extra police? The developer who caused it or the taxpayer in general upon whom this whole thing is forced from outside? The statement in the draft of increased police services vs. increased population is entirely wrong. This paragraph contains what we would call nonsense. If the author wants more details we are at his disposal.

15) We forgot to point out under item 9) above that there is an obnoxious error in table V-95. It mentions 5,000 KW of Diesel generating power in Kohala at Keahole, which as we verified with Helco is definitely in North Kona (emergency only), but because the EIS concerns North Kohala that kind of errors tend to lead people to believe that such"mistakes" might have been put in the draft on purpose, while we think Belt Collins as a reputable Engineering firm is above this. But it should be rectified in a prominent way.

16) The traffic situation is definitely insufficiently treated.

17) As to the alternatives of the proposed action we already mentioned a number of items that are insufficiently or inadequately discussed in the draft. Almost every paragraph in that section is full of mistaken assumptions and fantasied numbers and tilted opinions of the authors. We would like to criticize each of these individually but unfortunately time is lacking. However we have our notes and are ready to tackle this extensively as soon as time allows. There are many loose

statements made that lack a mention of sources.

18) Before we go any further and just for the record, we want to formally state that we raise objections against any and all issues of the draft EIS, not because everything is wrong, mind you, but just to comply with anything in Chapter 343 HRS and not sell ourselves short because of lack of time to review.

19) The draft says about water resources on page I-3 that the amount of water pumped would not exceed the aquifer's sustainable yield. This is an unfounded and loose statement, that should be backed up by scientifically obtained information about the location and other details of the aquifer, the quality, extent, etc. Also where the wells are projected and whether these can be legally drilled with a long term projection of the total use and expected limitations of the yield, insaltation over a number of years a.s.o. Total period of projection to be 50 years.

As water is extremely precious it should not be squandered away by any one venture and for reasons that do not qualify as sufficiently meritorious to the community whose natural assets are used and might be exhausted sooner or later.

20) This brings us to the next totally untrue statement in the draft, namely on page I-4: "The proposed project is generally consistent with the economic objectives of State and County plans and policies and is not in opposition to the objectives relating to the environment and public facilities." Public facilities are barely adequate for the present population augmented by some normal growth, except for fire protection which seems inadequate, and domestic water in some areas.

But to say that there is consistence with the goals of State and County Plans is patently untrue.

The GP allows for a small resort in the area. The fact that Mahukona Harbor is already on the map as a minor resort area is almost totally neglected in the draft. And it must of necessity

be discussed in extenso with all its ramifications, including what will happen if Castle & Cooke should decide to also build a hotel. The County should be alert if there can be a trade-off in zoning here, because the area cannot support unlimited resort expansion. And the General Plan does not contain a syllable about condominiums. They were not foreseen in 1971.

The State Plan, HRS 226, however says interalia that population growth and distribution must be "consistent with available and planned resource capacities" and that any actions must "seek to provide for adequate housing to meet the needs of Hawaii's people without encouraging an additional influx of people". There are more references to this theme and also to the preservation of lifestyle of existing communities. It is hard to believe that such an important law is done away with in one sentence in a report of 335 pages.

The building of 3200 luxury condos into a community of roughly 1000 families means additional influx of people and is prohibited by state law. It would also ruin the lifestyle of this community as must be evident from comparisons how this condominium phenomenon has changed Kailua-Kona's lifestyle in 10 years where unemployment among the local population is greater than in North Kohala and where the County now is planning for thousands of subsidized housing units because the local and original population or what is left of it cannot live there anymore in its accustomed way as property taxes have gone sky-high. This whole social change must absolutely be treated in depth in this draft by drawing parallels from Kona. Mitigating circumstances as to retirees from elsewhere in this State who might want to buy such condos must be supported by figures of markets and prizes and statistics of how many such retirees are now really occupying condos in Kona. Speculation and permanent foreighn invasion likewise must be discussed. IT MUST BE DEFINED AT WHAT COST THIS COMMUNITY CAN ALLOW ANYTHING BUT ITS NORMAL GROWTH AND HOW ITS LIFESTYLE IS GOING TO BE PRESERVED.

North Kohala people want more and better employment, but they do not want an imported labor force that would result in being pushed out of the labor market for local people who are not as vocal as newcomers, (see North Kona and South Kohala).

21) It should further be mentioned that the "dry side" of North Kohala (IV-3) is extensively used for grazing (Parker Ranch, Kahua Ranch, Puu Hua Ranch and many smaller ones), and that presently plans are being worked on by the North Kohala Community Association to get more irrigation water to that area, because the soil is fertile and then the area mauka of Mahukona Harbor will then be suitable for crops such as Macadamia nuts. We miss all these considerations in the draft and so it is very incomplete and it would appear that the author did not do his homework well, because all this information is readily available if the right persons are consulted.

22) When we skip pages that does not mean that these parts of the draft are acceptable. It is only because there simply is not enough time to treat everything. One may only conclude from what is presented here that if there is so much wrong with what has been reviewed rather helter-skelter, the rest is probably not much better.

For example we find that table IV-27 is totally incomprehensible. Maybe the surrounding pages throw some light on it, but tables should be self-explanatory and assumptions made in one table that are derived from assumptions in another table ad infinitum do not qualify as proper treatment of the subject matter There are no dates given in this table for the projections it supposedly contains. Similarly there are no state and county columns in table IV-28 as indicated in the footnotes. Table IV-30 does not give years for its projections and it takes ten minutes to figure out what the abbreviations stand for. This is all very foggy writing, of questionable value.

23) On page IV-58 a 250 page report is mentioned that has to be read also. And there are more reports that were drafted to support Belt Collins, some 700 pages of it have been deposited in Hilo and more is to come. It should be clear that it is virtually impossible

to review the draft and study all this material at 80 miles distance, material that contains vital basis material to the EIS. The public cannot review 1000 pages of partly treated here or there in 30 days and decide if it is not led astray , while insufficient scrutiny might result in a hotch-potch of legal quasy legal and maybe illegal elements which will be solidly planted down on its soil by the developer once he gets past this and some other hurdles. It may haunt themthe rest of their days and those of their children. And a law that allows an author to cut off any reviews that arrive after 30 days is not an equitable law and it is here seriously suggested that something must be done to change the fact that all an author of an EIS has to do to get it approved is to write more than a thousand pages on the subject, relevant or not, spun out or not, and distribute his handiwork over geographiçal distances that make it impossible to manipulate for reviewers.

24) It is agreed that "Kona provides a model for predicting potential crime impacts of resort development in North Kohala." (page IV-74), like"Kona"should serve as a model for many more impacts if properly presented.

However the presentation in table IV-36 is slanted or misrepresented. It is improper because one needs a mathematician and a sociologist to get to the root of the matter. The sociologist would tell you that"Kona"is not the right word, what is meant is North Kona and thus the statistics become different. The mathematician would point out that without South (rural) Kona the crime rate of North Kona is more than twice as high than that of North Kohala and expressed in percentages this means 75% of the county average in North Kohala and more than 150% of the average for North Kona. Now would it not have been easier to just include the crime report of the County Police which is broken down in areas for all sorts of crime. Everybody understands that and the source is above reproach. But maybe that shows too clearly what the author did not want to surface, or rather keep vague.

25) Finally because time has come to an end for reviewing this draft and get it in the mail in time, we want to propose that at the very minimum ALL OF CHAPTER IV BE REJECTED AS BASED

ON IMPROPERLY OBTAINED DATA. The socio-economic impacts happen to be the most important for the majority of the people in this area. We have therefor studied the P.A.A.S. Survey as far as time allowed. It is the basis of much what is said about this subject in the draft.

Our comment is as follows: This is a survey of the North and South Kohala population by a sub-contractor to Belt Collins for the purposes of the EIS.

A PROFESSIONAL SURVEY MUST CONTAIN IN ITS INTRODUCTION A DESCRIPTION OF ITS SAMPLING METHOD.

This survey tells us somewhere hidden in the back that it was done door to door and it also gives the magnitude of the sample vs population. How did they go door to door?

Well, in order to find that, one has to go to page IV-79 of the draft EIS, where Belt Collins says:.... the sampling methodology consisted of a"pinpoint" technique, which ".....involves the precise selection of geographical sampling areas in such a manner that the combined areas are representative of the population under study. In each selected sampling area, an intensive house to house personal contact procedure is followed"...

THIS IS TOTALLY UNACCEPTABLE AS A SAMPLING TECHNIQUE. IT IS A TECHNIQUE THAT IS USED IN BIG CITIES FOR SURVEYS ON HOW TO ADVERTISE OR TO SELL SOAP OR TOOTHPASTE.

We feel that the subject matter of this survey is not a commodity of short duration where when the survey does not work out one takes another and better marketing research firm to start all over.

We are talking about a population poll that will have extremely far reaching consequencies that cannot be erased from the land scape, once they have been executed.

If Belt Collins is interested where to go in Honolulu for a proper survey of this nature we can tell them who the best people are for a scientific and acceptable treatment with approved methods of sampling and statistics.

TO ILLUSTRATE THIS SEVERE CRITICISM we point to table 18 on page 19 of Part I of the Survey. As so many other relevant tables of the survey this table is not contained in the draft EIS, at

least we have not found it. THIS IS A GRAVE OMISSION.

That table shows the ethnic brake down of the people polled in North Kohala. And this should be representative as a sample should it not?

We have compared these figures in percentages of the total population out of the 1980 County Data Book which has a census table of the 1970 census, broken down in ethnic groups per census tract (the 1980 census brake down is not yet available, but as the population in North Kohala remained static over these ten years, this is an acceptable method sociographically)

The result for some groups that can be easily isolated is as follows:

	Japanese	Chinese	Hawaiians	Filippinos
Data Book	23.8%	4.3%	15.3%	29.2%
Paas Survey	19.6%	1.8%	25.3%	18.2%

It mustbe clear that the P.A.A.S. survey was not representative at all and thus everything based upon it must be deemed distorted. IT IS ALMOST UNBELIEVABLE THAT A REPUTABLE COMPANY LIKE BELT COLLINS WORKS WITH SUCH USELESS DATA. What does that tell us about their other sources? We do not know.

Another problem of the survey is that it included too many 15-19 year olds and too many over age 60 than would be in accordance with the real population apart from the fact that these people are not usually regarded as a sound basis for this kind of an opinion poll. There are many more criticisms but it would take too long to go over these here. In sum total we find the whole survey useless and unacceptable. In the Summary Highlights of this survey its authors sound a note of caution themselves by telling that we should not take this survey too seriously (usage to the detriment of its data and in their entirety -- whatever that means). Instead we would rather see a notarized statement that they did the survey to the best of their knowledge and ability, which also of course would not guarantee quality and veracity.
BUT IT IS DEPLORABLE THAT SUCH SLOPPY WORK COULD BECOME THE BASIS OF A FUTURE FOR A WHOLE COMMUNITY , if we would not have found out.

To take this one step further the questions in the survey were partly inappropriate and the resulting answers as used by Belt Collins are slanted to say it mildly. We refer to table IV-40 of the draft. It tells us that 51.4% percent of the people polled are in favor of the "Proposed Mahukona Resort Development. This is a lie.....!

In the footnote the question asked is quoted as: "Do you favor or oppose the building of a major hotel-resort development like Keauhou in the area between Lapakahi Historic State Park and Kawaihae?" This is a slanted question if we ever saw one. Keauhou is 70 miles away from the survey area and many people of North Kohala do not even know where Keauhou is, some have never left Kohala even. Keauhou developments are not commonly known in an area where many people do not read newspapers. A hotel resort means a hotel with swimming pools, tennis courts, shopping arcade, golfcourse etc. not only to the people here but everywhere. It does not imply condominiums at all. And especially not so in the County General Plan. What the local people know is the Mounakea Beach Hotel as a hotel resort and it has no condominiums around it either. And just to catch any excuse a resort hotel is the type of hotels in Waikiki without tennis courts and golfcourse.

Of course people here would like a hotel 7 miles away better than one 25 miles away with rising gas prices and having to work for an average wage of not over $5 per hour. But ask them if they would like to have 3200 condos at Mahukona. The overwhelming answer would be NO. A further mistake in the survey is where in table 11, page 12 of the PAAS survey 2 questions are combined in one. This is unacceptable practice and the answers whatever they are become invalid for any interprestation. It shows a certain inaptitude on the part of the surveyor unless it was done on purpose and then is becomes misleading. As far as we could ascertain Belt Collins did not use that table; they may not have liked it either. However they may have used the result somewhere

in the draft and therefor we want to expose it here. The question was: "Do you feel that new hotels and condominiums are needed to provide more future jobs for residents of North and South Kohala?"

It is unfair to this community, especially in an emotion-laden situation where you speak about employment to link in one question a hotel with its appurtenant employment potential, as everybody knows, with condos that do not generate employment but for a groundskeeper and a live-in concierge. And especially so, from a psychological point of view if you mention hotel first and hold out a bait to slip the other item by.

Thus we must of necessity conclude, that insofar as we have been able to go over this draft EIS, the methods used by Belt Collins and/or their subcontractors are unacceptable and WE THEREFOR SUGGEST THAT THE APPROVING AGENCIES, THAT IS THE HAWAII COUNTY PLANNING DEPARTMENT IN THE FIRST INSTANCE AND THE ENVIRONMENTAL QUALITY COMMISSION IN APPEAL , IF ANY, REJECT THIS DRAFT ENVIRONMENTAL IMPACT STATEMENT IN ITS PRESENT FORM, and we further suggest that the large part of this draft that must be rewritten shall by preference be done so by consulting the Kohala Community Association which represents all 3249 residents of North Kohala and has standing committees on housing, recreation, water, energy, historic sites, education, tourism, agriculture, health and it has a Planning and Land Use Committee, which could be of immense help as a source of information before one starts writing an EIS rather than after a draft is completed which then must be reviewed within 30 days of its announcement.

EXH. "A"

CONCERNING MAHUKONA RESORT

The following discrepancies or errors in the Mahukona Resort EIS have come to our attention. We respectfully request that they be corrected in the final version.

1. Condominium residents not counted in population summaries.

On page IV-18 the EIS refers to two effects of resort communities on population. They are support workers, and retirees/wealthy persons who live in residential condo units. The EIS says, "For the purposes of this report, we have neglected the latter influence."

We do not understand the logic of the omission and wish to see population statistics on condominium dwellers given in the report. These statistics have been omitted not only for Mahukona Resort's 3,200 condos, but for the over 6,000 condos already approved for South Kohala. The information should appear on page IV-18 and in related figures and tables.

2. Apparently inaccurate "Labor Force" Table IV-14.

This Table on page IV-24 indicates the labor force deficit in coming years, showing a 5,370 deficit in the year 2,000. Notes below the Table indicate that this figure assumes all available locally-born workers are employed in tourism. This is unrealistic. Resort work is not the preference of all. Therefore, if you like, assume that half of the locally-available 1,700 persons will opt for the industry, and adjust other figures accordingly in the table.

In general we believe this labor deficit figure may be too low since Hawaii Tourism Impact Plan (State of Hawaii, 1972) shows a labor force requirement for the Waikoloa project alone of over 9,000 persons. The Impact Plan also says, "Massive immigration of labor will be required if the growth of West Hawaii reaches projected levels." (pages 38, 52)

We are grateful for your regional approach but would like to request the County, a consulted party, to offer alternative labor-force-needs figures, to cover both the region and the Mahukona Resort. We would like to have these figures included in the final EIS also.

3. Access.

Access is discussed on page II-5 in four sentences. This is an important concern for residents of North Kohala, and we

page 20

request a lengthier treatment. In particular, we are concerned not only for highway-to-shoreline access, but for north/south access, since the shoreline here is rocky and difficult to hike.

Note that the shoreline trails organization Na Ala Hele requested that "The public's right to use . . . jeep trails and any other traditional trails that may be on the affected lands needs to be addressed." (page X-35) We request same.

4. Inaccurate Jeep-Trail Map.

This is a related concern.

The number of shoreline access trails, departing the highway, from Kehena 2, south, to Lapakahi on the north, gives a total of 8 and there may be more.

The EIS map on page II-4 shows only 4.

In addition the north/south shoreline jeep trail is in actuality much more complex than shown on the map.

We request that all actual jeep trails and traditional trails on the property be shown on the map.

5. Hawaiian Groups Not Consulted.

On page V-39 the rich archaeological resources of Kaiholena ahupuaa are destribed. They are said to equal those at Lapakahi and, furthermore, to be pre-contact remains--especially valuable. We simply wish to note for the record that Hawaiian historical groups and figures in North Kohala have not been notified of these findings and have not been consulted for their views on resort development of the site.

Thank you for the opportunity to offer these comments.

XII-77

PAAS Study - Critical Points...

* page 21 p. 2 — Question posed bears no relation to conclusion drawn. General versus specific. EXH. "B"

p. 5 — Note that 32.7% fear destruction of environment and historic sites. Tie in with objection to historic section.

* p. 71 — As soon as respondents have had any college education, opposition to project outnumbers favoring.

p. 75 — 35% of college grads or better are "very opposed to the idea" of resort between Mahukona & Kawaihae.

* p. 76 — Calculate: THE LARGEST PLURALITY BELIEVES "BEST USE" FOR PROPERTY IS "LEAVE AS IS."

p. 42 — The largest plurality of those between 25-40 feel there should be no more development.

p. 33 — 40% of unmarried residents feared destruction of environment and historic sites.

p. 29 — Jobs in agriculture perceived as "more beneficial" than hotel/visitor services.

p. 33 — Question is seriously misleading. "There are several hotel resort projects being planned in the Kohala region." This is what Stanford Research Associates referred to as 10,000 hotel units + 10,000 condo units in S. Kohala.

p. 39 — Age 25-29 - 51% oppose
30-39 44% oppose

* This study gives undue weight to older age group. High favoring percentages come from those 40 + over (including 60 + over) and those 15 to 20. Note that this is also the uneducated population

General Note: PAAS Services drew biased "conclusion" sections for Belt Collins, as if bias starts at source.
See p. 49, 79

p. 78 — Question regarding employee residence location unfair due to fact respondents not informed whether employees = themselves or labor immigrants. Not sure if this is

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
[illegible]

August 27, 1981
81AC-1448

Mr. Henry A. Ross
P.O. Box 969
Kapa'au, Hawai'i 96755

Dear Mr. Ross:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

A copy of your July 22, 1981 letter to the Hawaii County Planning Department regarding the Environmental Impact Statement (EIS) for the proposed Mahukona Resort has been forwarded to us. As you know, Belt, Collins & Associates prepared the document and is responsible for its contents. We appreciate the time that you were willing to spend reviewing the EIS. The remainder of this letter contains point-by-point responses to your comments.

1. Status of the EIS

The EIS for the proposed project was prepared pursuant to the requirements of Chapter 343, Hawaii Revised Statutes, and the State of Hawaii Environmental Quality Commission (EQC) Environmental Impact Statement Regulations. While the Federal government's EIS process provides for a "Draft Environmental Impact Statement" (DEIS) followed by a "Final Environmental Impact Statement" (FEIS), the State's does not. Chapter 343 and the EQC Regulations use only the term "Environmental Impact Statement." Hence, to have marked the Mahukona Resort EIS as a "draft," as you insist it should be, would have been a misrepresentation. Please refer to the EQC Regulations for a clarification of this matter.

2. Ownership of the Property

As stated correctly in the EIS, the site of the proposed Mahukona Resort is owned by Mahukona Properties, a limited partnership. Perhaps your confusion stems from the fact that Kehena Beach, Inc. is the general partner in the limited partnership. At any rate, I wish to assure you that Belt, Collins & Associates does know who its clients are.

3. Status of Mahukona Properties

Mahukona Properties is not defunct. The person at the Department of Regulatory Agencies whom you talked to over the phone only looked up the original partnership filing which was for ten years, and did not further research the amendments to that file. An amendment extending the partnership for 30 years from the original founding date was received by the Department of Regulatory Agencies on November 19, 1974.

Principals and Associates: [illegible]

4. 30-Day Review Period

As you note in your letter, the courts may not share your opinion. Even had the ownership of the property changed it is difficult to see how that would invalidate the objective analysis which we prepared.

5. Vagueness of the Proposal

While this comment meanders somewhat, the central point appears to be that an adequate assessment of the impacts of granting General Plan resort designation to the subject property cannot be made in the absence of a definitive site plan. We believe that this is not the case and have so-stated in the Preface to the document.

Our decision not to base the EIS on a specific site plan for the resort was based on a number of considerations. The most important of these included:

- The absence of a definitive site plan likely to be adhered to over the long-range development of the resort.
- The belief that the questions most relevant to a decision at the General Plan stage of the development process are ones related to major regional growth issues rather than to detailed designs.
- Related to the above is the conviction that an EIS designed to focus attention on a specific design would mislead and mis-direct public attention away from the more basic issues that are before them.

In your letter you state that, "all that is required now are some sketches, and any architect will gladly make these at a minimal cost for a prospective customer of this scope." We must take exception to this on several grounds. First, it is not architects, but planners who are needed at this stage of the project, and they cannot normally undertake the preparation of master plans on the assumption that they will recover their costs during the construction design phase. Second, normal practice in resort projects on this scale is for the master developer to lease or sell individual parcels within the overall resort area to other groups that construct and market the hotel and condominium units. No such sub-developers are "on-board" as yet. Hence, Mahukona Properties is not in a position to obtain free, speculative design services from these groups.

Finally, and most importantly, the idea that we should have included cheap sketches (which would necessarily reflect little thought and would almost certainly be deviated from greatly when development actually occurred) in the EIS is repugnant to us. Instead, we chose to base our analysis on the only facts which are truly known. In that manner potential problems and adverse impacts could be flagged and dealt with if and when conceptual approval for the project is obtained.

Land Cost as A Constraint. You letter asserts (page 3), that the EIS uses the $10,000 purchase price of the land as a justification for rezoning. You refer vaguely to Chapter 7 as a source, but do not give any specific page reference. In reviewing the chapter, I can find nothing which justifies your remark. What the EIS does state (page VII-3, paragraph 2, last sentence) is that, "In view of this, agricultural use does not appear to be an economically viable alternative to the proposed resort use." The first three paragraphs of page VII-1 make it clear that we do not believe that public agencies must act to insure the profitability of a particular action by granting a rezoning that would raise the market price of a particular piece of land above that which the owners paid for it. We simply note that uses which are not profitable are not viable alternatives for private landowners over the long-run.

The discussion of land values contained in the second paragraph on page three of your letter is difficult to follow. After testing several possibilities we concluded that you arrived at your 8 percent return estimate by assuming 1,045 acres, a land value of $200 per acre, and a net income of $16,000 per year from cattle ranching. The acreage figure is correct, and I will not quarrel with your agricultural land value estimate of $200 per acre (although we believe the "less than $100 per acre" estimate cited in the EIS is more accurate). However, $16,000 is a gross income figure, not a net amount. As explained on page VII-3 of the report, the land resource is responsible for only $3-4,000 of this. Correcting your estimate to account for this means that the calculated return would be as follows:

$$\frac{\$4,000}{(1,045 \text{ acres}) \times (\$200/\text{acre})} = 0.019 = 1.9 \text{ percent}$$

This is an extremely low rate of return, especially in perpetuity.

Conformance With Chapter 226, HRS. In the third paragraph of page 3 your letter asserts that we have gotten "another horse behind the cart" by discussing urban uses as potential alternatives for the Mahukona Resort site. It cites as the basis of this your opinion that,

> ...the County cannot initiate any rezoning away form (sic) its consistency with the state designation because of state law, see chapter 226, HRS, in effect by January 1982 the General Plans of the counties must conform with State land use designations, and definitely not vice versa.

A reading of Chapter 226, Hawaii Revised Statutes, shows that your paraphrasing of it is incorrect. Section 61.(c) states:

> The county General Plans and development plans shall be in conformance with the overall theme, goals, objectives, policies, and priority directions contained in this chapter by January, 1982.

There is no mention of the State Land Use designations in the State Plan, and your inference that being in conformance with the State Plan means being in conformance with the Land Use Commission District Boundaries is not substantiated.

6. Preface

The Preface to the report contains material which we believe provides readers with useful background information regarding the project and the EIS. In view of the fact that your comment makes no substantive points, a more specific response is impossible at this time.

7. Definition of Intermediate Resort

The Hawaii County General Plan (p.95) describes "Major" and "Intermediate" Resort Areas as having the following:

	Major Resort	Intermediate Resort
Maximum Visitor Units:	3,000 rooms	1,500 rooms
Resort acreage:	90 acres	45 acres
Active and passive recreation areas:	50 acres	25 acres
Maximum associated residential areas:	640 acres	320 acres

It does not define "Visitor Units," probably because it was assumed that they would be hotel rooms (note that the number is defined in terms of "rooms." This would tend to support your assumption that the phenomenon of resort condominiums was not one with which the drafters of the General Plan were familiar. However, at least two major resort proposals for South Kohala, the Waikoloa Beach Resort project and the Mauna Lani Resort project, have been the subject of environmental assessments and County review in recent years and both have included 3,000 hotel rooms and 3,000-plus condominium apartment units, a very substantial majority of which are to be aimed at the visitor (rather than the resident) market. In basing its approvals on these figures, the County has in effect given its tacit approval to the position that condominium apartment units are not covered by the "visitor unit" ceiling even if they will be used largely by transients. It is most certainly Mahukona Properties expectation that most of the Mahukona Resort's condominium apartment units would be used by visitors, and the EIS was written on this basis.

It should be noted that, with one possible (and generally minor) exception that will be discussed in a moment, the assumption that the condominium units would function as transient accommodations is a "worst-case" assumption that tends to maximize the projected impacts. In fact, it was employed for that very reason. Had we wished to downplay the secondary growth effects of the project rather than to report them honestly, we would have assumed that many

of the apartments would be occupied by residents in the labor force. Such an assumption would have reduced the projected population growth and off-site housing requirements below the level reported in the EIS.

The one situation in which the transient-use assumption might result in a lower-than-possible projected impact is if the condominium units were to be occupied by (i) unemployed (retirees or persons out of work) individuals with low incomes or (ii) wealthy retirees who would generate a large demand for goods and services. The relatively high price that units are expected to sell for combined with the generally high cost of living found in Hawaii is likely to minimize the number of low-income persons who would live at Mahukona. Hence, no serious distortion has been produced in this regard by our assumption. While the image of plane loads of rich families moving to Hawaii for their retirement years and expecting local residents to act as their servants is one that fires the imagination, it is not one likely to be borne out in reality. The costs of housing and other necessities in a resort area are simply higher than any but the very wealthy can afford. Hence, while some units will undoubtedly be used as retirement homes, the vast majority will not.

Project Nomenclature. The environmental assessment and the EIS for the project consistently refer to the proposed Mahukona Resort project as a major resort project. It is difficult to see how anyone could conclude that this is an example of "confusing and slanted statements" which you allege the EIS contains. The developer is seeking "intermediate resort" designation because the project is to include only 1,500 hotel rooms. However, the project total of 5,200 units of all types (see page II-6 of the EIS) makes it only marginally smaller overall than the "major resorts" being developed at Anaeho'omalu and Kalahuipua'a (the Waikoloa Beach Resort and the Mauna Lani Resort). Hence, we believe that the Mahukona Resort is most accurately described as a major resort project.

Use of the Mauna Kea Beach Hotel for Comparison Purposes. We are in complete agreement that a 5,200-unit resort project cannot be equated to the 310-room Mauna Kea Beach Hotel (MKBH) in assessing impacts; at no point in the EIS did we do so. Our report did draw on experience reported from other resort projects (including, but not limited to the MKBH) in attempting to determine the probable social and cultural effects of the Mahukona Resort because we believe that this is a rich source of knowledge. I do not believe that you will be able to find a more thorough discussion of socio-cultural impacts from a resort project of this sort in other environmental documents prepared pursuant to Chapter 343, HRS.

Tourism and Crime. At the bottom of page 5 your letter asserts that, "this social aspect (exposure to wealth generating increased crime and disconcerting workers' families) is not treated in the draft (sic) at any respectable length." On the contrary, these two social issues and many more are treated exhaustively on pages IV-64 through IV-84 of the EIS. It is

unfortunate that you did not have sufficient time to read that material before drafting your comments. With respect to the statistics which you specifically mentioned, i.e., data on relative crime rates in Kona and North Kohala, you will find them very clearly presented in Table IV-36 on page IV-75.

8. Sequence of Land Use Change Applications

As indicated in the last part of the discussion under item number 5 above, you have misunderstood the provisions of Chapter 226, Hawaii Revised Statutes. That Chapter required that County General Plans be in conformance with the State Plan, i.e., Chapter 226, not with the State Land Use District Boundaries administered by the Land Use Commission. In view of this, your objection appears to be groundless.

8. Electrical Power

Introductory Comments. We appreciate the fact that you worked under severe time limits in preparing your comments. It is unfortunate, however, that the hurried nature of your review led you to the erroneous conclusion that the document is "incomplete, confusing, slanted, or downright untrue" and to "suggest that this draft (sic) must be done over" (page 6). I hope that the following responses to the specific examples that you offered will convince you that the document does not deserve the comments that were made in such haste.

Page II-9. The utility system description contained on page II-9 is under the heading "Proposed On-Site Development" (see page II-1). The "electric feeder lines" (i.e., those in the regional transmission system) are off the Mahukona Resort site. Hence, the statement on page II-9 of the EIS that "most utility lines would be underground" is correct.

Page V-94. Off-site electrical power lines are discussed on page V-96 of the EIS. Since these would be installed by HELCO, Mahukona Properties is not in a position to determine what route the transmission lines would take, i.e., whether they would branch off from a Kohala Mountain Road line or follow a route parallel to the Mahukona-Kawaihae Road (Akoni Pule Highway).

I believe that your assertion that the developer would be responsible for construction costs if a transmission line were to be constructed along the Akoni Pule Highway corridor is incorrect. HELCO is mandated by the Public Utilities Commission to provide such service to the parcel boundary. In view of this, both possible transmission line routes would be the responsibility of HELCO, and construction costs would affect the utility's rate base. Your assertion that this would result in an increase in costs to HELCO users of $200 each is completely unsupported by any factual evidence. We believe that it it totally groundless, but would be more than willing to discuss the issue if you provide us the calculations upon which your conclusions are based.

The discussion on page 7 of your letter relating to the Kohala Mountain Road transmission corridor appears to be aimed more at HELCO than at the Mahukona Resort. Because of this we believe that it is a matter that is best resolved by HELCO and appropriate public agencies if and when changes become necessary.

10. Health Care Facilities

North Kohala had a population in April 1980 of approximately 3,300 persons. This is far too small a number to support a full-service hospital, and it is reasonable to expect that residents would travel out of the area to obtain treatment for serious medical problems. Our statement that "the Kohala Hospital...presently meets the medical needs of the community satisfactorily," was made with this in mind.

Belt, Collins & Associates was never sent a copy of the May 5, 1980 letter from Dr. Charles Morin, M.D., of the Kohala Health Center that you referred to in your letter. Subsequent to receipt of your comment I requested and have received a copy of that document. It is being attached as an appendix to this letter to insure that Dr. Morin's exact words become a matter of public record.

11. Water-Related Issues

Contact With the State Department of Agriculture. Following receipt of your letter, I requested and received a copy of Mr. Parias' memorandum to the Hawaii County Planning Department. The memorandum raises no questions that are not already addressed in the EIS.

Water Availability. As stated very clearly in the EIS (see, for example, page V-64), the developer's first choice as a water source is deep wells drilled immediately mauka of the resort site. Pursuit of this option will require the cooperation of the landowners there, i.e., Richard Smart/the State of Hawaii /Bishop Estate. No firm commitments have been obtained as yet. However, the precedent set by the use of wells on State land at Lalamilo to satisfy water needs of coastal resort development in South Kohala indicates that the approach is a plausible one if appropriate land use designations are obtained from both County and State agencies.

The preferred water supply option (deep wells mauka of the resort site) would not bring the proposed Mahukona Resort into competition with present or potential agricultural users of water because they would tap water so deep beneath the ground surface that it is not economically practical to use it for agricultural purposes. Without the resort, fresh water will continue to be discharged unused into the ocean.

If water were to be imported from farther north in the North Kohala District, the issue of competition with potential agricultural uses would become a real one. A decision to pursue one of these options would make it necessary to prepare an EIS for the proposed water facilities. A central issue of such a

report would have to be the effect that water use by the resort would have on the availability of water for agricultural pursuits. It is at this stage, i.e., after a decision has been made that it is advisable to consider "wet-side" water sources in lieu of wells mauka of the resort site, that a detailed examination of the implications of such a course of action would be undertaken.

12. Schools

The first paragraph in this comment covers a lot of ground, and in order to answer it completely we will deal with its component parts:

- Irrelevant Data. As stated repeatedly throughout the EIS, the secondary growth generated by the proposed project and by other already-planned resort developments will affect both North and South Kohala, and thus the schools which serve residents of these districts--Waimea Elementary/Intermediate and Honoka'a High as well as North Kohala High/Elementary. Hence, the enrollment and other information presented for those schools is very relevant to our impact assessment.

- Reliability of Sources. Belt, Collins & Associates uses a wide variety of techniques in collecting information for use in the reports that it prepares. While letters result in a hard-copy record of the questions posed and the answers given, they also lack many of the advantages inherent in direct conversations (whether in person or by telephone). We believe tht the crux of the matter is whether or not the information we presented is accurate and truely represents the opinions of the sources quoted. We believe that the material presented in the EIS is accurate and your letter cites no contrary evidence which dissuades us from this belief.

- Projections. Most of the planning which the Department of Education engages in most appropriately focuses on the near-term. You are mistaken in your belief that the Department does not also have a long-range view of its operations and potential facility needs. There are indeed DOE enrollment projections for the year 2000 which serve as a guide to the Department's leaders. We believe these are fairly presented in the EIS.

Enrollment Increase. You assert that the enrollment increase of 760 students cited in the EIS as the likely impact of the proposed Mahukona Resort indicates that the condominiums are for permanent residents. This conclusion is incorrect. The 760-student increase would result from the increase in resident population associated with the direct and indirect employment opportunities provided by the proposed project. A very small percentage of these persons are likely to reside on the Mahukona Resort site. In fact, to avoid underestimating the potential adverse impacts that the project might have on the availability of housing, we assumed that it would be zero.

Available Land. Your failure to understand the reasons for our allocating some of the projected growth in student enrollment to Waimea and Honoka'a, as well as to Kohala School, led to your conclusion that inadequate land is available on the existing sites to accommodate the projected growth. If you correct this misunderstanding, I am sure that your analysis will show that our statement that sufficient land is available is correct. This, of course, would obviate the need for the kind of discussion requested in the last sixteen lines of page 9 of your letter.

13. Recreational Facilities

Beaches. Figure V-15 portrays "recreational facilities." It was intended that "Kapa'a Beach" be read as "Kapa'a Beach Park." The same is true of "Mahukona Beach." Both of these are the official names of the parks as obtained from the County of Hawaii Recreation Plan, despite the fact that there are no beaches at these parks. You will note that this same convention was followed for Hapuna Beach (Park) and Keokea Beach (Park). It was certainly not our intention to mislead readers on this point, and I apologize for any misunderstanding it may have created.

Reserves. There are only two "reserves" depicted on Figure V-15. Neither the Kohala Forest Reserve nor the Pololu-Honokane Valley Reserve is intended for heavy recreational use. However, the County of Hawaii Recreation Plan (p.104) states:

> The Kohala Mountains serve as a spectacular backdrop for the district and is considered as another potential recreation source. Two proposals were made to establish wilderness camping areas; the first site is accessible only through Parker Ranch and Honokaa Sugar Company lands, and is situated at Kehena near the crest of the Pololu and Honokane Valleys; the other is located at the Niulii-Pololu area of the Hamakua Forest Reserve. Coordination should be achieved with the State in providing hiking trails in this area, by way of the Kohala Ditch Trail or through existing ravines. These trails would provide a means for hunters to enter the forest reserve and would help in promoting hunting as a recreational pursuit in this district.

14. Police Protection

Police protection must be supported by the County General Fund. The costs of providing it is one of the expenditures included in the section entitled "Fiscal Impact - Governmental Benefit: Cost Analysis" on pages IV-48 through IV-57 of the EIS.

Your letter states:

> "The statement in the draft (sic) of increased police services vs. increased population is entirely wrong. This paragraph contains what we would call nonsense. If the author wants more details we are at his disposal."

The absence of a specific paragraph reference in your statement makes it difficult to answer. If by "the statement in the draft" you are refering to the first paragraph under the sub-title "Projected Impacts" on page V-90, then it appears that you are incorrect. An increase in the resident and/or visitor population is likely to produce an increase in the need for protective services, and the EIS so states. However, whether or not the necessary police officer:person ratio will be higher, lower, or the same cannot be determined accurately at this time.

Should Belt, Collins & Associates find that additional information regarding the adequacy of protective services is necessary, we will seek it from public agencies, community groups, or persons with special expertise in the field. However, I thank you for your offer of assistance.

15. Forgotten Item

While I am surprised that someone so familiar with the Kohalas as yourself would need to check with HELCO to determine that Keahole is in North Kona rather than North Kohala, Table V-30 (not "table V-95" as erroneously reported in your letter) does in fact contain a typographical error. The Hawaii Electric Light Company facility is, as you correctly noted, situated in North Kona rather than in North Kohala. This is one of those small errors that inevitably survives even the best-intentioned proof-reading. The location of this generating facility will be correctly reported in the revised EIS.

16. Traffic

We do not agree with your unsubstantiated conclusion. In view of the absence of any specific criticism or page references, no changes are being made.

17. & 18. Alternatives and General Objections

I am grouping my response to these two comments together because they both lack any specific references to which we might reply and because they both seem to have the same basic purpose, that is to provide some legal basis for a court challenge to the EIS. First, consider comment number 17, which contains a total of 87 words. It refers to "mistaken assumptions," "fantasied numbers," and "tilted opinions." But it does not cite a single example of these alleged errors. Lack of time is cited as the reason for this omission; however, such an excuse rings hollow in view of the fact that other comments run on for an additional eight pages.

Comment number 18 makes the purpose of the allegations even clearer. Here we are told that you:

> "...raise objections against any and all issues of the draft (sic) EIS, not because anything is wrong, mind you, (emphasis added) but just to comply with anything in Chapter 343, HRS and not to sell ourselves short because of lack of time to review."

We understand your desire not to foreclose any possible legal options, but find it impossible to provide any substantive response to this comment.

19. Sustainable Yields of Water

Page I-3, to which your comment refers, is in the Summary chapter of the EIS. This accounts for the relatively brief treatment given the water issue there. A thorough discussion of the subject may be found in the analysis of water resources impacts presented on pages V-64 through V-79 of the EIS. These pages describe the location of the wells that are proposed, present data on the quality of water in representative wells from throughout the region, and generally summarize the basis for our conclusion that pumpage would not exceed the aquifer's sustainable yield. More detailed analyses and a water resources development plan will be prepared and submitted for review by responsible agencies if the General Plan amendment request is granted by the County Council. This review and approval process is designed to insure that the water resource is utilized in consonance with State and County policies.

20. Consistency with Economic Objectives of the General Plan

The complete passage from which your comment quotes is as follows:

> The proposed project is generally consistent with the economic objectives of State and County plans and policies and is not in opposition to the objectives relating to the environment and public facilities. The proposed project is not in conformance with any of the geographically specific land use plans (State Land Use Law or Hawaii County General Plan or Zoning).

Please note that it refers explicitly to consistency with the economic objectives of State and County Plans, not to all of the goals and objectives which they contain. Your objection appears to have been based on a mis-reading of our statement. As the quote above shows, the EIS does, in fact, recognize that there are a number of inconsistencies between existing plans and the proposal.

Mahukona Harbor Minor Resort Designation. The minor resort designation on the General Plan map at Mahukona Harbor is discussed on page VI-6 of the EIS. Since the owner has indicated no interest in developing this land as a resort area, it was not reasonable to include this site in our development scenarios. If Castle & Cooke should decide to develop a minor resort there, County regulations would require that an environmental assessment/impact statement be prepared to discuss the "ramifications," i.e., its impacts.

Hawaii State Plan. The last sentence in the first full paragraph on page 12 of your letter states: "It is hard to believe that such an important law (The State Plan, HRS 226) is done away with in one sentence in a report of 335 pages." In fact, your comment is refering to statements we made in Chapter I, the summary of the report. A full discussion of the project's relationship to the State Plan may be found on pages VI-1 through VI-3 and page VI-10 of the EIS. (Please note that page VI-10 should have been numbered IV-4 and the page numbered as VI-4 is really page VI-10).

Social Implications of the Project (page 12, second full paragraph). You will find an exhaustive treatment of the social impacts of the project on pages IV-58 through IV-84 of the EIS. This, in turn, is a summary of a much longer report by Community Resources, a copy of which is on file with the Hawaii County Planning Department.

21. Grazing Potential

Mention of the fact that the dry coastal areas are used for low-intensity grazing has been added to page IV-3 of the EIS. However, the primary discussion of agricultural potential remains on pages V-7 through V-9 and on pages VII-2 and VII-3.

The land considerably mauka of Mahukona Harbor may or may not be suitable for macadamia nuts if adequate irrigation water is provided. An investigation of that potential was beyond the scope of our study. The fact remains that the land on and around the Mahukona Resort site and that might conceivably be affected by the proposed project is classified by the United States Soil Conservation Service as being in capability classes VI and VII, i.e., as having "severe limitations that make them largely or completely unsuitable to cultivation." This is reported on page V-7 of the EIS. Had your own time limitations not forced you to "skip pages" as your comment number 22 indicated was necessary, you would have been familiar with this fact.

22. Clarity of Presentation

Skipped Pages. It is unfortunate that the EIS review time schedule mandated by the State's EIS Regulations left you too little time to read the entire document. As is true of any technical document, the report consists of a large number of interrelated pieces that are most comprehensible if read in

their entirety. Your review (which you term "helter-skelter") appears to have been too rushed to allow you the luxury of such a comprehensive treatment and to have led to many of the misunderstandings exhibited in your comments.

Table IV-27. Except in statistical compendiums, tables are always meant to be read in conjunction with the text which they support. Nevertheless, Belt, Collins & Associates always attempts to thoroughly footnote the tables used in its reports so that these may be read and interpreted separately if desired. Upon review we find the table to be easily understood from the information that is provided. With respect to inter-table references, this is a commonly used technique and is the only means by which tables can be kept from becoming overly long or repetitious. As clearly stated in the title to the table, the projection date is the year 2005.

Table IV-28. In an early draft of the EIS State and County expenditures were shown in the same table. The two sets of data were subsequently broken apart for clearer presentation. Inadvertently, the reference contained in footnote was not modified to account for this. The words, "For both the State and County columns" are being deleted from the revised EIS.

Table IV-30. "WOMR" and "WMR" are not abbreviations, they are simply names given to scenarios defined by specific combinations of parameter values, i.e., by a specific average daily expenditure, resident population increases, etc. There are only three abbreviations in the table. One of these, "B/C Ratio," is a very commonly used abbreviation for "Benefit:Cost Ratio." The other two terms are not familiar to lay-persons, but they are defined in the footnotes to the table.

23. Burdensome Time Limits

I thoroughly appreciate the frustration that you feel as the result of the 30-day time limit imposed on the review period by the State's EIS regulations. Unfortunately, that limitation is something over which Belt, Collins & Associates has no discretionary power. You should be advised, however, that we have not "cut-off any reviews that arrive after 30 days." On the contrary, we are responding to all the comments received up until the time the revised EIS goes to press.

Should you desire to see the regulations changed, I suggest you contact the State Environmental Quality Commission and make your views known. The Commission's address is Room 301, 550 Halekauwila Street/Honolulu, Hawaii 96813.

24. Effects on Crime Rates

Statistical tables are intended to present numerical data in a clear, accurate, and succinct manner. It is our belief that Table IV-36 does this and does it well. Crime rates for North and South Kona are reported together

because that is the way the Hawaii County Police Department aggregates its statistics, not, as you suggest, because we wished to conceal some fact or trend. On the contrary, crime rates for North and South Kona were included in Table IV-36 specifically because they show that Kona has a crime rate that is much higher than North Kohala's.

By the way, your calculation of crime rates in North Kohala and North Kona as a percentage of the County average appear to be mistaken. Based on 1979 crime data, Part I crime rates per hundred residents for North Kohala, South Kohala, North and South Kona combined, and Hawaii County as a whole were 2.74, 5.02, 6.72, and 5.37 respectively (see Table IV-36). Expressing these crime rates as percentages of the County average gives the following:

District	Part I Crime Rate as Percentage of County Average
North Kohala	51
South Kohala	93
North-South Kona	125

These figures make it far clearer than the numbers quoted in your letter that North Kohala is a veritable haven from serious crime at the present time. To have presented the voluminous data you requested (i.e., the entire County crime report) would, in our opinion, have obfuscated the issue, not clarified it, and was not included in the EIS for that reason. The effectiveness of our approach is demonstrated by the fact that all of the points raised in your letter regarding this issue may be answered by refering to the data that we provided.

25. P.A.A.S. Survey

On pages 14 through 18 of your letter, you raise a number of interrelated points dealing with the adequacy of the April 1980 survey of Kohala residents' opinions on resort development. It is difficult to determine the exact number of separate issues you are commenting on, as there is no listing of issues or subheadings on these four pages. The comments seemed to be based on six major points which are addressed under separate sub-headings below.

1. Description of Methodology.
and
2. Acceptability of Methodology. It is true that the PAAS report does not describe its sampling methodology. For this reason, during the preparation of the EIS we turned to the scope of work PAAS submitted to Belt, Collins & Associates on July 31, 1979 and incorporated the methodology description there into the EIS.

In order to respond to these comments in your letter, the PAAS officials who designed and supervised fielding of the survey, Dr. Daniel W. Tuttle and Mr. Walter Osakoda, were contacted. We then learned that PAAS altered its sampling approach when in the field in an attempt to provide a more extensive sample. Therefore, we are making the following changes to the current description under the Survey Methodology heading on pages IV-78 and IV-79 of the EIS:

- The first full paragraph on page IV-79 will be replaced with:

  > Public Affairs Advisory Services originally planned a pinpoint sampling technique, which would have involved intensive door-to-door personal contact procedures only in selected geographical areas. However, to improve the representativeness of the sample, the company instead chose to attempt to reach every residential housing unit in North and South Kohala. Inevitably, some households could not be approached because they were too isolated to find or because some threat to a survey worker's personal safety (e.g., guard dog) was present.

- The following will be substituted for the second sentence in the second full paragraph on page IV-79:

  > The refusal rate among residents who were contacted was estimated to be approximately eight percent. However, no record was kept of the number of households at which nobody was home. In such cases, no survey instrument was left, and no return visits were made.

- A new final paragraph under this heading will be added to page IV-79:

  > The 1980 U.S. Census reports the population of North Kohala was 3,249 and the population of South Kohala was 4,607. Thus, the sample of 261 North Kohala residents represents eight percent of the total population of that district, and the sample of 260 South Kohala residents represents nearly six percent of the total population of that district. The sample thus represents even higher percentages of the adult population of Kohala, although exact percentages cannot yet be determined because the Census Bureau has not reported any age breakdown for Hawaii's population.

Since PAAS went out of business in early 1981, their company records are no longer available. Thus, the decriptions of the actual methodology used are based on Dr. Tuttle's and Mr. Osakoda's memories.

3. **Omission of Table and Ethnic Breakdown of Sample.** It is true that the EIS includes only a few of the 35 tables contained in the full, 131-page PAAS report. Table 18, showing ethnic breakdown of the sample, is among those omitted. However, a more general summary of the sample's ethnic characteristics does appear on page IV-79 of the EIS.

You assert on page 16 of your letter that it is an "acceptable method sociographically" to compare the 1980 North Kohala sample ethnic breakdown with the 1970 Census figures because the population in North Kohala "remained static over these ten years." In fact, a great deal of outmigration and compensating immigration occurred in North Kohala during the 1970s. The current ethnic breakdown of the population will remain a matter for speculation until more detailed 1980 U.S. Census results are available. Therefore, we do not agree that the comparison with the 1970 figures is an "acceptable method." Furthermore, the deviations you show are moderate at worst and would be unlikely to have a great effect on overall results. Demographic biases in a sample are present only if (1) a demographic group has been under-represented or over-represented, and (2) the opinions expressed by this group are greatly different, on the average, from opinions expressed by other groups. Part II of the PAAS report shows only minor differences among ethnic groups in responses to the 1980 survey questions.

4. **Age Breakdown of Sample.** Again, the comparison to the 1970 Census figures is inappropriate. And mathematically weighting the results to conform to the 1970 age distribution would be unlikely to have a substantial impact on the overall results, judging from the age differences shown in Part II of the PAAS report.

5. **Survey Question in Table IV-40 of the EIS.** In order for the survey results to be included in the EIS, the survey obviously had to be conducted prior to the document's completion. Once the EIS was made public the resulting public knowledge of the proposal and its likely impacts could have affected attitudes in either a positive or a negative way. Pubic education is a major purpose of the EIS process. The survey results are a description of public attitudes prior to the dissemination of more detailed information about the project. Thus, it is an inherent feature of any EIS that publication of the document itself could change any public attitudes described therein; at the same time, the survey results are still a valid depiction of public attitudes at the time the survey was taken.

It is correct that the wording of the question you referred to does not specifically mention condominium units. However, it could be argued that many respondents would have a difficult time visualizing a project from a mathematical description of its dimensions and characteristics, and would have an easier time visualizing the project through reference to a nearby development of approximately the same nature and magnitude. The phrase "like Keauhou" was inserted in the question for this reason. Although Keauhou is a smaller development than the proposed Mahukona Resort ultimately would be, it is still the best approximation to be found in West Hawaii. You assert that many North Kohala residents are not familiar with Keauhou and/or its condominiums. It is difficult to prove or disprove this assertion without another survey. One of the most difficult tasks in survey research is to

measure public reaction to a proposal which has many aspects, because it is always necessary for practical reasons to give an oversimplified version of the proposed measure in the survey question. Few respondents will read a complex, multi-page description of the proposal before giving their opinion on it. In this case, the element of condominiums at Mahukona was implied by example but not made specific. Your belief that a majority of North Kohala residents would say 'No' to a project with 3,200 condominium units could only be tested through another professionally-conducted sample survey.

In response to your comment we are changing the title of Table IV-40 to "Kohala Residents' Reaction to a Major Resort Development in the Mahukona Area" and in the text on page IV-82 which discusses this table the phrase "such a project" will be substituted for "the project" to clearly show that respondents were reacting to a general questions about resort development rather than a specific development proposal.

6. **Survey Question in Table 11 of PAAS Report.** The objections you have to this question are irrelevant because neither the question nor the results for the question are used in the EIS.

Concluding Note. You suggest that the PAAS survey is so flawed that all references to it should be deleted from the EIS. While the survey may not have been perfect, no survey ever is. The imperfections are not so serious as to warrant deletion of results from the EIS. It should be noted that the results apply to residents' attitudes as of April 1980 and that another survey would be required to determine current attitudes.

Final Comments (p.18).

As indicated in the preceding responses, a careful review of your letter reveals that most of the questions you raised are already answered in the EIS or are based on a misreading of that document. In a few instances your points are well taken, and the revised EIS will incorporate appropriate changes. As noted on page IX-2 of the EIS, the Kohala Community Association was consulted during the preparation of the EIS, and information provided by its members is incorporated into the report.

Exhibit "A": Memorandum Concerning Mahukona Resort

Exhibit "A" which is attached to your letter consists of questions which we received under separate cover from the Kohala Community Association. A copy of our response to those questions is attached.

Exhibit "B": PAAS Study — Critical Points

This attachment appears to contain rough notes made by someone reviewing the results of the report of the survey conducted for Mahukona Properties by

Public Affairs Advisory Service (PAAS). While a few of the items are in the form of criticisms, most are simply observations. Because the criticisms duplicate comments we have responded to previously, we are not discussing them further.

Once again let me thank you for the effort you so clearly put into reviewing the Mahukona Resort EIS. Your comments have made it possible to eliminate several mistakes from the document and to clarify a few passages. I hope the material we have provided above improves your understanding of the EIS.

Sincerely,

Perry J. White

PJW:gha
attachments
cc: Hawaii County Planning Department
Environmental Quality Commission
Mahukona Properties
Community Resources

Charles R Morin, M D.

KOHALA HEALTH CENTER
P O BOX 340
KAPAAU, HAWAII 96755

May 5, 1980

Sidney Fuke
Hawaii County Planning Director
Hilo, Hawaii

Dear Mr. Fuke:

I would like to thank you for the excellent job your office did in the environmental assessment for the proposed Mahukona Development south of Lapakahi State Park in North Kohala.

The Kohala Community Association met with Wallington Chu and others last year - it was the overwhelming concensus of the community that the proposed development was unsatisfactory in every way. I am glad to learn that the County Planning Office also has serious reservations about this development in particular, and intermediate development in general in North Kohala.

There are precious few areas left in this State which have not succumbed to the developers dollars - I sincerely hope that North Kohala will remain one of these for many years to come.

Again, thank you for reflecting the community interest in this matter.

Sincerely,

Charles Morin, M.D.

XII-87

Mahukona Properties
Belt, Collins and Associates
745 Fort Street, Suite 514
Honolulu, O'ahu
96813

Hannah E. Springer
Kukui'ohiwai
R.R. #1, Box 397
Holualoa, Hawai'i
96725

July 16, 1981

Aloha mai,

I recently had the opportunity to review the final Environmental Impact Statement for the proposed Mahukona Properties development in South Kohala.

While many of the questions raised in this EIS are innovative, such as those pertaining to social impacts, I found much of the discussion too general to be considered appropriate for a final EIS.

In an effort to gain more information on the specific archealogy involved in the project, a colleguc tried to obtain a copy of the archealogical report(s) from the Hawai'i County Planning Department on July 8, 1981, but found none available. The public cannot maintain an informed position if such information is not made available.

On page VI 4, a discussion of the project objectives and guidelines being consistant with the objectives and guidelines of the Hawai'i County Planning Commission and Planning Department. But with regard to the discussion of man-made historic resources within the CZ: area the HCPC and HCPD objectives and guidelines are noted but not those of the project.

The term "mitigation" is used frequently to describe treatment of archealogic sites not suitable for preservation, but I am not clear as to what specific action(s) will mitigate the destruction of such sites.

There is also no specific statement of how the sites present on the Mahukona Properties land will aid in answering focal questions of cultural importance, or even what the exact questions with regard to land tenure/management and social stratification are.

Any information that you can share with me in these matters will be greatly appreciated.

Mahalo,

Hannah Springer

cc: Hawai'i County Planning Department
Debbie Chang Abreu, Pres., Na 'Aluhele

XII-88

Belt, Collins & Associates
A division of Lyon Associates, Incorporated
Engineers • Planners • Landscape Architects • Architects
Suite Pacific Guardian Center, Mauka Tower, 737 Bishop Street, Honolulu, Hawaii 96813 Telephone (808) 521-5361 Telex: 723-8432

August 27, 1981
81AC-1453

Ms Hannah K. Springer
Kukui'ohiwai
R.R. #1, Box 397
Holualoa, Hawai'i 96725

Dear Ms Springer:

Environmental Impact Statement for the Proposed
Mahukona Resort Project, North Kohala, Hawaii

Thank you for your letter dated July 16, 1981 regarding the Environmental Impact Statement (EIS) for the proposed Mahukona Resort. We appreciate the time you spent reviewing the document and preparing your comments. Your questions concern five major topics, and I will address each of them below.

General Nature of the EIS

The Mahukona Resort EIS was prepared to accompany an application by Mahukona Properties, the limited partnership which owns the resort site, for a change in the Hawaii County General Plan needed to permit the development of an "intermediate resort". At this early stage in the development process, only the basic resort concept has been defined, and it is that concept for which Mahukona Properties is seeking County approval in the form of the General Plan amendment. If the amendment is granted, either in whole or in part, the developer will be in a position to proceed to a more detailed design phase.

Numerous other land use approvals must be obtained before the project could be implemented; these are identified on pages VIII-2 and VIII-3 of the EIS and include a State Land Use District boundary amendment, a Special Management Area permit, and a change in County Zoning. In order to obtain these it will be necessary for the developer of each project within the overall resort to submit environmental assessments and/or environmental impact statements which present detailed descriptions of the proposed facilities, in-depth anaylses of potential impacts, and specific mitigation measures.

It is impossible to provide a more detailed impact analysis than we have done without more detailed plans. In order to prepare more detailed plans, much more extensive engineering and design studies would be required. These studies are very costly, and the information that they would provide would not substantially improve the County's ability to make the choices that are necessary at this stage in the decision-making process. In fact, it is our belief that additional volumes of data and discussion would tend to obscure, rather than illuminate, the central issues of growth management. Their inclusion in the EIS would most certainly make the document more bulky and difficult to read, thereby hampering its ability to serve as a useful source of information.

Availability of Archaeological Survey Results

At the time the EIS was written it was our belief that a copy of the Bishop Museum's archaeological survey report was on file with the Hawaii County Planning Department. On July 14, 1981 we received a telephone call from the Planning Department informing us that they did not have a copy of the study. As a result of that call, a copy of the survey report was forwarded to the Planning Department immediately. I apologize for any inconvenience or other problems this may have caused you.

Historic Resources

In assembling the master copy of the report before paginating it, pages VI-4 and VI-10 were inadvertently exchanged for one another. Hence, the page appearing as page VI-4 should be marked page VI-10 and the comment regarding the project's consistency with the historic resources objective listed at the bottom of that page may be found on page VI-11.

"Mitigation Measures"

The meaning of the term "mitigation" as it is used in the discussion of archaeologic sites depends upon the specific circumstances of the resource in question, particularly its location, character, relative value, importance as a source of useful scientific information, and spiritual associations and/or significance. In cases where the value is scientific, is largely independent of the resource's continued presence in situ, and derives largely from the site's ability to yield meaningful information when subjected to laboratory study, it may be appropriate to record the circumstances of the site and remove the object(s). In other instances, e.g., the presence of a he'iau possessed of great spiritual mana (power) or significance, mitigation may require that the resource and substantial surrounding area remain intact and reasonably well insulated from surrounding activities.

Relationship to Focal Questions of Archaeology

The Bishop Museum's archaeological survey report contains some discussion of the focal questions in Hawaiian archaeology (especially in regard to the process of social change) as they relate to the Mahukona Resort site. We have attached the relevant section of their report for your use.

Thank you again for your comments. If there is any additional information we may provide, please call me at 521-5361.

Sincerely,

Perry J. White

PJW:ghs
Attachment
cc: Mahukona Properties
Hawaii County Planning Department
Environmental Quality Commission

appendices

APPENDIX A

DERIVATIONS OF EMPLOYMENT, POPULATION, AND HOUSEHOLD GENERATION FACTORS

APPENDIX A. DERIVATION OF EMPLOYMENT, POPULATION, AND HOUSEHOLD GENERATION FACTORS

EMPLOYMENT

OPERATIONAL EMPLOYMENT

Direct, On-Site Employment

This report's estimate of long-term, on-site employment is based upon the ultimate completion and stabilized operation of the visitor facilities that have been proposed. Operational employment has been calculated by Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:16-19) on the basis of an average ratio expressed in terms of the number of jobs per hotel room, condominium unit, or square foot of commercial space. For hotel operations, the statewide average was calculated at approximately 0.70 jobs per room. A recent study focusing on Big Island hotel operations revealed a County average of about 0.60 employees per room (SRI International, December 1978:IV-15). This employment-to-room ratio varies from project to project, depending upon hotel size and the kind and quality of service that is offered. Small, cut-rate hotels in Waikiki have ratios of less than 0.5 employees per room. At the other end of the scale, the Mauna Kea Beach Hotel, a luxury facility situated in an isolated area, has an employee-per-room ratio that ranges from 1.8 to over 2.0.

For the purposes of this study, it was assumed that the first hotel at each new resort would have an employee-per-room ratio of 0.85. This ratio reflects all on-site hotel employment and all employment related to the maintenance and operation of proposed recreational amenities which must be developed concurrently with the first hotel. Subsequent hotel development is estimated to generate direct employment based on a 0.70 jobs-to-room ratio. This is consistent with the existing State and Hawaii County averages for hotels in established resort areas.

Direct employment resulting from the condominium development is expected to have a smaller impact than hotel projects. A survey of visitor-oriented condominium projects on the Big Island revealed an average ratio of 0.14 full-time and 0.04 part-time employees per condominium unit (SRI International, December 1978:IV-18). This number is generally consistent with the 0.26 jobs-per-unit ratio reported by Hastings, Martin, Hallstrom, and Chew, Ltd. (September 1980:18) for Neighbor Island apartment-hotel projects. The proposed Kohala Coast condominiums are expected to have employment ratios slightly lower than these because they will probably be marketed to owners who are less inclined to actively rent their condominiums than owners of units in more urbanized resort areas. Hence, the employment estimates developed by Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980) were based on an average of 0.15 jobs per unit.

Residential single-family development is estimated to have little or no impact on primary employment. Planned resort commercial development is expected to require roughly one employee for each 200 square feet of gross floor area.

To estimate the effect of the increase in job opportunities on the number of persons employed (i.e., the employed labor force), a jobs-to-persons conversion factor of 0.92 is incorporated into the analysis. The 0.92 conversion factor adjusts for multiple job

holdings exhibited by the employed labor force and corresponds to the general County average as calculated by Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:19) on the basis of State of Hawaii Department of Labor and Industrial Relations statistics, and U. S. Bureau of the Census data.

Indirect, Off-Site Employment

As a result of the direct, on-site employment and the increased basic economic activity generated by the Mahukona Resort, there will be additional off-site employment generated, both within and without the North/South Kohala impact area. The level of secondary or indirectly-generated employment to be created within the impact area has been estimated through the use of an appropriate employment multiplier. The employment multiplier is a factor which is applied to the total number of directly-generated jobs to yield the total number of both directly and indirectly-generated jobs. As an illustration, the lowest possible employment multiplier would be a factor of 1.0; a 1.0 multiplier would imply that each new job directly generated by the resort development would indirectly create zero additional jobs within the impact area. In this extreme example the resort development would have no indirect employment effect in the defined impact area. This situation could occur in the case of a small expansion in the number of rooms at an existing resort. In forecasting the indirect employment effects of the projected Kohala Coast resort development, the appropriate employment multiplier is estimated by Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:19) to be 1.2. In other words, each direct, on-site job created at the proposed resorts is expected to generate an additional 0.2 off-site job within the impact area.

The 1.2 employment multiplier is based upon employment multipliers derived by an input-output model of the economy of Kauai County (Anderson et. al., May 1975:134), and is considered appropriate for a rural impact area such as North and South Kohala. The total indirect employment effect of the proposed development should actually result in a multiplier in excess of 1.2, but a substantial amount of this total indirect employment increase will be absorbed in areas outside the defined impact area.

CONSTRUCTION EMPLOYMENT

The number and type of on-site construction jobs can be expected to fluctuate over the 20-year time period during which Kohala Coast resorts are being developed. Employment at any given time will tend to be a function of phasing schedules, plan specifications, construction methods, the general contractors' operating procedures, and the size and scope of subcontracting services being utilized. Uncertainties associated with this fluctuation have been addressed by converting projected construction jobs to person-year equivalents using coefficients derived from information supplied by contractors and construction managers (Hastings, Martin, Hallstrom and Chew, Ltd., September 1980:13-16). These coefficients, which are shown in Table A-1, represent the number of construction worker person-years required to complete specific types of units.

The annual average number of construction jobs for any particular type of project does not necessarily reflect the exact size of construction crews at any given point in time. However, due to the variety of planned projects and the similarity of skills needed for all projects, it is reasonable to assume that the demand for construction workers would be relatively constant over the course of each five-year development period.

Table A-1. Construction Job Coefficients.

Type of Unit	Estimated Direct Construction Man-Years Per Unit[1]
Hotel	0.5
Condominium	1.0
Single-Family Residential	1.5
Commercial [2]	0.7

[1] Includes site work and improvements.

[2] Coefficient expressed in terms of man-years per 1,000 square feet of commercial space.

Source: Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:15).

The total number of persons employed in on-site construction activities is estimated by multiplying average annual jobs by a ratio which allows for persons having more than one job. Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:16) report that on the Big Island the ratio is 0.92 construction industry workers for each construction industry position that is available.

The bulk of the construction work force consists of building trades craftsmen (skilled labor) and unskilled laborers. General contractors for large-scale developments on the Neighbor Island are typically off-island firms capable of achieving certain economies of scale. However, to minimize housing costs and other overhead associated with the maintenance of a temporary work force, the general contractors usually employ as many local subcontractors and workers as possible. It follows, then, that construction of the proposed resorts would be particularly advantageous to construction workers who reside in the North and South Kohala impact area. Labor requirements in excess of available local resources would have to be imported from outside the region.

In calculating the amount of additional employment indirectly generated in the impact area by construction jobs, a 1.15, rather than 1.2, multiplier is used. The lower multiplier reflects the greater leakages from the regional economy that result from expenditures originating in the construction industry as compared to the visitor industry.

POPULATION AND HOUSEHOLDS

VISITOR POPULATION

The proposed Kohala Coast Resort developments will attract a large number of visitors to the area. Because visitor arrivals are somewhat seasonal, the number of guests present at the different resorts (i.e., their occupancy rates) will vary from day to day and from season to season. While this seasonality is important to hotel operators, for our purposes only two situations need to be considered:

- o average daily visitor population (i.e., the total number of person-days spent by visitors on the island in one year divided by 365 days per year); and
- o average daily visitor population during the highest 30-day period.

In this analysis, the average daily visitor census for both of these periods has been calculated by multiplying the projected number of hotel and condominium units by the estimated room occupancy rates and average party size. The analysis incorporates the specific assumptions regarding visitor mix and characteristics that are shown in Table A-2.

RESIDENT POPULATION AND HOUSEHOLDS

An analysis of available census data by Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:31) indicates that, on the average, there are 1.45 workers per household on the Big Island. The same source estimates that the average household size will be 3.0 persons. This is somewhat smaller than the typical average household at the present time, but it is believed to be reasonable in view of the types of persons likely to in-migrate in order to fill resort-related jobs. Both the worker-per-household and household size estimates take into account the historic trend towards increased labor force participation and decreased household size and assumes that it will continue in the future.

Unemployment in visitor-dependent industries is variable. In an area where the visitor plant is growing rapidly, one would expect it to be rather low. With maturity, the unemployment rate would probably approximate the statewide average. For the purposes of our analysis, we have assumed that unemployment among the work force that the proposed resorts would draw from would be six percent. This is slightly lower than the nine- to ten-percent unemployment experienced by the Big Island as a whole in 1977 and 1978 (Hawaii, State of, Department of Labor and Industrial Relations, March 1978:1-16 as revised) and about the same as that experienced on Oahu and on Maui, other areas with a sizeable visitor industry.

Based on the preceding, it can be calculated that one person employed in visitor-related industries will result in a total population increase of 2.2 persons in the North/South Kohala impact area:

@ 1.45 workers/household and 0.94 employed workers/worker,
1 household = 1.36 employed workers

@ 1.36 employed workers/household,
1.0 employed worker = 0.73 household

@ 3.0 persons/household,
1.0 employed worker = population increase of 2.20 persons

Expanding job opportunities would produce this population increase either by causing persons born in North/South Kohala (i.e., natural increase) to stay there, or by inducing in-migration--from other parts of the County or from off the island.

Table A-2. Factors Used In Estimating Visitor Census.

Factor	Value Used In Calculation	
	12-Month Average[1]	Peak 30-Day[2]
Hotels:		
Occupancy Rate (%)	70	90
Average No. of Persons/Occupied Unit	1.8	1.9
Average No. of Persons/Unit	1.26	1.71
Resort Condominiums:		
Occupancy Rate (%)	25	60
Average No. of Persons/Occupied Unit	2.0	2.0
Average No. of Persons/Unit	0.5	1.2
Resort Single-Family:		
Occupancy Rate (%)	25	50
Average No. of Persons/Occupied Unit	2.5	3.0
Average No. of Persons/Unit	0.62	1.5

[1] Estimates are by Hastings, Martin, Hallstrom and Chew, Ltd. (September 1980:29). They incorporate the following assumptions:

- Hotel guests are in the proportion of 50 percent FIT travellers, 20 percent convention visitors, and 30 percent GIT visitors (60 percent of which are Japanese). With this mix, the average number of persons per occupied room is approximately 1.8.
- Condominiums have an average of 2.0 persons per occupied unit.
- Single-family resort residences have an average of 2.5 persons per occupied unit.

[2] Estimates are by Belt, Collins & Associates based on Hawaii Visitors Bureau data.

Source: Hastings, Martin, Hallstrom and Chew, Ltd.; Belt, Collins & Associates.

APPENDIX B

CHECKLIST OF PLANT SPECIES ON THE MAHUKONA RESORT SITE

CHECKLIST OF PLANT SPECIES FOR MAHUKONA PROPERTIES

Scientific Name	Common Name Hawaiian Name	Status
MONOCOTYLEDONAE		
GRAMINEAE (Grass Family)		
Cenchrus echinatus L.	sandbur 'ume'alu	exotic
Chloris divaricata R. Br.	stargrass	exotic
Chloris inflata Link	swollen fingergrass mau'ulei	exotic
Chloris radiata (L.) Sw.	radiate fingergrass	exotic
Eragrostis cilianensis (All.) Vignolo-Lutati	stinkgrass	exotic
Eragrostis tenella (L.) Beauv. ex R.& S.	Japanese lovegrass	exotic
Heteropogon contortus (L.) Beauv. ex R.& S.	pilligrass pili	Indigenous
Panicum maximum Jacq.	guinea grass	exotic
Pennisetum setaceum (Forsk.) Chiov.	fountaingrass	exotic
Pennisetum setosum (Sw.) L.C. Rich. in Pers.	feathery pennisetum	exotic
Cenchrus ciliaris L.	buffelgrass	exotic
Rhynchelytrum repens (Willd.) C.E. Hubb.	natal redtop	exotic
Sporobolus diander (Retz.) Beauv.	Indian dropseed	exotic
DICOTYLEDONAE		
AMARANTHACEAE (Amaranth Family)		
Amaranthus spinosus L.	spiny amaranth pakai-kukū	exotic
Amaranthus viridis L.	slender amaranth pakai	exotic

Scientific Name	Common Name Hawaiian Name	Status
ASCLEPIADACEAE (Milkweed Family)		
Gomphocarpus physocarpus E. Meyer	balloon plant	exotic
BORAGINACEAE (Heliotrope Family)		
Heliotropium amplexicaule Vahl	heliotrope	exotic
CAPPARIDACEAE (Caper Family)		
Gynandropsis gynandra (L.) Briq.	wild spider flower honohina	exotic
CHENOPODIACEAE (Goosefoot Family)		
Atriplex muelleri Benth.	-	exotic
Atriplex semibaccata R. Br.	Australian saltbush	exotic
Chenopodium murale L.	nettle-leaved goosefoot	exotic
COMPOSITAE (Daisy Family)		
Bidens pilosa var. *pilosa* L.	beggar's tick ko'oko'olau	exotic
Emilia javanica (Burm.f.)C.B. Robins.	red pua-lele	exotic
Erechtites hieracifolia (L.)Raf.	fireweed	exotic
Erigeron bonariensis L.	hairy horseweed ilioha	exotic
Zinnia pauciflora L.	wild zinnia pua-pihi	exotic
CONVOLVULACEAE (Morning-glory Family)		
Ipomoea cairica (L.) Sweet	koali	Indigenous
Merremia aegyptia (L.) Urban	hairy merremia koali-kua-hulu	exotic
Jacquemontia sandwicensis Gray	Hiiaka's little skirt Pa'ū-o-hi'i-'aka	endemic

Scientific Name	Common Name Hawaiian Name	Status
CUCURBITACEAE (Gourd Family)		
Cucumis dipsaceus Ehrenb. ex Spach	wild spiny cucumber	exotic
Momordica balsamina L.	balsam apple	exotic
EUPHORBIACEAE (Spurge Family)		
Euphorbia hirta L.	garden spurge koko-kahiki	exotic
GENTIANACEAE (Gentian Family)		
Centaurium erythraea Rafn.	bitter herb	exotic
LABIATAE (Mint Family)		
Leonotis nepetaefolia (L.) Alt.	lions-ear	exotic
LEGUMINOSAE (Bean Family)		
Cassia leschenaultiana DC.	partridge pea laukī	exotic
Indigofera suffruticosa Mill.	indigo 'ilikō	exotic
Leucaena leucocephala (Lam.) deWit	false koa koa-haole	exotic
Phaseolus lathyroides L.	cow pea	exotic
Prosopis pallida (Humb.& Bonpl. ex Willd.) HBK.	mesquite kiawe	exotic
MALVACEAE (Mallow Family)		
Abutilon grandifolium (Willd.) Sweet	hairy abutilon ma'o	exotic
Malvastrum coromandelium (L.) Garcke	false mallow hauuoi	exotic
Sida cordifolia L.	'ilima	indigenous
Sida fallax var. *fallax* Walp.	ilima 'ilima	indigenous
Sida spinosa var. *spinosa*	prickly sida	exotic

Scientific Name	Common Name Hawaiian Name	Status
NYCTAGINACEAE (Four O'Clock Family)		
Boerhavia diffusa var. *diffusa* L.	alena	indigenous
PAPAVERACEAE (Poppy Family)		
Argemone glauca Pope	prickly poppy pua-kala	endemic
PASSIFLORACEAE (Passionflower Family)		
Passiflora foetida var. *gossypifolia* (Desv. in Ham.) Mast.	passionflower	exotic
SOLANACEAE (Nightshade Family)		
Lycopersicon esculentum var. *cerasiforme* (Dunal) Alef.	cherry tomato 'ohi'a lomi	exotic
STERCULIACEAE (Cocoa Family)		
Waltheria americana L.	waltheria hi'aloa; 'uhaloa	indigenous

APPENDIX C

MARINE SPECIES OCCURRENCE IN NEAR-SHORE WATERS OFF THE MAHUKONA RESORT SITE

Explanation of symbol notation:

Abundance classification - organism abundance is subjectively classified as:

A = abundant; always observed, many individuals encountered

C = common; localized concentrations or even distributions of moderate amount of individuals

I = infrequent; small localized concentrations or only several observations

R = rare; only one or two organisms observed

Zonation classification

1. Littoral Zone
2. Basalt Boulder Zone
3. Limestone Platform Zone
4. *Porites* Reef-building Zone
5. *Porites* Pinnacle - Sand Flat Zone

Reef Coral Species Occurrence

Coral Species	Abundance	Zones of Occurrence 1	2	3	4	5
Cirrhipathes anguina	I				x	x
Montipora verrucosa	I				x	
Palythoa tuberculosa	C			x	x	x
Pavona varians	I				x	x
Pocillopora meandrina	C			x	x	x
Porites compressa	A				x	x
Porites lobata	A			x	x	x
Porites (Synaraea) convexa	I			x	x	

Macroinvertebrate Species Occurrence

Species	Abundance	Zones of Occurrence 1	2	3	4	5
PHYLUM PORIFERA						
Chondrosia chucalla	C				x	
Clathrina sp.	I				x	x
Demospongiae (3 spp.)	I				x	x
Spirastrella vagabunda	I				x	
PHYLUM ECHINODERMATA						
Acanthaster planci	C				x	
Actinopyga mauritiana	I	x				
Actinopyga obesa	I		x			
Chondraocidaris sp.	I				x	x
Clypeaster reticulata	R				x	x
Colobocentrotus atrata	A	x				
Culcita novaeguinae	R				x	
Diadema pauciapinum	C				x	
Echinometra mathaei	A	x	x	x	x	x
Echinometra oblonga	C	x	x	x		
Echinostrephus aciculatus	I		x	x	x	
Echinothrix calamaris	C			x	x	x
Echinothrix diadema	A		x	x	x	x
Eucidaris metularia	C			x	x	x
Heterocentrotus mamillatus	A		x	x	x	x
Holothuria atra	I				x	x
Linckia guildingii	I			x	x	
Linckia multiflora	C			x	x	x
Ophiocoma sp.	C				x	x
Pseudoboletia indiana	R				x	
Tripneustes gratilla	A		x	x	x	x
PHYLUM MOLLUSCA						
Bivalve (unidentified)	R				x	
Bursa cruentata	R				x	
Casmaria erinaceous	R				x	
Cellana sandivicensis	C	x				
Cerithium mutatum	I				x	x
Chama iostoma	I		x	x		
Charonia tritonis	R				x	
Conus ebraeus	I			x		
Conus sp.	R			x		
Conus textile	I			x	x	
Coralliophillia violacea	C				x	x
Cymatium pileare	R				x	
Cypraea caputserpentis	I	x		x		

(continued)

Species	Abundance	Zones of Occurrence 1	2	3	4	5
Cypraea gaskoini	R				x	
Cypraea helvola	I			x	x	x
Cypraea isabella	C			x	x	x
Cypraea maculifera	I		x	x		
Cypraea talpa	R				x	
Decatopecten nodulifernm	I					x
Dendropoma sp.	C		x			
Drupa morum	C		x	x	x	
Epitonium sp.	R				x	
Hastula lanceata	I				x	x
Hastula penicillata	I				x	x
Haumea juddi	I				x	x
Hexabranchus sanguineus	I				x	
Imbricaria olivaeformis	I				x	x
Isognomum californicum	I		x			
Littorina sp.	A	x				
Mitra sp.	I				x	
Morula uva	C			x	x	x
Nerita picea	A	x				
Phyllidia pustulosa	I				x	
Pinna muricata	I					x
Polinices tumidus	R				x	
Rhinoclavis sinensis	I				x	
Sabia conica	C				x	x
Siphonaria normalis	I	x				
Swainsonia newcombi	I				x	
Tellina elizabethae	C				x	x
Terebra sp.	I				x	x
Tonna perdix	I				x	x
Trachycardium orbita	I					x
Trapezium oblongum	C				x	
Trochus intextus	C				x	
Turbo sandwicensis	I				x	
PHYLUM CRUSTACEA						
Arctides regalis	I				x	x
Barnacle	C		x	x	x	
Grapsis grapsis	C	x				
MISCELLANEOUS						
Halocordyle disticha	C				x	x
Haloporella sp.	I				x	x
Hydrozoa	C				x	
Lichenopora sp.	I				x	
Spirobranchus gigantea	C				x	x
Triphyllozoan sp.	I				x	x

Fish Species Occurrence

Family	Species	Abundance	Zones of Occurrence 1	2	3	4	5
Holocentridae (Squirrelfish)	*Myripristis*	A				x	x
	Flammeo sammara	C				x	x
	Adioryx ensifer	C				x	x
	Adioryx lacteoguttatus	C				x	x
Serranidae (Groupers)	*Cephalopholis argus*	R					x
Priacanthidae (Big-eye)	*Priacanthus cruentatus*	I				x	x
Lutjanidae (Snappers)	*Aprion virescens*	C					x
Sparidae (Porgys)	*Monotaxis grandoculis*	C				x	x
Mullidae (Goatfish)	*Mulloidichthys samoensis*	C				x	x
	Mulloidichthys auriflamma	I				x	x
	Parupeneus bifasciatus	I				x	x
	Parupeneus chrysserydros	I				x	x
	Parupeneus multifasciatus	C				x	x
	Parupeneus porphyreus	C				x	x
Chaetodontidae (Butterflyfish)	*Centropyge potteri*	I				x	x
	Forcipiger flavissimus	C			x	x	x
	Hemitaurichthys thompsoni	A				x	x
	Chaetodon ephippium	R				x	
	Chaetodon fremblii	I			x	x	x
	Chaetodon lunula	R				x	x
	Chaetodon miliaris	C			x	x	x
	Chaetodon ornatissimus	I				x	x
	Chaetodon multicinctus	C			x	x	x
	Chaetodon quadrimaculatus	I				x	x
	Chaetodon trifasciatus	R				x	
	Chaetodon unimaculatus	I				x	
Carangidae (Jacks)	*Caranx melampygus*	I		x	x	x	x

(continued)

Family	Species	Abundance	Zones of Occurrence 1	2	3	4	5
Pomacentridae (Damselfish)	*Dascyllus albisella*	I			x	x	
	Abudefduf abdominalis	I		x	x	x	
	Abudefduf imparipennis	C		x			
	Abudefduf sordidus	R		x			
	Plectroglyphidodon johnstonianus	I			x	x	
	Stegastes fasciatus	C			x	x	x
	Chromis leucurus	C		x	x	x	x
	Chromis ovalis	C		x	x	x	x
	Chromis verator	C		x	x	x	x
	Chromis agilis	C		x	x	x	x
Labridae (wrasses)	*Bodianus bilunulatus*	C			x	x	x
	Labroides phthirophagus	C				x	x
	Pseudocheilinus octotaenia	I				x	x
	Thallosoma ballieui	C			x	x	x
	Thallosoma duperrey	A		x	x	x	x
	Thallosoma fuscum	I			x	x	x
	Gomphosus varius	I				x	x
	Coris flavovittata	I				x	x
	Coris gaimardi	I				x	x
	Anampses cuvier	I				x	x
	Halichoeres ornatissimus	I				x	x
Scaridae (Parrotfish)	*Scarops rubroviolaceus*	C		x	x	x	x
	Scarus dubius	C		x	x	x	x
	Scarus perspicillatus	C				x	x
	Scarus sordidus	C			x	x	x
Cirrhitidae (Hawkfish)	*Paracirrhites arcatus*	C				x	x
	Paracirrhites forsteri	C				x	x
	Cirrhitops fasciatus	C				x	x
Acanthuridae (Surgeonfish)	*Acanthurus achilles*	C		x	x	x	x
	Acanthurus dussumieri	C		x	x	x	x
	Acanthurus leucopareus	C		x	x	x	x
	Acanthurus nigrorus	C		x	x	x	x
	Acanthurus nigrofuscus	C		x	x	x	x
	Acanthurus olivaceus	C		x	x	x	x
	Acanthurus sandvicensis	C		x	x	x	x
	Ctenochaetus hawaiiensis	C		x	x	x	x
	Ctenochaetus strigosus	C		x	x	x	x
	Zebrasoma flavescens	C		x	x	x	x
	Naso hexacanthus	I				x	x
	Naso lituratus	C		x	x	x	x

(continued)

Family	Species	Abundance	Zones of Occurrence 1	2	3	4	5
Zanclidae (Moorish idol)	*Zanclus cornutus*	I				x	x
Scorpaenidae (Scorpionfish)	*Pterois sphex*	R				x	
Balistidae (Triggerfish)	*Melichthys niger*	I				x	x
	Melichthys vidua	I				x	x
	Sufflamen bursa	C				x	x
Monacanthidae (Filefish)	*Pervagor spilosoma*	I			x	x	x
Ostraciidae (Boxfish)	*Ostracion meleagris camurum*	I				x	
Canthigasteridae (Pufferfish)	*Canthigaster jactator*	I			x	x	
Diodontidae (Porcupinefish)	*Diodon hystrix*	R				x	

Algae Species Occurrence

Algal Species	Abundance	Zones of Occurrence 1	2	3	4	5
Ahnfeltia concinna	A	x				
Amansia glomerata	I	x				
Gibsmithia hawaiiensis	I			x	x	
Hydrolithon sp.	A		x	x	x	x
Jania sp.	C	x				
Porolithon onkodes	A	x	x	x		
Pterocladia caerulescens	A	x	x			
Pterocladia capillacea	A	x				
Ralfsia sp.	I			x	x	x
Valonia ventricosa	I			x	x	x

APPENDIX D

SUMMARY OF PRELIMINARY RECOMMENDATIONS FOR ARCHAEOLOGICAL SITES IN THE KAIHOLENA PROPERTY

SUMMARY OF PRELIMINARY RECOMMENDATIONS FOR
MAKAI PARCEL
OF KAIHOLENA PROPERTY

Site No.*	Site Type	Preserve	Main Precinct	Mitigate
1	Field of *Ahu*/Modified Outcrops			X
2	*Ahu*			X
3	C-Shape			X
4	C-Shape			X
5	C-Shape			X
6	Enclosure, circular			X
7	C-Shape			X
8	Modified Outcrop			X
9	Modified Outcrop			X
10	C-Shape			X
11	Modified Outcrop			X
12	Modified Outcrop			X
13	Single Stone Alignment			X
14	C-Shape			X
15	C-Shape			X
16	*Ahu*			X
17	*Ahu*			X
18	C-Shape			X
19	C-Shape			X
20	C-Shape			X
21	C-Shape			X
22	C-Shape			X
23	C-Shape			X
24	*Ahu*			X
25	Terrace			X
26	Compound: Enclosure/Platform/ U-Shapes	X	X	
27	Wall	X	X	
	Subtotals:	2	2	25

*All site numbers prefixed by 14-1-.

Site No.	Site Type	Preserve	Main Precinct	Mitigate
28	Enclosure/Historic well?	X	X	
29	Enclosure, rectangular	X	X	
30	Anomalous/Undefined	X	X	
31	Enclosure, rectangular	X	X	
32	Platform	X	X	
33	U-Shape	X	X	
34	U-Shape/Enclosures	X	X	
35	Platform	X	X	
36	Compound: U-Shapes	X	X	
37	Compound: Platforms	X	X	
38	Compound: Enclosures/Platform	X	X	
39	Compound: Enclosures/Platform/ Salt Pan (water catchment)	X	X	
40	Wall Remnants	X	X	
41	*Ahu*	X	X	
42	Enclosure, oval	X	X	
43	Remnant Structure	X	X	
44	Platform	X	X	
45	Platform	X	X	
46	*Ahu*	X	X	
47	C-Shape	X	X	
48	C-Shape	X	X	
49	*Ahu*	X	X	
50	*Ahu*	X	X	
51	C-Shape	X	X	
52	Midden	X	X	
53	C-Shape	X	X	
54	C-Shape	X	X	
55	Compound: Enclosure/C-Shape	X	X	
56	C-Shape	X	X	
57	C-Shape	X	X	
58	C-Shape	X	X	
59	C-Shape	X	X	
	Subtotals:	34	34	25

Site No.	Site Type	Preserve	Main Precinct	Mitigate
60	C-Shape			X
61	Wall Remnant			X
62	C-Shape			X
63	Enclosure, square	X	X	
64	Petroglyphs	X	X	
65	Petroglyphs	X	X	
66	Compound: Enclosures/Platform	X	X	
67	Compound: Enclosure/Platform	X	X	
68	Midden Scatter	X	X	
69	*Ahu*	X	X	
70	Compound: Wall/Enclosure/ C-Shape	X	X	
71	Compound: *Ahu*/Wall Remnant	X	X	
72	C-Shape	X	X	
73	U-Shape	X	X	
74	*Ahu*	X	X	
75	U-Shape	X	X	
76	Rectangular Enclosure	X	X	
77	C-Shape	X	X	
78	Enclosure, rectangular	X	X	
79	Enclosure, square	X	X	
80	Enclosure, circular	X	X	
81	Enclosure, square	X	X	
82	*Papamū*	X	X	
83	Compound: Enclosed Platform	X	X	
84	Compound: Enclosures, rectangular	X	X	
85(a)	Enclosure, circular	X	X	
85(b&c)	Compound: Enclosures, square			
86	Compound: Enclosures	X	X	
87	Compound: Enclosures/U-Shape	X	X	
88	C-Shape	X	X	
89	Platform, rectangular	X	X	
	Subtotals:	61	61	28

Site No.	Site Type	Preserve	Main Precinct	Mitigate
90	Compound: C-Shapes	X	X	
91	*Papamū*	X	X	
92	Compound: Enclosures	X	X	
93	Enclosure, rectangular	X	X	
94	Platform/Petroglyph/Salt Pan (water catchment)	X	X	
95	U-Shape	X	X	
96	U-Shape/Platform	X	X	
97	*Ahu*	X	X	
98	Enclosure, rectangular			X
99	C-Shape	X	X	
100	Modified Outcrop	X	X	
101	C-Shape	X	X	
102	Modified Outcrop	X	X	
103	Wall Remnant	X	X	
104	Enclosed Platform	X	X	
105	Cave Shelter	X	X	
106	Cave Shelter	X	X	
107	*Ahu*	X	X	
108	*Ahu*	X	X	
109	Enclosure, circular	X	X	
110	Midden	X	X	
111	Compound: Enclosures/Platforms	X	X	
112	Compound: Enclosures	X	X	
113	Remnant Structure	X	X	
114	C-Shape	X	X	
115	Enclosure, rectangular	X	X	
116	Midden			X
117	Midden			X
118	Platform, rectangular/Salt Pan (water catchment)			X
119	Modified Outcrop			X
	Subtotals:	86	86	33

Site No.	Site Type	Preserve	Main Precinct	Mitigate
120	Anomalous/Undefined			X
121	Compound: C-shapes			X
122	Cairn			X
123	Cairn			X
124	Platform, rectangular			X
125	Compound: Enclosures, square/ Salt Pan (water catchment)			X
126	Compound: C-Shapes	X		
127	Platform	X		
128	Enclosure, square			X
129	Enclosure, square			X
130	Compound: Platform	X		
131	Platform, rectangular			X
132	Platform, rectangular			X
133	Platform, circular			X
134	C-Shape			X
135	C-Shape			X
136	C-Shape			X
137	Enclosure, circular			X
138	Platform, rectangular			X
139	*Ahu*			X
140	C-Shape			X
141	C-Shape			X
142	Enclosure, circular			X
143	*Ahu*			X
144	Wall Remnant			X
145	Platform			X
146	Possible terracing			X
147	Enclosure, circular			X
148	Enclosure, oval			X
149	Modified Outcrop			X
	Subtotals:	89	86	60

Site No.	Site Type	Preserve	Main Precinct	Mitigate
150	Enclosure, circular			X
151	Enclosure, circular			X
152	Enclosure, square			X
153	*Ahu*			X
154	Compound: C-Shapes			X
155	Compound: C-Shape/Enclosure Combination			X
156	Compound: C-Shapes			X
157	Compound: C-Shape/Enclosure Combination			X
158	Wall Remnant			X
159	C-Shape	X		
160	*Ahu* (2 connected)	X		
161	Compound: Enclosure/Terraces/ Salt Pan (water catchment)	X		
162	Remnant Structure	X		
163	C-Shape			X
164	C-Shape			X
165	Enclosure	X		
166	Compound: C-Shape/Terraces	X		
167	Enclosure, oval			X
168	*Ahu*			X
169	*Ahu*			X
170	Enclosure	X		
171	Enclosure, rectangular/ Bait Cups(3)	X		
172	Remnant Structure	X		
173	Compound: Enclosure/Terraces	X		
174	Midden	X		
175	*Ahu*/Small Terrace	X		
176	*Ahu*	X		
177	*Ahu*	X		
178	*Ahu*	X		
179	*Ahu*	X		
	Subtotals:	105	86	74

Site No.	Site Type	Preserve	Main Precinct	Mitigate
180	Compound: Enclosure, rectangular	X		
181	C-Shape	X		
182	Midden	X		
183	C-Shape			X
184	*Ahu*			X
185	U-Shape			X
186	*Ahu*			X
187	*Ahu*			X
188	C-Shape			X
189	Petroglyph.			X
190	C-Shape			X
191	Compound: Enclosures, connected, circular			X
192	Platform, rectangular			X
193	Compound: Enclosure, square			X
194	*Ahu* (2)/Salt Pan (water catchment)			X
195	C-Shape			X
196	Compound: Platform/Enclosure/ Terrace			X
197	C-Shape			X
198	Wall Remnant			X
199	Enclosure, circular			X
200	*Ahu*	X		
201	Compound: Enclosure	X		
202	Enclosure, circular			X
203	Wall Remnant			X
204	Compound: Enclosures (6)/ C-Shape	X		
205	Enclosure, rectangular	X		
206	Compound: Enclosures (4)/ C-Shape	X		
207	Compound: Enclosures (3)/ Platform	X		
208	Compound: Enclosures, rectangular & circular/rubble	X		
209	Compound: U-Shape/C-Shape	X		
	Subtotals:	116	86	93

Site No.	Site Type	Preserve	Main Precinct	Mitigate
210	Remnant Structure	X		
211	Compound: Enclosures/Platform/ Rubble	X		
212	*Ahu*	X		
213	Anomalous/Undefined	X		
214	Platform			X
215	C-Shape			X
216	Platform, rectangular	X		
217	*Ahu*	X		
218	*Ahu*	X		
219	*Ahu*	X		
220	*Ahu*	X		
221	*Ahu*	X		
222	*Ahu*	X		
223	*Ahu*	X		
224	Modified Outcrop	X		
225	Remnant Structure	X		
226	*Ahu*	X		
227	Compound: C-shape/Platform	X		
228	*Ahu*	X		
229	Compound: Enclosure/C-Shape/ Rubble	X		
230	Compound: Enclosures/C-Shapes	X		
231	Platform (*Hōlua* Slide)	X		
232	C-Shape	X		
233	Enclosure, circular	X		
234	C-Shape	X		
235	Cairn	X		
236	C-Shape	X		
237	*Ahu*	X		
238	*Ahu*	X		
239	*Ahu*	X		
	Subtotals:	144	86	95

Site No.	Site Type	Preserve	Main Precinct	Mitigate
240	*Ahu*	X		
241	C-Shape	X		
242	C-Shape	X		
243	C-Shape	X		
244	C-Shape	X		
		149 ← 86		95
	Subtotal:	244 (Numbered Sites)		
"A" - "H"	Curbstone Trails	6 ← 1		2
	Subtotal:	8		
	TOTAL SITES:	252		

PRELIMINARY RECOMMENDATIONS FOR SITES IN HAUKA PARCEL OF KAIHOLENA PROPERTY

Site No.*	Site Type	Preserve	Mitigate
1	Complex: Circular Enclosure, C-Shape / 3 *ahu*/Modified Outcrop		X
2	Enclosure, rectangular	X	
3	Complex: 3 *ahu*	X	
4	Complex: 8 C-Shapes	X	
5	Complex: 1 enclosure, 5 *ahu*		X
6	U-Shape	X	
7	*Ahu*		X
8	Complex: 4 *ahu*/2 Trail Segments		X
9	*Ahu*		X
10	Complex: 3 *ahu*		X
11	Shelter	X	
12	*Ahu*		X
13	*Ahu*		X
14	Complex: 1 *ahu*/Trail Segment		X
15	*Ahu*		X
		5	10
	Subtotal:	15 (Numbered Sites)	
"a"	Curbstone Trail Segment	1	
"b"	2 Curbstone Trail Segments		1
"c"	Curbstone Trail		1
		1	2
	Subtotal:	3	
	TOTAL SITES:	18	

APPENDIX E
SUMMARY OF RECENT PRICES
OF HOMES FOR SALE IN NORTH AND SOUTH KOHALA

APPENDIX E.

Average sale price figures of homes do not provide an accurate picture of the housing cost situation in a particular area unless most of the homes involved in the transactions are similar to one another in size, quality, and location. Such homogeneity most definitely does not exist in the Kohalas. Because of this, no attempt to generalize with respect to prices has been made. Instead, this appendix presents a capsule summary of each of the residential units that was for sale as of May 20, 1981. The prices shown are asking prices, not actual sales prices. During the six-month period ending in October, 1980, sale prices in this area averaged 91 to 94 percent of the asking price, and this factor may be applied to the figures presented in the table to obtain a more accurate indication of actual sale prices on the housing market.

ASKING PRICE OF HOUSES FOR SALE AS OF MAY 20, 1981:

Location	Zoning	Land Area(ft^2)	Roofed Area (ft^2) Main	Other	Age(yr.)	Bdrm.	Bath	Price($)
N. Kohala Villages								
NK-1	Ag-40	1.358 Ac.	1,200	--	1	3	1	133,000
NK-2	RS-15	15,000	1,450	--	older	4	1½	84,900
NK-3	C-15	11,236	1,000	400	older	1	1	150,000
NK-4	RS-15	15,000	960	640	15	4	1½	90,000
NK-5	RS-15	2,300	2,300	356	older	4	2	220,000
NK-6	RS-15	4.54 Ac.	5,200	2,436	--	--	--	875,000
NK-7	RS-15	15,000	1,300	220	30	3	2	73,000
NK-8	Ag-1	41,428	1,582	916	older	4	1½	160,000
NK-9	Ag-1	17,860	1,536	--	7	4	2	155,000
Kohala Estates								
KE-1	Ag-20	20.15 Ac.	1,800	--	1	3	2½	175,000
Waimea								
W-1	Ag-3	3,127	416	734	2	1	1	185,000
W-2	Ag-1	10,890	1,650	560	new	3	2	150,000
W-3	RS-10	10,592	1,420	554	2	3	2	126,900
W-4	RS-10	10,158	1,156	500	2	3	2	132,000
W-5	--	9,750	960	--	8	3	1	74,500
W-6	Ag-1	9,750	1,260	120	3	2	2	118,500
W-7	Ag-1	9,253	1,056	440	3	3	2	82,000
W-8	Ag-1	8,658	1,072	--	8	3	1½	79,500
W-9	Ag-1	8,635	912	224	5	3	1½	78,000
W-10	Ag-1	8,010	1,008	400	7	3	1	85,000
W-11	Ag-1	7,577	1,200	--	1	3	1½	110,000
W-12	Ag-1	7,577	2,200	--	2	3	2	149,000
W-13	Ag-1	9,000	1,526	--	new	4	3	150,000
W-14	Ag-1	21,780	2,400	--	13	4	3	170,000
W-15	Ag-1	9,800	1,107	550	9	3	2	109,500
W-16	Ag-1	15,296	1,017	528	4	2	2	110,000
W-17	Ag-1	10,150	1,000	425	--	3	1½	92,500
W-18	Ag-1	10,780	1,144	220	2	3	2	97,500
W-19	Ag-1	13,431	1,328	576	1	3	2	115,000
W-20	Ag-1	9,798	990	213	12	3	2	123,500
W-21	Ag-1	17,141	1,274	800	8	3	2	105,000
W-22	Ag-1	16,640	2,222	822	5	3	1½	325,000
W-23	Ag-1	15,299	1,194	1,015	5	3	1½	137,000
W-24	Ag-1	30,762	3,392	1,108	6	4	4	257,000
W-25	Ag-1	10,000	1,248	200	new	3	2	99,700
W-26	Ag-1	10,000	1,248	200	new	3	2	110,000
W-27	Ag-1	10,000	1,056	756	2	3	2	115,000

NORTH AND SOUTH KOHALA DISTRICTS

Location	Zoning	Land Area(ft^2)	Roofed Area (ft^2) Main	Other	Age(yr.)	Bdrm.	Bath	Price($)
Kawaihae Village								
KV-1	RM-5	2,820	792	--	1	3	1	125,000
KV-2	RM-5	2,820	850	80	--	3	1	93,000
KV-3	RM-5	2,510	850	96	6	2	1	110,000
KV-4	RM-5	2,314	880	75	7	3	1	105,000
KV-5	RM-5	2,010	814	--	8	3	1	115,000
Wailea Bay/Puako/Lalamilo								
WPL-1	RS-10	11,186	n.g.	--	older	--	--	195,000
WPL-2	RS-10	14,000	736	--	24	Std.	1	500,000
WPL-3	RS-15	17,717	4,099	--	new	6	6	1,400,000
WPL-4	RS-10	10,475	1,148	616	1	3	2	180,000
WPL-5	RS-10	10,584	1,156	480	1	3	2	125,000
WPL-6	RS-10	10,279	1,560	240	1	3	2	129,500
WPL-7	RS-10	10,728	1,606	400	new	3	2	168,500
Waikoloa								
WK-1	RS-10	13,831	1,150	560	4	3	2	135,000
WK-2	RS-10	15,629	2,130	1,000	5	3	2	250,000
WK-3	RS-10	12,575	1,164	480	1	3	3	125,000
WK-4	RS-10	11,476	3,312	528	new	5	4	275,000
WK-5	RS-10	10,824	1,350	675	new	3	2¼	149,000
WK-6	RS-10	10,850	2,080	480	new	3	2	179,000
WK-7	RS-10	14,060	1,200	800	3	3	2	165,000
WK-8	RS-10	11,029	1,456	602	2	3	2	120,000
WK-9	RS-10	11,788	1,968	268	8	3	2	150,000
WK-10	RS-10	12,667	1,980	572	new	3	2	142,000
WK-11	RS-10	10,447	1,104	--	2	3	1	85,000
WK-12	RS-10	16,217	1,628	772	new	3	3	275,000
WK-13	RS-10	11,017	1,776	480	new	3	2½	195,000
WK-14	RS-10	10,466	1,136	280	4	2	2	149,000
WK-15	RS-10	10,649	1,424	508	new	3	2	180,000
WK-16	RS-10	12,620	1,472	700	5	3	2	147,000
WK-17	RS-10	14,249	1,836	886	4	3	2	158,000
WK-18	RS-10	10,654	1,176	351	4	2	1½	135,000

Source: Multiple Listing Service No. 22/23, May 26 - June 29, 1981