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EXECUTIVE OFFICER

**STATE OF HAWAII**  
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM  
**LAND USE COMMISSION**

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Telephone: 808-587-3822  
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May 8, 2003

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

Dear Ms. Salmonson:

Subject: LUC Docket No. A00-730/Lanihau Properties, LLC

At its meeting on March 25, 2003, the State Land Use Commission accepted Petitioner's Final Environmental Impact Statement ("FEIS") prepared for the subject docket. The Commission's Order Accepting Petitioner's Final Environmental Impact Statement Filed on April 25, 2003, will be filed at a later date under separate cover.

In accordance with Section 343-5 (c), Hawaii Revised Statutes, we are filing four (4) copies of the FEIS, the Office of Environmental Quality Control ("OEQC") Publication Form, a copy of the FEIS distribution list, a copy of the completed FEIS Distribution Cover Letter, and a copy of the project description. We understand that Ron Terry, Petitioner's representative, has transmitted a copy of the project description file to your office.

In addition, we are forwarding a copy of the FEIS and a copy of the Distribution Cover Letter from Petitioner.

We request that the notice of the FEIS be published in the OEQC's The Environmental Notice.

Should you require clarification or further assistance in this matter, please contact Russell Kumabe of my staff at 587-3822.

Sincerely,

ANTHONY J. H. CHING  
Executive Officer

Enclosures

c: R. Ben Tsukazaki, Esq.

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KALOKO-HONOKOHAU BUSINESS PARK  
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**Final Environmental Impact Statement**

**Kaloko-Honokohau Business Park**

Honokohau, North Kona District, Hawai'i Island, State of Hawai'i  
TMK (3rd): 7-4-8:13 (por.) and 30

**Prepared for:**  
Lanihau Properties, LLC  
3465 Waiialae Ave., Suite 260  
Honolulu HI 96816

**Prepared by:**  
Geometrician Associates  
HC 2 Box 9575  
Kea'au HI 96749

**April 2003**

LAND USE COMMISSION  
STATE OF HAWAII  
LWJ MAY -2 A 8 51.

This document is prepared pursuant to the Hawai'i Environmental Protection Act,  
Chapter 343, Hawai'i Revised Statutes (HRS), and  
Title 11, Chapter 200, Hawai'i Department of Health Administrative Rules (HAR).

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**Final Environmental Impact Statement**

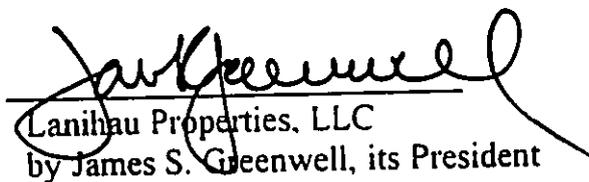
**Kaloko-Honokohau Business Park**

Honokohau, North Kona District, Hawai'i Island, State of Hawai'i  
TMK (3rd): 7-4-8:13 (por.) and 30

**Prepared for:**  
Lanihau Properties, LLC  
3465 Waiialae Ave., Suite 260  
Honolulu HI 96816

This document and all ancillary documents were prepared under my direction and supervision. The information contained herein fully addresses the document content requirements set forth in section 11-200-17, Hawai'i Administrative Rules.

Applicant:

  
Lanihau Properties, LLC  
by James S. Greenwell, its President

Date: April 7, 2003

Note: Sections of text with substantive additions, deletions or revisions are delineated with double underlines.

**Prepared by:**  
Geometrician Associates  
HC 2 Box 9575  
Kea'au HI 96749

**March 2003**

This document is prepared pursuant to the Hawai'i Environmental Protection Act,  
Chapter 343, Hawai'i Revised Statutes (HRS), and  
Title 11, Chapter 200, Hawai'i Department of Health Administrative Rules (HAR).

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**SUMMARY**

**PROJECT NAME:** Kaloko-Honokohau Business Park

**APPLICANT:** Lanihau Properties, LLC

**APPROVING AUTHORITY:** Hawai'i State Land Use Commission

**LOCATION:** Honokohau 1<sup>st</sup> and 2<sup>nd</sup>, North Kona District, County of Hawai'i

**TAX MAP KEY:** 7-4-8:13 (por.) and 30

**CLASS OF ACTION:** Reclassification of land in the Conservation District

**DETERMINATION:** Environmental Impact Statement Required (State EIS)

**PROPOSED ACTION:** Reclassify 336.984 acres to Urban

**PURPOSE:** To allow the development of the Petition Area for mixed light industrial and commercial uses and to allow the retention and expansion of the existing quarrying and quarry-related uses.

**ESTIMATED COST:** \$9,000,000 (estimated improvement costs)

**STATE LAND USE DISTRICT:** Conservation

**ZONING:** Open

**PERMITS REQUIRED:** *State:* State Land Use District Boundary Amendment; Underground Injection Control, State Historic Preservation Division Chapter 6E Concurrence. *County:* Change of Zone, Plan Approval, Subdivision Approval, Grading Permit, Building Permits.

**ACCEPTING AUTHORITY:** State Land Use Commission

## ALTERNATIVES

Lanihau (defined as Lanihau Properties, LLC, and its successors and assigns) is considering the proposed project alternative (described above), as well as a modified alternative in which only Phase 1 and 2 development areas are reclassified to the State Land Use Urban District and the Phase 3 area is reclassified to the Agricultural district. Under the No Action Alternative, the Petition Area would *not* be reclassified from the Conservation District to the Urban District. The existing quarry and related activities, which operate under a Conservation District Use Permit covering 261.723 acres, including 232 acres within the Petition Area, would continue into the foreseeable future. There would be no additional long-term impacts related to the conversion of vacant land to developed uses, nor any benefits of employment and tax base expansion. considered various land use alternatives during initial planning including residential, exclusively commercial, and combinations thereof, but rejected them for inconsistency with land use plans and lack of compatibility with surrounding land uses.

## SUMMARY OF IMPACTS AND MITIGATION MEASURES <sup>1</sup>

**Drainage and Flood Hazard.** No adverse drainage impacts would occur. No flood hazard areas or floodplains as defined in the Flood Insurance Rate Maps (FIRM) are present in or near the Petition Area, and none will be affected in any direct or indirect way by the proposed project. The proportion of impervious surface will increase substantially. In order to prevent off-site runoff and flooding, engineers will calculate the maximum runoff from extremely large storms and then design roadways, gutters, drainage canals and absorption areas accordingly.

**Water Resources.** Water quality is the leading issue cited by most people consulted on the project. The Petition Area itself lacks surface water, but there is concern that project-related alterations to the flow and nutrient load of the groundwater, as well as contamination with toxic substances, could potentially affect the anchialine ponds and nearshore waters of nearby Kaloko-Honokohau National Historical Park and environs. These coastal waters have value for

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<sup>1</sup> The adjacent property to the northeast has also been the subject of a Petition for Land Use Boundary Amendment from the Conservation District to the Urban District by TSA International, Ltd. TSA proposes to develop Phases III and IV of the Kaloko Industrial Park on this property. In February of 2002, the Land Use Commission (LUC) granted TSA's Petition, subject to a series of conditions related to wastewater treatment, stormwater disposal, pollution prevention, groundwater monitoring, regional/local transportation, financial contribution, affordable housing, archaeological and historic sites, landscaping, and other subjects. These conditions are set forth in Appendix 15 of this EIS, and are substantially similar to many of the mitigation measures that have been developed as part of this EIS. Conditions addressing similar issues in the Lanihau project are expected to be developed during LUC hearing for the Lanihau Petition.

maintaining a healthy aquatic biota, for historic preservation, for use and appreciation by visitors, and for the ongoing practice of Hawaiian culture.

As discussed in Section 4.2.2, the reports of certain consultants as to the potential impacts upon water resources and aquatic biota have been considered by the State Land Use Commission ("LUC" or "Land Use Commission" or "Commission") in a proceeding initiated by TSA International, Inc. ("TSA") for industrial development on land adjacent to the Petition Area. In the LUC's Findings of Fact, Conclusions of Law and Decision and Order ("TSA D&O"), dated February 14, 2002, the Commission found the consultants' analyses to be deficient in assessing the potential impacts of TSA's proposed project on water quality and aquatic biota. Inasmuch as the same consultants' studies are sources of information in the EIS, Lanihau acknowledges that such findings of the Commission and supporting portions of the record of TSA's proceeding are relevant to an assessment of potential impacts of Lanihau's project upon water resources and aquatic biota. Lanihau has, upon negotiation with representatives of the Kaloko-Honokohau National Park ("KAHO"), agreed to revisions of certain conditions of the Commissions' approval in TSA's case, in order to provide for further mitigation of such potential impacts. These conditions are set forth in Section 4.2.2.2.5.

To minimize potential impacts, Lanihau has committed to require the use of an Individual Wastewater System (IWS) with an enhanced treatment system, where the IWS and absorption field are designed to remove no less than 92 percent of the Total Nitrogen as well as offering additional phosphorus removal. It is anticipated that no more than 15 percent of the ultimate total lot count would be built on and occupied until after connection to the County's WWTP. Given this, the project's direct effects (as well as the cumulative impact of all expected development in the ahupua'a of Kaloko and Honokohau makai of Mamalahoa Highway) on alterations in groundwater flow levels, salinity changes, sedimentation, and nutrients are expected to be essentially negligible and will thus have minimal if any impact on aquatic biota in Kaloko and Aimakapa Ponds, as well as nearshore waters. When the full range of projects planned in the Kaloko and Honokohau ahupua'a between Mamalahoa Highway and Queen Ka'ahumanu Highway is implemented, mitigation of the cumulative impacts will require connection to a municipal sewage system, which is expected to occur. Therefore, neither direct project nor cumulative factors are expected to result in adverse impacts related to flow, salinity, sedimentation or nutrients upon the nearshore or marine environment or any particular species, given timely connection of area projects to a wastewater treatment plant. (See **Wastewater**, below, for further discussion).

Study of existing and proposed facilities, water quality records, and hydrogeologic modeling show that restricting potential contamination by toxic materials to very minor levels is practical through adherence to applicable laws and regulations and implementation of appropriate Best Management Practices. However, to further minimize risk, Lanihau will also develop Conditions, Covenants, and Restrictions (CC&Rs) for the Petition Area to contain spills and

prevent materials associated with light industrial uses attributable to the operations of property, including petroleum products, chemicals, or other pollutants from leaching or draining into the ground or subsurface storm drain collection areas, to the extent practicable. These covenants shall be subject to approval by the Hawaii State Department of Health, upon consultation with the National Park Service and the County of Hawaii. The CC&Rs will mandate adherence to a Pollution Prevention Plan that will address each use permissible in the Petition Area, by specifically designating Best Management Practices (BMPs) tailored to each specific use. Emphasis shall be given to structural BMPs to prevent industrial pollutants from being released into the environment, including reaching the groundwater. The CC&Rs will also help disseminate critical information about pollution prevention laws, regulations, and required practices and will establish an owners' association with power to oversee and report violations as a second line of defense against pollution violations.

**Lava Flow and Earthquake Hazards.** The entire region is classified as Lava Flow Hazard Zone 4, where there is minor risk of lava inundation over relatively short time scales. All of Hawai'i County is rated Zone 4 Seismic Probability Rating, and is thus at risk from major earthquake damage, especially to poorly-designed or -built structures. In general, however, geologic conditions impose no constraints on the project. Although the project is located in an area exposed to geologic hazard, any development that could service the growing needs for urban uses in Kona must be located within such an area, and there are thus no reasonable alternatives. The project would not tend to steer development into areas where geologic hazard makes it imprudent to live, work or travel. No cumulative risk or adverse effect is associated with the project and other developments or actions in the study area.

**Soils and Agriculture.** Other than very limited ongoing grazing associated with the ranching activities further mauka, no valuable soils, agricultural land or farms are present in the study area. None are present in the Petition Area. No soils or farming operations would be adversely impacted by the project.

**Flora and Fauna.** As a result of its location in the lowlands and its history of use for ranching, industrial purposes, and roadways, the current flora and fauna of the Petition Area is composed almost entirely of alien species. No rare, threatened or endangered species occur on the site. To the northeast of the Petition Area is an area of valuable native species and habitat on the Kaloko lava flow, which includes a rare variety of ko'oko'olau plants. In order to protect the valuable native plants in this area, the developer will preserve a protective buffer zone within the property setback of lots created in the northeast corner of the Petition Area. Indirect impact to aquatic biota in the ponds and nearshore environments makai of the Petition Area is discussed above.

**Visual Character.** Coastal areas of Honokohau and the National Park have expansive views of the forested slopes and summit of Hualalai. The topography of the area is such that the scenic views of the summit and upper slopes of Hualalai from the coastline of Honokohau will not be

obstructed in any way by the proposed development. A "built" landscape of existing utility poles and lines and graded and paved areas surrounding Queen Ka'ahumanu Highway intrudes into views from the mauka end of the National Park and the highway. Nevertheless, in order to minimize the potential for a disharmonious visual element for viewers from the National Park and motorists on Queen Ka'ahumanu Highway, several mitigative approaches have been employed. These include setbacks, landscaping, design elements, and height limits in the critical "first-row" of buildings, which would result in an attractive and minimally intrusive gateway for the project. Landscaping will utilize fast-growing species to provide a buffer for the early years of the project and slow-growing trees for the mature landscaping framework. Grading plans will specify a gradual, step-by-step elevation of lots mauka from the setback line, minimizing the potential for looming lines of buildings. Topographic and/or landscaping buffering are planned around the makai edge of the quarry area. Consultation with the National Park will develop landscaping themes and other visual design elements that render a harmonious connection between the two properties.

**Noise.** Development will entail excavation, grading, blasting, compressors, vehicle and equipment engine operation, and construction of new buildings and infrastructure. These activities will generate noise exceeding 95 decibels at times, impacting nearby areas. In cases where construction noise is expected to exceed the Department of Health's "maximum permissible" property-line noise levels, contractors will obtain a permit in conformance with Title 11, Chapter 46, HAR (Community Noise Control) prior to construction. DOH will review the proposed activity, location, equipment, project purpose, and timetable in order to decide upon conditions and mitigation measures, such as restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers. Heavy equipment, rock crushers, and large drills will be the dominant source of noise generated by quarry operations. Without mitigation, the maximum permissible noise level for industrial land use of 70 dBA would be periodically exceeded in a small section of the Petition Area adjacent to the quarry that is ultimately planned for industrial uses. Similarly, the maximum permissible noise level for commercial land use of 60 dBA would be periodically exceeded in a larger section of the Petition Area adjacent to the quarry. Initial buyers of lots shall receive noise model maps that depict where noise levels are modeled to be greater than 70dBA/60 dBA, thus exceeding levels permissible for industrial/commercial activities. They will be informed that industrial/commercial activities may not be approved in such areas by DOH without sufficient mitigation such as exterior sound barriers or interior noise absorption structures, and it must be demonstrated through a professional noise study that the appropriate maximum permissible sound level will not be exceeded before industrial/commercial uses may be approved by DOH.

**Social.** As government plans have specified and development projects have begun to fulfill, the Keahole-to-Kailua area is growing. Direct social impacts from the proposed reclassification would be minimal, because the project is not expected to create a substantial influx of population, but instead would draw employees primarily from the existing workforce. No

relocation of residences, businesses, community facilities, farms or other activities would occur because of the project. The principal social impacts - direct, secondary, and cumulative - are in the areas of economic benefits, traffic generation, and public services and facilities, and are thus discussed below. Lanikai will comply with County Affordable Housing policies.

**Archaeological and Historic Resources.** Archaeologists identified 73 sites within the Petition Area, including traditional Hawaiian sites consisting of dryland agricultural complexes, simple agricultural features, temporary, recurrent and permanent habitation sites, a refuge cave, seven human burials, animal containment features, an *ahupua`a* wall and various boundary walls, two petroglyphs, a network of trails, and *ahu* (shrines or markers). Historic-era cattle ranching sites were also found. Development will result in alterations of the landform that will destroy some of the sites. The proposed project has been planned in close coordination with archaeological and cultural inventory to ensure that all known burials and all sites important for preservation or data recovery would be preserved in place. Mitigation will occur through preservation of each of the burials and the eight archaeological sites that were recommended for preservation, and data recovery for the 31 sites that were recommended for Data Recovery (34 sites were recommended for no further work). In order to ensure proper treatment, a Preservation Plan, a Data Recovery Plan, and a Burial Treatment Plan will be prepared in consultation with the State Historic Preservation Division, the Hawai`i Island Burial Council, Kaloko-Honokohau National Historical Park, the Hawai`i State Na Ala Hele Trials Advisory Group, and other organizations.

**Cultural Impacts.** Historical research, oral interviews, and review of natural and historical resources determined that few valued cultural, natural or historical resources exist within the Petition Area itself. The proposed project site has not been used for traditional cultural purposes in the recent memory of any of the extensive list of interviewees consulted as part of the oral history research. The only important resources appear to be certain archaeological sites and human burials important for preservation in place. With proper mitigation through preservation, as well as access to and interpretation of certain archaeological sites, there will be minimal adverse effect to cultural values. It is reasonable to conclude that based upon the limited range of resources and the proposed mitigation for impacts to all affected resources, the exercise of native Hawaiian rights related to gathering, access or other customary activities will not be affected, and there will be no adverse effect upon cultural practices or beliefs.

In addition to resources within the Petition Area itself, Native Hawaiians consulted for the project cited water quality and the traditional visual character of the *ahupua`a* as valued cultural, natural or historical resources elsewhere in the two *ahupua`a* of Honokohau and adjacent areas that had the potential to be indirectly impacted, particularly through the cumulative effect of the sum of projects in existence or proposed for development. Mitigation that would avoid or minimize impacts to these resources is discussed above.

**Economic.** A market analysis demonstrated that the Petition Area enjoys an appropriate and exceptionally competitive location between two existing industrial/business park with frontage

## Final EIS: Kaloko-Honokohau Business Park

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location on the emerging Kailua-Kona to Keahole industrial/commercial corridor highway. It is a natural in-fill site that has already demonstrated the ability to support a quarry/heavy industrial operation, and it will complement existing and proposed industrial/business uses nearby at Honokohau, Kohanaiki and Kealakehe. By every market perspective, the Petition Area is a favorable location for the proposed use. The project would provide considerable benefit to consumers through widening competition, and no adverse market impacts are expected.

The subdivision, infrastructure development, building improvements, and business operations of the project would create 174,683 worker years of employment during the 34 years required to build-out the project, paying total wages in excess \$5.2 billion in year 2000 dollars. Thereafter, the operating business would generate 6,915 permanent jobs on site and an additional 3,357 off-site jobs, with total annual wages of \$298.75 million. The project would lower unemployment in the construction trades by 15 to 25+ percent during its building process, and the permanent on-site employees would represent about five percent of the total county workforce three decades hence. The direct economic impact of the undertaking would total more than \$5.2 billion during the development time-frame, with indirect impacts of more than twice this amount as the capital, wages and profits flow through West Hawai'i. The operating business would collect an estimated \$839 million annually in gross revenues. The development would result in significant expenditures that would favorably impact the West Hawai'i economy on both a direct and indirect basis, increasing the level of capital investment and capital flow in the region, which would in turn create employment and widen the tax base. The economic impact is highly beneficial and requires no mitigation.

As with most large scale privately-built industrial/commercial projects, the subject development has the potential to be a major net contributor to the tax base of the State and Hawai'i County. The net benefit to the State at completion after 34 years would be from \$50.2 to \$58.2 million per year, and to the County it would be from \$5.05 to \$6.48 million annually. Individually, each of the three phases of the park would generate a net revenue benefit for both the County and the State, and in no single year would there be a shortfall by either governmental entity.

**Traffic.** The Traffic Impact Analysis Report (TIAR) used figures from the Hawai'i Long Range Land Transportation Plan to estimate the base average daily traffic on Queen Ka'ahumanu Highway and Mamalahoa Highway, which was forecast to rise at an annual rate of about 3.5 percent. In order to be conservative, the TIAR then *added* traffic that would be generated from both the proposed project and all other developments in the Hina Lani Street area that would likely be operational by the years 2010 and 2020. The TIAR then factored in those roadway projects that are likely to be implemented (independent of the proposed project) in the next 20 years, by the State of Hawai'i, County of Hawai'i, or by adjacent developers. Level of Service (LOS) was used to qualitatively evaluate traffic conditions. With the basic traffic levels and network configuration assumed, the traffic Levels of Service (LOS) - which ranges from ideal "A" to unacceptable "F" - for various intersections were calculated using a traffic model. Where project-related deficiencies appeared to exist, lane additions or adjustments were developed to arrive at satisfactory LOS.

The peak hour increase in vehicles generated by the year 2020 by the proposed Kaloko-Honokohau Business Park is expected to impact traffic on existing roadways in the area. The traffic improvements recommended in the EIS, which include extending various roadways and adding left- and right-turn lanes or acceleration/deceleration lanes, would mitigate these impacts and result in overall improvement as compared to No Project. Although not all intersections would improve in LOS, and some would decline, the project would improve LOS for the major intersections of Queen Ka'ahumanu Highway with Hina Lani Street and Kealakehe Parkway.

**Air Quality.** Several mitigation measures are proposed for construction impacts. A dust control plan will be developed that involves watering, limiting disturbed area, applying chemical soil stabilizers, mulching and/or using wind screens as necessary. Open-bodied trucks will be covered when in motion if they are transporting materials that could be blown away, and road cleaning or tire washing will be done as appropriate. In addition, heavy construction equipment will be moved on-site during periods of low traffic volume

Project traffic would impact regional air quality only minimally, but models indicate that air quality impacts near intersections could approach, and in some worst-case situations exceed, State (though not national) standards. This is common at intersections in urban areas. As the nature of land use in this area of Kona means that sensitive land uses or receptors are not likely to be present within or directly adjacent to the actual intersections, no adverse impacts would likely occur and no mitigation is necessary.

Certain commercial and industrial operations have the potential to generate adverse air quality impacts. The analysis of such impacts and the mitigation measures used to avoid or minimize them are developed at the time specific facilities are proposed, when the activity must obtain a permit from the Hawai'i Department of Health. Detailed information must be provided by the applicant concerning the type and nature of any air pollution emissions and the emission control technology that would be utilized. Depending on the magnitude of the project emissions and other factors, air quality impact analyses and/or air quality monitoring and mitigation measures may be required before the application to construct/operate is approved.

Indirect air quality impacts may result from electrical power generation and solid waste disposal. The estimated indirect emissions from project electrical demand would amount to less than one percent of the present air pollution emissions occurring on the island of Hawai'i, even if all power is assumed to be derived from oil. Solid waste impacts would be very minor. Considering that criteria pollutants in Kona are all within national and State standards, the project would not individually or cumulatively generate adverse air quality impacts from power generation or solid waste disposal.

**Utilities and Energy.** GTE Hawaiian Tel currently provides telephone service for the area from the switching facilities in Kailua-Kona, with trunk cables on the 69 Kv lines along the east side of State Highway 19. No cable television service is currently present near the Petition Area.

## Final EIS: Kaloko-Honokohau Business Park

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Electricity is provided by Hawai'i Electric Light Company (HELCO), a privately owned utility company regulated by the State Public Utilities Commission. HELCO's Keahole generating plant, along with generating facilities in East Hawai'i, provides electricity for West Hawai'i.

The project's peak electrical demand when fully developed would reach 6,500 kilowatts, with an average annual electrical demand of about 28 million kilowatt-hours (kWh). HELCO's current strategy for meeting the rising energy needs of the next 20 years involves 141 megawatts (MW) of new generating capacity, which will be achieved through a combination of conventional power plants (oil and coal fired), with an unknown portion of renewable energy (solar, wind, hydroelectric, geothermal, and ocean thermal energy conversion). It is likely that legislation will be passed within the next five years requiring Hawai'i utilities to maintain a renewable energy portfolio in which various renewables jointly provide a set proportion of the load.

The Petition Area's enhanced potential for solar energy and passive strategies for cooling and lighting are recognized. It is recommended that Lanikai prepare a detailed energy information packet for all prospective tenants and initial lot buyers. The packet would provide a basic overview of the energy issues including photovoltaic opportunities, solar water heating, passive and active energy conservation strategies, and "designing for solar" (i.e., planning buildings and parking lots to accommodate potential solar facilities and avoiding the need for future retrofits). It would also provide contact names and numbers for private sector, government, and non-governmental organizations that can provide assistance and information. This may prove especially useful to out-of-State prospective tenants who may be unaware of Hawai'i's unique climatic conditions and high energy costs. This information would allow tenants to plan buildings that account for both the challenges and opportunities of the high insolation environment, at the same time contributing to energy efficiency of the island as a whole.

**Water Supply.** Existing water infrastructure is present near the Petition Area. For facility planning purposes, the DWS *Water System Standards* were applied to projected uses, resulting in an estimated demand of 1,120,000 gallons per day (GPD). This figure will be used to assist engineers in sizing storage and transmission facilities, and will be used by the County in assessing the amount of aquifer and water system capacity that the proposed project would involve. However, based on very similar land use elsewhere in Kona, along with information from the existing quarry and related operations, it is estimated that upon full development of the Petition Area, a more realistic average daily water demand would be 367,000 GPD. Additional water improvements would be required to serve the Petition Area at full build-out. These improvements would include source, transmission and storage facilities, which would be coordinated with the Hawai'i County Department of Water Supply and developed in accordance to their standards and requirements.

**Wastewater.** There are currently no sewer lines serving the Petition Area, and most businesses in the adjacent Kaloko Industrial Park are on cesspool sewage systems. The State Department of Health (DOH) requires new developments to utilize either septic systems or a sewage treatment plant (STP). The nearby Kealahou Wastewater Treatment Plant currently has 5.3 million gallons

## Final EIS: Kaloko-Honokohau Business Park

per day (MGD) of treatment capacity and is operating at approximately 20 percent of this capacity. The Hawai'i County Department of Public Works has initiated planning for the extension of the sewer collection system north to provide service to the Kaloko-Honokohau National Historical Park and developments to the north, including the Petition Area and the Kaloko Industrial Park, although there is no firm implementation plan or schedule.

For wastewater facility planning purposes, the Hawai'i County Department of Public Works *Wastewater Design Standards* were applied, which resulted in a flow of 896,000 gallons per day (GPD). These figures will be used to assist engineers in sizing lines, pumping facilities, etc., and will also be used by the County to determine how much of the sewage treatment system's capacity the proposed project would utilize. However, based on analysis of existing and similar land uses in Kona, a more realistic average wastewater flow would be approximately 200,000 GPD. Until the sewer lines are extended to connect to the Kealakehe WWTP, wastewater disposal will be in accordance with Chapter 62, HAR., which requires use of individual wastewater treatment systems (IWS) in unsewered areas, including septic tanks or aerobic units with disposal systems. To minimize potential impacts, Lanihau has committed to require the use of an (IWS) with an enhanced treatment system, where the IWS and absorption field are designed to remove no less than 92 percent of the Total Nitrogen as well as offering additional phosphorus removal. It is anticipated that no more than 40 lots (15 percent of the ultimate total lot count) would be built on and occupied before connection to the County's WWTP.

In preparation for eventual connection to the Kealakehe STP, Lanihau will build sewer lines as part of the subdivision infrastructure and is committed to working with the County to extend the sewer system to the Petition area, including participating on a fair and equitable basis in an improvement district.

**Solid Waste.** Solid waste is disposed of at the County of Hawai'i's Pu'u Anahulu landfill, about 18 miles north of the Petition Area. In 1993, the initial 30-acre increment of the 300-acre landfill was opened with a projected capacity of six to 11 years. Additional 30-acre increments are expected to be required every five years thereafter. The former Kailua (Kealakehe) Landfill is presently used as a transfer station where refuse collected from residential areas is compacted for transport to the Pu'u Anahulu landfill. In addition, there is a green waste facility within the study area that currently accepts vegetation matter generated in the West Hawai'i region. It is anticipated that this green waste operation will continue during the foreseeable future.

No substantial impact to the municipal solid waste collection and disposal system are anticipated during construction and operation of the proposed development. It is anticipated that refuse from the Petition Area would be collected by private services that would transport the waste to the landfill and green waste sites. The landfill at Pu'u Anahulu is expected to have the capacity to handle municipal solid waste from West Hawai'i for the foreseeable future. Waste management strategies are evolving rapidly, and it is expected that less land-intensive, locally based solutions will emerge within the next two decades to help solve the solid waste problem in Hawai'i.

**Police, Fire, Emergency, and Medical Services.** Any new development brings with it demand for such services, as police must respond to traffic accidents and criminal complaints, and fire and emergency personnel must respond to fires, hazardous material situations, and medical emergencies. The economic impact analysis determined that the project would annually induce additional police services worth \$188,750, fire protection services of \$189,000, and emergency medical response services of \$78,000. These levels of increase are not substantial, and would not burden the police, fire, emergency, and hospital systems. It is important to note that substantial real property and other taxes would enable improvement and expansion of such services.

**Recreation and Educational Facilities and Services.** No significant impacts on recreational or educational facilities or services would occur, because the project would not create a substantial influx of population, but instead would draw employees primarily from the existing workforce. Impacts from any new residents drawn to the area by employment in the project's businesses would presumably be mitigated by the considerable State and County taxes that business sales and employment would generate, which result in a highly favorable benefit/cost ratio. No adverse impacts to the noise, air quality, or traffic, or any other aspect of the environment for nearby Kealakehe High School students, teachers, staff and parents, would occur. In particular, it should be noted that implementation of the project and its associated traffic mitigation measures would *improve* Level of Service at the intersection of Kealakehe Parkway and Queen Ka'ahumanu Highway, which provides access to the high school.

#### CONSISTENCY WITH GOVERNMENT PLANS AND POLICIES

**Hawai'i State Plan.** The proposed reclassification is highly consistent with the goals, objectives and policies of the *Hawai'i State Plan* calling for continued expansion and diversification of economic activities and opportunities. It also supports the goals, objectives and policies related to protecting the environment and scenic and historic resources by providing for proper avoidance or minimization of adverse impacts.

**State Land Use Law.** HRS Section 205-2 requires the Land Use Commission to group contiguous land areas suitable for inclusion in one of these four major districts. It further provides that in establishing the boundaries of urban districts, those lands that are now in urban use and a sufficient reserve area for foreseeable urban growth shall be included, and that in establishing the boundaries of the districts in each county, the Land Use Commission shall give consideration to the master plan or general plan of the county. In accordance with HRS Section 205-17, in its review of any petition for reclassification of district boundaries, the Land Use Commission must specifically consider certain decision making criteria. The proposed reclassification meets all applicable criteria.

**Coastal Zone Management Act.** The proposed reclassification has implications for a number of CZM objectives. *Historic resources* of significance would be protected and preserved under a plan approved by the Hawai'i State Historic Preservation Division. Although coastal *open space* is not in any way impacted by the project, any development in the area has the potential to impact

views of and from the coastline. The proposed project includes design elements that ensure minimal interference with such views. *Coastal ecosystems* in the area are dependent upon the preservation of water quality in groundwater, anchialine ponds, and marine waters. Hydrological modeling indicates that water quality alterations would not adversely impact the biota if mitigation measures are implemented and properly enforced. *Coastal economic uses* and *coastal hazards* would not be affected. *Managing development* is accomplished through the review procedures that accompany a Petition to Amend a Land Use District Boundary, including this EIS. Given the substantial commitment to mitigation measures, the proposed reclassification would not substantially impact these coastal zone resources and appears to be consistent with the objectives of the program.

**Hawai'i County General Plan.** The proposed reclassification is highly consistent with the goals, objectives and policies of the General Plan. The Petition Area is well served by existing infrastructure and is strategically located along a major thoroughfare. The proposed industrial and commercial activities would support the stability of existing economic sectors such as tourism and also provide a good location and setting for support businesses for burgeoning sectors such as ocean-related technology. The improved economic opportunities would be compatible with the County's natural and social environment and would help diversify the County's economy by strengthening existing industries and attracting new endeavors. It would also support goals, objectives and policies related to protecting the environment, pollution prevention, and scenic and historic resources. Water quality effects can be limited to levels that do not cause adverse impacts through enhanced wastewater treatment and eventual connection to the Kealakehe Wastewater Treatment Plan, as well as implementation of Best Management Practices for non-point source runoff. Given this, direct and indirect effects to biological resources would be negligible. Historic resources would be protected through ensuring that known burials, and all historic sites that have been determined to be significant for preservation, would be preserved. The area is between two other commercial-industrial areas, and does not represent an intrusion of development into a pristine landscape, because the area has a long history of quarrying and related industrial activity. It takes advantage of existing and proposed road, water and sewage facilities. Proposed design and landscaping would provide an attractive roadway frontage with a landscaped buffer that mitigates the "industrial" look and does not conflict with views from the National Park to the scenic summit and upper slopes of Hualalai.

Furthermore, the proposed reclassification is consistent with the regional plans for the area, which call for development of this area in mixed industrial and commercial uses.

**General Plan Land Use Pattern Allocation Guide Map.** The Petition Area has been designated as "Industrial" and "Urban Expansion" by this component of the *Hawai'i County General Plan*, and the proposed development is consistent with these land use designations. Furthermore, the project would help fulfill several general objectives broadly illustrated in the Facilities Map.

**Hawai'i County Zoning.** The Hawai'i County General Plan is also the basis for Ordinance No. 63, the County Comprehensive Zoning Ordinance, which was adopted in 1967. Zoning for the entire Petition Area is Open. Assuming approval of the Urban reclassification by the State Land Use Commission, the required zone changes for specific urban land uses would be sought.

**West Hawai'i Regional Plan.** This 1989 plan coordinated efforts among State agencies that have programs, facilities and other interests in the region in order to respond more effectively to emerging needs and critical problems, to coordinate capital improvements within a regional planning framework, and to provide guidance in State land use decision-making processes. The plan recognizes the need to develop industrial and commercial facilities in this portion of Kona. It also seeks to steer urban development away from areas in which critical natural resources such as native forest, valuable agricultural lands, and sensitive coastal waters would be adversely impacted. The proposed project is highly consistent with the *West Hawai'i Regional Plan*.

**Keahole to Kailua Development Plan.** The Petition Area has been designated for "Limited Industrial" uses in this 1991 plan by the Hawai'i County Planning Department. The proposed uses within the Petition Area are consistent with the Land Use Plan of the *Keahole to Kailua Development Plan*. This plan specifically calls for the expansion of the industrial uses in the general area to include the Honokohau Lands.

**State Land Use District Boundary Review.** The Office of State Planning in 1992 recommended that the area be reclassified from Conservation to Urban as part of the proposed Keahole to Kailua Urban area (Recommendation No. 34). The proposed project is a fulfillment of that recommendation, which recognized the ongoing use of the area for quarrying and related uses, and also the importance of providing a sufficient supply of lands zone for industrial/commercial uses. Since 1992, the need for such lands has become greater, and the recommendation is more valid than ever.

#### **UNRESOLVED ISSUES**

No unresolved issues exist.

**PART 1: INTRODUCTION**

**1.1 Applicant and Accepting Authority**

Lanihau Properties, LLC, (hereafter referred to as Lanihau, which will also refer to legal successors and assigns for the purposes of the EIS) seeks to reclassify to Urban 336.984 acres of land that are currently within the State Land Use Conservation District in North Kona (Figs. 1-1 and 1-2). This action requires compliance with the Hawai'i Environmental Policy Act (HEPA, Chapter 343 Hawai'i Revised Statutes) and approval from the State Land Use Commission, which is the Accepting Authority for all documents during the Environmental Impact Statement process.

**1.2 Location and Ownership**

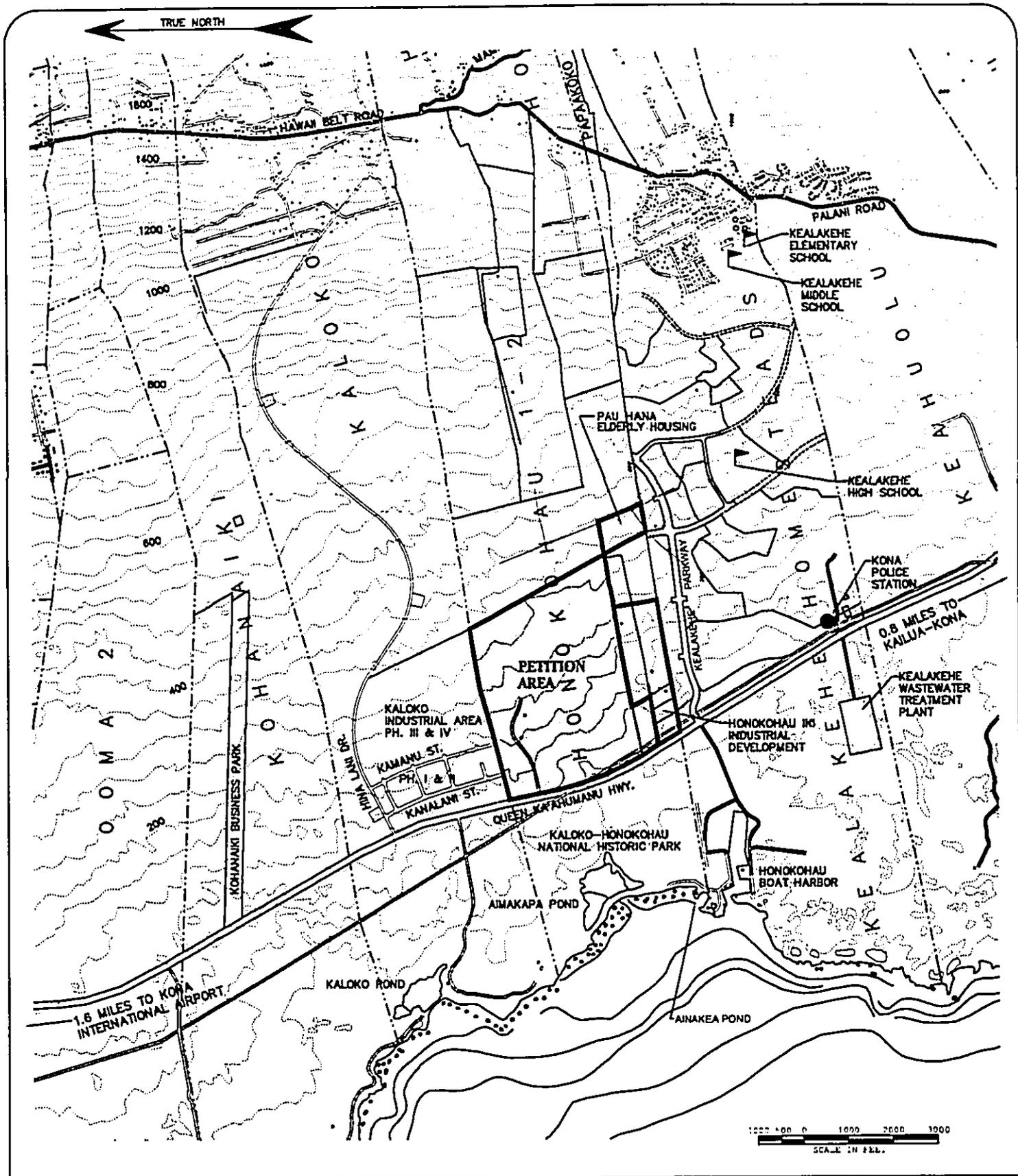
The subject properties that contain the area requested for reclassification are identified by TMKs 7-4-8:13 (por.) and 30 and are owned in fee by Lanihau. The portion of these properties requested for reclassification (see Fig. 1-1) has the following boundaries:

- *Makai (Western)*: Queen Ka'ahumanu Highway, at an elevation of 40-75 feet above sea level;
- *Mauka (Eastern)*: Approximately 6,000 feet mauka of the highway at an elevation of 280-320 feet, abutting open land;
- *Southern*: McClean's Honokohau Business Park and the Taylor/Isemoto/Kona Trans industrial development (all of which will be collectively referred to hereafter as the existing Honokohau industrial developments); the McClean Honokohau Properties' proposed Pau Hana residential development; and open land;
- *Northern*: Kaloko Industrial Park and open land

The area requested for reclassification will be referred to throughout the EIS documents as the *Petition Area*.

**1.3 Historic Perspective**

The ahupua'a of Honokohau Nui and Iki, in which the Petition Area is located, are two of twenty-three ancient ahupua'a within the 'okana (ahupua'a sub-region) of Kekaha-wai-'ole. The place name "Hono-ko-hau" may be literally translated as "Bay-of-wind-born-dew." Traditional and historic oral accounts and literature describe Honokohau as among the favored lands of Kekaha. The fresh watered shores of Honokohau, the fishponds of 'Aimakapa, 'Ai'opio and other ponds such as Kahinihini'ula; salt making locations and the rich ocean and near-shore fisheries; the inland agricultural field systems; and the diverse forest and mountain resources attracted native residents to the area, and sustained them on the land.

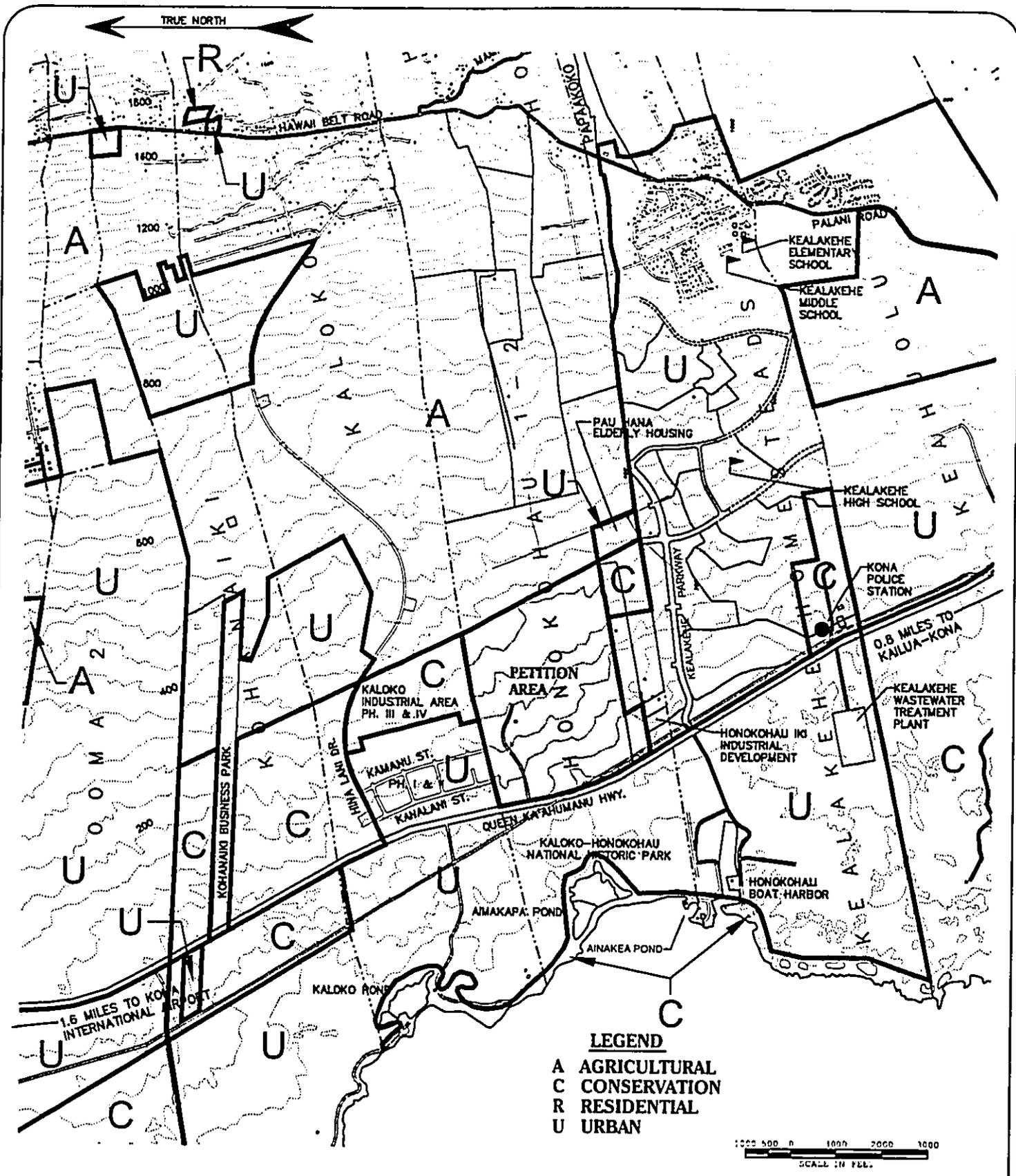


**STUDY AREA**

PREPARED FOR: LANIHAU PROPERTIES  
 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE: U.S. GEOLOGICAL SURVEY

**KALOKO-HONOKOHAU BUSINESS PARK  
 HONOKOHAU 1ST & 2ND  
 NORTH KONA, HAWAII**

**FIGURE # 1-1  
 PAGE NO. 1-2**



# STATE LAND USE MAP

PREPARED FOR: LANIHAU PROPERTIES  
 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE: LAND USE COMMISSION

KALOIKO-HONOKOHAU BUSINESS PARK  
 HONOKOHAU 1ST & 2ND  
 NORTH KONA, HAWAII

FIGURE # 1-2  
 PAGE NO. 1-3

## Final EIS: Kaloko-Honokohau Business Park

Records for the Land Commission Awards (LCA) conferred at mid-century indicate that the 2,653 acres of ahupua`a of Honokohau Nui were awarded as LCA 11216 to Mikahela Kekauonohi, great-granddaughter to Kekaulike (ruler of Maui); The 480 acres in Honokohau Iki were awarded as LCA 9971 to William Pitt Leleiohoku, a son-in-law of Kamehameha. Subsequent kuleana awards, none within the Petition Area, were granted to eleven individuals.

During the 19<sup>th</sup> century, contact with Westerners began to greatly influence land use. Missionary census data document a decline in population throughout North Kona, part of the tragic depopulation of the Hawaiian Islands. Cattle, first introduced to Hawai`i by Captain George Vancouver in 1793, soon became feral and abundant. Cattle hunting became necessary to reduce the depredations to gardens and orchards, and cattle hides and tallow became a new island industry. Organized cattle ranching was initiated in Hawai`i about 1820. The Petition Area was in the lower and least favorable reaches of land considered suitable for ranching.

H.N. Greenwell acquired a large extent of property in Kona in the late 1800s, and the story of the Honokohau ahupua`a thereafter is inextricably tied to the ranching activities of the Greenwell family. By 1929, as many as 10,000 acres were grazed, and cattle bound for Honolulu were herded to Napo`opo`o for trans-shipment. The Greenwells also leased land for dairy farming and coffee cultivation, well mauka of the Petition Area, which was little used at that time. At Honokohau on the coast, meanwhile, a village with homes, a chapel and schoolhouse persisted until about 1920.

H.N. Greenwell's three oldest sons inherited much of his holdings, which had for years been operated as three separate sections of the ranch. Frank Greenwell's portion included Honokohau I, and his holdings were later expanded to include an interest in Honokohau II. In 1968, Frank Greenwell's holdings were reorganized as Lanihau Corporation, which held title to the Honokohau makai lands, and Palani Ranch Co., Inc., which continued the family's cattle operation, primarily on mauka lands.

In the 1970s the Queen Ka`ahumanu Highway was built across the Honokohau lands, providing access between coastal Kona and Kohala and stimulating the visitor industry. When the right-of-way for the highway was acquired, Lanihau acquired title to that portion of the Mamalahoa Trail that crosses Honokohau in order to ensure that the highway frontage would be fully developable. The holdings of both the Lanihau Corporation and Palani Ranch were passed on to Frank's three sons, Robert, Radcliffe, and James M., who in 1986 separated their interests. The lands makai of Queen Ka`ahumanu Highway were conveyed to the Robert Greenwell branch, who sold the lands a few years later to the federal government to form the Kaloko-Honokohau National Historical Park. The James M. and Radcliffe Greenwell branches of the family formed Lanihau Partners, L.P., and retained title to the Petition Area, among other lands. Ownership of the Petition Area has remained essentially the same since 1986.

Portions of the Petition Area have been used by various licensees for quarrying and related activities since 1968 under a Conservation District Use Permit. Meanwhile, the Kaloko Industrial Park and the Honokohau Industrial developments were developed flanking the Petition Area. Lanikai's planning for developing the Petition Area began in 1989 and proceeded through the 1990s, conforming to the overall vision outlined in the *Hawai'i County General Plan* (Hawai'i County Planning Department 1989) and the *Keahole to Kailua Development Plan* (Hawai'i County Planning Department 1991). It became evident that in light of regional growth patterns and real estate economics, it would eventually make sense to phase out ranching activities on Lanikai's agriculturally marginal makai lands in favor of urban uses. In the interest of obtaining a clear understanding of the land resources before physical land planning, Lanikai in 1990 initiated a program of extensive archaeological inventory survey and cultural resource assessment. More recently, Lanikai has opened dialogue with Kaloko-Honokohau National Historical Park in order to address issues of common interest and concern.

#### 1.4 Environmental Impact Statement Process

*Scoping.* The preparation of an Environmental Impact Statement (EIS) begins with the scoping process. The purpose of scoping is to notify the public of the proposed action, identify issues, assess the relative significance of these issues, determine the alternatives for study, allocate the proper resources for environmental investigation, and plan a schedule for the EIS. The scoping process for this project commenced with the publication of the availability of this EIS Preparation Notice (EISPN) document in the June 8, 2000 edition of *Environmental Notice* of the Hawai'i State Office of Environmental Quality Control (OEQC).

A key element in scoping is agency and public participation. Agencies and the public are invited to provide written comments upon reviewing the EISPN. Ideally, the comments identify concerns or issues that should be addressed in the EIS, suggest resource persons or references that could provide useful information, confirm the accuracy of information presented in the EISPN, suggest alternatives, or identify persons or organizations who should be contacted because they may be affected by the project. A list of agencies, organizations and individuals to whom the EISPN was sent is provided in Section 1.3.

During the a 30-day comment period initiated by the publication of the EISPN (which was extended to July 24, 2000), 22 comment letters were received. These letters and the responses to them are included in Appendix 2. In general, the information identified by commenters has been included in the EIS where relevant, and the important issues identified by commenters has been investigated as part of the research for the EIS.

In addition to the opportunity for formal public review during the EISPN process, the applicant and/or its representatives met in person or by telephone with agencies and

## Final EIS: Kaloko-Honokohau Business Park

groups who have special concerns. These meetings offered an informal setting for soliciting concerns and gathering information. The following were consulted:

- Hawai'i State Department of Land and Natural Resources, Historic Preservation Division
- U.S. Geological Survey
- Kaloko-Honokohau National Historical Park (National Park)
- Hawai'i County Department of Water Supply
- Hawai'i County Department of Public Works
- Verizon Hawai'i, Inc.
- Hawai'i Electric Light Company
- Kaloko-Honokohau National Historical Park Advisory Commission
- Na Kokua Kaloko-Honokohau
- Sierra Club, Hawai'i Chapter

Information provided and concerns raised at these meetings have also been included in the EIS.

*Draft EIS.* The public had a 45-day period to review the Draft EIS and provide comments. Informal meetings with interested groups were also conducted during this period.

*Final EIS.* The applicant reviewed and responded to the comments received on the Draft EIS, in coordination with the accepting authority. The Final EIS incorporates revisions based on the comments, and includes a summary of the comments in Section 1.7, and copies of the comments and responses in Appendix 13. The accepting authority will decide whether the Final EIS meets the EIS requirements of the State of Hawai'i.

### 1.5 Agencies and Organizations Sent EISPN

The following agencies and organizations were sent a copy of the EISPN and formally invited to be consulted as part of the EIS process:

• *Federal*

U.S. Department of Agriculture, Natural Resources Conservation Service  
U.S. Department of the Interior, Fish and Wildlife Service  
U.S. Department of the Interior, Geological Survey  
U.S. Department of the Interior, Kaloko-Honokohau National Historical Park

• *State*

Land Use Commission  
Department of Accounting and General Services  
Department of Agriculture  
Department of Business, Economic Development, and Tourism

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Department of Hawaiian Home Lands  
Department of Health  
Department of Land and Natural Resources  
Housing and Community Development Corporation of Hawai'i  
Office of Planning  
Office of Hawaiian Affairs  
University of Hawai'i, Water Resources Research Center  
University of Hawai'i, Environmental Center

• *County*

Civil Defense Agency  
County Council  
Department of Parks and Recreation  
Department of Public Works  
Department of Water Supply  
Fire Department  
Office of Housing and Community Development  
Planning Department  
Police Department

• *Organizations and Individuals*

Hawai'i Leeward Planning Conference  
Kona Hawaiian Civic Club  
Kona Outdoor Circle  
Kona-Kohala Chamber of Commerce  
Na Kokua Kaloko-Honokohau  
Sierra Club, Moku Loa Group

The EISPN was also made available at the Kailua-Kona, Hilo, and Waimea Public Libraries and was sent to the *Hawai'i Tribune Herald*, *West Hawai'i Today* and the *Honolulu Advertiser*.

### 1.6 Agencies and Organizations Sent Draft EIS

The following agencies and organizations were sent a copy of the Draft EIS (\*indicates a comment was received):

• *Federal*

U.S. Department of Agriculture, Natural Resources Conservation Service\*  
U.S. Department of the Interior, Fish and Wildlife Service  
U.S. Department of the Interior, Geological Survey\*

**Final EIS: Kaloko-Honokohau Business Park**

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U.S. Army Corps of Engineers\*  
U.S. Dept. of the Interior, Kaloko-Honokohau Nat. Historical Park\*  
U.S. Dept. of the Interior, Kaloko-Honokohau Nat. Historical Park Advisory Commission

• *State*

Office of Environmental Quality Control\*  
State Land Use Commission\*  
Hawai'i State Environmental Center\*  
Housing and Community Development Corp. of Hawai'i  
Department of Transportation  
Department of Business, Economic Development and Tourism (DBEDT)  
DBEDT, Energy, Resources and Technology Division\*  
DBEDT, Library  
DBEDT, Office of Planning\*  
Department of Agriculture  
Department of Education\*  
Department of Hawaiian Home Lands\*  
Office of Hawaiian Affairs  
UH Manoa Water Research Center  
Department of Health  
Department of Health, Environmental Health Administration\*  
Department of Defense  
Department of Accounting and General Services\*  
Department of Land and Natural Resources  
Department of Land and Natural Resources, State Historic Preservation Division\*  
Department of Land and Natural Resources, Comm. on Water Resource Management\*

• *County*

Civil Defense Agency  
County Council  
Department of Parks & Recreation  
Department of Public Works\*  
Department of Water Supply  
Fire Department\*  
Office of Housing and Community Development  
Planning Department\*  
Police Department\*

• *Elected Officials*

Councilmember Curtis Tyler, Hawai'i County Council  
State Senator Lorraine Inouye, State Senate District 1  
State Representative Jim Rath, House District 6\*

Final EIS: Kaloko-Honokohau Business Park

• *Organizations and Individuals*

Kona Hawaiian Civic Club  
Sierra Club, Moku Loa Group  
Mr. Herb Lee  
Queen Liliuokalani Trust  
McClellan-Honokohau Properties\*  
SJA Partnership  
Verizon Hawaii`i  
Hawaii`i Leeward Planning Conference\*  
West Hawaii`i Concrete\*

Na Kokua Kaloko-Honokohau  
Sierra Club, Hawaii`i Chapter  
Belt-Collins Hawaii`i  
March E. Taylor  
Isemoto Contracting Co., Ltd.  
Hawaii`i Electric Light Company  
Sun Cablevision  
Queen Liliuokalani Trust\*

• *Libraries*

Hawaii`i State Library, Hawaii`i Documents Center  
University of Hawaii`i at Hilo, Edwin Mookini Library  
University of Hawaii`i at Manoa, Hamilton Library  
Legislative Reference Bureau  
Hilo Public Library  
Kaimuki Regional Library  
Kaneohe Regional Library  
Hawaii`i Kai Regional Library

Kailua-Kona Public Library  
Pearl City Regional Library  
Kahului Regional Library  
Lihue Regional Library

• *Press*

Honolulu Star Bulletin  
Hawaii`i Tribune Herald

Honolulu Advertiser  
West Hawaii`i Today

The applicant continues to welcome assistance in identifying others who may have special information or might be impacted by the proposed project, and who should therefore be consulted in the process of preparing project plans.

1.7 Comments on Draft EIS

The 45-day comment period for the Draft EIS extended from March 8 to April 23, 2001. Several agencies that requested extensions were granted as much as a week extra time to supply comments. A total of 24 comments were received within this period. Below is a brief summary of the issues raised in the comment letters, with comments raised most frequently cited first. After each issue is discussed, a summary of the response is presented. Readers interested in a more detailed discussion are referred to Appendix 13, which contains each comment letter and the response to it.

Comments spanned a range of issues. Most frequent were comments related to water quality, particularly concerns about elevated levels of nutrients that might result from wastewater, and pollutants that might result from normal operations or unusual

occurrences (e.g., spills) from industrial operations. Commenters expressed concern that despite the models presented in the Draft EIS that indicated that the somewhat higher levels of nutrients would be unlikely to have adverse health or biological effects, more stringent wastewater treatment should be required until hookup with the Kealakehe Wastewater Treatment Plant (WWTP). There was a similar concern about enforcement of Best Management Practices to ensure a minimum level of pollutants in stormwater from streets and industrial/commercial lots. In response, Lanihau committed to enhanced wastewater treatment, which removes most nutrients, until connection to the WWTP became feasible. EIS water quality specialists then re-analyzed potential impacts and determined that any increase in nutrients in groundwater arriving at the ponds and nearshore waters would be negligible, on the order of one percent. Such an increase is not expected to have any adverse impact on the essential quality of the water or to aquatic ecosystems. In terms of pollutants from toxics, in addition to strict adherence to all laws and regulations concerning the storage, use and disposal of such substances, Lanihau has committed to development of Conditions, Covenants, and Restrictions (CC&Rs) for the Petition Area. The CC&RS would include development of a Pollution Prevention Plan to contain spills and prevent materials associated with light industrial uses attributable to the operations on the property, including petroleum products, chemicals, or other pollutants from leaching or draining into the ground or subsurface storm drain collection areas. These covenants shall be subject to the approval of the Hawai'i State Department of Health, upon consultation with the National Park Service, and the County of Hawai'i. The Pollution Prevent Plan (PPP) will address each of the types of uses permissible in the Petition Area, by specifically designating Best Management Practices (BMPs) tailored to each specific use or activity. Emphasis shall be given to structural BMPs to prevent any and all pollutants that may be associated with such industries from being released into the environment, including reaching the groundwater. The CC&Rs will also help disseminate critical information about pollution prevention laws, regulations, and required practices and will also establish an owners' association with power to oversee and report violations as a second line of defense against pollution violations.

In responses to the comment letters, it was reiterated that Lanihau is committed to participating in local and regional solutions for wastewater and plans to continue to work with the County in seeking solutions to wastewater disposal, including participation in the County's proposed improvement district for the extension of the Kealakehe Wastewater Treatment Plants collection system on a fair and equitable basis.

Another cited concern was traffic, particularly the potential for this and other projects in the area to increase congestion on Queen Ka'ahumanu Highway. Other traffic concerns related to the phasing of road improvements and the relationship of the project to long-term plans for County roads paralleling Queen Ka'ahumanu Highway. EIS preparers determined that the road and intersection improvements outlined in the Draft EIS (along with other, separate planned improvements) would mitigate the cumulative impacts

## Final EIS: Kaloko-Honokohau Business Park

resulting from the proposed project and other potential traffic sources to acceptable levels. In responses to the comment letters, it was noted that Lanihau has developed its road circulation plan to provide alternative access roads between Kealakehe Parkway and Hina Lani Street that are consistent with the County's Keahole to Kailua Development Plan's Circulation Plan. These road networks will reduce the need to travel on Queen Ka'ahumanu Highway for intra-regional trips and contribute to the regional circulation network.

The Hawai'i State Department of Health cited regulations dealing with air quality and noise impacts during construction and expressed concerns about long-term noise impact from the quarry on adjacent uses. The Final EIS provides additional information about mitigation measures during construction.

Several commenters noted that the project landscaping and general appearance needs to blend with the adjacent Kaloko-Honokohau National Historical Park. Project plans call for appropriate landscaping to deal with this compatibility issue, to be arrived at in consultation with the Park.

Other issues that were less frequently mentioned included: concern for social impacts related to potential employees of businesses in the Business Park; sustainable building design, such as energy conservation and recycling; questions about the need for additional industrial area in Kona; clarification on status of archaeological mitigation, such as preservation areas; and other issues. For detailed discussion, please refer to Appendix 13.

It should also be noted that a number of comment letters highly supportive of the provision of industrial/commercial lots in the Honokohau area were received. Most commenters noted the need for additional space, the appropriateness of the location in terms of economic convenience and/or relative lack of environmental concerns, and the adequacy of the Draft EIS in addressing issues.

As discussed in Section 2.6 and other portions of the document, the adjacent property to the northeast has also been the subject of a Petition for Land Use Boundary Amendment from the Conservation District to the Urban District ("Petition"). TSA International, Limited ("TSA"), proposes to develop Phases III and IV of the Kaloko Industrial Park on this property.

The Final EIS for the TSA project was accepted by the Land Use Commission (LUC) in November of 2000. The hearing process for the Petition took place over the course of 2001. During the TSA EIS and hearing processes, various concerns were raised regarding the potential individual or cumulative adverse effects of the TSA and Lanihau projects on water quality in the ponds and nearshore waters of the Kaloko-Honokohau National Historical Park. In February of 2002, the LUC granted TSA's Petition, subject to a series

**Final EIS: Kaloko-Honokohau Business Park**

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of conditions related to wastewater treatment, stormwater disposal, pollution prevention, groundwater monitoring, regional/local transportation, financial contribution, affordable housing, archaeological and historic sites, landscaping, and other subjects. These conditions are set forth in Appendix 15 of this EIS. Conditions addressing similar issues in the Lanihau project are expected to be developed during LUC hearing for the Lanihau Petition. Several of these conditions are intended to mitigate potential impacts upon the water quality of the ponds and nearshore waters of this national park.

As the hearing on the TSA Petition occurred mainly during the interval between the Draft EIS and the Final EIS for the Lanihau project, further consideration was given to mitigation issues. Many of the essential concerns covered by those conditions relevant to the Lanihau project have been addressed during the development of mitigation measures in the Final EIS. In particular, there has been a focus on identification of additional mitigation measures to better ensure water quality protection, which are discussed in Section 4.2.2 of this Final EIS.

**PART 2: DESCRIPTION OF PROPOSED ACTION**

**2.1 Project Purpose and Background**

*Purpose*

The purpose of the reclassification and subsequent rezoning is to allow the development of the Petition Area for mixed light industrial and commercial uses and to allow the retention and expansion of the existing quarrying and quarry-related uses.

*Background: Existing Uses*

Currently, the existing quarry and related uses cover approximately 100 acres of the Petition Area. These quarry and related uses were approved by Conservation District Use Permit (CDUP) HA-66/6/12-35, which allows for eventual expansion of quarry-related activities over 261.723 acres (see App. 1), including approximately 232 acres within the Petition Area. Quarrying uses have been ongoing in this area since 1967, including surface quarrying over much of the 'a'a flows along the northern half of the Petition Area. The easternmost (mauka) portions of the Petition Area have been used for cattle grazing on an intermittent basis. The southern portion of the Petition Area supports no current land uses.

*Potential Demand for Project Product*

The Petition Area is strategically located along Queen Ka'ahumanu Highway halfway between the Kona International Airport at Keahole and Kailua-Kona. It is an in-fill property between the Kaloko Industrial Park and the existing Honokohau industrial developments. The type of land use that will be enabled by the reclassification would continue an existing use, complement and enhance adjacent activities, and interconnect the developing infrastructure grid in the area. The proposed reclassification is a logical use of a prime highway frontage site within an emerging urban corridor.

Market studies conducted for the project indicate that market conditions are appropriate for mixed light industrial and commercial uses and for retention and the expansion of the existing quarry and quarry-related use of the site (see Section 4.3.4 and App. 9). After an extended period of low real estate transaction activity, the West Hawai'i industrial sector is experiencing a resurgence of demand, with more than thirty subdivided lots sold or under contract in new developments since the beginning of 1999. Realtors anticipate land prices and rents to increase over the next five years. Furthermore, population and economic projections indicate that demand for industrial properties in West Hawai'i will double over the next 20 years. The market study analyzed historic and prevailing market trends in the West Hawai'i industrial/commercial sector, and estimated that it would take

about 10 years marketing and exposure time to successfully absorb the 102 gross acres of industrial/mixed-use lands in the first phase and the 100-plus acres of the quarry and heavy (general) industrial lands. The second increment, comprising 82.8 acres of industrial/mixed-use, will require an additional nine to ten years. The final 43 acres of industrial/mixed use will be absorbed over a subsequent four to six years. The entire development will take 23-plus years to be fully absorbed.

**2.2 Project Description**

Typical uses are described in Tables 2-1a and 2-1b. The proposed Mixed Use Industrial/Commercial Area (MCX) will contain uses similar to those in Kaloko Industrial Park and the Kailua Industrial Area, plus additional commercial uses consistent with the County's revised list of MCX zoning uses.

**Table 2-1a  
Examples of Permitted Uses within the Proposed (MCX) Zoned District**

Automobile sales and rentals	Repair establishments, minor
Automobile service stations	Restaurants
Business services	Retail establishments
Data processing facilities	Sales and service of machinery used in agricultural production
Financial institutions	Schools, business
Food manufacturing and processing	Self-storage facilities
Home improvement centers	Utility substations
Manufacturing, processing and packaging establishments, light	Veterinary establishments in sound-attenuated buildings
Medical clinics	Warehousing
Meeting facilities	Wholesaling and distribution operations
Offices	

Source: Hawai'i County Zoning Code

According to the Hawai'i County Zoning Code, the intent of the industrial-commercial mixed use zoned district is to accommodate diversified business and employment opportunities by permitting a broad range of uses, without exposing non-industrial uses to unsafe or unhealthy environments. This district is intended to promote and maintain a viable mix of light industrial and commercial uses.

The proposed commercial uses under consideration for the Petition Area would be well suited to an industrial/commercial mixed use area. These would include, but not be limited to, commercial uses and businesses that: (a) do not require location within a large shopping/commercial center that generates high traffic volumes; (b) cannot afford to locate in major shopping/commercial centers; (c) complement and support light industrial uses, such as business services and restaurants; or (d) are the result of an industrial startup use, which through time evolves into more of a commercial business.

Quarry operations and related uses such as concrete pre-casting and concrete batching operations would continue for approximately 20 more years. The related activities currently occupy approximately 15 acres within the quarry area. These and other compatible industrial uses are proposed to be expanded as quarry material is depleted. Appropriate buffers will be provided between existing quarry uses (and related activities) and the proposed and existing industrial and commercial mixed uses. Excavated areas no longer yielding aggregate materials will be converted to industrial use.

Lanihau is currently proposing to undertake the development of the Petition Area itself, including construction of roads and infrastructure systems and subdivision of the development lots. The finished lots will be either leased or sold, with the acquiring entity responsible for construction of buildings and other on-site improvements. Lanihau intends to finance the proposed project using a range of alternatives, including, but not necessarily limited to, equity contributions, conventional financing, joint venture partners and/or independent developers. Revenues obtained from sales/lease of the early development phases would also be available to finance subsequent phases of the proposed development.

**Table 2-1b  
Examples of Permitted Uses within the Proposed (MG) Zoned District**

Convenience stores	Recycling centers
Automobile and truck storage facilities	Repair establishments, major and minor
Automobile body and fender establishments	Restaurant
Automobile service stations	Self storage facilities
Concrete or asphalt batching and mixing plants and yards	Transportation and tour terminals
Contractors' yards for equipment, material, and vehicle storage, repair, or maintenance	Truck, freight and draying terminals
Freight movers	Utility facilities including offices or yards for equipment, material, vehicle storage, repair or maintenance, but excluding power plants
Lava rock or stone cutting or shaping facilities.	Warehousing
Lumber yards and building material yards	Wholesaling and distribution, including the storage of incidental materials equipment

Source: Hawai'i County Zoning Code

*Project Objectives*

The following objectives have been identified by the landowner for the Kaloko-Honokohau Business Park:

- Implement State and County plans, which identify the Petition Area for Industrial and Urban Expansion uses.
- Provide for expanded and conveniently located employment and business opportunities to serve the needs of existing and future Kona residents and visitors.
- Provide for continued use and expansion of the existing rock quarry and related uses in order to ensure a continuous supply of competitively priced building materials in Kona.

- Provide a roadway network that will interconnect the major mauka-makai arterial roads (Kealakehe Parkway and Hina Lani Street) and will supply alternative accesses for the Petition Area and neighboring areas.
- Provide a network of utility infrastructure, including water lines, wastewater lines, and electrical and telephone poles and lines.
- Engage in responsible development, by avoiding all adverse impacts when at all practical to do so, mitigating for any adverse impacts that remain, and enhancing the natural and cultural environment wherever possible. This includes developing a landscaping plan that not only minimizes visual impacts of the proposed development on the surrounding uses, including the Kaloko-Honokohau National Historical Park, but also provides an attractive gateway to the project, to the National Park, and in a wider sense, to Kailua-Kona itself. It also includes acknowledgment and careful consideration of the sensitive resources, including archaeological sites, cultural sites and practices, anchialine ponds and other coastal waters, that are present on and near the site. Furthermore, the development will provide opportunities for interpretation and preservation of historic sites.

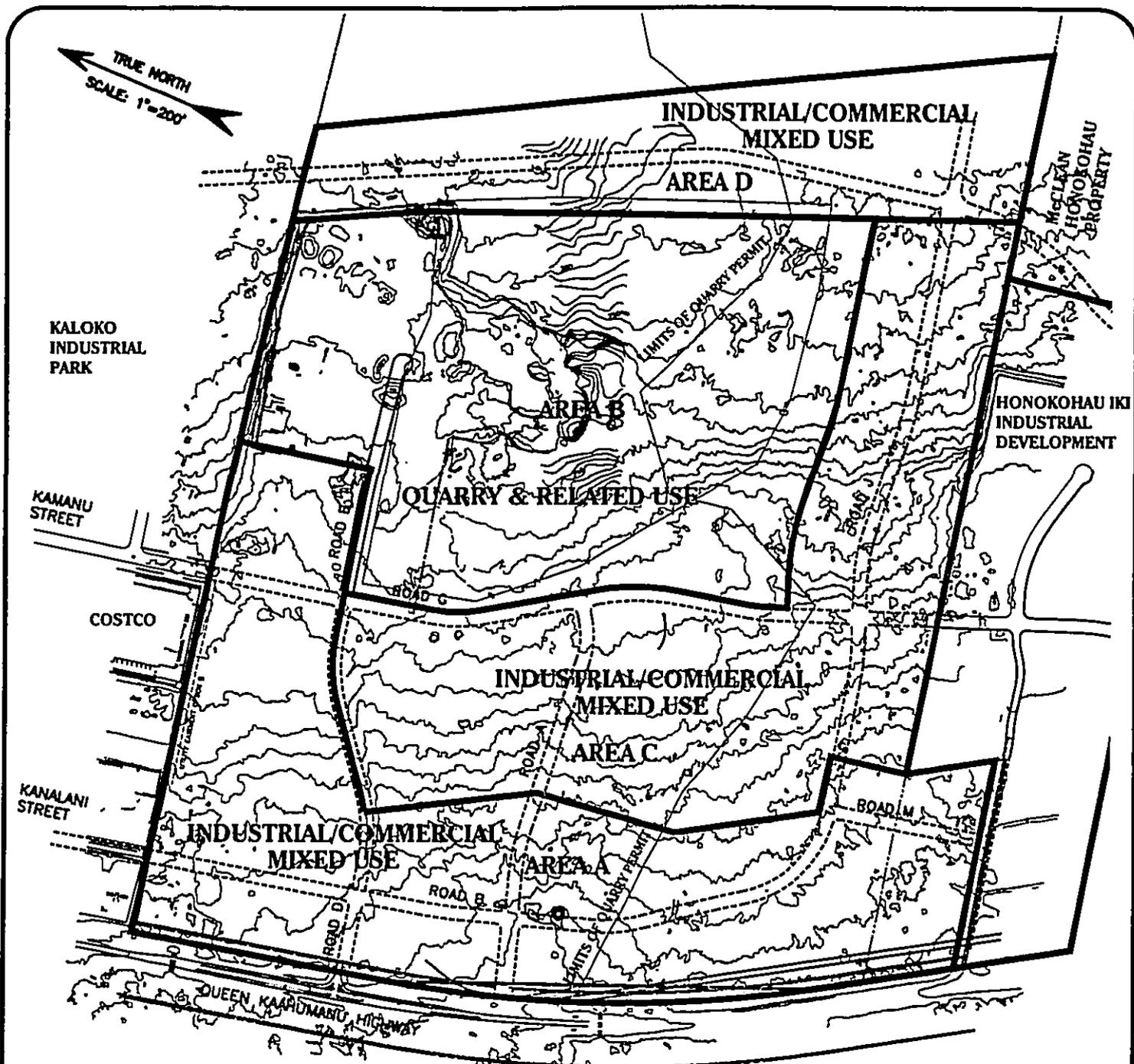
2.3 Project Cost and Schedule

The Petition Area encompasses several areas that are proposed under a preliminary Master Plan for a variety of uses according to a phased schedule. The estimated cost for the required infrastructure and improvements is approximately \$9,000,000. The projected uses and schedules are depicted in the Master Plan, Figure 2-1.

The proposed development will include lots ranging in size from ½ to 5+ acres within the Mixed Commercial and Industrial area, and from 1 to 25 acres within the proposed quarry area. Preliminary development concepts envision between 30 and 50 lots to be developed in Area A (Phase 1), between 10 and 25 lots within Area B (Phase 1), between 40 and 60 lots within Area C (Phase 2) and 20 to 30 lots within Area D (Phase 3). The final lot count and lot size will depend on market conditions and demand at the time of subdivision approval.

The development of the initial phases of the Petition Area are anticipated to start in late 2002, with completion anticipated in 2012.

<u>Phase</u>	<u>Start</u>	<u>End</u>
<u>Phase 1 Zoning and Subdivision</u>	<u>September 2002</u>	<u>December 2003</u>
<u>Phase 1 Infrastructure Development</u>	<u>January 2004</u>	<u>December 2006+</u>
<u>Phase 2 Zoning and Subdivision</u>	<u>January 2009</u>	<u>December 2009</u>
<u>Phase 2 Infrastructure Development</u>	<u>January 2010</u>	<u>December 2012+</u>
<u>Phase 3 Development</u>	<u>2015+</u>	<u>2020+</u>



KALOKO-HONOKOHAU NATIONAL HISTORIC PARK

PHASING SCHEDULE		
Area#	Phase	Start Date
A	1	2004
B	1	2004
C	2	2010
D	3	2015+

AREA SUMMARY		
Area#	Total Area	Net Area
A	101.845 ac	100 ac
B	102.429 ac	80 ac
C	87.859 ac	70 ac
D	44.851 ac	35 ac
Total	336.984 ac	285 ac

## LAND USE & PHASING PLAN

PREPARED FOR: LANIHAU PROPERTIES  
 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE: LANIHAU PROPERTIES

KALOKO-HONOKOHAU BUSINESS PARK  
 HONOKOHAU 1ST & 2ND  
 NORTH KONA, HAWAII

FIGURE # 2-1  
 PAGE NO. 2-5

Development of Phase 3 will commence as the market conditions warrant. Under the most favorable circumstances, development could commence in 2011 in conjunction with the Phase 2 development. However, a reasonable scenario would anticipate commencement of Phase 3 development in about 2015. The actual development schedule will depend on market conditions and may vary according to the economy, market demand, and financing.

2.4 Summary of Conformity of Proposed Action with Major Land Use Plans

Land use designations contained in State and County plans are consistent with the proposed development of the Petition Area for mixed light industrial and commercial uses and for retention and expansion of the existing quarry and quarrying-related uses.

- The Office of State Planning's *State Land Use District Boundary Review* (Hawai'i Office of State Planning [OSP] 1992) recommended that the area be reclassified from Conservation to Urban as part of the proposed Keahole to Kailua Urban area (Recommendation No. 34) (Fig. 2-4).
- The Petition Area has been designated as "Industrial" and "Urban Expansion" by the General Plan Land Use Pattern Allocation Guide map of the *Hawai'i County General Plan* (Hawai'i County Planning Department, 1989). (Fig. 2-2).
- The Petition Area has been designated for "Limited Industrial" uses by the *Keahole to Kailua Development Plan* (Hawai'i County Planning Department 1991) (Fig. 2-3).

Chapter 5 contains a detailed discussion of individual State and County plans and designations, as well as analysis of the conformity of the proposed use with these plans and designations.

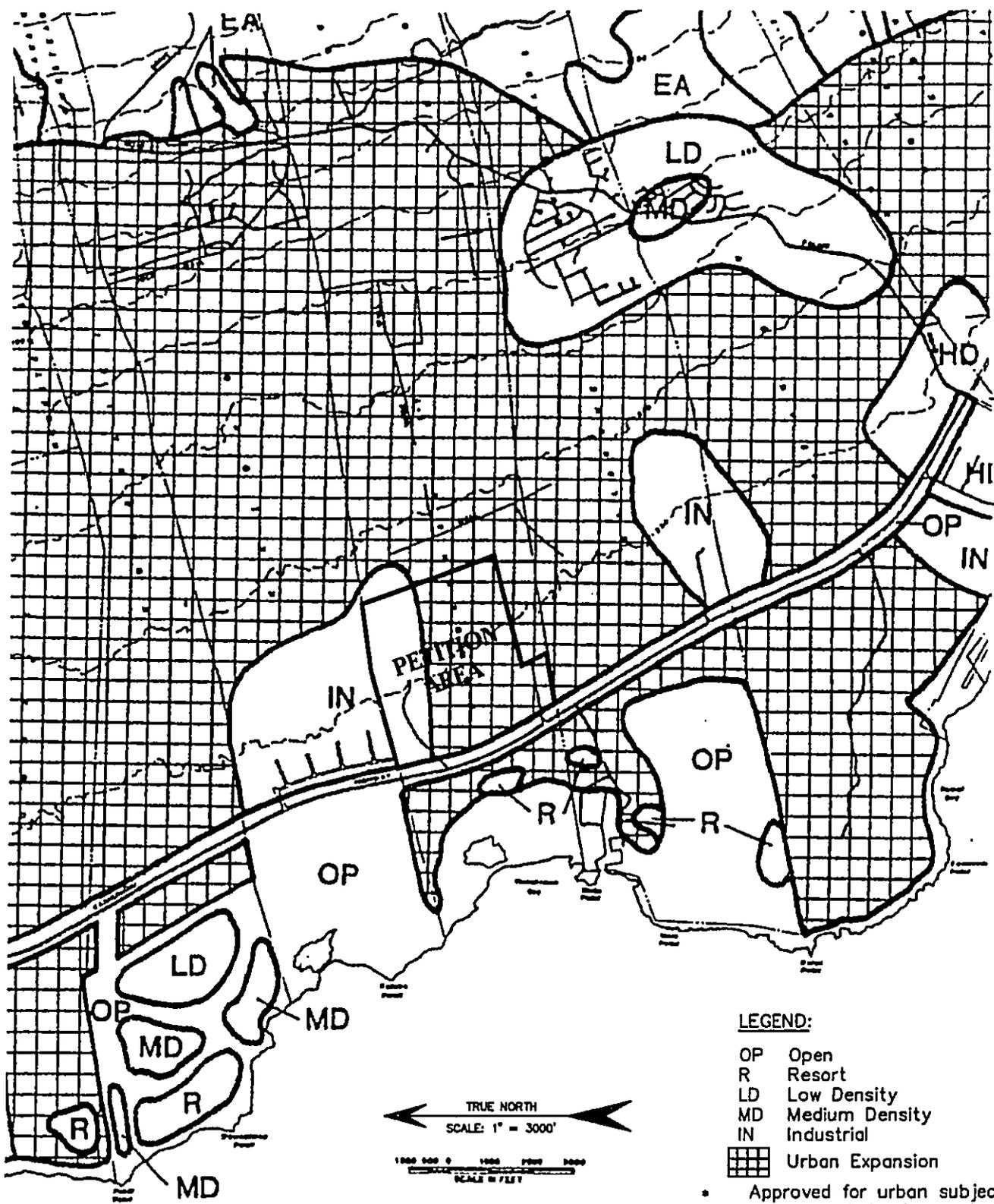
2.5 List of Permits and Approvals Required

*State*

- State Land Use District Boundary Amendment
- Underground Injection Control
- State Historic Preservation Division Chapter 6E Concurrence
- National Pollutant Discharge Elimination System (NPDES)

*County*

- Change of Zone
- Plan Approval
- Subdivision Approval
- Grading and Grubbing
- Building Permits



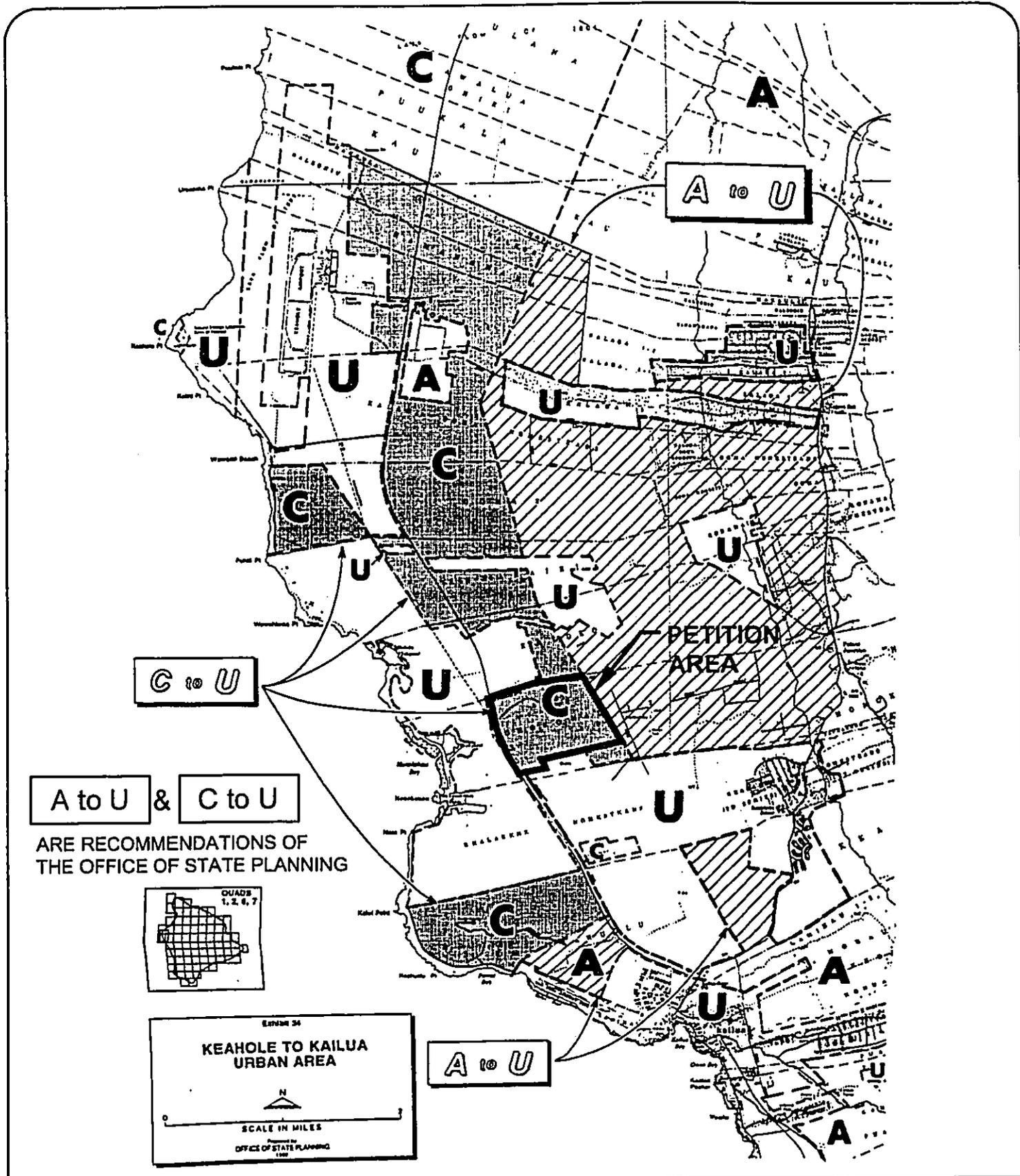
**COUNTY GENERAL PLAN**  
**LAND USE PATTERN ALLOCATION GUIDE MAP**

PREPARED FOR: LANIHAU PROPERTIES  
 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE: HAWAII COUNTY GENERAL PLAN

KALOKO-HONOKOHAU BUSINESS PARK  
 HONOKOHAU 1ST & 2ND  
 NORTH KONA, HAWAII

**FIGURE # 2-2**  
**PAGE NO. 2-7**





**STATE LAND USE DISTRICT  
BOUNDARY REVIEW (1992)**

**KALOKO-HONOKOHAU BUSINESS PARK  
HONOKOHAU 1ST & 2ND  
NORTH KONA, HAWAII**

PREPARED FOR: LANIHAI PROPERTIES  
PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
SOURCE: OFFICE OF STATE PLANNING

**FIGURE # 2-4  
PAGE NO. 2-9**

2.6 Existing and Planned Uses in the Study Area

Existing and planned uses in the general area bounded by Hualalai volcano, the shoreline, Keahole Point and Kailua-Kona (the so-called Keahole to Kailua area) form the context for both project planning and environmental impact discussion. An overview of this development is presented in Table 2-2. In very general terms, current and planned land use in this area conforms to the broad outlines envisioned in the *Keahole to Kailua Development Plan* (Hawai'i County Planning Dept. 1991) (Fig. 2-3). Projects actively in planning or construction in the Keahole to Kailua area are illustrated in Figure 2-5.

In general, residential development is concentrated in the area surrounding Mamalahoa Highway and in subdivisions that extend makai of the highway. The *Keahole to Kailua Development Plan* predicted that as many as 5,774 residential units would be built within the planning area by the year 2010, an increase of 282 percent over the approximately 1,500 present in 1987. With the exception of the proposed Pau Hana development (see Fig. 2-5), most of the planned units are located at elevations of 1,000 feet or greater, in slightly cooler and cloudier areas away from the bustle of the major highways and commercial/industrial area.

A number of industrial/commercial complexes, including Kaloko Industrial Park, the existing Honokohau industrial developments, and the Honokohau Harbor area, intermittently line the Queen Ka'ahumanu Highway. Planned mauka developments will incorporate some mixed-use areas, mostly concentrating on commercial activities. Several additional industrial developments are planned, including Phases III and IV of the adjacent Kaloko Industrial Park.

The major recreation/preservation use is Kaloko-Honokohau National Historical Park, which contains various significant archaeological, cultural, hydrological and biological resources on a 1,178-acre site. Honokohau Harbor is a major facility for not only commercial but also recreational fishing, with about 450 berthing slips and also on-land boat storage. On the fringe of the Keahole to Kailua area is the Old Kona Airport State Park/County Park, which contains a number of passive uses as well as a large pavilion, a gymnasium, a swimming pool, baseball, football and soccer fields, a skateboard facility, and other active components. A number of planned communities, including the Queen Liliuokalani Trust Lands, the State of Hawai'i lands, the Villages of Lai'opua, and the Y-O lands, include parks in their planned land uses. Some parks or other lands will contain small archaeological and botanical preserves.

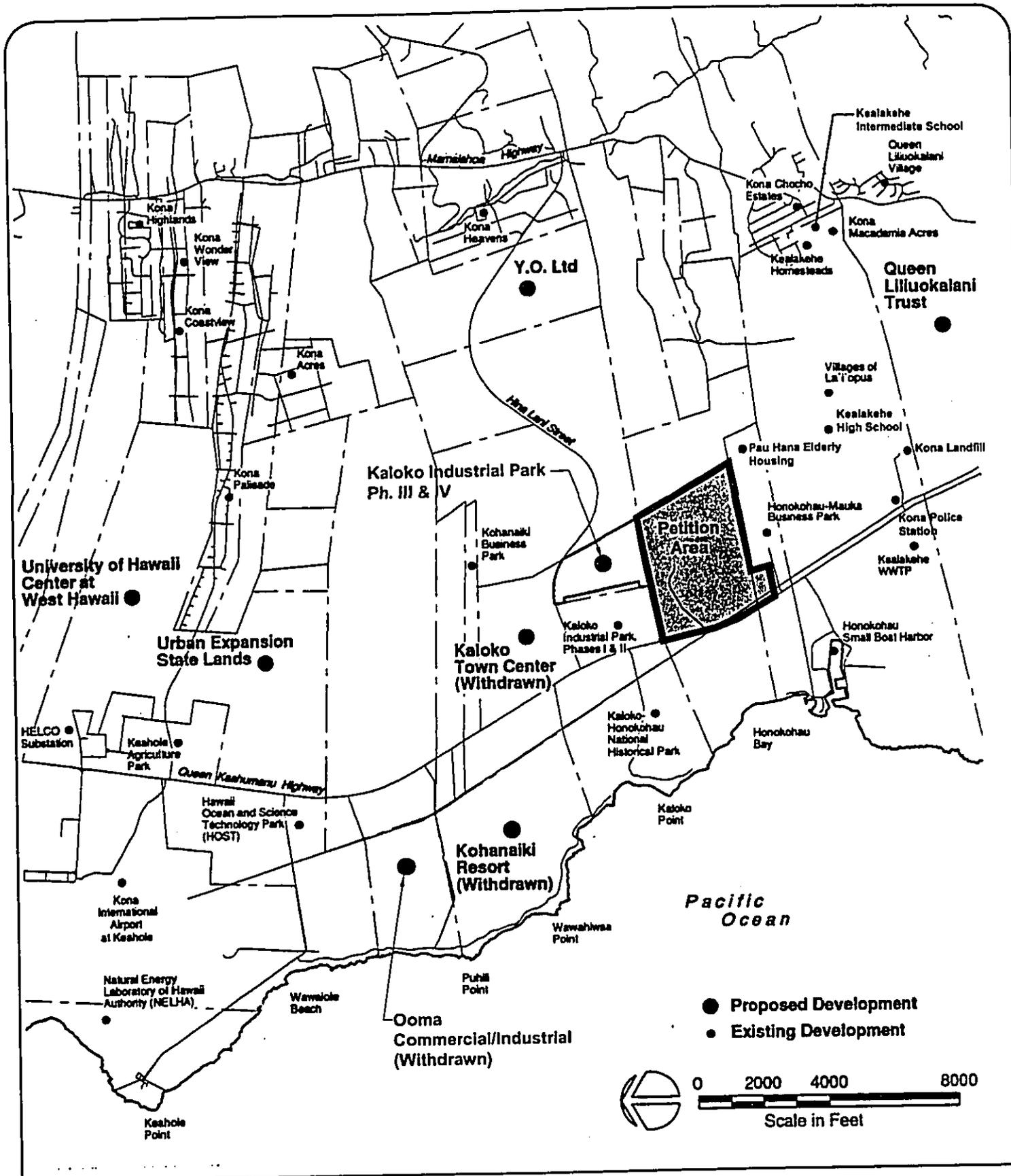
Because of low rainfall and poor soils conditions, agriculture in this area is limited, consisting mainly of fruit farming (coffee and macadamia nuts) in the moister elevations near the Mamalahoa Highway. Scattered areas of cattle grazing extend below

**Table 2-2  
Existing and Proposed Land Uses, Keahole to Kailua Area**

Development	Residential	Commercial/Industrial	Public Facilities
<b>EXISTING</b>			
Existing	Approx. 2,000 units, including subdivisions of Kona Palisades, Kona Heavens, Kealakehe Homesteads, Lai'opua, etc.	Kaloko Industrial Park, 92 lots, industrial, warehouse, retail, service. Existing Honokohau industrial developments, 55 acres of light industrial/commercial development. Kohanaiki Business Park, 26 light industrial lots. Honokohau Small Boat Harbor complex. Petition Area Quarry.	Honokohau Small Boat Harbor. Kealakehe Sewage Treat. Plant. Kona International Airport NELHA (Natural Energy Lab) Kealakehe Schools Police Station Kaloko-Hono. Nat'l Park Old Kona Airport Parks
<b>MAJOR PLANNED</b>			
Y-O Ltd. Partnership, 408 ac.	Single- and multi-family homes	Commercial.	
The Villages of Lai'opua	Planned over 15-20 yrs. 4,358-unit, 60/40 mix affordable/market.	Neighborhood commercial.	Governmental Facilities.
Keahole State lands, 2,640 ac., & Keahole Airport	Residential.	Neighborhood commercial & light industrial.	Civic centers, employment center, golf course, parks, and U. of Hawai'i Center at West Hawai'i, \$26.6 m, by 2004. Keahole International Airport: \$100 m, runway and terminal.
McClellan-Honokohau, 45 ac.	70-unit single-family home and active retirement.	Mixed use commercial- residential area.	
Kaloko Industrial Park Phases III & IV, 100 ac.		Improved lots for light industrial and industrial-commercial mixed uses by the year 2010.	
Honokohau Industrial, 55 ac.		Conversion of existing quarry and related uses to other industrial uses.	
Liliuokalani Trust (Keahuolu Lands), 1,135 ac.	Residential.	Retail, commercial, office.	Civic, cultural, hospital, parks.

Mamalahoa Highway. In the makai areas, Keahole Agricultural Park, located at the base of Kaiminani Street, is occupied by various nurseries, and aquaculture ventures are present at the National Energy Laboratory of Hawai'i Authority (NELHA) near Keahole Point.

About one-third of the land in the area is open and not planned for any immediate uses. Under the *Keahole to Kailua Development Plan*, these areas may be used for future urban expansion, for open space, or for other purposes.



# PLANNED LAND USES IN REGION

PREPARED FOR: LANIHAU PROPERTIES  
 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE: WILSON OKAMOTO & ASSOCIATES

KALOKO-HONOKOHAU BUSINESS PARK  
 HONOKOHAU 1ST & 2ND  
 NORTH KONA, HAWAII

FIGURE # 2-5  
 PAGE NO. 2-12

**PART 3: ALTERNATIVES**

**3.1 Proposed Project**

The proposed project is described above in Sections 2.1 through 2.3 and illustrated in Figures 1-1 and 2-1.

In addition to the proposed project as described in Section 2.1 through 2.3, Lanihau has considered revising the development to include the Phase 1 and 2 development areas only and reclassifying the Phase 3 area to the State Land Use Agricultural district, in lieu of Urban. This is based on the uncertain development schedule for the Phase 3 area, the commencement of which could extend beyond 10 years from the reclassification of this area.

Should this alternative be pursued, the Phase 3 area would be combined with the adjacent SLU Agricultural designated lands immediately mauka of this area and utilized as part of the Palani Ranch agricultural operations. The Phase 3 area and adjacent lands are or have historically been utilized for grazing by Palani Ranch, although the agricultural capability of this area is marginal at best.

Should Phase 3 (Area D), consisting of approximately 45 acres, be reclassified to Agriculture, there will be a reduction of 35 net acres of industrial/commercial mixed uses out of a total of 285 net acres - i.e., about a 12 percent reduction. There would be a commensurate reduction in potential development impacts. There would also be a corresponding reduction of tax revenues and fiscal benefits from this alternative. Furthermore, there would also be less incentive and opportunity for the implementation of the County's proposed roadway network in this area, which includes the construction of a new connector road through a portion of the Phase 3 area. The discussion of impacts in Section 4 includes a section in each resource area describing in more detail how the impacts of the modified alternative would differ from those of the full alternative.

If this Alternative is selected, and Lanihau later proposes to utilize the Phase 3 area for urban uses in the future, it will need to petition the LUC to reclassify this area to the Urban District. At that time, the impacts and benefits of such reclassification can be revised by the LUC, the County and other interested parties.

**3.2 No Action**

Under the No Action Alternative, the 336.984 acres in the Petition Area would *not* be reclassified from the Conservation District to the Urban District. The project activities specified in the Master Plan would not be implemented. The existing quarry and related activities, which are already operating under a Conservation District Use Permit that covers 261.723 acres, including the 232 acres within the Petition Area, would continue into the foreseeable future. No additional long-term impacts related to the conversion of vacant land to developed uses would occur. Similarly, none of the benefits of the expansion of employment, tax base and infrastructure networks would occur. This EIS considers the No

Action Alternative the baseline by which to compare environmental effects from the project. For most categories of impact, the No Action Alternative would result in no change or increase in current impacts from the existing quarry operation. Therefore, unless explicitly mentioned, discussion of impacts and mitigation will relate to the proposed project alternative only.

### 3.3 Other Alternatives Considered and Dismissed

Lanikai considered various land use alternatives for the Petition Area during the initial planning process, including residential, exclusively commercial, and combinations thereof. These uses were dismissed from further consideration based on the following:

*Inconsistency with Land Use Plans.* The County's land use plans encourage the area to be developed for non-residential uses, with a focus on industrial and compatible uses. The *Hawai'i County General Plan LUPAG* map designates the Petition Area for Industrial and Urban Expansion activities. While residential uses are allowed within the Urban Expansion designated areas, there is a potential for conflict between such uses.

In addition to the *General Plan*, the County has prepared the *Keahole to Kailua Development Plan* to guide development in this region on a more detailed level. This plan also recommends the Petition Area for Limited Industrial and Urban Expansion uses. The Plan further recommends that residential uses be concentrated east (mauka) of a future Mid-Level Arterial that is located mauka (east) of the Petition Area (see Fig. 4-7 for depiction of various existing and planned roads).

Consequently, residential uses would not be consistent with the adopted County land use plans for this region.

*Lack of Land Use Suitability.* The Petition Area is not well situated for use as a major shopping/commercial center. There are existing and emerging commercial centers in Kailua-Kona Village (Lanikai Shopping Center, the Cross Roads shopping area, and the Kona Coast Shopping Center) and in the Queen Liliuokalani Trust lands at Keahuolu (Makalapua), immediately north of Kailua Village. These major shopping/commercial centers are strategically situated along the major arterial roadways, are already zoned for these uses, and are developed with basic infrastructure. Consequently, these areas have a strong competitive advantage over the Honokohau lands for regional shopping center use.

Furthermore, neither residential uses nor major shopping/commercial centers would be compatible with existing and proposed future land uses in the immediate area, which include the quarry and related activities of the Petition Area, along with the Kaloko Industrial Park on the north and the existing Honokohau industrial development areas on the south. While quarry and related uses in the Petition Area will be gradually phased out in the future, in the interim they could result in conflicts with non-industrial/commercial mixed uses within the Petition Area.

**PART 4: ENVIRONMENTAL SETTING, IMPACTS AND PROPOSED MITIGATION MEASURES**

This chapter describes the various physical environmental and socio-cultural resources as well as existing public facilities and services, and then for each, evaluates the potential beneficial and adverse impacts of the proposed action and the mitigation measures proposed to reduce adverse impacts.

Direct, secondary (indirect), and cumulative impacts are all addressed. Secondary impacts occur as a "side-effect" of a particular project, and may include impacts to air quality, water quality, noise, open space, natural vegetation, historic sites, and demands for public infrastructure. Cumulative impacts may be defined as impacts on the environment which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency or entity undertakes the action (Council on Environmental Quality [CEQ] 1997:v). The related actions or projects in the Keahole-to-Kailua study area described in Section 2.6.

**4.1 Basic Orientation to Site**

For purposes of the EIS documentation, the *Petition Area* has been defined as the actual property under consideration for reclassification, where most of the actual physical impacts will occur (see Fig. 1-1). The *study area* is a more flexible term, meant to provide context for resources or impacts under discussion in the Petition Area and to help evaluate impacts that potentially extend off-site (e.g., air quality and traffic). It will vary according to the resource under discussion, usually including certain portions of surrounding properties, and it may refer to a much larger area, typically the Keahole-to-Kailua area. For certain social and economic impacts, the study area will encompass as broad a region as the entire North Kona District or even all of West Hawai'i.

The Petition Area is a dry, rocky, sloping piece of land mauka of the Queen Ka'ahumanu Highway (see map in Fig. 1-1). It extends in elevation between about 40 feet above sea level at the highway to about 320 feet at the mauka border. The surface is pahoehoe and 'a'ala lava flows erupted from Hualalai Volcano approximately 1,500 to 3,000 years ago (Wolfe and Morris 1996). The modest average annual precipitation of 15-20 inches limits soil development, and vegetation consists of an intermittent cover of mostly non-native grasses and shrubs.

The Petition Area currently supports a rock quarry and related uses, including a ready mix concrete plant, an asphalt concrete plant, stockpiling, quarry and aggregate sales, and pre-cast concrete manufacturing. Under the conditions of the Conservation District Use Permit (CDUP) in force for the Petition Area, 232 acres – or almost 70 percent of the

Petition Area – is permitted for such quarry and quarry-related uses. Much of the 'a'a flow was surface quarried over the past 30 years under the CDUP.

Surrounding the Lanihau parcels are the Kaloko Industrial Park to the north and the existing Honokohau industrial developments to the south. The land mauka is used for ranching. Kaloko-Honokohau National Historical Park is directly makai of the project, extending between Queen Ka'ahumanu Highway and the shoreline, about 3,000 feet away.

## 4.2 Physical Environment

### 4.2.1 Drainage and Flooding

#### *Environmental Setting*

Lava flows in the drier coastal areas of Kona are not appreciably weathered or eroded and do not exhibit overland drainage systems. Precipitation rapidly percolates through cracks in the lava and descends to the level of the basal groundwater table, mixing with salt water and flowing towards the ocean as a thin lens overlying the salt water. Thus there are no intermittent or perennial streams, wetlands or special aquatic sites within the Petition Area itself. The area is classified in the National Flood Insurance Program's Flood Insurance Rate Maps as Zone X – areas identified in the community flood insurance study as having moderate or minimal hazard from the principal source of flood in the area.

#### *Impacts and Mitigation Measures*

The proposed project will increase the proportion of impervious surface (pavement and structures) in the Petition Area from near zero to a substantial portion of the property. Increase in impervious surface leads to increase in runoff, which, if unmitigated, has the potential to create on-site and off-site flooding. In order to prevent this, engineers will calculate the maximum amount of runoff that is likely to occur in extremely large storms, and will design roadways, gutters, drainage canals and absorption areas to accommodate these maximum flows, in conformance with Chapter 27, Flood Control, of the Hawai'i County Code. Based on these drainage improvements, which will be reviewed by the Hawai'i County Department of Public Works, there is little likelihood that either onsite or offsite flooding will occur.

No flood hazard areas or floodplains as defined in the Flood Insurance Rate Maps (FIRM) are present in or near the Petition Area, and none will be affected in any direct or indirect way by the proposed project.

Modified Alternative Impacts and Mitigation Measures

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. As there are no floodplains and no expected drainage impacts anywhere in the Petition Area, there would be no additional or different impacts under the modified alternative.

Secondary and Cumulative Impacts: No adverse drainage impacts would occur, and there would thus be no potential for adverse effects to accumulate with others. The project would not induce activities that would tend to cause secondary impacts to drainage on or offsite.

4.2.2 Water Resources

Water quality is the issue cited as most important by many of those consulted on the project, including commenters on the EISPN. In the Petition Area itself, there is no surface water, due to its location above sea level in a dry area of highly permeable lava substrate. Over non-paved surfaces, surface runoff is rarely observed during the most intense rainfalls. There are no wetlands located within the Petition Area.

However, there is particular concern that project-related alterations to the quantity of flow and nutrient load of the groundwater, as well as contamination of groundwater with toxic substances, could adversely affect the fishponds, which are currently being restored, anchialine ponds (ponds with no open connection to the ocean) and nearshore waters of the Kaloko-Honokohau National Park ("KAHO" or "National Park") and environs, makai of the Petition Area (Fig. 1-1). These coastal waters have value for maintaining a healthy aquatic biota, for historic preservation, for use and appreciation by visitors, and for the ongoing practice of Hawaiian culture. The National Parks and Recreation Act of 1978 provided for the establishment of this park to preserve the integrity of the many archaeological features and fishponds found in the area. The two principal fishponds, Kaloko and Aimakapa, are brackish bodies of water separated from the ocean by a rock wall (Kaloko) and a sand beach berm (Aimakapa).

Activities associated with projects such as the proposed Business Park have at least some potential to affect groundwater, nearshore waters and coastal ponds. Changes in the flow rate can affect salinity. If great enough changes occur, the basic ecosystems may undergo alteration. Additions of nutrients can induce eutrophication - which occurs when the lower levels of water become deprived of oxygen as a result of the decomposition of biomass (e.g. algae) produced by nutrient rich upper waters - in non-eutrophic pond waters, and increase the rate of eutrophication process where they already occur. Toxic

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materials such as heavy metals and synthetic organic compounds can become concentrated in the food chain of aquatic ecosystems.

Accordingly, the research accomplished for this EIS focused intensively on potential effects to water quality. Investigations included the entire hydrologic cycle, from rainfall, to percolation through soil and rock to the water table, transport of groundwater to the shoreline, and finally the mixing of groundwater with pond and open ocean water. This section summarizes and integrates separate reports contained in Appendix 3 (Impacts to Water Resources, by Tom Nance Water Resource Engineering), Appendix 4 (Assessment of Effects to Marine and Pond Environments, by Marine Research Consultants), and Appendix 5 (a report on toxic substances by Masa Fujioka and Associates). These reports assessed the existing and future bio-hydrological environment in and around the study area from a perspective integrating physical, biological and engineering characteristics. The reader interested in detailed discussion of these issues is referred to these appendices. Because aquatic biology is so strongly connected to water quality characteristics, aquatic biota is also discussed in this section. For the Final EIS, Sections 4.2.2.2.1, 4.2.2.2.2, and 4.2.2.2.6 have been rewritten to reflect substantially revised reports from the consulting hydrologist and marine biologist, which are included as Appendices 3 and 4. These reports were revised to account for the change from conventional septic system treatment to enhanced treatment for the Lanihau and TSA projects, to incorporate sample data on stormwater nutrients, and to address methodological concerns raised during the Draft EIS comment period.

In response to the scientific research and opinions rendered by project water quality consultants, there has been considerable interest by KAHO and other entities concerned with general water quality and aquatic biota in the vicinity of Lanihau's project site. KAHO and other entities dispute certain methods and conclusions of the project consultants. These concerns were raised during the Kaloko Business Park Phases III and IV State Land Use Commission boundary amendment process that was initiated by TSA and thereafter designated as "Docket No. A-00-732." The Commission found the consultants' analyses to be deficient in assessing the potential impacts of TSA's proposed project on such resources. Inasmuch as the same consultants' studies are sources of information in the EIS, Lanihau acknowledges that such findings of the Commission and supporting portions of the record of TSA's proceeding are relevant to an assessment of potential impacts of Lanihau's project upon water resources and aquatic biota.

Given the Commission's findings in the TSA proceeding, Lanihau acknowledges the importance of disclosing the disputed nature of such analysis and conclusions, including those set forth in this EIS. The complete record of the controversy and the basis for the LUC's determinations is contained in the transcripts of the Land Use Commission's hearings and the Findings of Fact, Conclusions of Law, Decision and Order for a State Land Use District Boundary Amendment for the Kaloko Business Park Phases III and IV.

all of which is incorporated here by reference. The following (referenced by Decision and Order [D&O]) reflects the determinations made by the LUC regarding water quality, water treatment, park resource impacts, and pollution prevention in the TSA D&O:

- Congress authorized KAHO on November 10, 1978, to provide a center for the preservation, interpretation and perpetuation of traditional native Hawaiian activities and culture and to demonstrate historic land use patterns as well as provide needed resources for the education, enjoyment and appreciation of those activities and culture by local residents and visitors, and be administered in accordance with provisions of the law generally applicable to the National Park System. The National Park Service's mandate and the purpose of KAHO is to restore and resurrect many of the park's cultural and natural resources (TSA D&O #155 & #157).
- When a development is proposed up-gradient of a National Park and the contaminants threats are potentially serious, the National Park recommends an Ecological Risk Assessment be conducted consistent with their criteria. No party conducted such an assessment (TSA D&O #160).
- Evidence shows that the TSA's proposed development will increase nutrients and release contaminants into the groundwater that flows into the National Park, and that the existing industrial development already has (TSA D&O #169).
- Loss of wetland habitat is the primary cause of the decline of endangered Hawaiian waterbirds. Urbanization of areas around wetlands causes damage to water quality from urban runoff and other inputs such as nutrients and pathogens. Altering the hydrology of wetland areas makes them less suitable, or even unsuitable, for native waterbirds. Alterations include withdrawals from municipal water sources, which can change the depths of wetlands, affect temperature changes, and cause saltwater intrusion into coastal groundwater supplies, which then alters salinity levels in associated wetlands (TSA D&O # 206 & #207).
- Increased nutrients can cause algal blooms that deprive water bodies of oxygen. A lack of dissolved oxygen can kill vertebrate and invertebrate species, giving the bacteria that produces botulism toxin the opportunity to grow. Industrial contaminants (such as pesticides, metals, or other toxics) that reach a water body can also cause acute die-offs, and set the stage for avian botulism (TSA D&O #212, #213 & #246).
- The National Park has at least 70 anchialine pools ranging from tiny depressions in the lava to larger ponds, including Aimakapa pond, representing about 10% of all anchialine resources in the State. The anchialine pools and the species that they support are susceptible to impacts from changes to their unique ecosystem, including water chemistry changes from added nutrients and contaminants (TSA D&O #252 & #264).

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- Aimakapa Pond is nitrogen limited. Water bodies limited in nitrogen are at risk of eutrophication when additional nutrients, such as nitrogen and phosphorus, are added to the water body. This leads to changes in plant and animal communities and, in the National Park, potential impacts to federally protected species and their habitat and to native Hawaiian practices (TSA D&O # 284, #285, #184, #178, & #290).
- Nutrient enrichment of coral reefs and near shore areas may affect marine-life communities and make coral reefs vulnerable to additional devastating indirect effects (TSA D&O #245, #248, #249 & #251).
- Eutrophication is a gradual accumulation of nutrients and organic biomass, accompanied by an increase in production (plants or algae) and a decrease in the average depth of water caused by sediments accumulating on the bottom. Man's activities accelerate the eutrophication process, which causes severe problems for affected bodies of water. This acceleration is brought on by human discharges of organic wastes and/or nutrients, such as nitrogen and phosphorus (TSA D&O #286 & #287).
- There is an absence of evidence showing that the TSA development would not adversely affect the National Park's resources. (TSA D&O # 294)
- In the absence of adequate studies to show that the additional contaminants generated by the new industrial development will not harm the National Park, effective controls on pollution must be in place to contain and treat contaminants to protect the groundwater and the National Park (TSA D&O #307).
- Surface water is a source of polluted runoff or "nonpoint source pollution" because the water carries pollutants from impermeable surfaces such as roads, roofs and parking lots, picking up spills, trash and other contaminants. In a lava environment, this contaminated surface water can quickly leach into the lava towards the groundwater. Significant pollutant types include sediments, nutrients, toxins, floatables, and pathogens (TSA D&O #309).
- Untreated surface water from the industrial development will potentially impact National Park resources by contaminating the groundwater that reaches the park's ponds and coastal areas. Control of contaminated surface water can be achieved through the development of a pollution prevention plan ("PPP") designed to address all pollutants associated with industrial developments and to identify measures that will contain and treat such pollutants, in order to prevent any release into the environment, including the groundwater (TSA D&O #319 & #320).
- Although the TSA's expert alleged that data exists to support the theory that a huge petroleum spill would not reach the National Park, no such data or documentation was presented as evidence before the Commission. (TSA D&O #326)

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- Groundwater is vulnerable to impacts associated with industrial development and uses, such as the release of petroleum products, solvents, and other toxic chemicals in to the groundwater, the disposal of nutrient-rich wastewater, and irrigation and washwater into the groundwater, contaminated stormwater runoff, and the removal of groundwater for drinking water supply (TSA D&D #338).
- Contamination of groundwater, increased nutrient load in the groundwater, changes in salinity of groundwater, and changes to groundwater volume alter the natural ecosystems in the National Park (TSA D&O #339 & #372).
- No State wastewater system regulations protect significant natural resources and the rules do not address the removal of nutrients, such as nitrogen and phosphorous, that may disrupt natural systems (TSA D&O #377).
- Drainage wells provide a direct conduit to groundwater, and are sometimes drilled into groundwater. Groundwater contamination from drainage wells is a serious problem because it affects drinking water and also streams and the ocean (TSA D&O #408 & #409).
- There are no State laws or County codes currently in place to ensure that pollutants carried with surface runoff do not get into the environment through groundwater. This lack of protection puts water quality and natural resources at risk where drainage wells are used. County drainage well standards are only designed for flood control purposes and not for removing any hazardous substances (TSA D&O #412 & #419).
- Native Hawaiian rights and natural and cultural resources would be damaged or destroyed by the pollution of groundwater that reaches the National Park from surrounding areas, including Petitioner's proposed development at the Kaloko Industrial Park. Appropriate mitigation measures are, therefore, required under the Hawaii Constitution and the Commission's decision making criteria in order to approve reclassification of the project area (TSA D&O Conclusion of Law #7).

Lanihau believes that the majority of these concerns have been or can be addressed through the proposed mitigation measures. At the same time, consistent with the Land Use Commission's findings in the TSA D&O (See TSA D&O 162-164), Lanihau acknowledges that in the absence of scientific agreement or exhaustive scientific evidence, precautionary measures should be taken to protect important natural and cultural resources.

The philosophy of "The Precautionary Principle" was developed to address the inherent complexities of natural systems and the difficulties of predicting the effects of human activities on dynamic ecosystems. Lanihau fully embraces this principle and concurs with KAHO and the Land Use Commission that if development raises threats of harm to the environment, cultural resources, or human health, precautionary measures should be taken to protect the environmental, cultural and natural resources, even if some cause and

effect relationships are not fully established scientifically (See TSA D&O 165). A lack of scientific inquiry is cause for caution.

In light of a mutual acknowledgment of this principle and the goal of incorporating additional mitigation measures, Lanihau and KAHO have agreed to revisions to the Land Use Commission's conditions of TSA'S approval related to wastewater, drainage, and pollution prevention, and groundwater quality monitoring. These revisions are contained in Section 4.2.2.2.5.

#### 4.2.2.1 Environmental Setting

##### *Nearshore Waters*

The marine habitat near the National Park is composed of three predominant zones that run parallel to the shoreline. The shallowest zone is formed of a basaltic shoreline bench. The coral *Pocillopora meandrina* is the dominant colonizer in this area of severe wave stress. Moving seaward, the flat nearshore bench terminates in a ledge with a vertical face extending to a depth of about 25 feet, beyond which is a typical West Hawai'i reef platform, with high relief. Many reef corals and other benthic fauna find this an ideal habitat. At about 50 feet in depth, the slope becomes steeper, leading to the third zone, in which the coral is dominated by interconnected mats of finger coral (*Porites compressa*). Other important organisms in all zones are sea urchins, sea cucumbers, sponges, red calcareous algae, and various mollusks and crustaceans. The reef fish populations are typical of those throughout West Hawai'i, and include many food fish taken by subsistence and/or recreational fishermen. Surgeon fishes, parrotfish, damselfish, and wrasses are all very common.

Several species of marine animals that occur in Hawaiian waters have been declared threatened or endangered under federal law. The threatened green sea turtle (*Chelonia mydas*) is commonly found along the Kona Coast and the National Park is an important resting and feeding area for a large resident population of juvenile green turtles. The endangered hawksbill turtle (*Eretmochelys imbricata*) is also found within the National Park. Populations of the endangered humpback whale (*Megaptera novaeangliae*) winter in Hawaiian waters from December to April. Individuals of the endangered Hawaiian monk seal (*Monachus schlauslandi*), are occasionally seen in the area, including in the National Park.

##### *Kaloko and Aimakapa Ponds*

Water in Kaloko and Aimakapa Ponds is a mixture of seaward-flowing, brackish groundwater, and landward-flowing seawater. Several smaller anchialine pools (surface

water bodies that respond to the tides but are not directly connected to the ocean) are also present in the area. There are large differences in water quality characteristics between Aimakapa and Kaloko ponds. These are primarily the result of differences in the physical structure of the barrier between the ponds and the ocean. Kaloko Pond is separated from the ocean by a permeable rock wall, with exchange of water between the ocean and pond enhanced by channels (makaha) constructed through the wall. It is near oceanic in its salinity. Aimakapa Pond, on the other hand, is separated from the ocean by a sand berm of low permeability. Its salinity is about 35 to 40 percent of the ocean's salinity. As a result, there are no sharp differences in water chemistry between Kaloko Pond and the ocean, whereas there are substantial differences between Aimakapa Pond and the ocean. The floors of both contain sediment layers.

These ponds are valuable environments with a mixture of native and non-native fish, crustacean and mollusk species, and they serve as feeding and nesting habitat for various birds.

The U.S. Fish and Wildlife Service (USFWS) in a letter of July 7, 2000 (see App. 1) expressed explicit concern for avian and invertebrate inhabitants of anchialine and other ponds. In particular, they named the endangered Hawaiian Stilt, *Himantopus mexicanus knudseni*, the endangered Hawaiian Duck *Anas wylvilliana* (which does not in fact occur in Kona, although the endangered Hawaiian Coot [*Fulica alai*] does), and a number of shrimp species. *Metabetaeus lohena* and *Palaemonella burnsi*, are candidate endangered species, reported to be known from two anchialine ponds located within the National Park. USFWS also listed other candidate endangered shrimp species that might be present, including *Antecaridina lauensis*, *Calliasmata pholidota*, *Procaris hawaiiiana*, and *Vetacris chaceorum*. Such species, where present, are dependent upon maintenance of natural water quality conditions and low impact from alien competitor and predator species. In addition to these species, a number of native fish important for food and cultural practices are also found in the ponds and nearshore waters. The Orangeblack Damselfly (*Megalagrion xanthomelas*) is a candidate endangered species that inhabits the Park's anchialine pools.

#### *Groundwater Conditions*

Knowledge of groundwater conditions comes primarily from wells located in the vicinity of the Petition Area (Fig. 4-1). Wells situated nearest the Petition Area include State No. 4061-01, located within the National Park, and State No. 4060-01, within the adjacent Honokohau industrial developments. Other nearby wells include State Nos. 4161-02, 4161-01, 4160-01, and 4160-02 (Fig. 4-1). All six wells draw from the basal lens and produce brackish water. State Nos. 4160-01 and 4160-02 are not currently being used.



It is important to note that the nearest wells producing potable water, State Nos. 4158-02, 4258-03, and 4358-01, are all located mauka of Mamalahoa Highway, and more than two miles inland of the Petition Area.

Groundwater beneath the Petition Area and within the National Park exists as a thin, brackish, relatively slow-moving basal lens in hydraulic contact with saline water at depth. Table 4-1a shows the baseline flow rate, nitrogen, and phosphorus values of the basal groundwater moving beneath the Petition Area and through the southern portion of the National Park.

**Table 4-1a  
Baseline Groundwater Conditions**

Flow rate (MGD)		Salinity (PPT)		Nitrogen (µM)				Phosphorus (µM)			
				NO <sub>3</sub> <sup>-</sup>		Total		PO <sub>4</sub> <sup>-</sup>		Total	
Project site	Park	Project site	Park	Project site	Park	Project site	Park	Project Site	Park	Project Site	Park
2.0	3.0	4.0	5.8	85	85	115	120	5.8	6.0	6.9	7.0

Source: Appendix 3, Draft EIS

Further inland there is an abrupt change from the brackish basal lens to high-level ground water of exceptionally low salinity. The existence of this high-level water may be associated with a dike complex located in the vicinity of Mamalahoa Highway.

The high-level groundwater has a water table that ranges from 40 to 292 feet above sea level in the wells inland of the Petition Area. Chloride levels are typically less than 10 mg/liter, which is very similar to rainwater, and the temperature is higher than basal water downgradient. Permeabilities are sufficient to accommodate high capacity pumps, and a number of potable water wells draw water from this resource.

#### 4.2.2.2 Potential Impacts and Mitigation

The first discussion (Section 4.2.2.2.1) focuses on the potential impact of the project to the rate of flow and to the chemical composition (salinity, nitrogen, and phosphorus) of basal groundwater moving beneath the Petition Area and through the southern portion of the National Park. Section 4.2.2.2.2 then assesses the potential impact of the project on the surface water chemistry and biota of the fishponds and nearshore marine environment within the National Park. The reader is reminded that Sections 4.2.2.2.1 and 4.2.2.2.2 have been extensively rewritten for the Final EIS. Section 4.2.2.2.3 examines effects of toxic substances that could potentially migrate from the Petition Area to sensitive coastal

waters. Section 4.2.2.2.4 summarizes the impacts and mitigation under the modified alternative use while Section 4.2.2.2.5 summarizes the additional mitigation measures that are proposed. Finally, Section 4.2.2.2.6 discusses cumulative effects, considering the total impact to water resources, assuming the implementation of all current and planned development in the Kaloko and Honokohau ahupua`a, the area that supplies the groundwater for the National Park.

#### 4.2.2.2.1 Potential Impacts to Groundwater and Mitigation

There are four aspects of the proposed project that have the potential to alter the existing rate of flow, salinity and nutrient levels of the groundwater:

- 1) Drawing potable supply from inland wells will reduce the rate of flow from the high level aquifer into the basal lens.
- 2) Excess landscape irrigation and external water uses will percolate downward into the basal lens.
- 3) The disposal of onsite wastewater during an interim period before sewer service is available will be a localized source of recharge and nutrient loading.
- 4) Stormwater disposed of in dry wells will enter the basal lens.

#### *Groundwater Withdrawals for Potable Use: Impacts and Mitigation*

The Business Park's projected use of approximately 0.367 MGD potable water would likely come from one or more of the four high level wells in the study area (Fig. 4-1). Withdrawals from any of these wells will diminish leakage of high level groundwater into the down-gradient basal lens. Based on model results from the USGS, this would reduce the flow of groundwater through the National Park by 0.055 MGD, or 2.6 percent of existing flow (see App. 3). Such a change is not considered significant, as natural variations in groundwater levels related to periodic changes in ocean levels are far greater. At the same time, there will be some increase in salinity levels at both ends of the range. Because this quantity impact is negligible in relation to the several million gallons per day of flow, and is offset by the addition of landscape irrigation water as described below, no mitigation procedures are necessary or planned.

#### *Landscape Irrigation and Other External Water Uses: Impacts and Mitigation*

Most potable water that does not become wastewater would be used for landscape irrigation, dust control or other external uses. Approximately 0.029 MGD of irrigation and other water would percolate through to the groundwater system beneath the Petition Area and would then flow into the southern half of the National Park. This water would have lower salinity than the basal groundwater, and nutrient levels approximately twice

that of the potable supply. However, because this amount of water is very small relative to the quantity of flow in the basal lense, its greater nutrient load and reduced salinity would produce almost no measurable impact. Nitrogen levels in the groundwater are calculated to increase 0.14 percent and phosphorus levels by 0.03 percent. As such, no mitigation procedures are necessary or planned.

*Wastewater Disposal: Impacts*

There may be an interim period after partial development of Phases A and B before the Petition Area is connected to the County of Hawai'i's Kealakehe Wastewater Treatment Plant (WWTP). The connection is expected to occur by about 2010 (see Section 4.4.4 for discussion of wastewater treatment plans). During this interim period, wastewater will be disposed of in individual systems approved by the Department of Health (e.g., septic tanks and leach fields). Without enhanced treatment, there would be some potential during this period for nutrient-enhanced groundwater from the Petition Area to reach the ponds of the National Park. To minimize potential impacts, Lanihau has committed to require the use of an enhanced Individual Wastewater Systems (IWS), where the IWS and absorption field are designed to remove no less than 92 percent of the Total Nitrogen and to provide additional phosphorus removal. Lanihau will develop and participate in a Wastewater Treatment System Maintenance Agreement to assure appropriate operation and maintenance of the IWS. This *enhanced system* treats wastewater to a greater extent than required by existing laws and regulations, thereby reducing the nutrient load to the groundwater as compared to a standard septic tank and leach field system. It is anticipated that no more than 15 percent of the ultimate total lot count would be built on and occupied before connection to the County's WWTP. Under these assumptions, about 0.055 MGD of treated wastewater would be added to the groundwater flowing beneath the project site and to the water flowing through the southern half of the National Park, carrying a relatively small load of nutrients with it.

In a typical enhanced system, the septic system, leach field, and travel through the vadose (above the water table) and groundwater zones each contribute to removal of nitrogen and phosphorus. For the purposes of calculating impacts for the proposed project (Table 4-1b), conservative ends of removal rate ranges were used for vadose/groundwater removal estimates. These estimates were based on empirical values derived from data from the Kealakehe Wastewater Treatment Plan effluent disposal. However, as the Land Use Commission found in the TSA D&O, "because of the nature of lava flows and fractures, the actual flow rates of the groundwater are not known." There may be lava tubes and other preferred paths of groundwater flow that increase flow from the project site to the National Park.

As Table 4-1b indicates, both nitrogen and phosphorus loading in the downgradient southern half of the National Park during the interim period (when IWS are being used)

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would be on the order of 0.5 percent, an essentially negligible amount well within the natural variation of the system.

The County of Hawai'i through its Department of Environmental Management has initiated the process to establish an improvement district to extend sewer lines into the Petition Area and surrounding lands. Lanihau is committed to participate in the improvement district on a fair and equitable basis. It is expected that County sewer lines will extend into the Petition Area by no later than 2010, and all businesses in the Petition Area will then connect to the Kealakehe WWTP. Wastewater will be conveyed to the Kealakehe WWTP, treated, and reused for irrigation. The impact of developing the Petition Area to groundwater regionally - including the National Park - would be negligible following connection.

**Table 4-1b  
Estimated Nutrient Loading to Groundwater  
in Southern Half of National Park, Interim Period**

Point in the Process	Nitrogen			Phosphorus		
	Removal Rate (%)	Concentrat. (MG/L)	Loading (Lbs/Day)	Removal Rate (%)	Concentrat. (MG/L)	Loading (Lbs/Day)
Raw Wastewater to Septic Tank	--	40	18.3	--	15	6.87
Leaving Enhanced Septic Tank	50	20	9.2	0	25	6.87
Percolating Below Leach Field	80	4.0	1.83	90	1.5	0.69
Arriving at Ponds/Pools in Park	83	0.68	0.24	94	0.09	0.025
Current Groundwater Flow	--	1.54	41.69	--	0.22	5.85
Combined with Project Wastewater	--	1.53	41.88	--	0.22	5.88
Percent Increased by Project			0.5			0.5

*Stormwater Disposal: Impacts*

Approximately one-third to one-half of the 15-20 inches of rain that fall on the project site per year enter the groundwater system. This is equivalent to 0.15 MGD. The rest is lost to the atmosphere through evapotranspiration. Development of the site will render much of land surface impermeable to water. On the local scale, this will create surface runoff that will be collected and disposed of in dry wells and/or settling ponds, and then percolate into the basal lens. The amount of stormwater reaching the basal groundwater after development will be higher than pre-development percolation and therefore there may be changes to the amount of groundwater flow or salinity levels; but based upon

design assumptions and BMP's the volume and salinity levels are not anticipated to appreciably change.

Stormwater can, however, increase nutrient levels and add toxics to groundwater (see Section 4.2.2.2.3, below, for discussion of toxic materials). In order to ascertain potential nutrient loading in stormwater, research undertaken for this EIS (see App. 3) collected and analyzed stormwater from various locations in the nearby Kaloko Industrial Park. In general, the stormwater runoff samples were less saline, had less silica, less nitrogen and more phosphorus than high level or basal groundwater. Percolating runoff from stormwater is calculated to increase nitrogen and phosphorus levels in the southern half of the National Park on the order of 0.1 percent, which is essentially negligible.

*Total Project Impacts on Groundwater Flow and Nutrients from the Proposed Kaloko-Honokohau Business Park and Mitigation*

No adverse effects on the quantity or quality of potable well water from any existing or proposed wells would occur as a result of the proposed project. The total reduction in groundwater flow - an estimated 2.6 percent - would occur as a result of project potable water wells withdrawing from high level aquifers. This degree of withdrawal is not considered significant, as natural variations in groundwater level related to periodic changes in ocean levels are far greater. At the same time, there will be some increase in salinity at both ends of the range.

The nutrients nitrogen and phosphorus would not appreciably increase as a result of landscape irrigation (0.14 percent and 0.03 percent, respectively), wastewater disposal (0.5 percent for both, during the interim period only) and stormwater runoff (0.1 percent for both). The *total* increase in both nitrogen and phosphorous is less than one percent, an essentially negligible amount well within the natural variation of the system.

The eventual connection to the County sewer service will largely eliminate even the small effects of the interim period, and flow rate, salinity and nitrogen and phosphorous would essentially return to the baseline levels indicated in Table 4-1a.

4.2.2.2.2 Potential Impacts to Surface Water & Aquatic Biota Habitat

Any development project has potential to impact downslope water quality. In this case, the pond and marine environments within Kaloko-Honokohau National Historical Park (National Park) are highly significant resources. Preservation, and ultimately restoration, of these ponds is an important priority for the National Historical Park and many organizations and individuals in Kona. For this reason, special attention was paid to the

potential for impacts from the project, as well as cumulative impacts from the sum of all projects in the area, to impact salinity, nutrients, sedimentation and toxics, as these parameters influence the biological composition and health of the ponds and nearshore waters.

In order to predict the magnitude of this environmental change, baseline information on the current surface water (pond and nearshore) quality was collected, and the current contribution of groundwater to the pond and marine environments was assessed. In addition, the potential impacts of sedimentation and the release of toxic substances from construction and daily operations at the project site was examined (see next section).

*Salinity: Impacts and Mitigation*

Salinity in Aimakapa Pond is approximately 13 PPT and salinity in Kaloko Pond is approximately 33 PPT (compared to seawater, which has salinity of about 35 PPT). Thus, Aimakapa can be said to be approximately 60-65 percent groundwater, while Kaloko is about 90 percent seawater. Based on the analyses described earlier, the proposed project is not expected to have any measurable impact on the salinity of the pond or nearshore ocean environment, and no mitigation for salinity impacts is thus necessary.

*Nitrogen and Phosphorus: Impacts and Mitigation*

Several important principles about anchialine ponds (defined as those shoreline ponds with no open connection to the ocean) are key to understanding the potential for alterations that can be brought about by changes in land use. First, anchialine ponds undergo a distinct "life history" or sequence. The initial phase of pond life history begins as depressions in lava flows below the level of the water table. At this stage, there is little or no sediment in the ponds, and water flows relatively unobstructed through the ponds. A distinct assemblage of plants and animals colonize the ponds. With time, sediments are produced in the ponds by deposited organic material (plankton and plant litter). The deposition of the sediments on the bottom of the ponds results in a series of changes. The flow of water through the ponds lessens as the spaces within the rocks that line the pond are filled. Reduced water flow reduces pond flushing, and the natural balance of the ponds is altered, changing water quality substantially. With time, infilling of the ponds can become complete, and the ponds turn into a marsh or wetland. While it appears that all ponds will proceed through such a life history, it has become evident that the process will speed up if the natural balance of the ponds is disturbed. In particular, the addition of alien species which prey on naturally occurring species in the ponds can accelerate the degradation of the ponds.

The second major point regarding anchialine ponds concerns the concentrations of plant nutrients (primarily nitrogen and phosphorus). Because natural groundwater contains high levels of nutrients, the concentrations in anchialine ponds are normally very high compared to the ocean. A balance between the plants and animals within undisturbed ponds results in maintenance of clear water columns, even with consistently higher nutrient levels than are utilized by the plants in the ponds. The best example of this concept is the occurrence of healthy anchialine ponds in the middle of several golf courses in South Kohala. Even with the additional nutrients entering the ponds from fertilizers, the water columns are clear and the ponds are full of native pond species (particularly red shrimp, *opae' ula*). The key to the maintenance of these high nutrient ponds in such a healthy condition is the maintenance of the natural populations of plants and animals within the ponds.

Nitrate levels are very low ( $<0.5 \mu\text{M}$ ) in both ponds. The near absence of these inorganic nutrients in the ponds suggests substantial uptake by benthic plants and plankton within the ponds. In the nearshore marine environment, concentrations of these nutrients range between  $2 \mu\text{M}$  and  $6 \mu\text{M}$ , with highest levels in areas with greatest groundwater seepage, which provides a natural nutrient source. Concentrations of ammonium ( $\text{NH}_4^+$ ) generally increase moving seaward across both ponds ( $0.05 - 0.50 \mu\text{M}$ ), and peak in the nearshore ocean (approximately  $0.7 \mu\text{M}$ ). The concentration of inorganic phosphorus ( $\text{PO}_4^{3-}$ ) in all pond samples was greater than for nitrate and nitrite.

Organic forms of nitrogen and phosphorus (DON and DOP) are present in substantially higher concentrations than inorganic forms in both ponds. Furthermore, levels of these nutrients are 3-6 times greater in Aimakapa pond than in Kaloko pond, which has levels similar to the nearshore marine water. There is a high rate of decomposition and insufficient organisms that can use these organic nutrients. In addition, the residence time of water in Aimakapa Pond appears to be far longer than the nutrient cycling period, resulting in the continual buildup of organic materials.

Based on the assumption that wastewater effluent would be treated, either by connection to the County's WWTP or in the interim by an enhanced septic system, the proposed project is projected to elevate the nutrient concentration (both nitrogen and phosphorus) by less than one percent in the groundwater moving under the southern half of the National Park (see Section 4.2.2.2.1, above). The very slight nutrient increases are within the natural variability of the system and will not result in significant changes to the biota of the ponds or nearshore ocean.

#### *Sedimentation: Impacts and Mitigation*

A potential mechanism for negative impact to nearshore marine and pond systems is

increased sedimentation from surface runoff and wind as a consequence of grading and changes in land use. Increased sedimentation in the surface water bodies makai of the proposed project is highly unlikely for two reasons. First, surface water runoff has rarely, if ever, been observed in the area due to the highly porous nature of the underlying basalt. Second, thermal convection from solar heating of the land mass produces wind that predominantly blows inland. This would transport most project-related dust away from coastal areas. It is important to note that the Petition Area is separated from the ponds and the coast by 3,000 feet of nearly flat lava fields and that stormwater runoff will be required to be contained onsite. It is thus highly unlikely that measurable amounts of sediment would reach these surface water bodies. Any small additional inputs of sediment from construction activity are not likely to affect organisms in that area, thus no mitigation measures are necessary to reduce sedimentation.

*Total Project Impact on Flow Rates, Salinity, Nutrients and Aquatic Biota*

As discussed above, based on the mitigation measures to be implemented by Lanihau, the effects of alterations in flow, salinity changes, sedimentation, and nutrients are expected to be within the tolerance of the existing ecosystem. It is therefore unlikely that project-related changes in these factors would impact aquatic biota in Kaloko and Aimakapa Ponds. As for nearshore waters, mixing with ocean water will almost immediately transform the groundwater, which will have undergone relatively minor changes in salinity and nutrient levels, to a composition completely within the range of normal ocean water in Kona. There is therefore no reason to expect that project related alterations of groundwater flow, salinity, sediment or nutrient levels will lead to adverse water-related impacts upon the nearshore or marine environment or any particular species.

Impacts to aquatic birds inhabiting or using the ponds of the National Park are also expected to be minimal. As birds were investigated as part of the faunal report commissioned for the Petition Area, they are discussed in Section 4.2.5, below.

4.2.2.2.3 Potential Impacts from Toxic Substances and Mitigation

4.2.2.2.3.1 Potential Impacts from Toxic Substances

A variety of chemicals that have adverse impacts on the health of plants, animals, humans even at fairly dilute levels are classified as toxic substances. Toxic substances include petroleum-based hydrocarbons, synthetic organic compounds found in pesticides, heavy metals, and radioactive substances. Toxic substances are often constituents of very commonly used substances such as gasoline, household cleaning fluids, weed-killers, and batteries, and they can enter sensitive waters through improper handling and disposal. Biologists and health specialists have studied the effects of many such toxic substances

and determined levels below which there appears to be little risk in terms of mortality or health. The U.S. Environmental Protection Agency and the Hawai'i State Department of Health maintain lists of such standards and regularly sample drinking water wells and some ponds, streams and coastal waters to guard against these often invisible menaces to human health and natural ecosystems. Toxic substances are often removed from or neutralized in surface or groundwater or soil through treatment or natural bioremediation.

In order to address potential impacts from toxic substances entering the groundwater, an engineering firm specializing in toxic substances was commissioned to prepare an evaluation of potential hazard and recommend mitigation measures to avoid or minimize such risks. The report is attached as Appendix 5, and is summarized below. The assessment focused on potential effects of industrial pollutants on the underlying groundwater and the ponds. The following were assessed:

- Types and magnitudes of releases of potential contaminants.
- Characteristics of the subsurface environment and effects on migration, retardation, and subsurface remediation of potential contaminants.
- Characteristics of potential contaminants and effects on the likely fate of the contaminants in the subsurface environment.
- Based on the above, analytical assessment, using qualitative analytical modeling, of likely environmental fate of potential contaminants with regard to subsurface migration, retardation, and remediation.
- Comparison of the results of analytical assessment with available groundwater monitoring results.

#### *Potential Contaminants Based on Allowable Land Uses*

The most likely releases to the environment from the type of land uses planned for the proposed business park are petroleum or petroleum-based products, including gasoline and diesel fuels, motor oil, and solvents. Release would most likely occur when non-point source accumulations — such as relatively small quantities of residues on parking and maintenance areas — are washed by rainfall and percolate into the subsurface. Because such residues are exposed to air and the sun, they typically undergo significant evaporation and biodegradation during the course of accumulation. Most of the chemical pollutants that are typically mobile in the subsurface environment are therefore actually removed prior to washoff and percolation.

A release from a subsurface or surface petroleum storage tank could pose a significant threat, but would be unlikely under current environmental controls and regulations. Nevertheless, this assessment includes a hypothetical "worst-case" analysis of just such an event.

Underground storage tanks (USTs) could be found at gas stations, contractor yards, and light manufacturing facilities. A large food manufacturing facility may also store vegetable oils. There would typically be only limited use of USTs in the type of industrial/commercial development envisioned for the Kaloko-Honokohau Business Park. At the neighboring Kaloko Industrial Park, records indicate only four USTs, all used for gasoline and diesel. According to the State Department of Health (DOH) UST Section, a 1,000-gallon tank had been leaking and was removed in 1998, and was cleaned up to DOH's satisfaction.

Both underground and surface storage of petroleum are strictly regulated by federal and State laws. The requirements for monitoring of storage tanks and the requirements for spill prevention control and countermeasures (SPCC) plans make it highly unlikely that large releases would occur without containment. The worst case scenario would be the rapid release of a tank's entire petroleum volume, typically 5,000 to 10,000 gallons, followed by rapid percolation into the subsurface environment.

*Hydrogeologic Characteristics of the Subsurface Environment.*

The ground surface in the Petition Area consists of thin-to-no-soil over basaltic lava flows. As a result there is a very high rate of water percolation which results in no surface runoff even during intense rainfalls. All rainfall either evaporates or enters the subsurface regime. With the combination of high infiltration rates and a highly permeable subsurface, groundwater flow is characterized by high rates of flow and high flow velocities, generally towards the ocean. Fresh water tends to become somewhat mixed with salt water and flows towards the ocean as a thin lens overlying the salt water.

The subsurface regime is highly conducive to the flow of single phase fluids such as air and water. Lava flows generally are bedded at a slope which approximates the surface slope of the parent volcano, in this case Hualalai. Clinker zones, consisting of highly porous and permeable gravel, are often found between very recent lava flows. With depth and age, the clinker zones tend to become more compressed and weathered. As the volcano gets older, lava flows become sufficiently infrequent that thin soil layers may form between lava flows. However, the frequency of Hualalai eruptions is likely sufficient to have prevented significant formation of soil between lava flows.

The geologic bedding slopes downward towards the ocean and tends to preferentially direct groundwater flow seaward. The hydraulic gradient is also towards the ocean, as landward sources of groundwater, primarily inland rainfall, flow seaward.

Air moves rapidly within the subsurface rock in the zone above the water table because of the high permeability of the basaltic rock and clinker zones. Air plays an important role

in evaporating volatile organic constituents and degrading less volatile constituents. Unlike many subsurface soil regimes, where the lack of oxygen produces anaerobic conditions unsuitable for petroleum degradation, the naturally rapid flow of air in the subsurface of the Petition Area means that the availability of oxygen generally would not constrain subsurface degradation of petroleum.

Subsurface movement of petroleum hydrocarbons is much more complex than the flow of groundwater or air. Petroleum is generally immiscible (does not blend) with water with the exception of the soluble constituents of petroleum hydrocarbons. When found together, petroleum and water tend to form separate phases of flow. The flow down to the groundwater table is an example of a multi-phase flow consisting of simultaneous petroleum, air and water flow. Upon reaching the groundwater table, petroleum tends to flow laterally on top of the groundwater. Because air is always present near the top of the groundwater surface, the flow remains a multi-phase flow of air, water and petroleum.

Petroleum flow is inhibited in this subsurface regime for a number of reasons:

- (i) Water has preferential wetting characteristics over petroleum, and petroleum therefore tends to flow more slowly than water; i.e. the petroleum has a greater tendency to adsorb to the rock and gravel it is moving through than does water.
- (ii) The presence of air near the groundwater/air/petroleum interface tends to inhibit the flow of both water and petroleum at and near the interface. The permeability of a porous medium for a particular fluid is generally lowered in the presence of air.
- (iii) The high tidal reaction of the groundwater regime tends to move the floating petroleum hydrocarbons up and down resulting in a relatively large "smear" zone at the groundwater surface. More petroleum is left adsorbed to the rocks and gravel within the smear zone. This also further exposes the petroleum to air and promotes volatilization and degradation.
- (iv) The downward bedding which facilitates groundwater flow actually inhibits petroleum flow. Bedding planes intersect the groundwater table and petroleum, which generally can only flow laterally along the water table and cannot flow downward along the bedding plane, has a tendency to become trapped in pockets where relatively solid basalt intersects the water table. Typically, an 'a' basalt formation consists of 25-50% solid basalt, with some fracturing, interlayered with clinker zones.

*Contaminant Migration Characteristics*

Petroleum products are complex mixtures of hydrocarbons. Each constituent in a petroleum mixture has different physical and chemical characteristics that control its behavior in a soil system. Fleischer et. al. (1986) studied 13 specific compounds chosen because of their presence in petroleum products, their tendency to be released to the subsurface environment, and their potential toxicity, using the computer simulation model SESOIL (Seasonal Soil Compartment Model) (Table 4-2). Modeling results indicated that the petroleum hydrocarbon constituents could be grouped into four categories based on their environmental fate tendencies, as shown in Table 4-2.

**Table 4-2  
Migration Pathways for Representative Petroleum Hydrocarbon Constituents**

<b>1) Adsorb to Soil Particles</b>	<b>2) Volatilize in Air</b>	<b>3) Solubilize in Groundwater</b>	<b>4) Multiple Pathways</b>
Benzo (a) Pyrene	(n) Hexene	Phenol	Benzene
Phenanthrene	(n) Heptane		Ethylbenzene
Benz (a) Anthracene	(n) Pentane		Napthalene
	1-Pentene		(o) Xylene

Source: Fleischer et al. 1986.

*Results of Analytical Assessment of Potential Petroleum Hydrocarbon Release*

In order to determine the effects of a hypothetical "worst-case" spill, the release of up to 10,000 gallons of petroleum hydrocarbon in a single event was assessed, based on the specific subsurface hydrogeology and petroleum hydrocarbon characteristics (See App. 5 for details). The spilled material would undergo a convoluted migration towards the water table, during which there would be lateral spreading of the hydrocarbons on top of hard basaltic rock layers, combined with relatively direct vertical movements through fractures and interlayered clinkers. The relatively high ground surface elevations would enable the unsaturated zone to absorb the bulk of a potential hydrocarbon release. Accounting for the elevation of the site and various factors related to the underlying geology, it was calculated that even minimal lateral spreading would result in essentially *the entire amount of a 10,000 gallon release* being adsorbed by the 80 feet of rock and gravel above the water table, most likely in the upper zones of the 80-foot column.

Upon adsorption to rock and gravel surfaces, the hydrocarbon would be subject to natural remediation due to volatilization and biological degradation. The high permeability of the basaltic formations would enable ready access to air and moisture which would promote volatilization and biological activity.

*Adsorption and Degradation of Hydrocarbon in the Capillary Fringe*

The analysis presented in the above section indicates that a "worst case" release of 10,000 gallons of gasoline would likely be essentially entirely contained within the unsaturated zone, where it would be subject to volatilization and biological degradation. In this section, the possibility that some of the hydrocarbons migrates to the water table is examined (See App. 5 for details). Considering the adsorption, volatilization and degradation processes discussed above, a worst-case value of 10% of the total release (1,000 gallons) reaching the water table is assumed.

The width of the hydrocarbon plume floating on the water table would widen as it migrated towards the shoreline, at approximately the same rate as the migration distance. Considering the geological and hydrological setting, the area required to enable complete adsorption of the gasoline within the smear zone formed by the tidal fluctuations can be calculated. The tidal fluctuations measured in wells in the area range from approximately 0.5 to 1.0 feet, in response to a tidal range of approximately 2.5 feet measured at Honokohau Harbor (App. 3). For a smear zone ranging from 0.5 to 1.0 feet, 1,000 gallons of gasoline would be contained within a lateral migration distance of under 400 feet, which would contain the hydrocarbons within the subsurface beneath the Petition Area itself or within a few hundred feet makai of the Queen Ka'ahumanu Highway. The ponds of the National Park, which are located 2,000 feet from the highway, would very likely not be affected.

Furthermore, the hydrocarbons contained within the smear zone would be subject to extremely rapid degradation due to the presence of air and groundwater, which would promote high rates of biological activity.

*Comparison of Analytical Assessment with Groundwater Monitoring Data*

The above analytical assessment primarily applies to Categories 1, 2, and 4 of the petroleum hydrocarbon constituents listed in Table 4-2, i.e., petroleum constituents which tend to adsorb to soil, volatilize in air, or those with multiple pathways.

The third category of constituent, those that solubilize in groundwater, i.e., phenol, would migrate relatively rapidly with groundwater. A study was conducted by the USGS (Oki, et al., 1999) in cooperation with the National Park Service, which included groundwater monitoring of three wells downgradient of the existing Phases I and II of the Kaloko Industrial Park. One of the purposes of the study was to describe the concentrations of trace metals and organic contaminants from three wells in the National Park (see Fig. 4-1). A large number of chemical constituents were tested for, including trace metals,

volatile organic compounds, semi-volatile organic compounds, and organochlorine and organophosphate pesticides.

The full results are presented in Table 4 of Appendix 5. In summary, testing of three downgradient wells and one upgradient well did not detect any of the petroleum constituents with the exception of trace levels of phenol. It is important to note that phenol was detected at levels approximately 20,000 times lower than EPA standards for cleanup of drinking water, also much lower than State of Hawai'i water quality standards. The effects of phenol on anchialine ponds and coastal resources have not been assessed.

The testing did not indicate the presence of any other organic constituents, although approximately 130 organic constituents were tested for. Two trace metals were detected, but as these were also found in an upgradient well, they are believed to be derived from the natural decomposition of volcanic materials.

The presence of phenol indicates that at least some petroleum hydrocarbons have been released during the approximate 15-year history of the Kaloko Industrial Park. Although phenol can be found in many industrial products, the use and storage of petroleum based fuels, oils, solvents, or pesticides is the most likely source of a phenol release from the existing industrial park.

The presence of phenol and the absence of other petroleum hydrocarbon constituents would appear to be a validation of the analytical assessment of the environmental fate of released petroleum hydrocarbons described in Appendix 5. The presence of phenol - and no other organic constituent - indicates that some petroleum hydrocarbon has likely been released to the environment, but all but the most soluble constituent, phenol, has been retained and likely naturally remediated within the subsurface environment in the vicinity of the existing Industrial Park. The very low levels of phenol are also indicative of the very active subsurface environment which promotes the degradation of such organic compounds.

#### 4.2.2.2.3.2 Mitigation for Potential Impacts from Toxic Substances

The proposed development will be limited to light industrial and industrial-commercial activities, limiting potential sources of contaminants. Also, today's strict environmental controls and regulations effectively limit the likelihood of contaminant releases.

Of primary importance in limiting potential contamination are adherence to applicable laws and regulations and implementation of appropriate Best Management Practices (BMPs). The following summarizes laws, regulations and BMPs (App. 5 has extended discussion).

*Petroleum Products Laws, Regulations and BMPs*

Storage of petroleum in underground or aboveground tanks is strictly regulated by the State Department of Health (DOH) and the federal Environmental Protection Agency (EPA). DOH has adopted new State Underground Storage Tanks (UST) rules (Hawai'i Administrative Rules [HAR] §11-281). A permit is required for installation of a UST in Hawai'i. Once the UST is installed, a completed Certificate of Underground Storage Tank Installation must be submitted to DOH's Underground Storage Tank Section.

Management practices for the control of petroleum releases from USTs are included in the UST regulations. The rules contain requirements for performance standards for USTs, installation of USTs, notifications and permits, spill and overflow control, release detection, release reporting, investigation and confirmation, release response action, and closure. These required management actions have been made part of the rules to protect the environment from releases from USTs. The Business Park's Conditions, Covenants and Restrictions (CC&Rs; see *Additional Mitigation Measures* below for discussion of CC&Rs) will specify that prior to installation of any USTs, owners and lessees shall consult applicable State and Federal regulations and comply with requirements. The following management practices are examples from applicable State and Federal regulations:

- Each UST and any piping that routinely contain regulated substances must be properly designed, constructed and installed, and any portion underground that routinely contains product must be protected from corrosion. All USTs/piping must meet strict, specific construction requirements, and owners/operators must maintain records that document and demonstrate compliance with the requirements for the life of the USTs/piping.
- Spill and overfill protection equipment is also required for USTs, such as spill catchment basins, automatic shutoffs, operator alerts and alarms, secondary containment features, external liners, flow restrictors, and release detectors.
- In addition, tanks and piping must be monitored at least every thirty days for releases by gauging, vapor monitoring, or other approved methods. Piping that conveys regulated substances under pressure must be equipped with automatic line leak detectors, which must be tested every 12 months.
- Owners/operators of USTs or tank systems must keep and maintain records demonstrating compliance with all applicable release detection

requirements. Owners/operators of USTs or tank systems must notify the DOH within 24 hours if there is evidence of release, unusual operating conditions that might indicate a release, or if monitoring indicates a release may have occurred. Upon confirmation of a release, or after a release from the UST or tank system is identified in any other manner, owners and operators must report the release to DOH, and then, within 24 hours, identify and mitigate any safety hazards (such as fire, explosion, and vapor hazards), take necessary actions to prevent any further release, and take necessary action to minimize the spread of contamination. The owner/operator of USTs or tank systems is also obliged to perform a variety of cleanup and monitoring actions afterwards.

- The regulations provide guidance for closure of tanks that are not in service, to prevent releases from such tanks. Owners and operators of USTs or tank systems must perform a site assessment in permanently closing or changing the service of an UST or tank system. Before permanent closure or a change-in-service is completed, owners and operators must measure for the presence of a release of regulated substance where contamination is most likely to be present at the UST or tank system site.
- Spill Prevention Control and Countermeasures Plan (SPCC) plans may also be required by the EPA of facilities that store petroleum, under Clean Water Act regulations. The Best Management Practice for prevention of discharge of oil to navigable waters and adjacent shorelines is the preparation and implementation of an SPCC plan, as described in Code of Federal Regulations (CFR) Title 40, Part 112. These required management actions have been made part of the federal regulations to protect the environment from releases from certain facilities. The plans may include detailed specifications for containment and/or diversionary structures or equipment to prevent discharged oil from reaching a navigable water course, sorbent materials, facility drainage, tank specifications, testing, loading and unloading protocol, inspections, security, and many other elements of the facility. The Business Park's CC&Rs (see *Additional Mitigation Measures* below for discussion of CC&Rs) will specify that prior to installation of above-ground or under-ground storage tanks, owners and lessees shall consult applicable State and Federal regulations related to SPCC plans and comply with requirements.

*Stormwater Runoff/Underground Injection Wells Laws, Regulations and BMPs*

Under State and County laws, any stormwater must be disposed of onsite. A system of collecting surfaces and channels will funnel drainage into storm water injection wells that will dispose of this collected runoff.

Injection wells are regulated under the Safe Drinking Water Act, and in Hawai'i are administered by the State's Safe Drinking Water Branch (SDWB) under HAR §11-23, "Underground Injection Control".

Injection wells are categorized by the State by the type of fluids injected into the well and the aquifer characteristics. According to DOH's UIC Map for Keahole Point quadrant, the site is located below the UIC line and, therefore, the underlying aquifer is "exempt". Injection wells at the site would, therefore, be classified as Subclass AB (injection wells which inject only into exempted aquifers), category B (industrial disposal wells).

The Best Management Practices for prevention of contamination for injection wells consist of certain practices for construction and operation of the injection well. These practices have been made part of the regulations to protect groundwater from contaminated injection well effluent. Prior to the installation of injection wells, the party proposing the well shall consult applicable State and Federal regulations and comply with requirements. The following management practices were extracted from applicable State regulations:

- An injection well shall be designed for its intended use, in accordance with good engineering practices. If a large void, such as a lava tube or solution cavity, is encountered during drilling, measures shall be taken to prevent unacceptable migration of the injected fluids. For the proposed project, Lanihau additionally commits that if a large void is encountered during drilling, where the drill rod drops more than three feet, measures shall be taken to prevent migration of the injected fluids to the Kaloko-Honokohau National Park to the satisfaction of the Hawaii State Department of Health as described in HAR §11-23-09(f).
- The operator of injection wells, as specified in HAR 11-28, must keep detailed records of the operation of the well, which, depending on the type of fluids discharged, may include the type and quantity of injected fluids, and the method and rate of injection for each well.
- Government officials may require an abandoned well to be plugged in a manner that will prevent detrimental movement of fluids between formations. The DOH may order an injection well to be plugged and abandoned when it no longer performs its intended purpose, or when it is determined to be a threat to the ground water resource.
- Permits are required to construct, operate, modify or abandon an injection well.

In addition, it is recognized that laws and regulations related to non-point source polluted runoff are changing. The State of Hawaii, through its Coastal Zone Management (CZM) Program is developing a "Coastal Non-Point Pollution Control Program" in accordance with EPA's Guidance Document for compliance with Section 6217 of the Coastal Zone Act. Improved Best Management Practices may result from adoption of new standards. The National Pollutant Discharge Elimination System (NPDES) permit, which is also anticipated to be necessary for the Business Park because of the area required to be graded, is also being revised and strengthened. Lanihau is committed to containing, treating, and disposing of runoff in accordance with applicable regulations and BMPs in order to minimize the possibility of industrial pollutants reaching the groundwater such that they violate State water quality standards.

#### *Hazardous Waste*

Due to the nature of permitted uses in MG and MCX districts, hazardous waste issues are anticipated to be minimal and hazardous waste releases would be unlikely to migrate to groundwater and impact the ponds. However, some waste oil or other petroleum product may be regulated as a hazardous waste, so the applicable regulations are discussed below.

Generators and transporters of hazardous waste are regulated under the federal Resource Conservation and Recovery Act (RCRA). Light manufacturing and processing facilities may generate hazardous waste. As an example, one facility at the current Kaloko Industrial Park, Costco Wholesale, is listed as a RCRA large quantity generator. According to a Costco manager, Costco conducts silver recovery as part of their one-hour photo processing, and the silver is removed from the site as waste in compliance with RCRA.

All wastes defined as "hazardous" are regulated under HAR §11-260 to §11-279. Hazardous waste is defined to include all solid wastes or combination of solid wastes or combination of solid wastes which may: (1) cause or significantly contribute to an increase in mortality or an increase in a serious or irreversible or incapacitating reversible illness; or (2) pose a substantial existing or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed. HAR §11-261 further identifies the characteristics of hazardous waste.

The rules establish standards applicable to generators, transporters, treatment, storage or disposal facilities, and persons who deal with hazardous waste fuel. These standards are, in effect, Best Management Practices for hazardous waste facilities. The standards include operating practices, record keeping requirements, corrective action plans and other standards. In the event of a hazardous waste release from a facility that handles

hazardous wastes, the facility may be required to take response actions, including corrective measures which are necessary to protect human health or the environment.

Due to the nature of the MG and MCX land uses, it is not anticipated that hazardous waste treatment, storage, or disposal facilities will be located in the proposed business park. The Business Park's CC&Rs (see *Additional Mitigation Measures* below for discussion of CC&Rs) will specify that owners and lessees shall consult the applicable State and Federal regulations in regard to hazardous waste activities and comply with all applicable requirements.

Hazardous wastes management regulations and practices concentrate on tracking, containerizing, and monitoring. The following discussion of practices was extracted from applicable State and federal regulations for generators of hazardous wastes.

- An owner/operator must not generate, transport, or offer for transportation, hazardous waste without having received an EPA identification number, using EPA form 8700-12 "Notification of Regulated Waste Activity".
- The regulations also contain a number of limits for accumulation times and quantities. Facilities that exceed the limits may be considered storage or treatment facilities, triggering a number of additional requirements.
- A number of other regulations regarding transportation and manifesting requirements for generators of hazardous waste are described in HAR §11-262. Before transporting hazardous waste or offering hazardous waste for transportation off-site, a generator must package, label, and mark the waste according to applicable Department of Transportation (DOT) regulations.
- Under some circumstances, the generator must have available at least one employee either on premises or on call, with the responsibility for coordinating all emergency response measures. The generator must ensure that all employees are thoroughly familiar with proper waste handling and emergency procedures relevant to their responsibilities during normal facility operations and emergencies. The emergency coordinator or designee must respond to any emergencies that arise.
- In the event of a fire, the fire department must be called and an attempt made to extinguish the fire using a fire extinguisher. In the event of a spill, the flow of hazardous waste must be contained to the extent possible; as soon as is practicable, the hazardous waste and any contaminated

materials or soil must be cleaned up. In the event of a fire, explosion, or other release which could threaten human health outside the facility or when the generator has knowledge that a spill has reached surface water, the generator must immediately notify the federal National Response Center and the Hawai'i Department of Health's Hazard Evaluation and Emergency Response Office, providing them with detailed information.

- Transportation of hazardous materials is regulated under HAR §11-263 (Hazardous Waste Management; Standards Applicable to Transporters of Hazardous Waste) and federal Department of Transportation Regulations: 49 CFR, Subchapter C - Hazardous Materials Regulations (Parts 171-177). The regulations describe the reporting, packaging, marking, labeling, and transport requirements for hazardous materials.

*Pesticides Laws, Regulations and BMPs*

Pesticides may be used at the site and may also be stored by plant nurseries or other authorized handlers. Pesticides are regulated by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). The licensing, sale and use of pesticides in Hawai'i are governed by the Hawai'i Pesticides Law. Although FIFRA places ultimate supervisory responsibility for uniform control of pesticides with the EPA, the State may regulate the sale or use of pesticide used intra-state and may regulate the sale or use of pesticides which are not prohibited by FIFRA. The Hawai'i Department of Agriculture (DOA) is responsible for the administration of the Pesticide Law, under HAR §4-66, "Pesticides".

Pesticides that are received, used, sold, offered for sale or distributed within Hawai'i must be licensed by the Board of Agriculture (Board). The application for the license must contain a description of the pesticide, a copy of the labeling, claims made for the pesticide including directions for use and information about the license. Any pesticide which is sold, distributed or transported in violation of the Pesticides Law or rules may be seized.

Best Management Practices for pesticides consist of using and applying them in a manner consistent with their labeling, or at a concentration, frequency or dosage less than that specified on the labeling. Pesticide containers must be stored, transported and discarded in a manner which does not have unreasonable adverse effects on the environment. The Business Park's CC&Rs (see *Additional Mitigation Measures* below for discussion of CC&Rs) will specify that owners and lessees shall consult applicable State and Federal regulations concerning pesticides and comply with requirements.

*Summary of Impacts and Mitigation for Toxic Substances*

Limiting potential contamination can be accomplished by adherence to applicable laws and regulations and implementation of appropriate Best Management Practices (BMPs).

Handling and storage of petroleum products, hazardous waste, and pesticides are all strictly controlled under State and federal laws. Businesses that deal with these substances are required under law to implement BMPs and are subject to oversight by federal and State agencies. Heavy fines and criminal prosecution can occur if these practices are neglected or not implemented correctly. The Business Park's Conditions, Covenants and Restrictions (CC&Rs) will contain a Pollution Prevention Plan emphasizing structural BMPs specific to each type of use expected in the Business Park, they will disseminate critical information about pollution prevention laws, regulations, and any further pollution prevention practices required for the area; and will establish an owners' association with power to oversee and report violations as a second line of defense against pollution violations.

Considering the structure of regulated practices set up to prevent contamination, the natural hydrogeologic setting which encourages rapid remediation of most substances that are spilled, and the excellent record of water quality as measured by monitored wells downslope from the existing Kaloko Industrial Park, there appears to be minimal risk of toxic substance contaminating ponds and nearshore waters, given standard mitigation measures as prescribed by law and regulation.

#### 4.2.2.2.4 Modified Alternative Impacts and Mitigation

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. The 12 percent reduction in developed area associated with the modified alternative would mean a corresponding reduction in water withdrawn from wells (about 10 percent at buildout) and cycled through the project area as wastewater or irrigation and other external uses. Stormwater from 12 percent of the developed portion of the Petition Area would also be less loaded with nutrients or contaminants as it initially penetrated the ground surface. The amount of nutrients expected from the full project would thus be reduced on the order of 10-12 percent, a reduction that would likely be undetectable, as would any effects on flow rates, salinity levels or contaminant levels.

#### 4.2.2.2.5 Additional Mitigation Measures

The philosophy of "The Precautionary Principle" was developed to address the inherent complexities of natural systems and the difficulties of predicting the effects of human activities on dynamic ecosystems. Lanikai fully embraces this principle and concurs with KAHO that if development raises threats of harm to the environment, cultural resources, or human health, precautionary measures should be taken to protect the environmental, cultural and natural resources, even if some cause and effect relationships are not fully established scientifically. A lack of scientific inquiry is cause for caution.

In light of a mutual acknowledgment of this principle and the goals of incorporating additional mitigation measures in the furtherance of that principle, Lanihau and KAHO have agreed to the following revisions to conditions of the TSA D&O related to wastewater, drainage, and Pollution Prevention Plans. Agreed upon revisions to the TSA conditions are shown in a Ramseyer format whereby new language is underlined and in bold and deletions are bracketed.

Wastewater

- 1a. The Petition Area shall be developed with dry sewer lines for eventual connection to the Kealakehe Wastewater Treatment Plant (WWTP).
- 1b. The Petition Area shall be required to connect to the WWTP, when such connection is available. The Petitioner, its successors, and assigns, shall collaborate with the County of Hawaii to include the Petition Area within an improvement district, if one is developed to fund the connection to the WWTP. The Petitioner or individual lot owners within the Petition Area shall pay for their fair share of the cost to fund such connection to the WWTP, whether or not an improvement district is established.
- 1c. **Except for the existing quarry operations and the construction of the roads and utilities as provided for below, the [The] Petitioner and/or any future owner(s) of the Petition Area shall refrain from constructing upon or occupying any portion of the Petition Area until such time as the portion (e.g., lot) to be constructed upon or occupied is connected to the WWTP, unless in the interim, the portion to be constructed upon or occupied has installed a septic tank system or other [ ,i.e.,] Individual Wastewater System (IWS) designed to remove no less than 60% Total Nitrogen from the treatment system (e.g., septic tank with FAST, Biofilter, Recirculation Filters, Sequential Batch Reactor, or comparable technology) and an absorption field of import material which is constructed in a manner [designed] to achieve no less than 80% reduction of nitrogen and 90% reduction in phosphorous; featuring adequate percolation rate. The existing quarry operation shall have in place an IWS as described above within one year of the date of issuance of the boundary reclassification. Installation is subject to conditions of approval dictated by the Director of the Hawaii State Department of Health and Hawaii Administrative Rules (HAR) Title 11 Chapter 62. When connection to the WWTP becomes available, all portions of the Petition Area, including all individual lots therein, shall connect to the WWTP, whether or not an interim wastewater treatment system has been installed.**

- 1d. Utilization of the IWS described above in Condition 1c ~~{(i.e., septic tank with FAST, Biofilter, Recirculation Filters, Sequential Batch Reactor, or comparable technology and an absorption field of import material which is designed to achieve no less than 80% reduction of nitrogen, featuring adequate percolation rate, and offering additional phosphorus removal)}~~ shall be limited to no more than ~~[45% of the individual]~~ **40** lots to be developed in the Petition Area.
- 1e. The owner of the IWS shall certify with the Hawaii State Department of Health that the IWS shall be operated and maintained in accordance with all of the provisions of the operation and maintenance manual developed pursuant to HAR 11-62. The certification shall include that upon the sale or transfer of ownership of the IWS, the sale or transfer will include the appropriate transfer documents and provisions *binding the new owner to the operation and maintenance manual.*
- 1f. Petitioner and/or each individual lot owner(s), shall develop and participate in a Wastewater Treatment System Maintenance Agreement, before constructing upon or occupying any portion of the Petition Area, that shall provide for safe and effective operation and maintenance of the treatment unit(s), whether shared or individual, and/or the temporary sewage line. **This Maintenance Agreement shall require a contract with a wastewater professional to regularly inspect, maintain and certify that the IWS unit(s) installed in the Petition Area are operating correctly. Necessary repairs shall be performed promptly and record of repairs shall be kept.** This requirement shall be included in the conditions of sale of any lot and/or parcel in the Petition Area.
- 1g. Should the National Park Service elect to pursue installation of a temporary sewage line to the WWTP for the Kaloko-Honokohau National Historic Park Visitor Center construction project, the Petitioner may elect, subject to prior authorization by the National Park Service, to dispose of wastewater from not more than 20 ~~[ one-acre ]~~ lots in the Petition Area, via such temporary line to the WWTP. In no event shall the temporary sewage connection be in place and utilized for longer than five (5) years from the date of completion of construction of such temporary line except at the sole discretion of the National Park Service. The Petitioner shall pay its fair share cost to fund such temporary connection to the WWTP, as determined by the National Park Service, the Petitioner and the County of Hawaii. When connection to the WWTP becomes available through permanent sewer lines, all portions of the Petition Area, including all individual lots that may have been connected to the above described temporary sewage line, shall connect to the WWTP through permanent lines, whether or not one or more lots were connected via the temporary sewage line. Connection of not more than twenty (20) ~~[ one-acre ]~~ lots to the WWTP via such temporary sewage line does

not release any other individual lots within the Petition Area from compliance with any other condition(s) of this decision and order.

Storm and Surface Water Runoff

- 2a. To the extent possible, all storm and surface water runoff shall be captured on the premises. To the extent possible, all runoff entering the ground shall be first treated to remove all industrial waste so that no industrial pollutants will reach the Kaloko-Honokohau National Park or enter the water table. Petitioner shall be subject to and prepare covenants, conditions, and restrictions for the Petition Area to contain spills and prevent materials associated with [tight] industrial uses attributable to the operations of property, including petroleum products, chemicals, or other pollutants from leaching or draining into the ground or subsurface storm drain collection areas. Said covenants shall be subject to the approval of the Hawaii State Department of Health, upon consultation with the National Park Service, and the County of Hawaii. The Petitioner and/or tenant shall obtain all required permits and construct required improvements for storm water discharge on and from the property. These conditions shall include the following:
- 2b. Except for uses permitted under the existing quarry permit, prior [Prior] to the occupancy of any part of the Petition Area, the Petitioner shall engineer, construct (or require to be constructed) and maintain surface water/storm water containment systems that ensure no State water quality standards will be violated.
- 2c. No injection well shall be constructed as an element of a surface water/storm water containment system in the Petition Area unless, prior to the start of any construction, appropriate requirements of HAR Chapter 11-23 are satisfied and the Hawaii State Department of Health issues an UIC (Underground Injection Control) permit. Contaminants shall be monitored and removed with best efforts prior to entering injection wells. Monitoring protocols for injection wells shall be established in the Pollution Prevention Plan, pursuant to Condition 3b. All monitoring records shall be maintained and made available to the State Department of Health, the County and the National Park Service, upon request.
- 2d. If a large void, such as a lava tube or solution cavity, is encountered during drilling, where the drill rod drops more than three feet, measures shall be taken to prevent migration of the injected fluids to the Kaloko-Honokohau National Park to the satisfaction of the Hawaii State Department of Health as described in HAR §11-23-09(f).

- 2e. All injection wells established in the Petition Area shall be operated in such a manner that they do not violate any of the Hawaii State Department of Health's administrative rules under title 11 HAR, regulating various aspects of water quality and pollution, and chapters 342-B, 342-D, 342-F, 342-H, 342-J, 342-L, and 342-N, Hawaii Revised Statutes (HRS). Relevant HAR include but, are not limited to:
- i. Chapter 11-20, "Rules Relating to Potable Water Systems";
  - ii. Chapter 11-62, "Wastewater Systems"; and
  - iii. Chapter 11-55, "Water Pollution Control".
- 2f. The operator of any injection well or wells in the Petition Area shall keep detailed records of the operation of the well or wells, including, but not limited to, the type and quantity of injected fluids, and the method and rate of injection for each well. Such records will be available for inspection or review by the Hawaii State Department of Health as specified under appropriate sections of HAR Chapter 11-28.
- 2g. Any person who violates any of these conditions shall be subject to penalties as prescribed in appropriate chapters of HRS and HAR as they relate to (but are not limited to): Potable Water Systems; Wastewater Systems; Water Pollution Control; Safe Drinking Water; and Underground Injection Control.
- 2h. The Petitioner, successors and/or individual lot owners in the Petition Area shall ensure that all drainage injection wells or subsurface drainage structures be designed with an appropriate size [a] debris catch basin to allow the detention and periodic removal of rubbish and sediments deposited by runoff. Storm water runoff shall first enter the debris catch basin before flowing into the drainage well. [~~The debris catch basin's volume should be at least two (2) cubic yards (or approximately 4'x4'x4').~~] The debris catch basin shall be periodically inspected and cleaned accordingly. Oil/water separators shall be utilized where petroleum products are used.
- 2i. The Petitioner shall establish an owners' association with the power to oversee and report violations as a second line of defense against pollution violations.

Pollution Prevention

- 3a. [~~Any~~] Petitioner currently operates a quarry in a portion of the Petition Area. Any further public or private industrial development within the Petition

Area which could be considered a new source of pollution or an increased source of pollution shall, in its initial project design and subsequent construction, provide the highest and best degree of waste treatment practicable under existing technology.

- 3b. **[Before] Except for the existing quarry operation and the construction of roads and utilities, before** constructing upon or occupying any portion of the Petition Area, a Pollution Prevent Plan (PPP), after consultation with the National Park Service, shall be developed that addresses each of the types of uses permissible in the [light] industrial park, by specifically designating Best Management Practices (BMPs) tailored to each specific use. Emphasis shall be given to structural BMPs to prevent any and all pollutants that may be associated with such industries from being released into the environment, including reaching the groundwater. Structural BMPs shall include, but shall not be limited to, oil/water separators, detention ponds, lined containment pits, and stormwater filtration units designed to contain and remove industrial contamination. The PPP shall include but not be limited to:
- i. All cleaning, repairs and maintenance of equipment involving the use of industrial liquids, such as gasoline, diesel, solvent, motor oil, hydraulic oil, gear oil, brake fluid acidic or caustic liquids, antifreeze, detergents, degreasers, etc. shall be conducted on a concrete floor, whether roofed or unroofed. The concrete floor shall be constructed to contain any drip or spills and to provide for the recovery of any spilled liquid. Water drainage from these concrete floors if necessary, shall pass through a separator sump before being discharged. **The PPP may identify exceptions to this rule under specific circumstances, provided that adequate alternative BMPs (structural or otherwise) are identified and utilized for containment.**
  - ii. Any containers used for storage of used oil or other industrial liquids shall be kept on a concrete surface. The surface shall be bermed to prevent the loss of liquid in the event of spills or leaks. The containers shall be sealed and kept under shelter from the rain. (The Department of Labor and Industrial Relations' Occupational Safety and Health regulations, sections titled, "Housekeeping Standards" and "Storage of Flammable or Combustible Liquids," shall be followed along with the local fire code.)
  - iii. All employees shall be informed to immediately collect and contain any industrial liquid spills on the concrete floor and should be informed against discharging or spilling any industrial liquids. Employees shall be aware to prevent any industrial spill onto the bare ground.

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~~[In the event that a specific use is proposed for the Petition Area that is not specifically addressed in the PPP, the Petitioner and/or the individual lot owner(s) proposing such use shall consult with the National Park Service to establish a set of BMPs appropriate for such proposed use and consistent with the goal of preventing any and all pollutants from being released into the environment.]~~ In the event that the Petitioner and the National Park Service cannot agree upon a mutually acceptable **final** PPP within 12 months of the date of issuance of the boundary reclassification, the Commission shall review the draft PPP, along with written comments from Petitioner, the National Park Service and the other parties, and shall issue a final PPP. In no event shall the Petitioner and/or individual lot owner(s) construct upon or occupy any portion of the Petition Area until such time as the final PPP is complete. The final PPP shall be recorded and shall run with the land within the Petition Area in the same manner as all conditions of approval imposed by the Commission. **In the event that a specific use is proposed for the Petition Area that is not specifically addressed in the final PPP, the Petitioner and/or the individual lot owner(s) proposing such use shall consult with the National Park Service to establish a set of BMPs appropriate for such proposed use and consistent with the goal of preventing any and all pollutants from being released into the environment.**

- 3c. The Petitioner, its successors or individual lot owners shall provide signage for all drainage/injection wells in the Petition Area with warnings such as the following: DUMP NO WASTES. GOES TO GROUNDWATER AND OCEAN. HELP PROTECT HAWAII'S ENVIRONMENT. Signage shall be either stand-up (legible from at least 30 feet, permanently posted at an effective and safe height) or painted on the ground next to the drainage well's inlet.
- 3d. For parking areas, BMPs will be established as covenants running with the land, which emphasize pollution prevention rather than treatment. All large vehicles such as buses, trucks or construction equipment shall utilize drip pans to avoid release of petroleum onto paved or graveled surfaces or, in the alternative, all parking areas for large vehicles shall include grassed or vegetative swales to capture drainage from such parking areas. Areas used primarily for automobile parking shall be periodically checked and cleaned to avoid build up of oil or other automotive fluids. **Protocol for cleaning parking areas shall be established in the Pollution Prevention Plan, pursuant to Condition 3b.** Maintenance work other than emergency work on vehicles will be banned in parking areas.
- 3e. Where site geometry permits, the Petitioner, its successors or individual lot owners shall design and construct (or require to be constructed) landscaped areas,

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including grassed or vegetative swales to capture storm water drainage from all perimeter lots, facilities, and parking areas of the Petition Area. For all vegetative swales, Petitioner and/or individual lot owners may apply only the minimum required nutrients (fertilizer) to maintain the vegetation without causing significant nutrient runoff, and the water used for irrigation purposes shall not exceed the amount necessary to maintain the vegetation.

- 3f. Owner or operator covenants developed for the Petition Area shall expressly disclose to all future individual lot owner(s) the existence of the National Park System Resource Protection Act, 16 U.S.C. Sections 1911-1911-4, and the consequences of violation of such act. In particular, future land owners shall be made aware that any person who destroys, causes the loss of, or injures any park system resource is liable to the United States for response costs and damages resulting from such destruction, loss or injury.
- 3g. The Petitioner shall participate and collaborate in a regional (Kaloko-Honokohau) pollution prevention forum to be convened by the Commission within one year from the issuance of this decision and order. [Intervenor] The National Park Service shall be invited as well. Topics to be discussed include: pollution prevention planning; best available control technologies (BACT); structural and operation BMPs addressed to the type of uses permissible in the [light] industrial park, and formulas for determining fair and reasonable pro-rata share costs relating to any ground water monitoring program. Participants in this forum should include but not necessarily be limited to individuals or entities with property or development interests impacting the Queen Kaahumanu Highway corridor extending from the Kona International Airport to the Palani Road intersection.

Groundwater Quality Monitoring

4. The Petitioner shall contribute its fair and reasonable pro-rata share of costs relating to a ground water monitoring program of USGS Wells 4161-01, 4161-02 and 4061-01, Aimakapa Pond, Kaloko Pond and two (2) other anchialine ponds of the Kaloko-Honokohau Historic National Park as identified by the National Park Service. Monitoring would continue once every six months for 10 years from initial occupancy, or until such time as sewer lines and hookup to the WWTP is implemented provided further that if McClean and TSA Dockets are amended to require a longer monitoring period, or the Petitioners otherwise agree to a longer monitoring period, the Petitioner shall be required to participate in the monitoring program for the stipulated period. Constituents to be monitored shall be of a full suite of nutrients (including nitrogen and

phosphate), contaminants (including metals, phenolic compounds, pesticides and pesticide breakdown products, chlorinated solvents, BTEX compounds, selected pharmaceutical endocrine disruptive compounds, such as ethinyl estradiol, and nonylphenol), and standard water quality parameters (including pH, temperature, dissolved oxygenates, and salinity). The fair and reasonable pro-rata share of costs will be determined by the Commission and in conjunction with the findings generated at the regional pollution prevention forum discussed above.

Permitted Uses

5. The Petitioner, its successors and assigns are prohibited from engaging in or allowing the following uses in the Petition Area: heliports, bulk storage of flammable and/or explosive materials (tank farms), landfills for dumping or disposal of refuse or waste matter (except for green waste/composting facilities), fertilizer manufacturing plants, junkyards, public dumps, saw mills, refining of petroleum products, slaughterhouses, commercial pesticide and/or extermination facilities, and power plants.

4.2.2.2.6 Potential Regional Cumulative Impacts and Mitigation

As discussed in Section 2.6, the proposed Kaloko-Honokohau Business Park is one of several existing and planned commercial-industrial developments adjacent to and upgradient of the Kaloko-Honokohau National Historical Park. Entitlements are currently being pursued for Phases III and IV of the Kaloko Industrial Park, and buildout of the adjacent Honokohau industrial developments will continue. Further urbanization in the area from Keahole-to-Kailua area will continue to occur.

In order to account for the effects of all these projects in the future, the hydrology study detailed in Appendix 3 assumed essentially full build-out in the Kaloko and Honokohau ahupua`a between Mamalahoa Highway and Queen Ka`ahumanu Highway. The study also assumed that all such developments would connect to the County sewage system and/or would adopt septic systems that removed the majority of nutrients from wastewater. Sources of potential long-term cumulative impacts on basal groundwater flowing through National Park could conceivably arise from various sources: groundwater withdrawals from wells/additions from external water uses; wastewater treatment and disposal; and subsurface stormwater disposal from roads and parking lots, along with spills or unauthorized releases associated with commercial/industrial uses.

The undeveloped area around and mauka of the Kaloko-Honokohau Business Park is likely to ultimately require 1.5 to 2.0 MGD of potable supply at full build-out. This will probably come from high-level wells mauka of Mamalahoa Highway. Based on the

results of modeling done by the USGS the flow rate beneath the National Park will be reduced between 0.2 and 0.3 MGD, or about 10-15 percent, from its current level. This will slightly increase salinity in basal groundwater. A portion of the water used for external purposes such as washing and landscaping will percolate to the basal lens and will have slightly elevated nitrogen and phosphorous loading, estimated at about 1 to 2 percent. The predicted reduction in flow rate and increase in salinity and nutrients are relatively modest and do not represent adverse impacts to the quality or quantity of groundwater, nor to the biota of the ponds and nearshore water.

In the long-term, projects of significant size and density are likely to be required to connect to the County's sewer system. Most of the wastewater conveyed to the County wastewater treatment plant (WWTP) will ultimately be treated to R-1 quality for irrigation reuse. Based on the County's present and long-term plans, irrigation reuse will occur around and directly mauka of the WWTP. Percolation of a portion of this reuse water to the basal lens, because of the location of its application, would not be likely to impact the water or biota of the ponds at or groundwater beneath the National Park.

As discussed in Section 4.2.2.1 above, percolating runoff from stormwater contains a small proportion of nutrients that, even after being combined with other projects in the area at full buildout, would result in increases of less than two percent for nitrogen and less than one percent for phosphorus. In other words, even considered cumulatively, stormwater would not increase nutrients in the groundwater in any appreciable amount; this slight increase would not materially impact the biological resources of the anchialine ponds and nearshore waters.

Other contaminants would certainly be present in initial stormwater from roads, parking lots, and industrial yards, with the most likely source of contamination area the industrial and commercial facilities of the type proposed for the Petition Area. Similar facilities are present at the adjacent Kaloko Industrial Park and the Honokohau industrial developments. As the belt of land mauka of Queen Ka'ahumanu Highway is being developed for commercial and industrial uses, the most likely releases to the environment from MG and MCX-zoned land uses are petroleum or petroleum-based products, including gasoline and diesel fuels, motor oil, and solvents. The most likely release form would be non-point source accumulations washed away by rainfall and percolated into the subsurface. However, due to a combination of anticipated minimal quantities of pollutants, use of proper BMPs and natural remediation processes, this potential source is unlikely to substantially affect area groundwater.

A release from a subsurface or surface petroleum storage tank - or releases from multiple areas - could pose more of a threat. Such releases are increasingly unlikely under current environmental controls and regulations. Both underground and surface storage of

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petroleum are strictly regulated by Federal and State laws. The requirements for storage tank monitoring and spill prevention control and countermeasures (SPCC) plans make it highly unlikely that large releases would occur without containment. If they did, the sub-surface geology, which is fairly uniform across the area in which these industrial/commercial uses are planned, would probably result in any release being adsorbed and contained by rocks and gravels before it moved significantly away from the Petition Area towards sensitive coastal waters. Even if some of the petroleum reached the groundwater, tidal fluctuations would create a smear zone where petroleum would be adsorbed and contained within a migration distance of a few hundred feet; i.e., close to Queen Ka'ahumanu Highway.

In general, planned developments in the area would be residential, commercial, light industrial, quarrying and quarry-related activities, agricultural, and government activities. In contrast to petroleum refining or chemical manufacturing sites, there are relatively limited sources of potential contaminants. Also, today's strict environmental controls and regulations effectively limit the likelihood of contaminant releases. Toxic substances can be limited to concentrations below the threshold of harm to human health or ecosystems by adherence to applicable laws and regulations and implementation of appropriate Best Management Practices (BMPs) for containment, transfer, use and monitoring of these substances. As stated above, businesses that deal with these substances are required under law to implement BMPs and are subject to oversight by federal and State agencies. Heavy fines and criminal prosecution can occur if these practices are neglected or not implemented correctly.

Considering the structure of regulated practices set up to prevent contamination, the mitigation measures such as those to be implemented by Lanihau, the natural hydrogeologic setting which encourages rapid remediation of most substances that are spilled, and the excellent record of water quality as measured by monitored wells downslope from the existing Kaloko Industrial Park, continued development of the entire region in accordance with the existing County plans (Section 4.2) would pose minimal risk of toxic substance contamination of ponds and nearshore waters, given mitigation measures as prescribed by law and regulation and imposed as part of the land use regulatory process.

At the same time, Lanihau acknowledges that development of a business park mauka of the Kaloko-Honokohau National Historical Park could possibly result in unanticipated impacts to park resources. Because of the lack of complete certainty concerning these possible impacts, appropriate mitigation measures have been proposed as part of this EIS. In addition, Lanihau understands that the Land Use Commission will require conditions similar to those developed as part of the recently approved Land Use Boundary Amendment for the adjacent Kaloko Industrial Park, Phases III and IV.

#### 4.2.3 Lava Flow and Earthquake Hazards

##### *Environmental Setting*

The entire Big Island is subject to geologic hazards, especially lava flows and earthquakes. The entire surface of Hualalai Volcano, on which the project is located, is classified as Lava Flow Hazard Zone 4 (on a scale of ascending risk 9 to 1). Zone 4 areas have had 25 percent of their surfaces covered by lava in the last 1,000 years. Hualalai last erupted in 1800-1801, covering land several miles north of the Petition Area. As such, there is minor risk of lava inundation over relatively short time scales (see Heliker 1990).

In terms of seismic risk, the entire Island of Hawai'i is rated Zone 4 Seismic Probability Rating (*Uniform Building Code*, Appendix Chapter 25, Section 2518). Zone 4 areas are at risk from major earthquake damage, especially to poorly-designed or -built structures.

##### *Impacts and Mitigation Measures*

In general, geologic conditions impose no constraints on the project. Although the project is located in an area exposed to geologic hazard, any development that could service the growing needs for urban uses in Kona must be located within such an area, and there are thus no reasonable alternatives. As required under County of Hawai'i regulations, all construction will conform with the provisions of the *Uniform Building Code* appropriate to the Zone 4 Seismic Probability Rating.

##### Modified Alternative Impacts and Mitigation

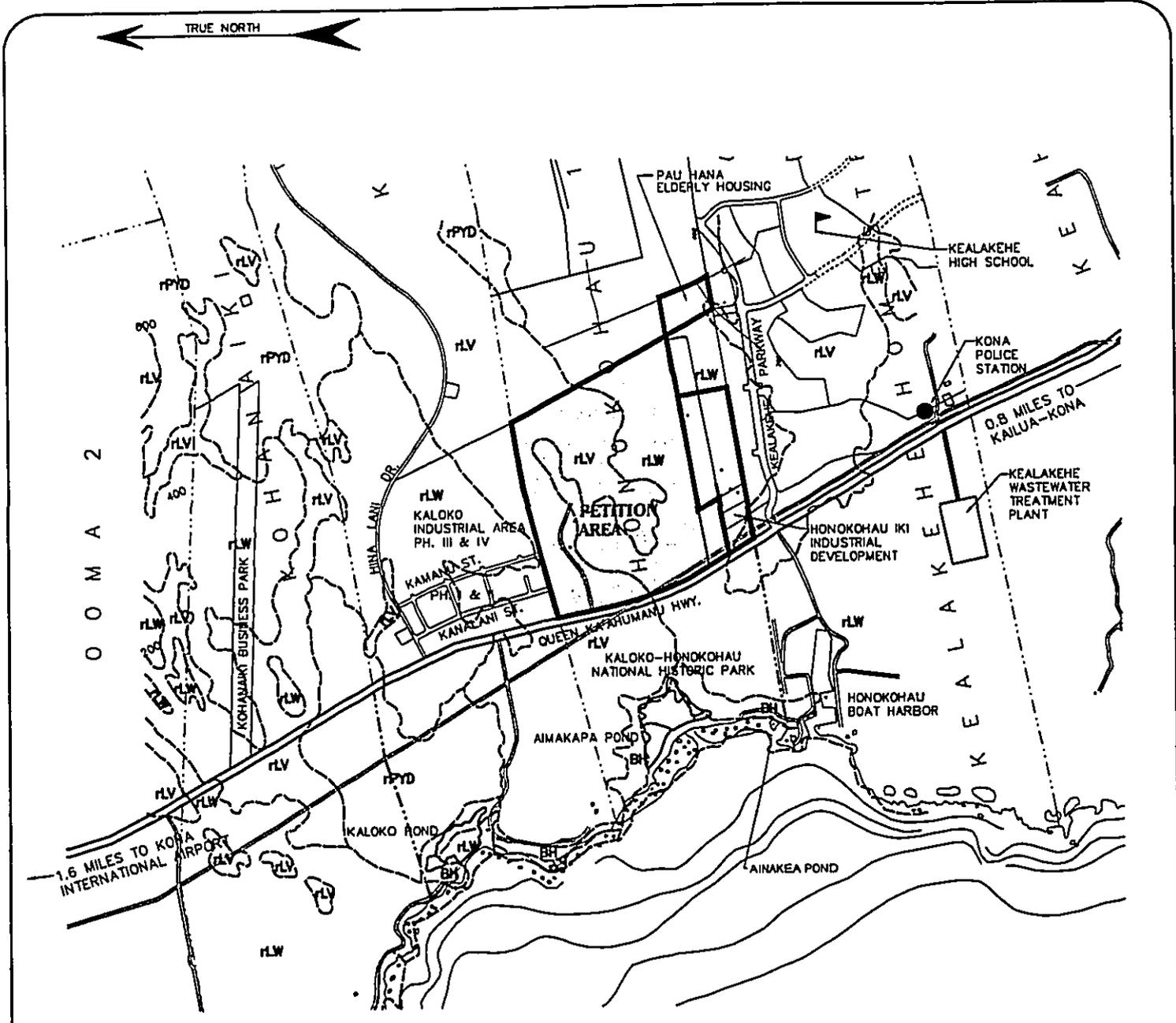
Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. As there is no substantial potential lava flow or earthquake hazard, and as the levels of these hazards are identical across the Petition Area, there would be no additional or different impacts under the modified alternative.

Secondary and Cumulative Impacts: The project would not tend to steer development into areas where geologic hazard makes it imprudent to live, work or travel. No cumulative risk or adverse effect is associated with the project and any other, or the sum of all other, developments or actions in the study area.

#### 4.2.4 Soils and Agriculture

##### *Environmental Setting*

Soil is minimal in the Petition Area, which is mapped by the U.S. Natural Resources Conservation Service as *Lava Flows, 'A'a and Pahoehoe* (USSCS 1973) (Fig. 4-2). The Land Study Bureau Maps for the area rate the land as "very poor for agriculture" in



LEGEND	
	PETITION AREA
rLV	LAVA FLOWS, 'A'A
rLW	LAVA FLOWS, PAHOEHOE
rPYD	PUNALUU EXTREMELY ROCKY PEAT
BH	BEACHES



### SOILS MAP

PREPARED FOR: LANIHU PROPERTIES  
 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE: U.S. SOIL CONSERVATION SERVICE

**KALOKO-HONOKOHOU BUSINESS PARK  
 HONOKOHOU 1ST & 2ND  
 NORTH KONA, HAWAII**

**FIGURE # 4-2  
 PAGE NO. 4-43**

Categories E319 (Bare `A`a) and E289 (Almost Bare Pahoehoe). (Fig. 4-3). Inventory maps of important farmland from the U.S. Natural Resources Conservation Service (USNRCS) show no lands in the Petition Area that are identified as Prime, Unique, or Other Important Lands in the Agricultural Lands of Importance to the State of Hawai`i (ALISH) map series.

#### *Impacts and Mitigation Measures*

Other than very limited ongoing grazing associated with the ranching activities further mauka, no valuable soils, agricultural land or farms are present in the study area. None are present in the Petition Area. No soils or farming operations would be adversely impacted by the project.

#### Modified Alternative Impacts and Mitigation

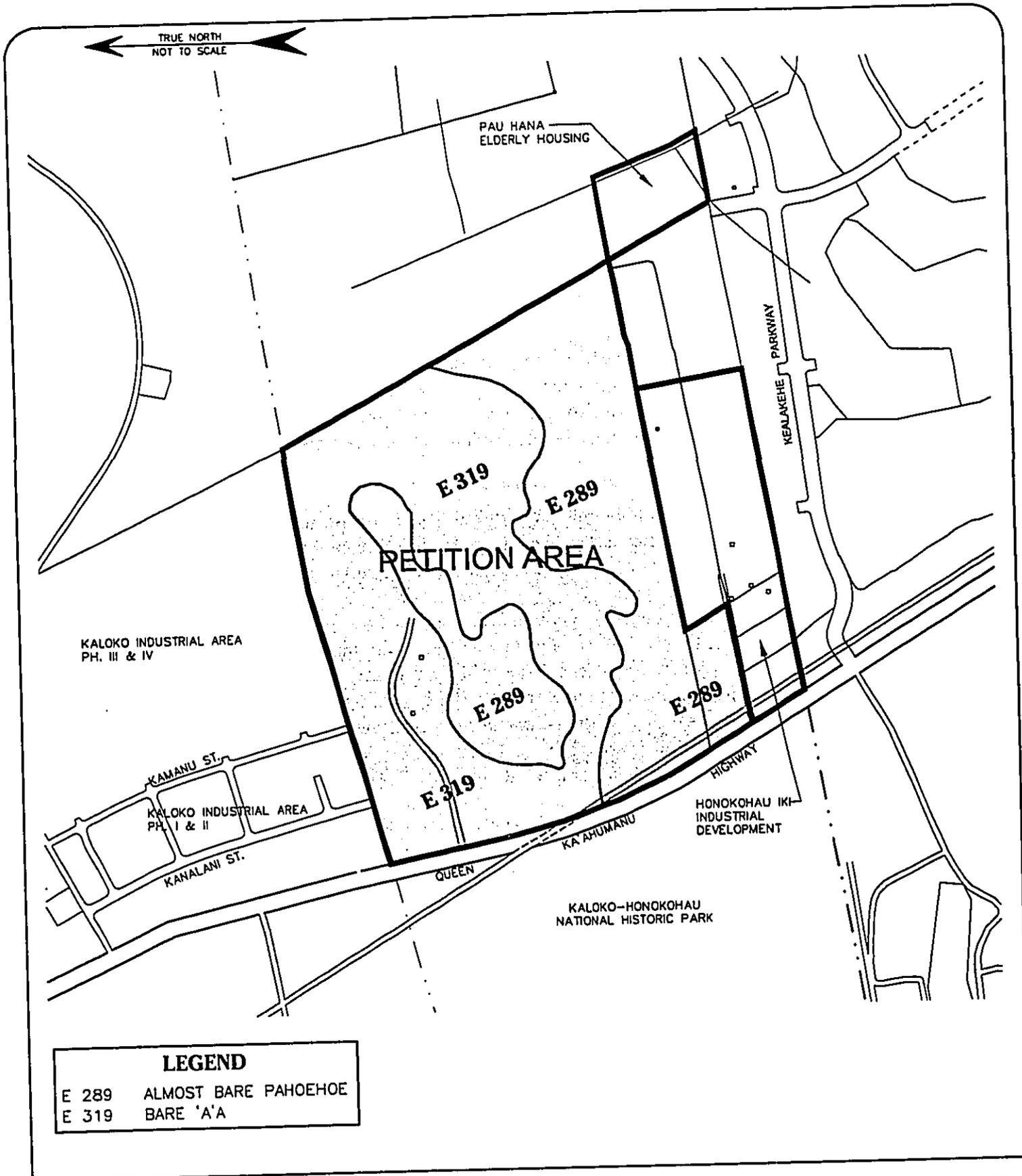
There are no differences in soils or Land Study Bureau ratings between Area D (the 45-acre piece that would not be developed under the modified alternative) and the remainder of the Petition Area. There would thus be no additional or different soil impacts under the modified alternative. Implementation of the modified alternative would allow grazing on the 45 acres that would not be developed, at least until such time, if any, that the land was converted to urban uses through a boundary amendment. This land is of very marginal value for grazing and would not appreciably benefit ranching operations, which are concentrated mauka in areas of better soils and rainfall.

Secondary and Cumulative Impacts: No adverse impacts to soil or agriculture would occur, and there would thus be no potential for adverse effects to accumulate with others. The project would not induce activities that would tend to cause secondary impacts to soil or agriculture on or offsite.

#### 4.2.5 Flora and Fauna

The botanical and faunal surveys commissioned for the project are attached in full as Appendices 6 and 7, respectively, and are summarized in this section. Aquatic life in the coastal waters and ponds that might be indirectly affected by project activity was also considered in the water quality investigations performed (see Section 4.2.2.2 and App. 4). The surveys focused on species that were rare and/or listed or proposed as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS). Direct impacts were analyzed, as well as secondary and cumulative impacts, particularly potential offsite effects resulting from increased fire hazard or changes in water quality.

The topic of water quality in the coastal waters and ponds with some potential to be indirectly affected by project activity is covered in detail in Section 4.2.2.2.



LEGEND	
E 289	ALMOST BARE PAHOEHOE
E 319	BARE 'A'A

## LAND STUDY BUREAU MAP

PREPARED FOR: LANIHAI PROPERTIES  
 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE: LAND STUDY BUREAU

KALOKO-HONOKOHAU BUSINESS PARK  
 HONOKOHAU 1ST & 2ND  
 NORTH KONA, HAWAII

FIGURE # 4-3  
 PAGE NO. 4-45

*Environmental Setting: Flora*

The natural vegetation of the study area was probably composed of one or more Lowland Dry communities, including forests, woodlands, shrublands and grasslands (Gagne and Cuddihy 1990). These original communities, however, have been destroyed or heavily degraded throughout much of the study area and the surrounding region. In the study area in general, native trees and shrubs such as `ohi`a (*Metrosideros polymorpha*), lama (*Diospyros sandwicensis*), wiliwili (*Erythrina sandwicensis*), `ohe (*Reynoldsia sandwicensis*), kolomona (*Senna gaudichaudii*), alahe`e (*Psydrax odoratum*), and naio (*Myoporum sandwicense*) may be prominent components of remnant patches of dry forests and shrublands. Several listed endangered species are known to exist in undisturbed portions of the Kaloko lava flow mauka of the Petition Area. It is important to note that these native communities and endangered species are not within the Petition Area.

As a result of its location in the lowlands and its history of use for ranching, industrial purposes, and roadways, the current vegetation of the Petition Area is composed of two communities dominated mostly by alien species (introduced to Hawai`i by man).

1) Quarry scrub vegetation covers the `a`a lava flow on the northern half of the property. Almost all of the `a`a flow has been bulldozed and disturbed at some time by the quarry operation. Where the flow is actively used by the quarry and other related businesses, there are few, if any, plants. Along the access road, the vegetation consists of scattered patches of mostly weedy vegetation on largely barren areas. Other parts of the `a`a flow support low, dense koa haole shrubs (*Leucaena leucocephala*) and fountain grass (*Pennisetum setaceum*).

Some native plants are found in patches of `a`a lava where the rough substrate has prevented heavy grazing. On the northeast corner of the property, there are a few clumps of `ohi`a lehua (*Metrosideros polymorpha*) trees. Three plants of a rare variety of ko`oko`olau (*Bidens micrantha* ssp. *ctenophylla*) are found just outside the northeast corner of the Petition Area

2) Koa haole shrubland occurs on the pahoehoe flows on the south half of the property. It is composed of koa haole shrubs, 4 to 6 feet tall, with a dense cover of fountain grass between the shrubs. Scattered through the shrubland are trees of kiawe (*Prosopis pallida*) and jacaranda (*Jacaranda mimosifolia*), as well as shrubs of Christmas berry (*Schinus terebinthifolius*), klu (*Acacia farnesiana*), maiapilo (*Capparis sandwichiana*), and noni (*Morinda citrifolia*). In a low lying area closer to the highway, the koa haole shrubs are taller and the kiawe and Christmas berry become more common.

*Impacts and Mitigation Measures: Flora*

The proposed development is not expected to have a significant negative impact on the botanical resources, since the site is dominated by introduced or alien species including koa haole, fountain grass, Christmas berry, and kiawe. No rare, threatened or endangered species occur on the site. All of the native plants which are found on the site can also be found in similar dry lowland environments in West Hawai'i and on most of the main Hawaiian Islands.

*Modified Alternative Impacts and Mitigation*

There is no difference in flora or fauna between Area D (the 45-acre piece that would not be developed under the modified alternative) and the remainder of the Petition Area, and there would be no additional or different biological impacts under the modified alternative. There would be no change in the fire risk to the surrounding areas, including the ko'oko'olau population outside of the northeast corner of the Petition Area. A proposed condition of approval provides for a thirty (30) foot buffer in or adjacent to the northeast corner of the Petition Area.

Secondary and Cumulative Impacts. Development of the project has some potential to increase the risk of fire, by introducing more human activity to the area, but it also has some potential to reduce the severity of fires, by replacing fountain grass with developed areas. There is a possibility that fires may begin in the Petition Areas and spread into areas containing the ko'oko'olau plants, outside the northeast corner of the Petition Area, or further mauka into areas of good native habitat on the Kaloko lava flow. In order to protect the valuable native plants in this area, the developer will preserve a protective buffer zone within the property setback of lots created in the northeast corner of the Petition Area.

The cumulative loss through regional development of the common native plants found in the Petition Area would detract only negligibly from the population of these species and would not affect the general health or makeup of areas in Kona with intact ecosystems. There would thus be no potential for adverse effects to accumulate with others.

*Environmental Setting: Fauna*

An ornithological and mammalian survey of the Petition Area was conducted in December 1999. The full report is attached as Appendix 7 and is summarized here.

The fauna currently found within the Petition Area and surrounding areas is dominated by alien species (introduced to Hawai'i by man). Only one live mammal, a mongoose (*Herpestes auropunctatus*), was sighted, but skeletons, scat or other sign of feral goats (*Capra h. hircus*), cattle (*Bos taurus*) and donkeys (*Equus a. asinus*) were also observed. It is also likely that Norway rats (*Rattus r. rattus*) (and possibly the Polynesian rat, *Rattus exulans hawaiiensis*), mice (*Mus domesticus*), dogs (*Canis f. familiaris*) and cats (*Felis catus*) utilize the area. The endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*) has been recorded from the general area in past faunal surveys and thus is likely to occasionally forage above the site. However, none were detected by this survey.

The study area in general is dominated by fountain grass and provides few resources for birds. It thus exhibits a low diversity and density of avian species, which has been exacerbated by drought conditions of the last few years. The birds found within the study area are predominantly introduced species, as is typical of most of the ecologically disturbed lowland areas of Hawai'i. A total of 15 avian species were detected during station counts. The most common species were House Finch (*Carpodacus c. mexicanus*), Zebra Dove (*Geopila striata*), and Japanese White-eye (*Zosterops japonicus*). All of the birds found are common throughout the leeward lowlands on the island of Hawai'i.

No endangered or threatened avian species were detected (Federal Register 1998; Hawai'i State DLNR 1986). It is possible that small numbers of the endangered endemic Hawaiian subspecies of Dark-Rumped Petrel (*Pterodroma phaeopygia sandwichensis*) may overfly the site between May and October. However, the distribution of the species has lately been reduced to a limited number of breeding colonies high on Mauna Loa and possibly Hualalai. Collision with utility structures as a result of disorientation by exterior lighting is considered the second highest cause of mortality for this seabird in Hawai'i.

The Petition Area is not considered to be essential habitat for any native terrestrial vertebrate species. There is no federally designated Critical Habitat for birds in/near the Petition Area.

The terrestrial invertebrate fauna of the study area, or for that matter of most of the island of Hawai'i, has not been systematically studied or completely described. No listed invertebrate species are known from the Petition Area or any directly adjacent areas.

#### *Existing Fauna in Off-Site Areas Potentially Impacted by Project Activities*

An indirect, offsite impact to native bird and aquatic invertebrate species could occur if sufficient contaminants migrate downslope from the Petition Area into Aimakapa Pond, located in the Kaloko-Honokohau National Historical Park. Two endemic waterbird

species, the Hawaiian Coot (*Fulica alai*) and Hawaiian Stilt (*Himantopus mexicanus knudseni*) nest on islands within the pond. Both are listed as endangered species under both the Federal and State endangered species acts (DLNR 1986, Federal Register 1999). One indigenous (but not endangered) waterbird species, Black-crowned Night-Heron (*Nycticorax nycticorax hoactli*), not endangered, also nests there. There is also seasonal usage of habitat within the park by a number of migratory shorebirds including the indigenous Pacific Golden Plover (*Pluvialis fulva*)

The U.S. Fish and Wildlife Service (USFWS) in their letter of July 7, 2000 (see App. 2 ), expressed concern for potential impacts to the Hawaiian Stilt and the Hawaiian Duck (*Anas wyvilliana*). The latter species has not been observed in the Kaloko-Honokohau area.

The intertidal zone and Aimakapa Pond within the National Park have been censused annually since 1988 as part of the National Audubon Society's, North Kona Christmas Bird Count (CBC). The Kealakehe Wastewater Treatment Plant has also been included in the count since its opening. The counts indicate that usage of Aimakapa Pond by these bird species has varied considerably during the past 12 years. For example, the Hawaiian Stilt count has been as high as 190 and as low as 4. Similar patterns have been observed for the Hawaiian Coot. Prior to the construction of the Cyanotech aquaculture facilities (near the Kona International Airport) and the Kealakehe Wastewater Treatment Plant (south of Honokohau Harbor), most resident waterbirds in North Kona were concentrated within the National Park. Since the construction of these facilities, most of those waterbirds have moved to one or the other, a common phenomenon for artificial wetlands features. Populations of the three non-migratory species have also increased considerably during this same period.

*Impacts and Mitigation Measures: Fauna*

No direct adverse impacts to native or otherwise important fauna would occur, as the Petition Area is almost entirely composed of alien species. To minimize the potential for disorientation and subsequent injury or death of Dark-Rumped Petrels that may overfly the site, it is recommended that all street lighting within the Petition Area be shielded to eliminate upward-directed light.

*Modified Alternative Impacts and Mitigation*

There is no difference in flora or fauna between Area D (the 45-acre piece that would not be developed under the modified alternative) and the remainder of the Petition Area, and there would be no additional or different biological impacts under the modified alternative. There would be no change in the fire risk to the surrounding areas, including

the ko'oko'olau population outside of the northeast corner of the Petition Area. A proposed condition of approval provides for a thirty (30) foot buffer in or adjacent to the northeast corner of the Petition Area.

Secondary and Cumulative Impacts: Considering the structure of regulated practices set up to prevent contamination, the mitigation measures such as those to be implemented by Lanihau, the natural hydrogeologic setting which encourages rapid remediation of most substances that are spilled, and the excellent record of water quality as measured by monitored wells downslope from the existing Kaloko Industrial Park, continued development of the entire region in accordance with the existing County plans (Section 4.2) would pose minimal risk of toxic substance contamination of ponds and nearshore waters, given mitigation measures as prescribed by law and regulation and imposed as part of the land use regulatory process.

At the same time, Lanihau acknowledges that development of a business park mauka of the Kaloko-Honokohau National Historical Park could possibly result in unanticipated impacts to park resources. Because of the lack of complete certainty concerning these possible impacts, appropriate mitigation measures have been proposed as part of this EIS. In addition, Lanihau understands that the Land Use Commission will require conditions similar to those developed as part of the recently approved Land Use Boundary Amendment for the adjacent Kaloko Industrial Park, Phases III and IV.

In summary, some alteration of water characteristics will occur, but with proper care, particularly with respect to toxic substances, no secondary impacts to the general health of offsite nearshore or coastal species or ecosystems is expected.

Cumulatively, even with implementation of all of the projects proposed for the study area, the total water withdrawal and nutrient addition do not appear to have the potential to induce long-term changes in the physio-chemical composition of pond or marine waters of a magnitude that could cause adverse biological impacts (See Section 4.2.2.2.4). Best Management Practices applied to all developments can prevent any significant quantities of contaminants from entering groundwater.

Again, as recommended in Section 4.2.2, it is recommended that Kaloko and Aimakapa Ponds be periodically monitored for biological resources and water quality to detect and correct potential pollution problems.

#### 4.2.6 Visual Character

##### *Existing Environment*

In this region of Kona, located adjacent to major highways on gently sloping land at some distance from the ocean, vistas of Hualalai Volcano and the coastal waters provide scenic value. Figures 4-4a-e illustrate various photographic views from and of the Petition Area.

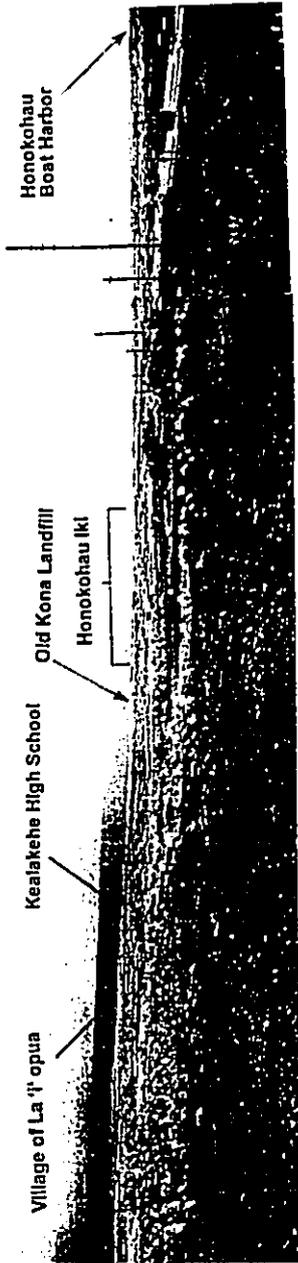
The Petition Area occupies a corridor of land extending mauka from elevations of 40 to 75 feet at Queen Ka'ahumanu Highway up to elevations of 280 to 320 feet at the top of the property. It is surrounded to the north and south by two other developed or developing commercial/ industrial areas (Figs. 4-4a&b). The site is directly mauka of Kaloko-Honokohau National Historical Park. The main concerns regarding visual impact are the potential to: 1) interfere with National Park views of the scenic slopes of Hualalai; 2) insert a disharmonious element to viewers from various parts of the National Park, and 3) detract from the viewplane of Queen Ka'ahumanu Highway motorists, who now have a view mauka through 69 kV lines within the highway right-of-way towards the quarried area and some undisturbed open space (Fig. 4-4c).

There are expansive views from the coastal areas of Honokohau and the National Park extending to the summit of Hualalai (Figs. 4-4d&e). These views look over the Petition Area to the forested areas of mauka Honokohau and the summit area of Hualalai (in the ahupua'a of Keauhou and Kaupulehu).

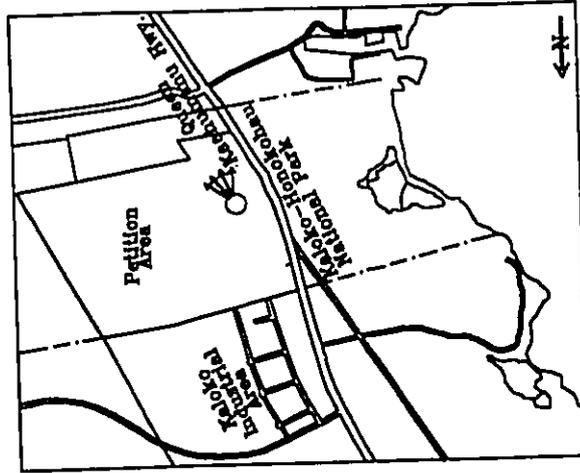
Queen Ka'ahumanu Highway extends in a north/south direction along the boundary between the National Park and the Petition Area. This highway introduces a "built" landscape within this area and includes utility lines and graded and paved areas. HELCO has constructed steel utility poles about 70 feet high along this corridor, intruding into the mauka views from the National Park and the highway (Fig. 4-4c).

The Petition Area itself consists of open lava lands. The quarry area along the mauka portions is for the most part screened from view from the National Park and Queen Ka'ahumanu Highway by a topographic bench that runs parallel to the slope through the middle of the Petition Area (Fig. 4-4a). This bench or crest is the makai boundary of the quarry area and the proposed general industrial area. Land makai of the bench is visible from the National Park and Queen Ka'ahumanu Highway. The northern portion of this area consists of 'a'a lands that have been surface-quarried in the recent past. The southern portion of this area consists of pahoehoe lava, with scattered shrubs of haole koa, kiawe trees and clumps of grass.





View of Petition Area from South  
Access Road Looking South

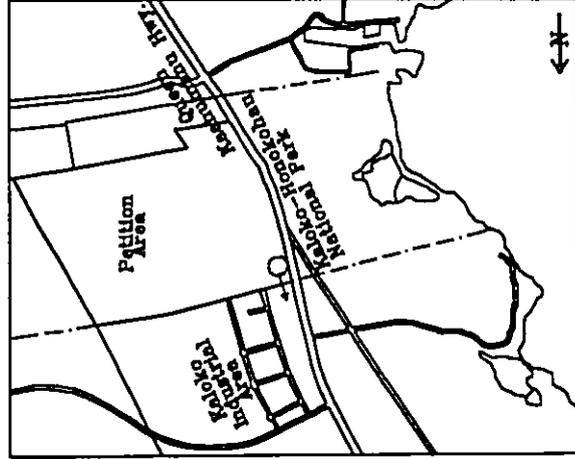


**PROJECT AREA PHOTOGRAPHS  
FROM SOUTH ACCESS ROAD**

PREPARED FOR: LANIHOU PROPERTIES  
PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
SOURCE:

KALOKO-HONOKOHAU BUSINESS PARK  
HONOKOHAU 1ST & 2ND  
NORTH KONA, HAWAII

**FIGURE # 4-4b**  
PAGE NO. 4-53



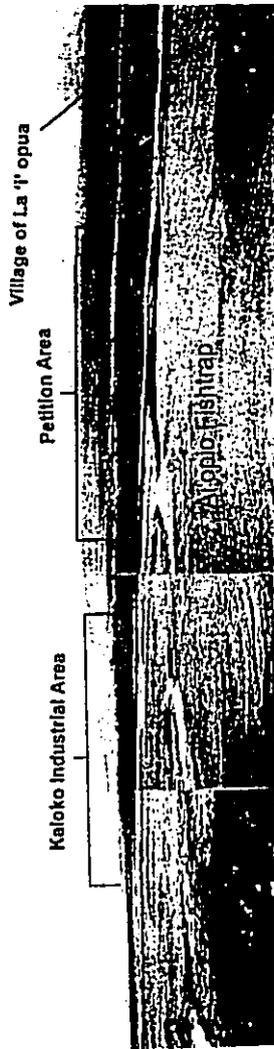
View From North Access Road Looking  
North Along Queen Kaahumanu Highway

**PROJECT AREA PHOTOGRAPHS**  
**ALONG QUEEN KAAHUMANU HIGHWAY**

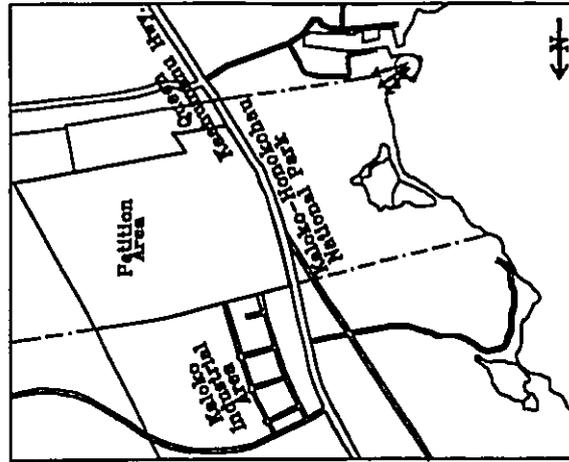
PREPARED FOR: LANIHU PROPERTIES  
PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
SOURCE:

KALOKO-HONOKOHAU BUSINESS PARK  
HONOKOHAU 1ST & 2ND  
NORTH KONA, HAWAII

**FIGURE # 4-4c**  
PAGE NO. 4-54



View of Hualalai from Maliu Point Looking East

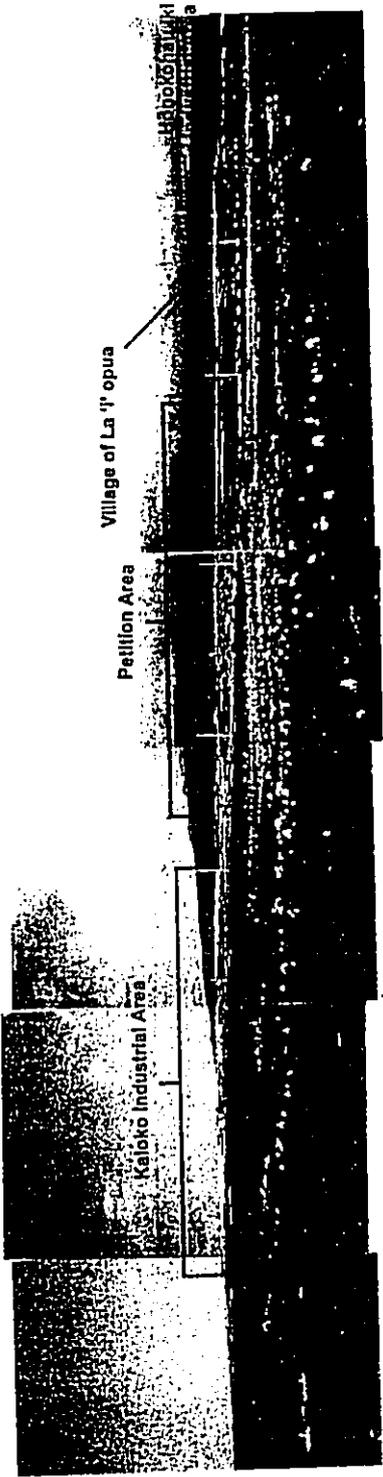


**PROJECT AREA PHOTOGRAPHS  
FROM MALIU POINT**

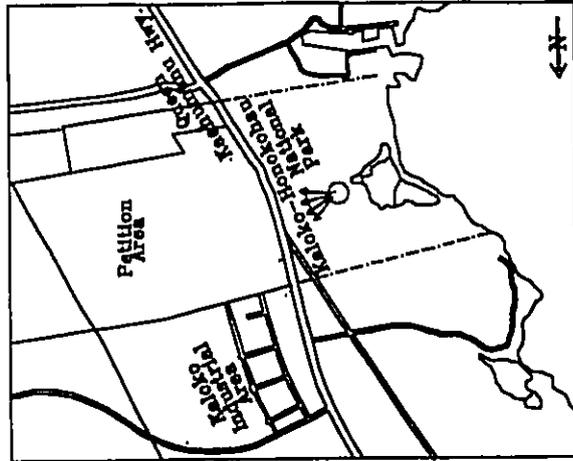
PREPARED FOR: LANIHAU PROPERTIES  
 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE:

KALOKO-HONOKOHAU BUSINESS PARK  
 HONOKOHAU 1ST & 2ND  
 NORTH KONA, HAWAII

**FIGURE # 4-4d**  
 PAGE NO. 4-55



View of Hualalai from Kaloko Honokohau National  
Historic Park's Proposed Visitor Center Site Looking East

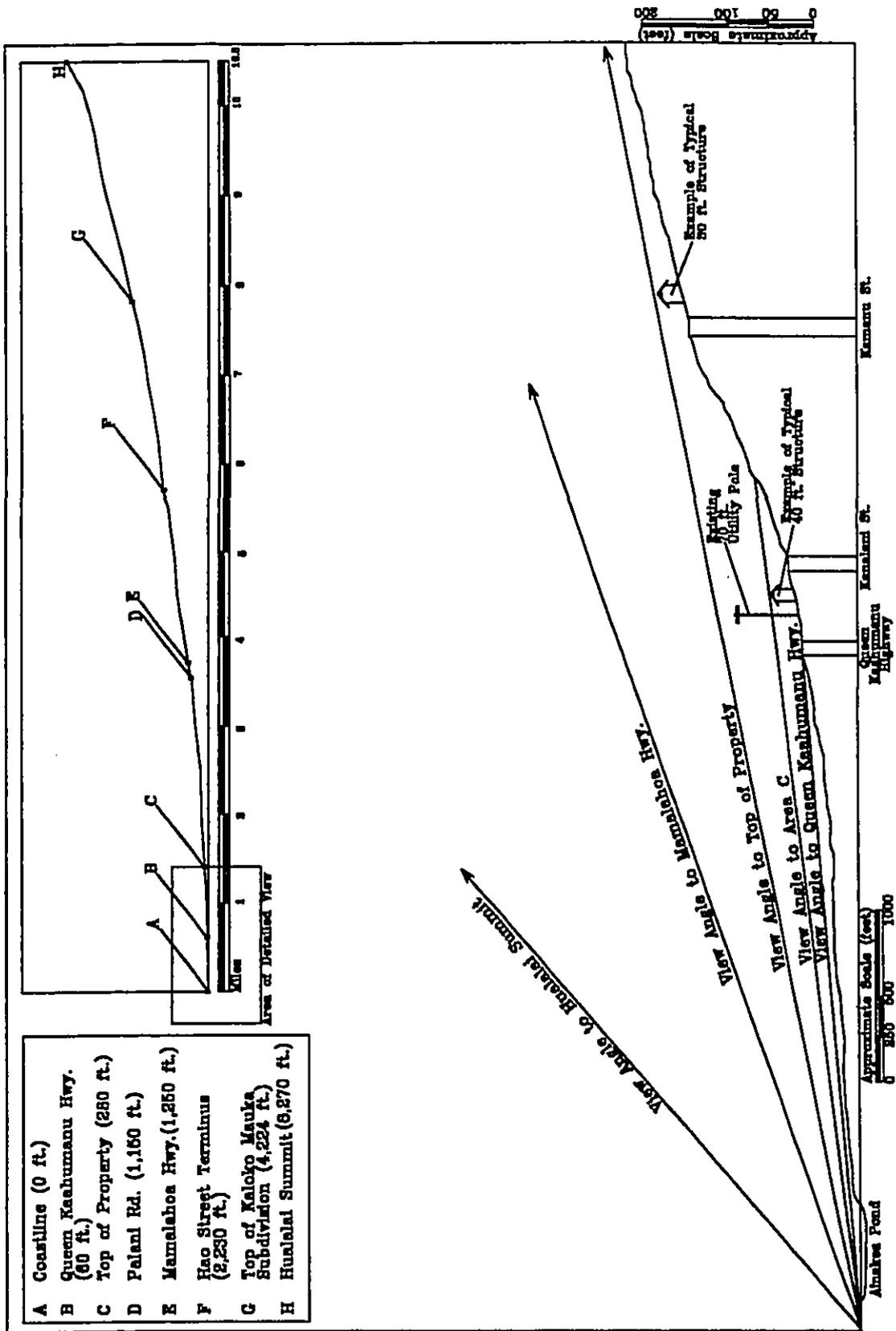


**PROJECT AREA PHOTOGRAPHS  
FROM PROPOSED PARK CENTER SITE**

PREPARED FOR: LANIHAI PROPERTIES  
PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
SOURCE:

KALOKO-HONOKOHAU BUSINESS PARK  
HONOKOHAU 1ST & 2ND  
NORTH KONA, HAWAII

**FIGURE # 4-4e**  
PAGE NO. 4-56



# VISUAL CROSS SECTION THROUGH STUDY AREA

KALOKO-HONOKOHAU BUSINESS PARK  
HONOKOHAU 1ST & 2ND  
NORTH KONA, HAWAII

PREPARED FOR: LANIHAI PROPERTIES  
PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
SOURCE:

FIGURE # 4-4f  
PAGE NO. 4-57

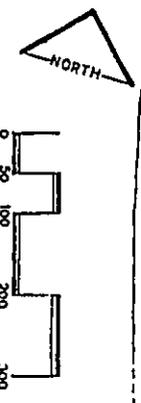
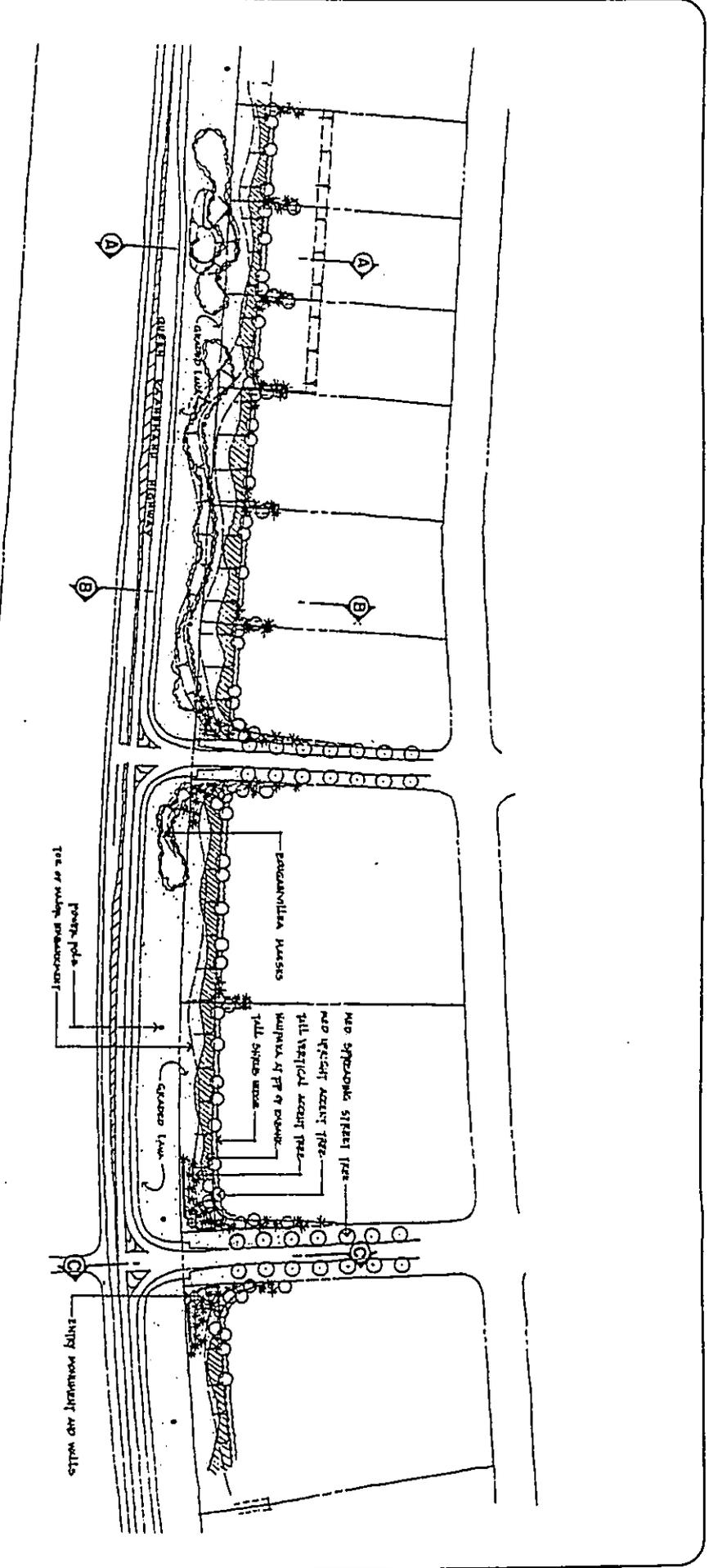
*Impacts and Mitigation Measures*

The topography of the general area is such that the scenic view of the summit and upper slopes of Hualalai from the coastal areas of Honokohau extending mauka will not be obstructed by the proposed development of the Petition Area. The Petition Area is at an intermediate elevation that will not be silhouetted against the skyline of Hualalai. Figure 4-4f shows the relationship of the Petition Area and proposed improvements to the views from within the upper portions of Kaloko and Honokohau towards the Hualalai summit area.

The development of the Petition Area will alter the existing open lava landscape by introducing a "built" landscape of buildings, roads, utilities and other facilities. Several approaches have been employed to present an attractive, harmonious appearance for viewers from the National Park and motorists on Queen Ka'ahumanu Highway:

*First Row Design:* Setbacks, landscaping, design elements, and height limits in the critical "first-row" of buildings will help provide an attractive and minimally intrusive gateway for the project (Figs. 4.4g-j). The entire area of development has been set back a distance varying between 50 and 80 feet from the edge of the Queen Ka'ahumanu Highway right-of-way. Architectural design criteria that minimize adverse visual impacts will be developed for this area, addressing aspects of building design including profiles, materials, color, surface treatment, reflectivity, lighting, sign standards, and landscaping. The buffer zone landscaping has been designed to insert selected areas of tree mass between the setback and the buildings and to break up roof lines with vertical elements. In this area, the use of mirrored glass and illuminated signs will be controlled (while still promoting the visibility valued by lot users), and natural colors will be encouraged. Certain lots in the visually sensitive "first-row" will be required to adhere to lower building heights than those allowed by the Hawai'i County Zoning Code height limit for buildings in the Mixed Light Industrial and Commercial district.

*Landscaping "Grow-in".* The landscaping plan utilizes fast-growing species to provide a buffer for the early years of the project (Fig. 4-4g-j). As time progresses, slow-growing trees will begin to provide the mature landscaping framework, and some of the fast-growing species will be pruned or removed. Various native and Polynesian species, including hau, naupaka, noni and wili-wili will be used, along with selected exotics such as monkeypod. Bougainvillea will be incorporated as a link with its existing usage as a landscaping theme along the Queen Ka'ahumanu Highway.

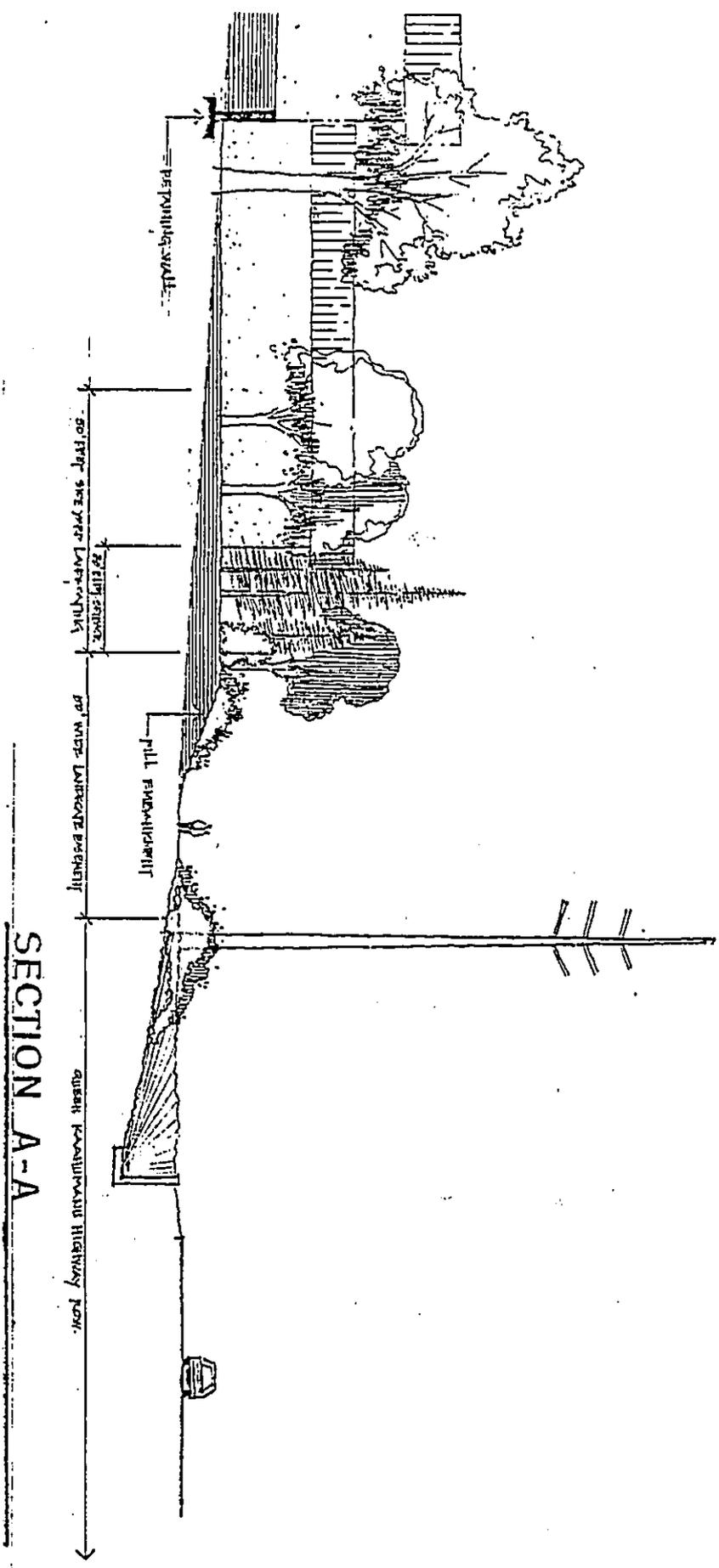


**CONCEPTUAL  
LANDSCAPE PLAN**  
KALOHEHONU BUSINESS PARK

**CONCEPTUAL LANDSCAPE PLAN**  
PREPARED FOR: LANIHAU PROPERTIES  
PREPARED BY: ANIKAYA & ASSOCIATES, LTD.  
SOURCE:

KALOHEHONU BUSINESS PARK  
HONOKOHAU 1ST & 2ND  
NORTH KONA, HAWAII

**FIGURE # 4-4a**  
PAGE NO. 4-59



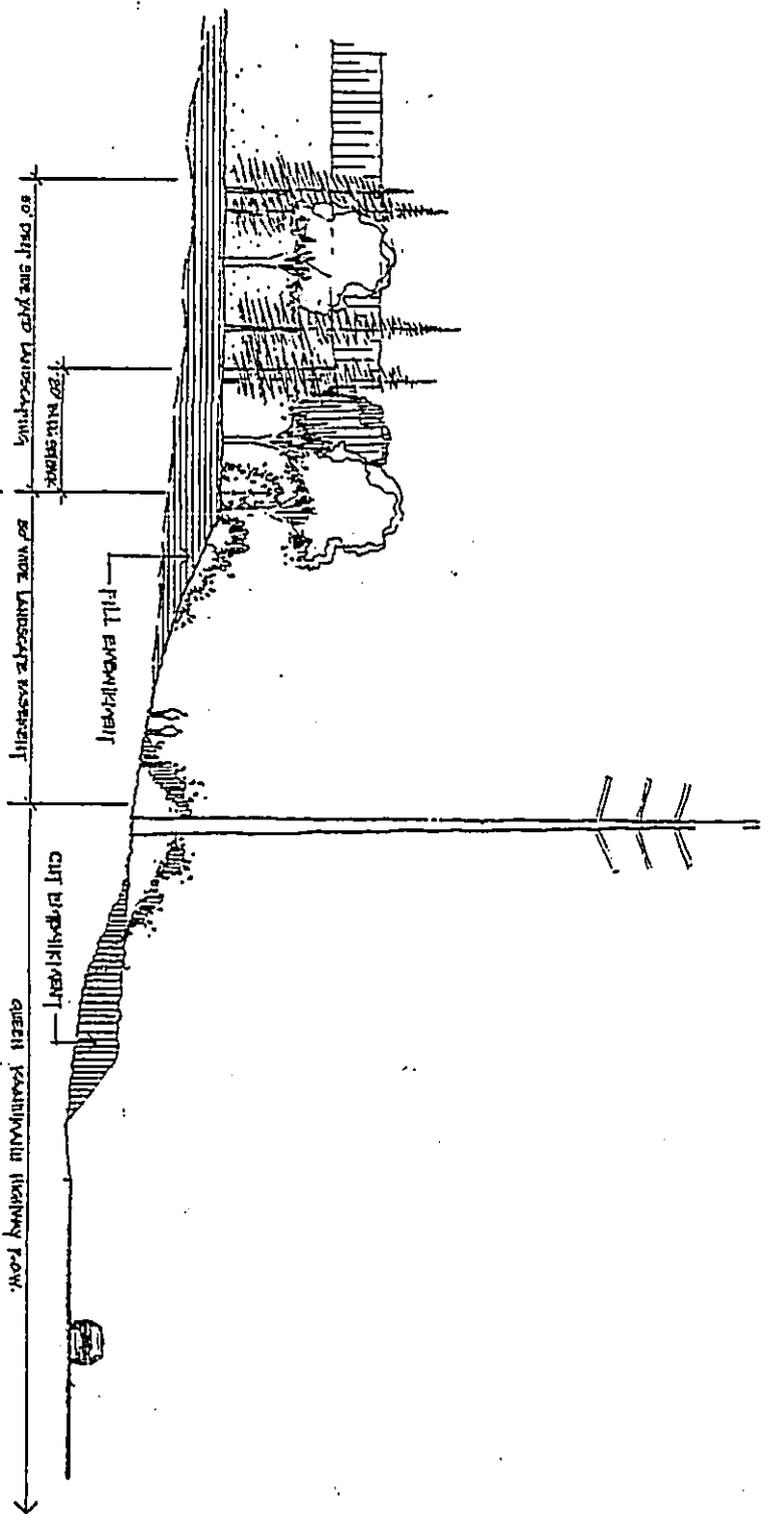
SECTION A-A

CONCEPTUAL LANDSCAPE PLAN  
SECTION AA

PREPARED FOR: LANIHAU PROPERTIES  
PREPARED BY: ANDRUKA & ASSOCIATES, LTD.  
SOURCE:

KALOHO-HONOKOHAU BUSINESS PARK  
HONOKOHAU 1ST & 2ND  
NORTH KONA, HAWAII

FIGURE # 4-4h  
PAGE NO. 4-60

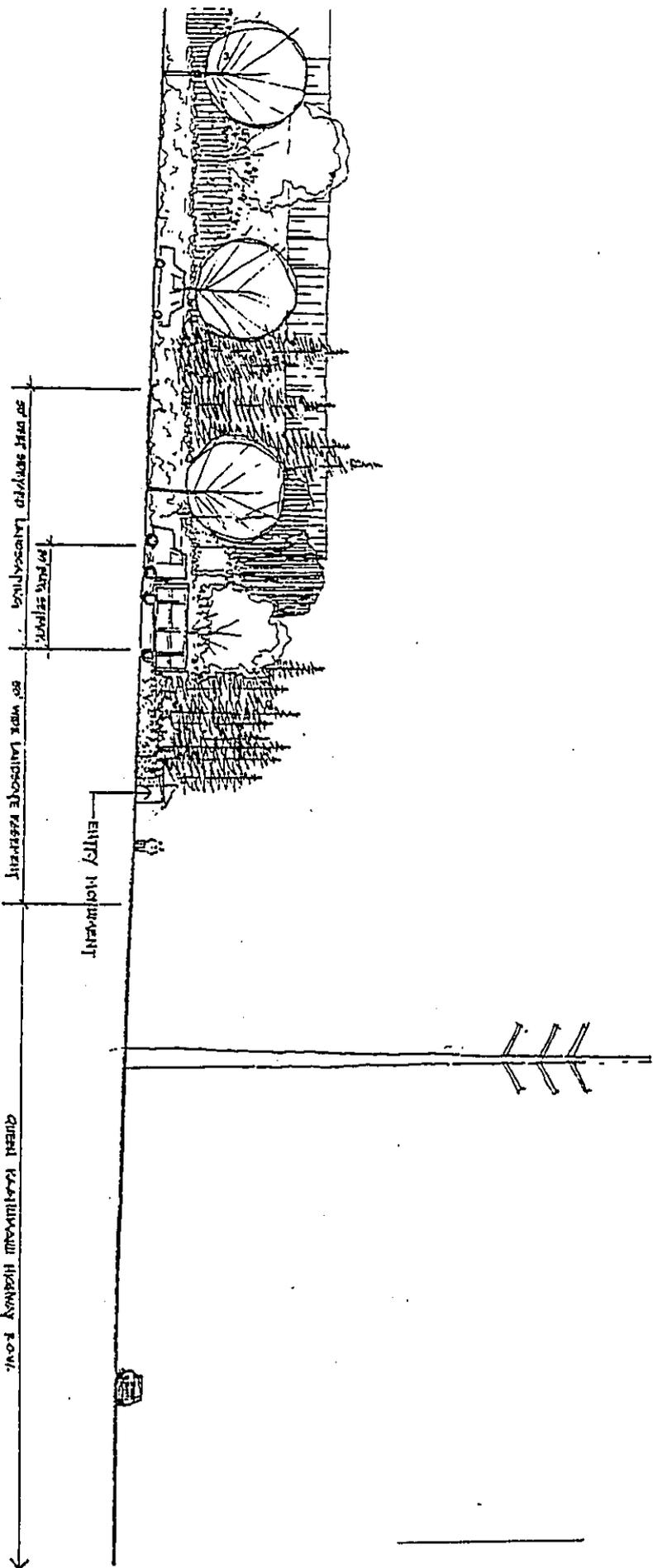


**SECTION B-B**

**CONCEPTUAL LANDSCAPE PLAN**  
**SECTION BB**  
 PREPARED FOR: LANIKAU PROPERTIES  
 PREPARED BY: ARYANA & ASSOCIATES, LTD.  
 SOURCE:

KALOKO-HONOKOHAU BUSINESS PARK  
 HONOKOHAU 1ST & 2ND  
 NORTH KONA, HAWAII

FIGURE # 4-41  
 PAGE NO. 451



**SECTION C-C**

GENERAL KALIWAHUI HIGHWAY F.O.V.

**CONCEPTUAL LANDSCAPE PLAN  
SECTION CC**

KALOKO-HONOKOHAU BUSINESS PARK  
HONOKOHAU 1ST & 2ND  
NORTH KONA, HAWAII

PREPARED FOR: LANIHAU PROPERTIES  
PREPARED BY: ANIWA & ASSOCIATES, LTD.  
SOURCE:

FIGURE # 4-4J  
PAGE NO. 4-62

*Grading Plans.* Grading plans will specify a gradual, step-by-step elevation of lots mauka from the setback line, minimizing the potential for looming lines of buildings. As the sight-line profile shown in Figure 4-4f indicates, none of the altered topography or proposed buildings would intrude into the mauka-makai viewplanes between the coastline and/or the National Park entrance and scenic slopes of Hualalai.

*Quarry Edge Buffer Area.* Topographic and/or landscaping buffering are planned around the makai edge of the quarry area.

*Integration with Kaloko-Honokohau National Historical Park.* Consultation with the National Park, which is ongoing, will continue through the design plans for the project and beyond. In particular, the landscaping and other visual design elements at the South Access Road intersection, which provides entrance to both the Business Park and the National Park, will be designed to render a harmonious connection between the two properties. Native plants will play a prominent role in this landscaping.

As a result of these mitigation measures, Kaloko-Honokohau Business Park will not interfere with views and will be a visually harmonious and attractive neighbor for the Kaloko-Honokohau National Historical Park, passing traffic, and other adjacent properties on the Queen Ka'ahumanu Highway.

*Modified Alternative Impacts and Mitigation*

Area D, the 45-acre piece at the mauka end of the property that would not be developed under the modified alternative, is partially hidden behind the makai portions. As the scenic viewpoints of concern are from the shoreline, the National Park and the Queen Ka'ahumanu Highway mauka towards Hualalai mauka of Mamalahoa Highway (and vice versa), there would be no difference in visual impacts if the modified alternative were implemented.

**Secondary and Cumulative Impacts:** There is the potential for the project to accumulate with other developments that subtract from the total area of open space views from the highway. Although substantial areas of undeveloped land in the study area do provide unobstructed open-space views, without proper design, the cumulative impact of adjacent commercial and industrial areas can create a "wall-to-wall" urban corridor that creates unpleasant visual surroundings and obscures all natural and cultural values present in the landscape, as has happened on Nimitz Highway in Honolulu. It is for this reason that the project will include an integrated program of visual design involving setbacks, height limitations, and landscaping, with the overall goal of preserving a feeling of open-space feeling and avoiding the look of an industrial corridor.

#### 4.2.7 Noise

A study of the acoustic environment of the study area, including estimates of the effects of both the Build and No-Build Alternatives, was conducted for this EIS (Appendix 14).

Noise may be defined as unwanted sound. Evaluation of sound levels requires a consideration of loudness at various pitches. Loudness is measured in units called decibels (dB). Since the human ear does not perceive all pitches (frequencies) equally, noise levels are adjusted to correspond to human hearing. This adjusted loudness standard is known as the A-weighted scale, abbreviated dBA. Noise levels over 70 decibels are considered unpleasant by most individuals; levels under 50 decibels are generally perceived as acceptably quiet. State and federal governments have jointly specified acceptable noise levels for various categories of land use in order to protect human and animal health and safety. Most relevant to the proposed land use are the Hawai'i State Department of Health (DOH) maximum permissible sound levels of 60 dBA for commercial areas and 70 dBA for industrial areas.

#### *Existing Acoustical Conditions*

Noise levels on the site are currently influenced by on-site quarrying, as well as adjacent industrial and commercial activity, the Queen Ka'ahumanu Highway, and various smaller roadways. Noise level measurements were taken in June 2000 at the northern boundary and various locations inside and outside of the Petition Area. The quarry operation and related activities are the only significant current onsite sources of noise. Heavy equipment, trucks, rock crushers, drilling, and very occasional blasting contribute to periodically high noise levels within the quarry itself. However, the average noise level at the northern boundary of the Petition Area was 56 dBA, with traffic and wind being the

dominant source of noise. This is below the DOH maximum permissible sound level of 60 dBA for commercial areas and 70 dBA for industrial areas. Noise from current quarry activities, except for occasional drilling and blasting, is generally not audible in developed areas near the Petition Area because they are shielded by the existing topography.

The following discussion of noise impacts is divided into sections on temporary construction noise, quarry noise, and traffic noise. They are discussed separately because these noise sources and the areas they affect will be separated in time and place and will interact only negligibly.

#### *Potential Impact from Construction Noise*

Development of the Kaloko-Honokohau Business Park will involve excavation, grading, blasting, compressors, operation of vehicle and equipment engines, and construction of new buildings and infrastructure. These construction activities may generate noise exceeding 95 decibels at times, which may impact nearby areas. In cases where construction noise exceeds, or is expected to exceed, the DOH's "maximum permissible" property-line noise levels, a permit must be obtained from the DOH to allow the operation of vehicles and construction equipment which exceed these levels.

#### *Mitigation of Construction-Generated Noise*

The State of Hawai'i requires contractors engaged in construction activities to conform with Title 11, Chapter 46, HAR (Community Noise Control). The Hawai'i State Department of Health's (DOH) Noise, Radiation and Indoor Air Quality Branch issues permits for construction activities which may generate noise. The permit is applied for during the construction phase by the contractor. DOH will review the proposed activity, location, equipment, project purpose, and timetable in order to decide upon conditions and mitigation measures. Possible measures include restriction of equipment type, maintenance requirements, restricted hours, and portable noise barriers. The contractor will comply with requirements pertaining to construction activities as specified in the rules and the conditions issued with the permit as stated in Section 11-46-7(d)(4), as determined to be necessary during consultation with DOH. Construction equipment and on-site vehicles will be equipped with mufflers as stated in Section 11-46-6(b)(1)(A).

#### *Noise Impact From Continued Quarry Operations*

Sample measurements taken in the vicinity of various quarry activities were used to predict the future impact of quarrying activities as they progress southward<sup>2</sup>. Heavy

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<sup>2</sup> The quarry is a permitted, pre-existing use, and the various land use approvals in adjacent properties have been granted with the explicit understanding that the quarry would continue to operate. Therefore, although the noise impact analysis conducted for the EIS has considered impacts on surrounding properties, it has primarily focused on impacts to adjacent portions of the Petition Area itself.

equipment, rock crushers, and large drills that periodically operate at the top of the quarry wall will be the dominant source of noise generated by quarry operations. The predicted noise levels are illustrated in Figures 4-5a and 4-5b, which show the effect of shifting the center of activity during the lifetime of the quarry, which is expected to operate for about 20 more years.

Within the area designated for quarry operations, average sound levels will range from 57 dBA when no drilling is occurring to 81 dBA during drilling.

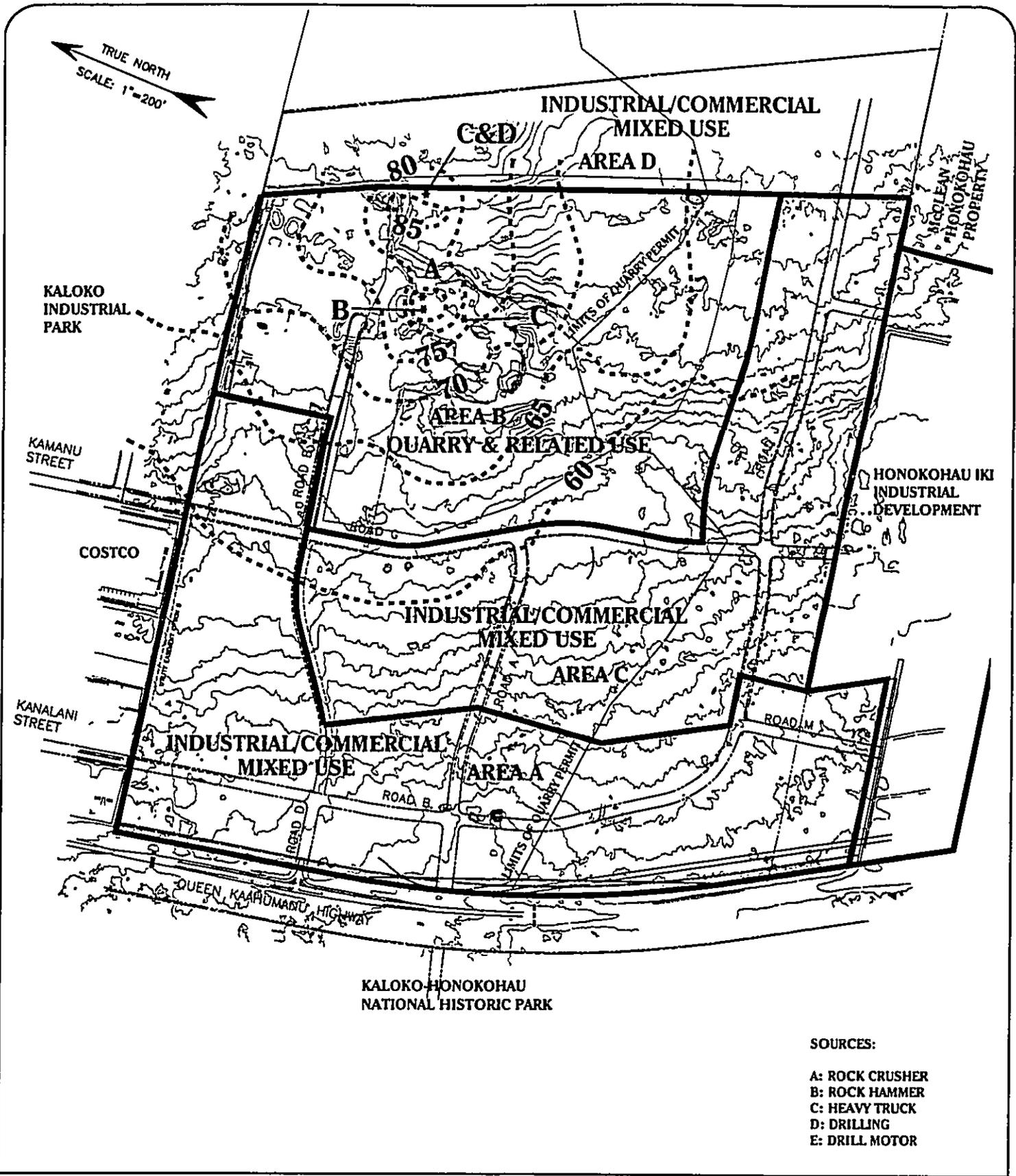
Although surrounding areas will continue to be shielded from much of the quarry noise by the quarry wall, noise levels there will nevertheless rise. When the quarrying activities are in the northern part of the Petition Area (Fig. 4-5a), where they are now, average sound levels in the areas designated for industrial and commercial mixed-use would range from 52 dBA to 67 dBA without drilling, and from 63 dBA to 67 dBA with drilling. When the quarry reaches its southernmost location, sound levels would range from 60dBA to 75 dBA in the areas designated for industrial and commercial use (Fig. 4-5b). Therefore, without mitigation, the maximum permissible noise level for industrial land use of 70 dBA would be periodically exceeded in a small section of the Petition Area adjacent to the quarry that is ultimately planned for industrial uses. Similarly, the maximum permissible noise level for commercial land use of 60 dBA would be periodically exceeded in a larger section of the Petition Area adjacent to the quarry.

The noise radiating to the mauka (eastern) limits of the Kaloko-Honokohau National Historical Park, closest to the Petition Area, is expected to be below the daytime noise limits (55 dBA) for a conservation zone.

#### *Mitigation of Quarry-Generated Noise*

The predicted noise levels represent worst-case scenarios, assuming undeveloped land with no structures present to provide noise absorption. In reality, industrial structures such as warehouses or manufacturing facilities may be built between the quarry and the more sound-sensitive commercial areas, thus serving to buffer those areas from the quarry noise. Importantly, maximum permissible sound levels in industrial areas are allowed to be exceeded if appropriate hearing protection is employed. Similarly, if the industrial or commercial activities involve only portions of a site not subject to excessive noise, such as one side of a building or the interior only, appropriate noise mitigation incorporated into building design can also allow such activities as permitted uses under DOH rules.

In order to account for the best available predictions of noise as well as the potentially changing noise environment, all initial buyers of lots shall receive noise model maps such as those presented in Figs. 4-5a and 4-5b. They will be informed that noise levels in areas modeled to exceed 70dBA/60 dBA are assumed, in the absence of other information, to exceed levels permissible for industrial/commercial activities, and that industrial/commercial activities may not be approved in such areas by the Department of



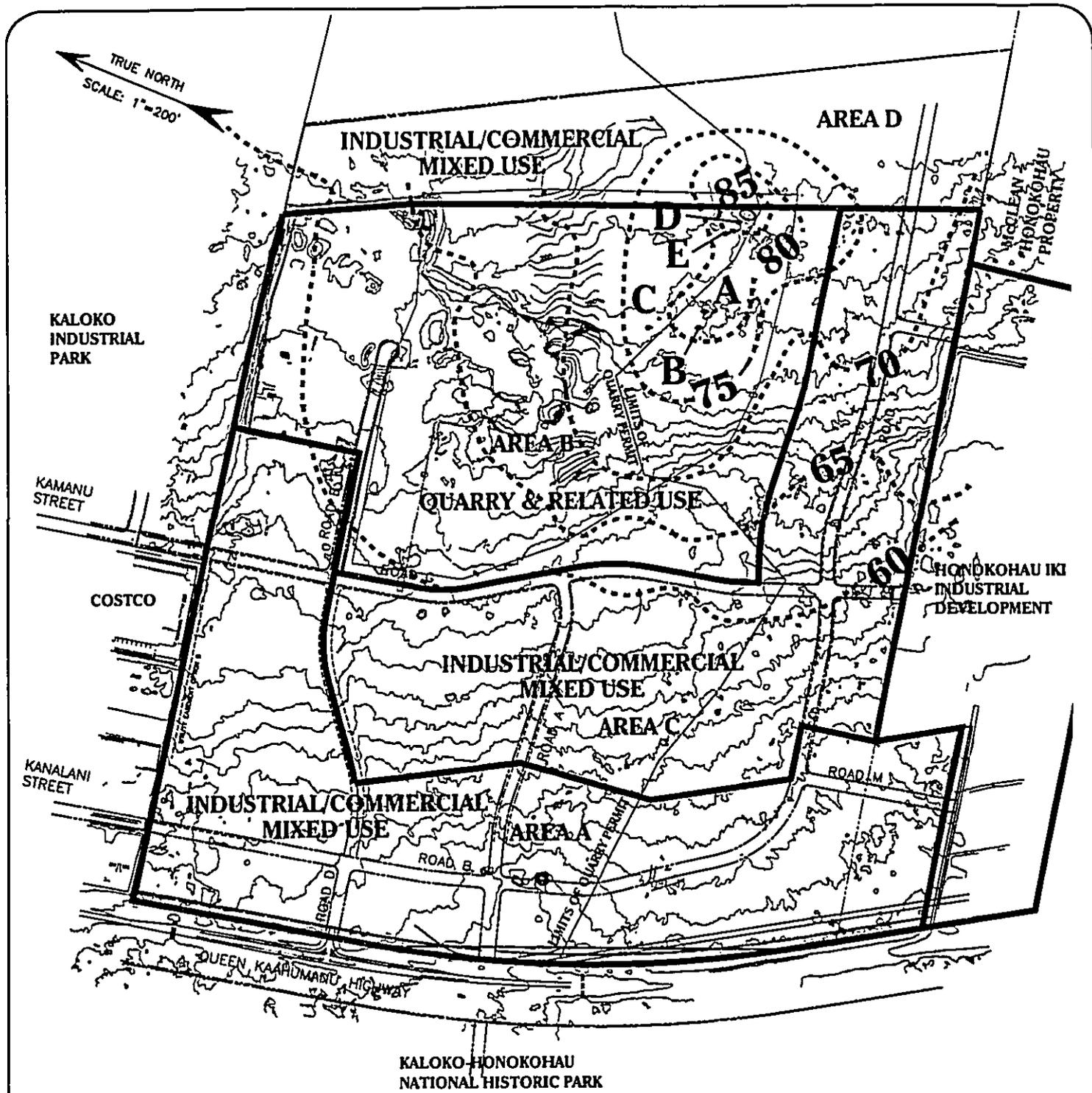
**NOISE CONTOURS**  
**QUARRY ACTIVITIES NORTH**

KALOKO-HONOKOHAU BUSINESS PARK  
 HONOKOHAU 1ST & 2ND  
 NORTH KONA, HAWAII

PREPARED FOR: LANIHAI PROPERTIES  
 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE: D.L. ADAMS & ASSOCIATES

- SOURCES:
- A: ROCK CRUSHER
  - B: ROCK HAMMER
  - C: HEAVY TRUCK
  - D: DRILLING
  - E: DRILL MOTOR

**FIGURE # 4-5a**  
 PAGE NO. 4-67



SOURCES:

- A: ROCK CRUSHER
- B: ROCK HAMMER
- C: HEAVY TRUCK
- D: DRILLING
- E: DRILL MOTOR

**NOISE CONTOURS**  
**QUARRY ACTIVITIES SOUTH**

KALOKO-HONOKOHAU BUSINESS PARK  
HONOKOHAU 1ST & 2ND  
NORTH KONA, HAWAII

PREPARED FOR: LANIHAU PROPERTIES  
PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
SOURCE: D.L. ADAMS & ASSOCIATES

FIGURE # 4-5b  
PAGE NO. 4-68

Health without sufficient mitigation such as exterior sound barriers or interior noise absorption structures. They will also be informed that although construction of intervening buildings, changing drilling techniques, or the cessation or alteration in quarry activity all have the potential to reduce noise, it must be demonstrated through a professional noise study that the appropriate maximum permissible sound level will not be exceeded before industrial/commercial uses would be approved by DOH.

*Potential Impact of Traffic Noise*

The increase in traffic noise from the proposed project is expected to be between 0.1 and 2.0 dBA. A change of less than 1 dBA is considered imperceptible by most people, and a change of 3 dBA is required before the change is just barely perceptible. Thus, no significant traffic noise increases due to the project are expected, and no mitigation measures are necessary.

*Modified Alternative Impacts and Mitigation*

Area D, the 45-acre piece at the mauka end of the property that would not be developed under the modified alternative, would be subject to high levels of noise because of quarry operations, as indicated in Figs. 4-5a & 4-5b. As discussed above, Area D would be developed last, when quarry operations had been or would soon be discontinued. This fact coupled with potential mitigation measures involving structural measures or land use restrictions would minimize but not completely eliminate potential conflicts between businesses and the adjacent quarry. The modified alternative would avoid even the potential for such conflict in Area D.

Secondary and Cumulative Impacts: The noise analysis determined that other than the quarry, which is a pre-existing, permitted use, any direct noise effects of the proposed project would be essentially confined to the Petition Area and immediately surrounding areas, and would not combine with noise from other areas to produce adverse, high levels of noise. In terms of secondary impacts, traffic generated from the employees and customers of the Business Park will add to the volume of noise produced on all roads on which they travel. The major highways on which the vast majority of this added traffic would occur are federal aid projects and have been subject to federal and State noise evaluation criteria, or will be subject to these when federal funding is requested. They have thus been designed to avoid sensitive land uses within areas that exceed Noise Abatement Criteria or to employ noise attenuation measures, when feasible, where noise impacts do occur.

4.3 Socioeconomic and Cultural

4.3.1 Social

*Environmental Setting*

Kona was an important region in pre-Contact Hawai'i, a center of political power and population. After 1850 it became a sleepy rural district of scattered coffee farms and cattle ranches. Tourism was quite modest until the 1960s, when resort hotels and vacation homes began to dot the coastline. Today, the primary economic activities in Kona are *tourism* (hotels, condominium rentals, and tourism services, concentrated near the coast); *industry, retail and service activities*; and *agriculture*, concentrated in the uplands, where large coffee farms, ranches, and macadamia nut and avocado orchards are present.

Population has grown rapidly in all of West Hawai'i and particularly in North Kona (Table 4-3), where the number of inhabitants increased from 4,832 in 1970 to 22,284 in 1990, and to an estimated 25,447 in 1995. Of the nine districts on the Big Island, North Kona has sustained the second largest rate of growth (after Puna) since 1970, at 429 percent. High growth since 1960s has resulted from the steady stream of new residents lured by Kona's attractions and the employment and entrepreneurial opportunities of the tourism industry.

The prevalence of tourism has also increased the visitor share of the de facto population (those actually present on any given day) to about one-fourth of the resident population. Both resident and de facto populations are expected to keep rising, although less sharply, into the foreseeable future. The *Keahole to Kailua Development Plan* estimated the resident population of that portion of North Kona at 4,230 in 1988, and estimated that it would grow to 14,674 by the year 2010 (Hawai'i County Planning Dept. 1991:1-11).

**Table 4-3  
Resident Population Growth in Kona, 1970-1990**

District/Period	1970	1980	1990	1995	%Growth 1970-1990
North Kona	4,832	13,898	22,284	25,547	429%
South Kona	4,004	5,809	7,658	8,619	115%
Hawai'i County	64,468	92,053	120,317	137,291	113%

Sources: U.S. Bureau of the Census: "1990 Census of Population. General Population Characteristics," 1990 CP1-13; Hawai'i State DBEDT: *Hawai'i State Data Book, 1997*.

Along with increasing population have come changes in social characteristics. The housing stock includes many newer condominium complexes providing short-term rentals, time-shares for visitors, and retiree housing. Many permanent residents today are affluent, older (often retired), relative newcomers from the mainland. The 1990 U.S. Census of Population provides the most recent detailed demographic information. Table 4-4 presents demographic data that compare the island of Hawai'i, the North Kona District, and the Kailua-Kona CDP (Census Designated Place), the largest population unit in North Kona.

*Impacts and Mitigation Measures*

As government plans have specified and development projects have begun to fulfill, the Keahole-to-Kailua area is growing. Direct social impacts from the proposed reclassification would be minimal, because the project will not create a substantial influx of population. This is because the businesses expected to occupy the facility are either already operating (in the case of the quarry and related businesses) or are primarily service-type industries that depend upon, but do not measurably induce, population growth. Such businesses may be contrasted with operations such as: a) resort hotels, which often require a substantial new labor force and thus may induce migration; or b) resort residential, for which new (usually out-of-state) residents are an intrinsic characteristic. The proposed project, which will be occupied over a twenty to thirty year period, is not expected to induce any significant in-migration to Kona, but rather to service primarily the needs of the growing population, which will also supply a growing source of labor.

No relocation of residences, businesses, community facilities, farms or other activities would occur because of the project. The principal social impacts - direct, secondary, and cumulative - are in the areas of economic benefits (providing jobs and services in the Petition Area), traffic generation, and public services and facilities, and are thus discussed in those sections. As far as affordable housing, Lanihau will comply with the requirements of Hawai'i County Code, Chapter 11, relating to the County of Hawai'i Affordable Housing Policy. More specifically, Lanihau will comply with Section 11-5 relating to Requirements for Rezoning Involving Resort and Industrial Uses, including the development of a housing needs assessment which will include an analysis of the jobs generated by the development, the projected number of qualified households which may be entitled to housing assistance and other factors as may be identified.

Table 4-4  
Selected Socioeconomic Characteristics

CHARACTERISTIC	Hawai'i Island	North Kona	Kailua-Kona CDP
Total Population	120,317	22,254	9,126
Percent Under 18 Years	28.7	26.4	28.2
Percent Over 65 Years	12.6	10.1	8
Percent White	39.9	59.5	53.9
Percent Japanese	20.8	10.5	8.3
Percent Hawaiian	19.2	16.4	19.2
Percent Born in State of Hawai'i	85	49.3	53
Percent Relocated 1985 -1990	46.9	60.6	63.3
Percent 16-64 years w/Work Disability/Mobility Limitation	12.9	9.5	9.9
Percent > 25 Yrs. W/ H.S. Diploma	77.7	86	84.3
Percent Adults in Labor Force	64.2	70.7	71.8
Per Capita Income	\$13,169	\$17,497	\$13,363
Percent in Poverty	14.2	9.2	11.6
Percent Housing Vacant	14.1	21	16
Median Home Price	\$113,000	\$211,900	\$179,900

Source: U.S. Bureau of the Census: 1990 Census of Population and Housing. STF 1-A, STF 3-A.

Modified Alternative Impacts and Mitigation

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. There would be fewer jobs and thus less need for affordable housing. Although Area D accounts for about 12 percent of the total property, under the main alternative it is slated for development last. Therefore the reduction of impacts would be considerably less than this proportion considered over the time frame of the next several decades.

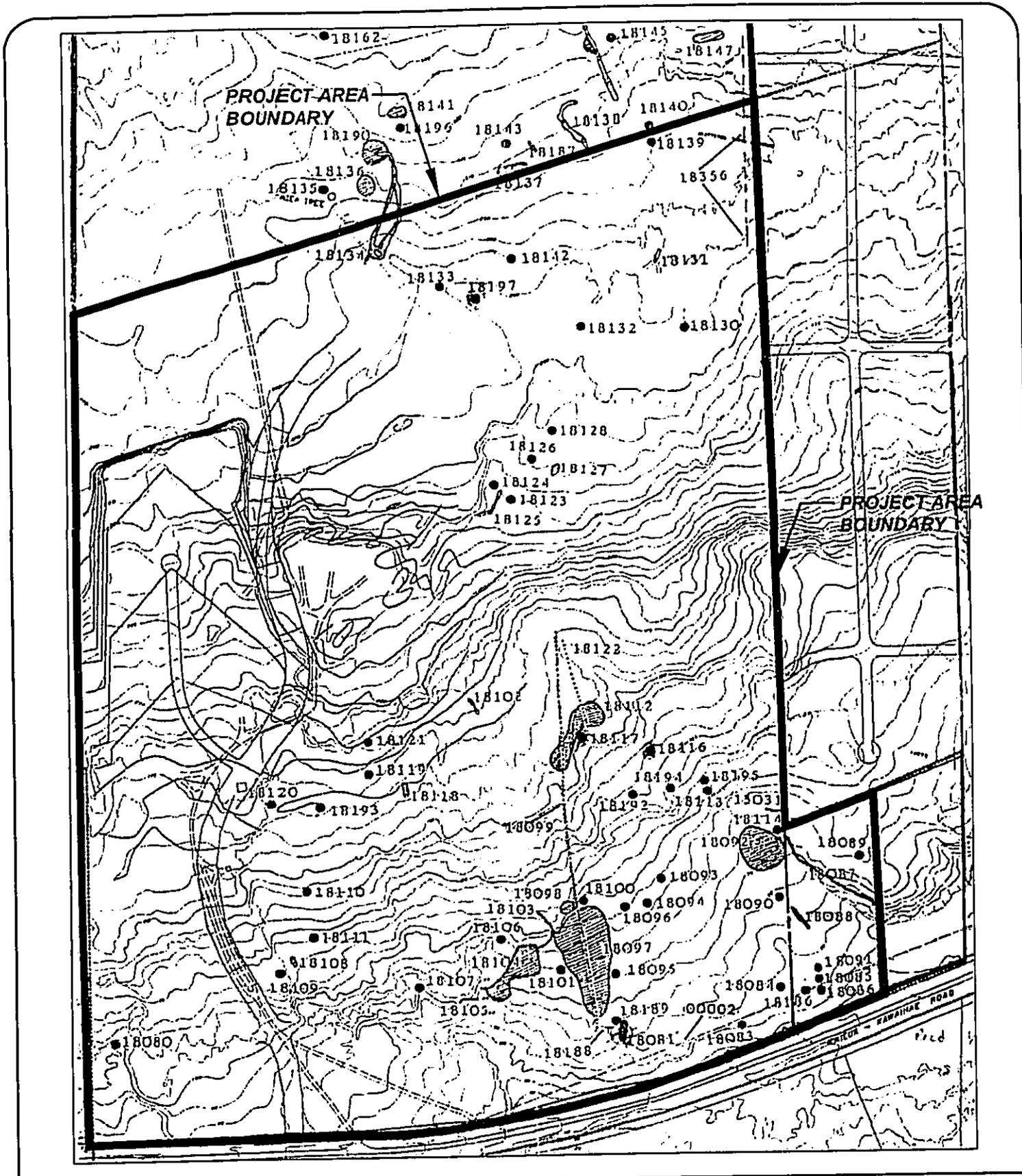
#### 4.3.2 Archaeological and Historic Site Resources

##### *Environmental Setting*

Archaeologists performed an inventory survey with limited subsurface testing of the Petition Area and a large extent of surrounding property. Appendix 8 contains an extended summary of the archaeological report for sites within the Petition Area, which contains 73 historic sites (Fig. 4-6). The report is summarized below.

As part of the work, archaeologists completed a full-property, on-foot survey to determine whether historic sites were present and, if so, to establish their nature and locations. The field archaeologists examined the Petition Area using parallel pedestrian transects spaced no more than 30 meters apart. Utilizing the pedestrian surveys, all archaeological sites were located, described, and mapped. Field documentation included photographs and drawings to scale of the majority of sites. In accordance with the Hawai'i State Historic Preservation Division (SHPD) guidelines, all sites were assigned State site numbers, and per-site interpretive evaluations including the archaeological significance and recommended treatment were conducted.

Seventy-three archaeological sites were identified within the Petition Area parcel (Table 4-5). The primarily traditional Hawaiian sites consist of dryland agricultural complexes, simple agricultural features, temporary, recurrent and permanent habitation sites, a refuge cave, human burials (7 sites), animal containment features, an *ahupua`a* wall and various boundary walls, two petroglyphs, trail segments, and *ahu* (shrines or markers). Sites associated with historic-era activities - cattle ranching - were also identified within the Petition Area.



**ARCHAEOLOGICAL SITES**

PREPARED FOR: LANIHAI PROPERTIES  
 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE: CULTURAL SURVEYS INC.

KALOKO-HONOKOHAU BUSINESS PARK  
 HONOKOHAU 1ST & 2ND  
 NORTH KONA, HAWAII

**FIGURE # 4-6**  
 PAGE NO. 4-74

Table 4-5  
Archaeological Site Types

Site Types	(#)	Site Numbers Habitation Type: (Temporary (T), Permanent (P), Recurrent (R));
Trail(s)	(5)	02, 18099, 18103, 18122, 18133,
Walls & wall segments	(6)	13031, 18080, 18087, 18105, 18186, 18356
Petroglyphs	(2)	18081, 18091
Outcrops	(7)	18083 (T), 18089, 18108, 18130, 18140, 18142, 18193,
Rock shelters	(2)	18084 (T), 18128 (T),
Lava tubes	(14)	18085 (T), 18088* (T), 18094 (T), 18102 (T), 18117*, 18124 (T), 18125 (T), 18131 (R), 18132 (T), 18134* (T / refuge), 18138 (R), 18187 (T), 18188 (P), 18197*
Pecked basin, pahoehoe excavation	(2)	18086, 18097
Complexes can contain numerous elements - terraces, enclosures, platforms, trails, etc.	(14)	18090 (T), 18092 (R), 18098 (P), 18111 (T/ag), 18112 (P), 18116* (P), 18118, 18121 (R), 18127 (R), 18136, 18137 (P), 18190 (P), 18189 (P), 18194,
Ahu	(4)	18093, 18096, 18100, 18114,
Mound (s)	(2)	18095, 18135
Enclosure, enclosure remnants	(9)	18101 (T), 18104, 18107, 18109, 18110, 18119, 18126 (P), 18143 (T), 18192 (T),
Platform	(2)	18106 (undetermined), 18113,
Lava blister	(1)	18120 (R)
Sink	(1)	18123
Pavement	(1)	18139 (T)
Terrace	(1)	18195 (R)

Source: Appendix 8

Notes: \* indicates burials or possible burials present

Of the 73 recorded sites in the Petition Area, 50 (68 percent) are located in several concentrations between the Queen Ka'ahumanu Highway and 175 feet above sea level, where there are lava tubes and *kipuka* in pahoehoe lava surrounded by the dominant 'a'a flow. Few sites were identified between 175 and 225 feet in elevation, where the topography consists of a steady rise to the next plateau. Between 225 feet elevation and the mauka end of the Petition Area the remaining 23 (32 percent) are found, on a gently sloping plateau area, with sinks, lava tubes and rock shelters widely dispersed.

To put the Petition Area in context, beyond its mauka upper boundary the same kinds of sites exist, with a predominance of agricultural and temporary habitation components. This general pattern continues up to 900 feet in elevation, after which sites become more dense with more permanent habitation and agricultural sites and features.

The great majority of sites in the Petition Area date from pre-Western Contact, while some exhibit a combination of pre- and post-Contact use, and some are historic-era sites. They vary in context from traditional Hawaiian use to historic-era ranching. The traditional Hawaiian sites, which contain a variety of formal site and feature types, include: intensive dryland agricultural complexes; simple agricultural features and sites; temporary, recurrent and permanent habitation sites; a refuge cave; human burials; animal containment features; an ahupua'a wall and various boundary walls; petroglyphs; a network of trails; and ahū. The historic-era sites are associated with cattle ranching.

#### *Significance Assessments*

An important aspect of the survey was to provide functional interpretations and to apply an initial assessment of significance. The functional interpretations were established on the basis of structural characteristic and in some cases associated artifacts, in conjunction with external correlations with other archaeological studies and interpretations in the general region. Additionally, limited subsurface testing was performed to provide important information regarding the likely function of the sites and chronological information. Appropriate procedures have been followed to identify and gather sufficient inventory information to make initial assessments regarding site significance. The full archaeological inventory survey from which Appendix 8 was abstracted (Robins *et al.* 2000) has been prepared and submitted to SHPD, which is currently reviewing the report.

All sites were evaluated by the archaeologists as having some level of archaeological significance (Table 4-6). In overview, they recommended that of the 73 sites, 8 sites are significant for preservation, 31 are significant for the information they contain and are recommended for data recovery, and 34 sites are recommended for no further work, as sufficient information has already been obtained from them, and they are therefore deemed no longer significant.

**Final EIS: Kaloko-Honokohau Business Park**

The initial significance assessments are based on criteria established by both the Hawai'i and the National Registers of Historic Places. To be significant, an historic property shall through design, construction materials, workmanship, feeling and association meet one or more of the following criteria:

- A Be associated with events that have made an important contribution to the broad patterns of our history;
- B Be associated with the lives of persons important in our past;
- C Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
- D Have yielded, or be likely to yield, information important for research on prehistory or history;
- E Have an important traditional cultural contribution or value to the native Hawaiian people or to other ethnic groups of the State.

The State Historic Preservation Division has concurred with the significance assessments.

**Table 4-6  
Archaeological Sites by Significance Criteria**

Site Criteria	Site Numbers
A,C,D	18099
A,C,D,E	02, 18134*
C,D	18098, 18112, 18133
C,D,E	18091
D	13031, 18080, 18083, 18084, 18085, 18086, 18087, 18089, 18090, 18092, 18093, 18094, 18095, 18096, 18097, 18100, 18101, 18102, 18103, 18104, 18105, 18106, 18107, 18108, 18109, 18110, 18111, 18113, 18114, 18118, 18119, 18120, 18121, 18122, 18123, 18124, 18125, 18126, 18127, 18128, 18130, 18131, 18132, 18135, 18136, 18137, 18138, 18139, 18140, 18142, 18143, 18186, 18187, 18188, 18189, 18190, 18192, 18193, 18194, 18195, 18356
D,E	18081, 18088*, 18116*, 18117*, 18197*

Source: Appendix 8

Notes: \* indicates burials or possible burials present

**Table 4-7  
Archaeological Preservation Sites**

State Site Numbers for Sites Slated for Preservation	Function and Site Type
18116	Permanent Habitation Complex (with Burial Component)
02, 18099	Representative Portions of Transport or Transit Trails
18088, 18117, 18134, 18197	Lava Tubes with Burials
18081	Petroglyph Concentration along Mamalahoa Trail

Source: Appendix 8

*Impacts and Mitigation Measures*

Development of the proposed project will result in alterations of the landform that will destroy some of the archaeological sites. The proposed project has been planned in close coordination with archaeological and cultural inventory to ensure that all known burials and all sites important for preservation or data recovery would be preserved in place.

Mitigation of significant historic sites generally takes one of two forms: 1) preservation, or 2) data recovery. Preservation is accomplished either through site protection as is, or through the development of an interpretation program. As described above, of the 73 sites, 8 sites are recommended for preservation, 31 are recommended for Data Recovery, and 34 sites are recommended for no further work.

In order to ensure proper treatment, several formal plans will be prepared in consultation with SHPD, the Hawai'i Island Burial Council, Kaloko-Honokohau National Historical Park, the Hawai'i State Na Ala Hele Trails Advisory Group, and other organizations. These are the Preservation Plan, the Data Recovery Plan, and the Burial Treatment Plan.

Although the details of these plans have not been finalized, the following mitigation measures are expected to be incorporated:

- All known burials will be preserved in place, and all sites recommended for preservation will be preserved.
- Buildings, road, and infrastructure have been planned and will continue to be planned to avoid and incorporate buffer zones for all burial and preservation sites.
- Burials will receive treatment in close coordination with lineal descendants and the Hawai'i Island Burial Council.
- Interpretive programs, including signage and access for certain preservation sites, will be developed in consultation with Kaloko-Honokohau National Historical Park.

- The developer, consulting archaeologist and cultural historian will continue their coordination with local historians, resource persons, and community groups in gaining a full appreciation of the historical and archaeological resources of the Petition Area.
- It is expected that permitting agencies will require successful completion of the actions specified in the Preservation Plan, Data Recovery Plan and Burial Treatment Plan in order to proceed with development plans.
- If any previously unidentified sites, human burials, or remains such as artifacts, shell, bone or charcoal deposits, rock or coral alignments, pavings, or walls are encountered, work will stop immediately and SHPD will be consulted to determine the appropriate mitigation. Information on functional associations may also be generated in data recovery, which could change the presently recommended treatment. Care will be taken during ground preparation to ensure that, in the unlikely event that human burials are present, they are recognized and dealt with appropriately.

The Data Recovery and Preservation Plans will be submitted to SHPD and must be approved before any activity with the potential to adversely affect historic sites is permitted. These plans are expected to be completed during the next year.

Secondary and Cumulative Impacts: The archaeological inventory survey considered the regional distribution of sites of the types found in the Petition Area, along with the frequency and preservation of such sites on a regional basis, when considering the need for preservation and data recovery of each individual site. This ensured that there would be no adverse impact to the overall historical heritage and information contained in the archaeological sites of West Hawai'i.

Modified Alternative Impacts and Mitigation

Area D, the 45-acre piece at the mauka end of the property that would not be developed under the modified alternative, contains eight archaeological sites, including two planned for preservation and two burials or possible burial sites. All these sites would avoid development-related disturbance under the modified alternative.

4.3.3 Cultural Impact Assessment

4.3.3.1 Background

A Cultural Impact Assessment prepared for the project is attached as Appendix 10 and is summarized below. It addresses cultural impact, and is meant to: 1) satisfy the requirement of Chapter 343, HRS, to address cultural impacts, and 2) to provide information to address the constitutional duty of agencies of the State of Hawai'i to protect the reasonable exercise of customarily and traditionally exercised rights of native Hawaiians, to the extent feasible, in connection with such petitions. To this end, the

Hawai'i Supreme Court has recently pronounced an analytical framework within which State agencies may fulfill this constitutional duty. In the recent case of *Ka Pa'akai O Ka 'Aina vs. Land Use Commission*, the court directed the LUC, in consideration of petitions for district boundary amendments, to make specific findings before reaching a decision on the petition concerning:

1. The identity and scope of "valued cultural, historical and natural resources" in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area.
2. The extent to which those resources – as well as traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action, and
3. The feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights, if they are found to exist.

This cultural impact assessment was prepared in accordance with the methodology and content protocol provided in the Nov. 19, 1997 *Guidelines for Assessing Cultural Impacts* from the Office of Environmental Quality Control. This included examining cultural practices and beliefs within the ahupua'a of Honokōhau Nui and Honokōhau Iki and surrounding areas, conducting research on archival-historical literature, and identifying and consulting with individuals and/or organizations with knowledge of the area's cultural resources, practices, and beliefs, or of its historical and natural resources. The information in this assessment was largely drawn from a separate, detailed report by Kepā Maly (Maly 2000), copies of which have been provided to all libraries on the EIS distribution list (See Section 1.6).

#### 4.3.3.2 Traditional Land Use

##### *Ancient Hawaiian Land Divisions In Reference To The Project Site*

By the time 'Umi-a-Līloa rose to rule the island of Hawai'i in ca. 1525, the island (*moku-puni*) was divided into six districts or *moku-o-loko* (Fornander 1973–Vol. II:100-102). On Hawai'i, the district of Kona is one of six major *moku-o-loko* within the island. The district of Kona extends from the shore across the entire volcanic mountain of Hualālai, and continues to the summit of Mauna Loa, where Kona is joined by the districts of Ka'ū, Hilo, and Hāmākua.

Kona, like other large districts on Hawai'i, was further divided. The northernmost portion of North Kona was called "Kekaha" (descriptive of an arid coastal place). Native residents of the region affectionately referred to their home as "Kekaha-wai-'ole o nā Kona" (Waterless Kekaha of the Kona district), or simply as the "*āina kaha*." It is within this region of Kekaha, that the two *ahupua'a* of Honokōhau are found.

The large districts (*moku-o-loko*) and sub-regions (*'okana* and *kalana*) were further divided into manageable units of land, and were tended to by the *maka'āinana* (people of the land) (Malo 1951:63-67). Of all the land divisions, perhaps the most significant management unit was the *ahupua'a*. Although the term is familiar to most Hawai'i

residents, it may be recalled that ahupua'a is a pie-shaped wedge of land that extends from the ocean fisheries fronting the land unit to the mountains or some other feature of geological significance (e.g., a valley or crater). The boundaries of the ahupua'a were generally defined by the topography and cycles and patterns of natural resources occurring within the lands.

The ahupua'a were also divided into smaller manageable parcels of land (such as the *'ili*, *kō'ele*, *māla*, and *kihāpai*, etc.) in which cultivated resources could be grown and natural resources harvested. These access rights were almost uniformly tied to residency

Entire *ahupua'a*, or portions of the land were generally under the jurisdiction of appointed *konohiki* or lesser chief-landlords, who answered to an *ali'i-'ai-ahupua'a* (chief who controlled the ahupua'a resources). The *ali'i-'ai-ahupua'a* in turn answered to an *ali'i 'ai moku* (chief who claimed the abundance of the entire district). Thus, ahupua'a resources supported not only the *maka 'āinana* who lived on the land, but also contributed to the support of the *ali'i* of regional and/or island kingdoms. As long as sufficient tribute was offered and *kapu* (restrictions) were observed, the *maka 'āinana* who lived in a given ahupua'a had access to most of the resources from mountain slopes to the ocean. This right to gather resources was generally tied to residency within an ahupua'a, and also was tied to the obligation to pay tribute to the *ali'i* (Malo 1951:63-67; Kamakau 1961:372-377; and Boundary Commission testimonies cited in Maly 2000).

This form of district subdividing was integral to Hawaiian life and was the product of careful adherence to resource management planning. In this system, the land provided fruits and vegetables and some meat in the diet, and the ocean provided a wealth of protein resources. Also, in communities with long-term royal residents, divisions of labor (with specialists in various occupations on land and in procurement of marine resources) came to be strictly observed. It is in this setting that we find Honokōhau and the present study area.

#### *Nā Hono i nā Hau 'Elua: The Ahupua'a of Honokōhau Nui and Iki*

The Honokōhau ahupua'a are two of twenty-three ancient ahupua'a within the *'okana* of Kekaha-wai-'ole. Hono-kō-hau may be literally translated as "Bay-of-wind-born-dew", and a traditional account by J.W.H.I. Kihe cited in Maly (2000) implies that the name is descriptive of the *hau* (dew) which seasonally seems to flow down the mountain. The dew carried with it moisture by which native residents successfully grew dry land crops, and was considered life-giving. Traditional and historic literature, and oral historical accounts describe Honokōhau as among the favored lands of Kekaha. The fresh watered shores of Honokōhau; the fishponds of 'Aimakapā, 'Ai'ōpio and ponds like Kahinihini'ula; salt making locations and the rich ocean and near-shore fisheries; the inland agricultural field systems; and diverse forest and mountain resources attracted native residents to the area, and sustained them on the land.

#### *Land Use Patterns within the Ahupua'a*

The ahupua'a of Honokōhau crosses several environmental zones that are generally called "wao" in the Hawaiian language. These environmental zones include the following:

<i>Kahakai</i>	Nearshore fisheries and shoreline strand
<i>Kula Kai</i>	Shoreward plains
<i>Kula Uka</i>	Inland plains
<i>Wao Kanaka</i>	Region of man (lit.)
<i>Wao Nahele</i>	Region of forest
<i>Wao Ma'ukele</i>	Rainforest
<i>Wao Akua</i>	Region or zone of deities (lit.)

The following is a more detailed description of each of these environments as they pertain to Honokōhau:

#### *Kahakai*

The Kahakai includes the nearshore waters and the beach strand areas. In Honokōhau, these areas were rich in marine resources.

#### *Kula Kai and Kula Uka*

The *kula* region of Honokōhau and the greater Kekaha is now likened to a volcanic desert, though native and historic accounts describe or reference groves of native hardwood shrubs and trees such as 'ūlei (*Osteomeles anthyllidifolia*), ēlama (*Diospyros ferrea*), uhiuhi (*Caesalpinia kavaiensis*), and ohe (*Reynoldsia sandwicensis*) extending across the land and growing some distance shoreward.

The lower *kula* lands receive only about 20 inches of rainfall annually, and it is because of their dryness that the larger region, of which Honokōhau is a part, is known as "Kekaha." While no water appears on the surface, abundant groundwater flows beneath the lava and feeds the springs, fishponds and anchialine ponds on the *Kula Kai* (coastal flats).

These were transitional lands between the intensively utilized *kahakai* and the *Wao Kanaka*. Because of the limited rainfall and barren soils, uses within these areas were primarily transitional or intermittent in nature.

#### *Wao Kanaka and Wao Nahele*

Continuing along the *Kula Uka* (inland slopes), the environment changes as elevation increases. In the *Wao Kanaka* (region of man) and *Wao Nahele* (forest region) rainfall increases to 30 or 40 inches annually, and taller forest growth occurs.

This region provided native residents with shelter for residential and agricultural uses, as well as a wide range of natural resources that were important for religious, domestic, and economic purposes. In Honokōhau, this region is located

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generally between the 1,200 and 2,400-foot elevations, and is crossed by the present-day Māmalahoa Highway (which is situated not far below the ancient *ala loa*, or foot trail that was part of a regional trail system).

Continuing further inland, Honokōhau Nui ends near Pu‘u Hinakapo‘ula, at about the 6,000 foot elevation, where it meets the region of Kaloko on the north, Kaupulehu to the east, and Kealakehe and Honua‘ula on the south.

### *Wao Ma‘ukele and Wao Akua*

In the upper reaches of Honokōhau Nui and extending into Kaloko and Keauhou, we find the *Wao ma‘ukele* (a rain forest-like environment) and the *Wao Akua*, literally translated as the “region or zone of deities.”

The *Wao Akua* is so named because of the pattern of cloud cover and precipitation that settles upon the mountain slope—this covering was interpreted as concealing from view the activities of the deity and gods who were believed to walk the land under the cover of the mist and clouds (1959:16-18; and M.K. Pukui, pers. comm. to Kepā Maly 1975).

### *Historical Accounts Of Honokōhau And Kekaha*

There are a number of early (pre-nineteenth century) and later historical accounts that specifically name Honokōhau, and most of the accounts describe the area in the context of the larger Kekaha region (Fornander 1959; Kamakau 1961; I‘i 1959). These accounts describe an area rich with legend and associations with important events in Hawaiian history, and also refer to use of the various marine resources, including working fishponds in the Honokōhau-Kaloko vicinity. The surf at Honokōhau was also noted as important.

Kamakau (1961) reported that following the death of Kamehameha and the period of mourning and purification, Liholiho (Kamehameha II), who retreated to Kawaihae upon the death of his father, began his return to the Kailua area. On the way, Liholiho stopped at Honokōhau and dedicated a heiau to his god and prepared for his return to Kailua. The events that unfolded at Honokōhau also set in motion, the “*ai noa*” (free eating), or breaking of the *kapu* (restrictions) of the gods that heralded the end of the ancient religious system.

In the nineteenth and early twentieth centuries, references to Honokōhau are limited—most likely a result of the great changes in the regional population that occurred in the early 1900s. Ellis’ account from 1823 (1961) and Wilkes (1845) mention various areas in Kekaha but not Honokōhau specifically.

In 1913, H.W. Kinney’s visitor’s guide to the island of Hawai‘i included a description of Honokōhau in which he noted a dozen houses by the beach, salt making, the remains of a heiau, and “some excellent specimens of the *papa konane*, or checker boards used by the

ancient Hawaiians" (Kinney 1913:57-59). In 1924, the Hawaiian language newspaper *Ka Hōkū o Hawai'i* published a variety of traditional accounts of Kekaha, penned by J.W.H.I. Kihe. Kihe also submitted articles reflecting on the changes he had seen in his lifetime:

"The lands of Honokōhau were filled with people in those days, there were many women and children with whom I traveled with joy in the days of my youth. Those families are all gone, and the land is quiet. There are no people, only the rocks remain, and a few scattered trees growing, and only occasionally does one meet with a man today [1924]. One man and his children are all that remain."  
(Kihe 1924 in Maly 2000)

#### *Cultural-Historical Context*

The ancient Hawaiians saw (as do many Hawaiians today) all things within their environment as being interrelated. That which was in the uplands shared a relationship with that which was in the lowlands, coastal region and even the sea. This relationship and identity with place worked in reverse as well. The *ahupua'a* as a land unit was the thread that bound all things together in Hawaiian life.

The lands of Honokōhau Nui and Iki were among the favored lands of Kekaha, where water, one of the most important natural resources needed for sustaining life, was often difficult to come by. The highly valued, and carefully managed resources of Honokōhau extended from the sea to the forested mountain slopes of Hualālai. The diverse resources available to the native residents included rich deep sea and nearshore fisheries (*ko'a*), highly developed *loko i'a* (fishponds and fish traps), sheltered shores and canoe landings (*awa pae wa'a*), and fresh water springs (*punawai*), which provided potable water to sustain the native residents, as well as supporting the unique balance required for long-term propagation and collection of fish from the *loko i'a*. A wide range of environmental zones (*wao*), extending from near shore to upland forests provided the natural resources and materials necessary for the development of a sophisticated agricultural system. These resources allowed the native residents of the lands to meet their immediate community needs as well as contribute to the overall support of the larger Hawaiian social, economic, religious and political system of Kona.

Oral history interviews formed an important part of the historical recording process for the information upon which the cultural impact assessment was based. Potential interviewees were identified, in part through previous work in the region by the author, and also through conversations with various individuals and agency representatives. When the interviewees were contacted, they were told of the proposed Lanihau project, and asked if they could participate in the interview program. Prior to beginning the oral history interviews, a simple-form questionnaire guideline was developed for reference during the interview. The questionnaire followed a standard oral history interview format, and also included specific questions relative to knowledge of sites and practices associated with the study area (incorporating selected information from archival-

historical resources), as well as questions aimed at eliciting recommendations of site treatment. During interviews and other communications, several historic maps were referenced, and as appropriate, general locations of sites referenced were marked on maps.

All of the interview participants have either lived upon or worked the lands of Honokōhau Nui and Iki (dating back to 1913), or frequented the coastal village while visiting family members or fishing (dating back to ca. 1927). Additionally, the historic interviews include documentation based upon personal experiences dating back to the 1890s. Several of the interview participants are descended from native Hawaiian families who lived at Honokōhau since at least the 1840s. Some of the consultation program participants are also descended from native residents of the Honokōhau vicinity, or have worked (and continue to work) on historic preservation and resource management issues in Honokōhau and the larger Kona region.

Responses regarding traditional cultural sites in the Petition Area parcel were of a general nature. With the exception of the *Alanui Aupuni* (Old Government Road), and a cave site on the Petition Area's edge (known to the interviewee as a result of archaeological investigations of the 1970s), no one shared knowledge of specific sites in the Petition Area.

All interviewees recorded that in the early twentieth century, residency and life in Honokōhau focused on activities that took place on the shore, or in the uplands, with little activity (except for limited ranching) on the lower *kula* (flatlands or plains). Some area residents worked the fishponds and off-shore fisheries while living on the shore at the small village in Honokōhau Iki; others lived in the uplands, where *kalo* (taro), *'ulu* (breadfruit), *'uala* (sweet potatoes), coffee and other crops were grown; and others lived and worked on ranches, generally in the area extending *mauka* from the Māmalahoa Highway.

Those who resided in the Honokōhau vicinity all recorded that except for occasional excursions into the lowland *kula* (generally undertaken as a part of the ranch operations), little or no travel occurred via trails in Honokōhau Nui for as long as the interviewees can remember (ca. 1915). Travel via *mauka-makai* trails in Honokōhau Iki-Kealakehe; lateral shore line travel between Honokōhau and Kailua; and *mauka-makai* travel between Honokōhau to upland Kohanaiki (the trail crossed through Kaloko) did take place.

Two informants stated that in their youth (ca. 1930), they went with older relatives to areas perhaps directly adjacent to the Petition Area in Honokōhau Iki to cultivate *'uala* (sweet potatoes) and other crops which could be grown in pockets of soil and mulched planting areas on the lava flats of the lower *kula* (flatlands).

While interviewees were not able to share site specific documentation for resources within the 337-acre Petition Area, many of them expressed concern for the archaeological sites that may have been found prior to or during project fieldwork. The interviewees concurred with the preservation of sites with *ilina* (human remains), sections of the old *mauka-makai* trail, and other sites, as the archaeological inventory survey recommended. It was also suggested that some of the sites within the study area may receive some level

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of interpretation (tying in with the interpretation of Kaloko-Honokohau), and there was agreement that it might be appropriate to curate any artifacts which may be discovered on the parcel in the Kaloko-Honokohau National Historical Park collection (thus remaining on the land of origin).

The effects of the project on downslope water quality (especially at the Kaloko-Honokohau Fishponds and nearby anchialine pond resources) and the National Park itself were also of concern to many interviewees.

The Petition Area is located approximately 3,000 feet mauka of the shoreline (Kahakai zone), within the dry, barren *Kula Kai* and *Kula Uka* zones. These areas were transitional lands between the more heavily utilized *Kahakai* and the *Wao Kanaka* zones where the ancient Hawaiians traditionally lived.

The major uses in the *Kula Kai* and *Kula Uka* zones were in general, temporary or intermittent. Uses included trails, intermittent agriculture, and temporary habitation. Limited cultural activities, including burials occurred in these lands as well.

The proposed project, which will include a mix of commercial and industrial uses, is consistent with the character and traditional use of this region. The proposed uses reflect a transitional or intermittent use of the area by residents. They will come to this area during the day for business purposes, then return home to the more comfortable residential areas which tend to be located in the *Kahakai* or *Wao Kanaka* zones.

A key element of the development plan for this area is to retain the integrity of the ahupua'a by recognizing the relationship of the area and the proposed uses to the climatic zones, protecting important archaeological and cultural sites within the Petition Area and by minimizing the impacts to the linkage between the *Kahakai* and *Wao Kanaka* zones within Honokohau by protecting trail segments and visual corridors from the shoreline to the mauka regions of Hualalai. In addition, the proposed development will be done in a manner to protect the water resources that will flow from the upper regions of Honokohau to the shoreline.

### 4.3.3.3 Valued Natural, Historical and Cultural Resources

The Honokohau lands were highly utilized by native Hawaiians before Western contact, especially in the *Kahakai* and *Wao Kanaka* zones. However, the Petition Area, which is in the *Kula Kai* and *Kula Uka* zones, had much less intensive, often intermittent or transitional utilization, including trails, temporary habitation, and agricultural uses. Although it is acknowledged that certain activities within the Petition Area have the potential to cause impacts off-site or otherwise interact in a way as to cause harm to valued resources, it is important to maintain the distinction between the relatively limited resources in the Petition Area and the significant resources in the greater Honokohau lands, most of which have already been protected in the National Park.

*Valued Cultural, Natural and Historical Resources in the Honokōhau Ahupua'a*

As discussed above, traditional and historic literature as well as oral historical accounts describe Honokōhau as among the favored lands of Kekaha for its shoreline, rich ocean and near-shore fisheries and marine resources, fishponds at 'Aimakapā and 'Ai'ōpio, salt making locations, mauka agricultural field systems, and diverse forest and mountain resources. A number of storied places associated with history and legend are present, and there are also heiau and other features that have vital functions in symbolizing and enabling the relationship among the Hawaiian people, resources, and spiritual activities. Many reminders of these resources still exist, especially in the Kaloko-Honokōhau National Historical Park, where there are excellent examples of natural and human-altered ponds and water features, along with the extensive archaeological resources and numerous human burials, all of which are important to protect and honor.

*Valued Cultural, Natural and Historical Resources in the Petition Area*

The Petition Area contains cultural resources in the form of archaeological features, including intensive dryland agricultural complexes; temporary, recurrent and permanent habitation sites; trails and ahu; petroglyphs; a refuge cave, and ahupua'a and various other walls. Archaeologists have determined that some are important and valuable enough to be significant for preservation in place. These features demonstrate that at one time the area supported a variety of activities. This appears to have been based mostly on the position of this somewhat barren intermediate area between the resource-rich and well-settled areas mauka and makai. There are remnants of a mauka/makai trail extending through the center of the Petition Area. This trail provided access between the *Kahakai* and the *Wao Kanaka* zones. According to the interviews, these trails have not been utilized since the mid-1800s. Since at least these periods, access between the mauka areas of Honokohau and the shoreline area was via the Kaloko Trail to the south or along Palani Road to Kailua Village then north along the coastal trails.

While there were heiau in the *Kahakai* and *Wao Kanaka Zones* of Honokōhau, there are no such features within the Petition Area. Furthermore, according to native testimony, the *Kula Kai* and *Kula Uka* lands here did not contain any land features (such as *pu'u*) that were used for locating *ko'a 'ōpelu* (opelu fishing grounds).

Seven human burials are present, all associated with lava tubes. They represent a sensitive and important cultural resource, one which those consulted urged to be properly respected and preserved in place.

The Petition Area appears to have contained very few valued natural resources such as traditional quarries or water features, although plants important for cultural purposes (e.g., *ko'oko'olau*) were probably present. Today, alien vegetation has replaced native species almost entirely, leaving only the most common natives. Still present are two native plants with ethnobotanical value, the *'uhaloa* (*Waltheria indica*) and *maiapilo* (*Capparis sandwichiana*). The former species is very common in many parts of the Big Island; the latter is less common but relatively well-distributed throughout the *Kula Kai*.

Furthermore, extensive archival research and interviews have revealed no traditional or ongoing practices or beliefs specifically associated with the Petition Area, nor are there any specific traditional and customary native Hawaiian rights being exercised.

*Relationship Between Petition Area and Entire Ahupua'a*

As stated above, there were and are connections between the Petition Area and the lands mauka and makai. The significance of the ahupua'a as a mauka-makai planning unit or management entity has diminished over time, as ownership patterns have become fragmented and modern development patterns and infrastructure have evolved. Nevertheless, certain land use principles fundamental to the ahupua'a concept continue in the Kekaha region, and more specifically, Honokōhau. The *Kahakai*, which represents the resource-rich and highly productive coastline, as well as portions of the *Kula Kai*, are protected within the Kaloko-Honokōhau National Historical Park, which will preserve and interpret the history and uniqueness of this most vital component of the ahupua'a.

Moving mauka, the transitional lands of the *Kula Kai* and *Kula Uka* (which include the project area) today fill a useful and necessary role in the Kona community by providing for commercial and industrial services. The area is well-suited for this use largely due to its favorable terrain, central location, and ready access to the major transportation routes and facilities in West Hawai'i. It also does not conflict with the traditional ahupua'a uses either makai or mauka.

Next mauka is the *Wao Kanaka* region, which has continued as the desired living and farming belt in North Kona for many of the same reasons that it was favored in history - adequate rainfall and soil, pleasant temperatures, and relative proximity to the shoreline activities.

More mauka still and extending into and above the mauka-most portions of Honokōhau, is the *Wao Ma'ukele* rainforest belt. Here, residential use is less common and is more rural in character, often interspersed with farming, ranching or forested areas. Extending even further mauka into the fog-shrouded upper elevations of Hualālai is the *Wao Akua*, within the Keauhou ahupua'a.

The ahupua'a concept has been transformed, but the values of prudent land use and resource management which were honored in the past merit enduring respect. In particular, issues related to the water cycle, scenic vistas, and being good neighbors remain as important as ever. Furthermore, these relationships extend beyond the ahupua'a to adjacent areas.

It is thus important to establish not only the valued cultural, natural and historical resources and native Hawaiian rights related to these in the Petition Area, but also those in surrounding areas that could be affected. The resources that have been specifically and repeatedly cited by those interviewed for the project (and others in discussions and

meetings) are water quality and the visual character of the ahupua'a, particularly as seen from the coastal area, where the traditional visual connection between the summit, slopes and coastal waters is best preserved. Unmitigated impacts to water quality, in particular, could theoretically jeopardize valuable resources in ponds and nearshore waters, which have cultural value and implications for native Hawaiian rights concerning fishing and gathering.

4.3.3.4 Impacts to Valued Natural, Cultural and Historical Resources and Mitigation

Based on historical research and oral interviews, as well as review of natural and historical resources, it can be concluded that there are few valued cultural, natural or historical resources within the Petition Area itself. Those present include various archaeological sites and human burials important for preservation in place. With mitigation through preservation where recommended, as well as access to and interpretation of certain archaeological sites, there will be minimal adverse effect. The treatment of the seven known burials, all associated with lava tubes, will be in accordance with procedures approved by the Hawai'i Island Burial Council and the State Historic Preservation Division.

The proposed project site has not been used for traditional cultural purposes in the recent memory of any of the extensive list of interviewees consulted as part of the oral history research. It is reasonable to conclude that based upon the limited range of resources and the proposed mitigation to all affected resources, the exercise of native Hawaiian rights related to gathering, access or other customary activities will not be affected, and there will be no adverse effect upon cultural practices or beliefs.

Indirect impacts to the valued cultural, natural or historical resources elsewhere in the two ahupua'a of Honokōhau and adjacent areas are intrinsically more difficult to evaluate. The resources that have been specifically cited by native Hawaiians consulted for the project have been water quality and the traditional visual character of the ahupua'a. The project has the potential through alteration of water quality and topography to impact upon these resources. It is particularly important to recognize that native Hawaiian cultural beliefs and practices are continually affected by the loss of land to development that intrudes into the natural setting, changes the landscape, and disturbs traditional sites and trail networks. These processes have become recently intensified in North Kona, where the rate of development is rapidly increasing. When taken in pieces, each development does not necessarily impose a significant cultural impact, especially when concentrated mauka of Queen Ka'ahumanu Highway. Eventually, however, the transformation of the lava fields may result in the loss of this traditional Kona landscape. Similarly, incremental alteration of groundwater may cumulatively detract from the water quality upon which cultural practices partly rely.

Other sections of this EIS have evaluated in detail offsite impacts, both from project-only and cumulative perspectives. Water quality studies quantified the degree of impact, and formulated mitigation measures that are designed to avoid or minimize to minor levels

any adverse impact on water quality. Small changes in groundwater flow levels, salinity and nutrient concentrations would occur as a result of the project, but not to a degree that would harm individual species or the biological community structure of the nearshore marine environment or ponds. When the full range of projects planned in the Kaloko and Honokōhau ahupua'a between Mamalahoa Highway and Queen Ka'ahumanu Highway is implemented, mitigation of the cumulative impacts would require connection to a municipal sewage system, which is expected to occur. Toxic substances can readily be limited to concentrations below the threshold of harm to human health or ecosystems by adherence to applicable laws and regulations which require implementation of appropriate Best Management Practices (BMPs) for containment, transfer, use and monitoring of these substances.

The EIS also considers visual impacts, especially from the standpoint of viewers within the National Park, where cultural practices are important and ongoing. The scenic view of the summit and upper slopes of Hualalai from the coastal areas of Honokōhau will not be obstructed by the proposed development of the Petition Area. At the South Access Road intersection with Queen Ka'ahumanu Highway, which would access the Petition Area and also serve as the major gateway to the National Park, project design would provide a harmonious connection between the two properties, with native plants playing a prominent role in landscaping. The continued discussions with the National Park, Na Kokua Kaloko-Honokōhau and other groups concerning design and landscaping that are planned as part of project development will also mitigate concerns related to potential impacts.

In summary, in the judgement of Lanihau, with implementation of mitigation as recommended in the EIS, the proposed Kaloko-Honokōhau Business Park would have a minimal adverse impact upon valued cultural, natural or historical resources, as well native Hawaiian rights, beliefs, and practices in the project area.

Secondary and Cumulative Impacts: No cultural practices or beliefs will be adversely impacted by the project, and no valuable natural, cultural or historical resources will be substantially affected, given implementation of mitigation measures to prevent adverse impacts to culturally important viewplanes and water quality of the culturally important ponds and marine waters downslope of the project. Proper treatment of historic sites with cultural values will prevent adverse cumulative impact.

#### 4.3.4 Economic

##### *Economic Overview*

In general, the economic base of West Hawai'i is in the midst of a major transition. Forty years ago West Hawai'i was a stable agrarian society, with scattered villages, a resident population of about 14,000, little tourism, and limited commercial and industrial development. All finished products were shipped from Oahu, there was a relatively simple financial structure with few major retailers, and most of the island's businesses were located on the Hilo side.

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The last four decades have seen a steady, if somewhat cyclical, trend towards an urban economy, echoing the transitions seen on Oahu in the 1940s through 1960s, and on Maui in recent years. Today, most of the state's major businesses are represented in West Hawai'i with independent major facilities. Where few base businesses once existed and consumer options were limited, there is now competition and an expanding spirit of local entrepreneurship. Nonetheless, agriculture remains one of the island of Hawai'i's prime economic industries.

Sugar, macadamia nuts, and coffee have historically been the major agricultural products. The last of the Big Island's sugar operations shut-down during early 1996, although coffee and macadamia nuts remain important. Significant and growing contributions are being made by the state's diversified agricultural sector, with crops including papayas, vegetables, cut flowers, and nursery products. Livestock raising remains an important economic activity.

Kamehameha Schools has over the last five years leased 20,000 acres to Prudential Timber for production of timber/forest products, primarily fast-growing eucalyptus trees to be used in plywood as well as other wood and wood fiber products. 15,000 of those acres are located within the Hamakua district, while an additional 5,000 acres in Ka'u were leased in June 1998.

Two other noteworthy agricultural developments have occurred in the past two years. The University of Hawai'i developed a ringspot resistant super papaya variety; which may reinvigorate the flagging papaya industry on the Big Island. Second, the first operating agricultural crop irradiation plant opened recently in Keaau. The facility deals with a variety of infestations commonly found on Hawai'i produce, which will allow greater export potential for Big Island crops.

Historically, most jobs on the Big Island were related to agriculture, directly or through services. Only in the 1960s did tourism begin to provide large numbers of jobs. With the demise of sugar, tourism has become increasingly vital to the economy of Hawai'i, despite being subject to periodic downturns. Tourism has experienced meaningful recovery since late 1996 and is in a definite upcycle, particularly on the Kohala Coast, one of the most popular destinations in the State of Hawai'i. Expensive, resort-residential homes in both Kona and Kohala are a prominent element of this recovery.

East Hawai'i remains hard hit from the recession, as more than 1,000 sugar industry-related jobs have been lost since 1993. Over 45,000 acres have been taken out of sugar production. A small portion has been utilized for other purposes, including truck farming, timber, cattle grazing, or various start-up, experimental or low capital requirement activities. Few of these efforts employ meaningful numbers of former sugar workers, and most of the former sugar cane acreage now lies fallow.

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However, the island's economy is poised for recovery. After the relatively quiet 1990s, the visitor industry is booming and conditions are ripe for a period of accelerating growth. In the first five months of 2000, State of Hawai'i general excise tax receipts from Hawai'i County have risen by 18 percent over the corresponding period in 1999, and the value of private construction permits has risen by 54 percent. Annual growth of receipts in West Hawai'i and Puna are estimated as even higher ([www.Hawai'i.gov/dbedt/selected](http://www.Hawai'i.gov/dbedt/selected)). Tourism gains, recovery in construction expenditures, growth of the agricultural industry and the development and strengthening of new sections in the economy will provide for the foundation of this growth in 2001 and beyond.

A summary of the various population and economic indicators comparing Hawai'i County and West Hawai'i is provided in Table 4-8.

**Table 4-8**  
**Summary of Historic and Projected Population and Economic Indicators**  
**For the West Hawai'i Region, 1960 to 2020**

	1960	1970	1980	1990	2000	2010	2020
<b>Resident Population</b>							
Hawai'i County	61,332	63,468	92,053	120,317	149,600	173,900	205,400
% Annual Compounded Change		0.34%	3.79%	2.71%	2.20%	1.52%	1.68%
West Hawai'i Region	14,167	14,472	27,518	43,373	65,031	82,776	104,343
% Annual Compounded Change		0.21%	6.64%	4.66%	4.13%	2.44%	2.34%
% of County Total	23.10%	22.80%	29.89%	36.05%	43.47%	47.60%	50.80%
<b>Economic Indicators</b>							
<b>1. Tourism</b>							
Hawai'i County Room Count	581	3,166	5,889	8,952	9,900	11,400	13,000
% Annual Compounded Change		18.48%	6.40%	4.28%	1.01%	1.42%	1.32%
West Hawai'i Region	152	1,584	3,844	6,825	7,600	8,900	10,200
% Annual Compounded Change		26.41%	9.27%	5.91%	1.08%	1.59%	1.37%
% of County Total	26.16%	50.03%	65.27%	76.24%	76.77%	78.07%	78.46%
Hawai'i County Visitor Arrivals	119,000	477,720	761,103	1,030,900	1,300,000	1,800,000	2,350,000
% Annual Compounded Change		14.91%	4.77%	3.08%	2.35%	3.31%	2.70%
West Hawai'i Region (2)	27,000	254,720	442,483	730,900	975,000	1,450,000	1,975,000
% Annual Compounded Change		25.16%	5.68%	5.15%	2.92%	4.05%	3.14%
% of County Total	22.69%	53.32%	58.14%	70.90%	75.00%	80.56%	84.04%
<b>2. Job Count</b>							
Hawai'i County Job Count	22,293	28,410	38,200	57,200	63,500	78,400	95,000
% Annual Compounded Change		2.45%	3.01%	4.12%	1.05%	2.13%	1.94%
West Hawai'i Region (est.)	3,300	8,600	17,300	34,200	40,200	53,900	68,000
% Annual Compounded Change		10.05%	7.24%	7.05%	1.63%	2.98%	2.35%
% of County Total	14.80%	30.27%	45.29%	59.79%	63.31%	68.75%	71.58%

Sources: US Census (population), Hawai'i Visitors Bureau (tourism) County of Hawai'i and State DBEDT (employment)

Notes: (1) Includes the districts of North Kohala, South Kohala, North Kona and South Kona.  
 (2) Estimated according to port of entry.

## Final EIS: Kaloko-Honokohau Business Park

A three-fold economic analysis was conducted specifically for the proposed project is attached as Appendix 9. The report provided:

- A *Market Study*, to ascertain whether there would be sufficient demand in the West Hawai'i industrial and commercial markets to successfully absorb the finished inventory from the proposed project in a timely manner, considering the project's characteristics and those of competing in-place and proposed regional development.
- An *Economic Impact Analysis*, to estimate the general and specific effects on the local economy that would result from the development of the proposed project, including construction and operating employment, wages and income, contractor/supplier profits, end-user expenditures, and other regional monetary and employment effects.
- A *Public Cost-Benefit Assessment*, to quantify the impact on public finances arising from the proposed project, specifically in regard to tax/fee revenues which will be received by the State and County of Hawai'i, versus the implied cost of providing needed government services to the development.

The following sections present these findings. Full details may be found in Appendix 9.

### 4.3.4.1 Market Analysis

#### *Existing Conditions*

Following an extended period when demand for industrial lots was down significantly and new development was at a virtual standstill, activity in this sector has meaningfully recovered during the past 24 months. Two new projects offered lots that experienced rapid absorption in 1999; the vacancy rates among existing buildings have declined; and numerous new structures are being proposed. All relevant indicators point to the early stages of an up-cycle period in West Hawai'i, with tourism rising, a solidifying economic base, decreasing unemployment rates, and an increase in business creation.

#### *Methods*

The analysis of the West Hawai'i industrial market sector was divided into three general subsections: quantification of demand, identification of supply, and correlation of indicators.

Demand was modeled as a function of both long- and short-term perspectives; the former used resident and tourism population requirements as a basis for determining additional industrial spatial needs over the next two decades, the latter was based on absorption levels currently being achieved in study area subdivisions and prospects for further business expansion over the next several years.

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The level of existing and proposed industrial acreage supply was then analyzed, with the demand/supply quotients then compared to arrive at a conclusion of need (or lack thereof) for further designation of industrial lands in West Hawai'i.

### *Trends in Supply and Demand of Industrial Lands in West Hawai'i*

[Note: Detailed discussion of data and models, including spreadsheet tables, is contained in Appendix 9; the following is a narrative summary only]. Studies of real-estate transactions determined that the study area (Keahole-to-Kailua-Kona) had successfully absorbed some 240.2 gross acres of industrial lands and 1.91 million square feet of finished floor space through 1999, averaging 8.9 acres and 73,200 square feet annually since 1979. Based on population, business expansion and general economic trends, total additional demand is forecast at 388.5 gross acres and 3.18 million square feet over the next 20 years, *more than double the present inventory.*

The existing in-place supply of industrial/business land in the Keahole-to-Kailua-Kona corridor will be sufficient to meet market demands for only another three or four years. After that time, additional properties will be required if the sector is to maintain an appropriate demand/supply balance. The recent offerings at Kaloko Industrial Park Phase 2, Honokohau Iki, and Kohanaiki, while serving to fill pent-up demand that accumulated during the past decade, are almost fully absorbed, mostly by owner-user purchasers who plan on building and occupying the finished space over the next five years. Other existing projects (such as at NELHA and Kawaihae) are not competitive in the general market sector for reasons of restrictions or geography. While there are other large-acreage industrial additions proposed in the region, virtually all would have to be developed in a timely manner in order to meet demand levels. Although there would be an oversupply if all were approved and built during the projection period, this is considered highly unlikely. Several of the projects are second phases of existing parks that have yet to be scheduled, others are not yet approved, some have undesirable leasehold land tenure, and one will probably be put to commercial uses. A competitive highway-frontage location in the in-demand Kaloko-Honokohau neighborhood would appear to be a highly marketable development.

The availability of "heavy" (general) industrial lands in West Hawai'i is extremely limited, with most located near Kawaihae, well-removed from the growing Keahole-to-Kailua-Kona business corridor. The continuing urbanization of the study area will put a premium on locations convenient for consumers, suppliers, and end-users. The other existing and proposed competing regional industrial parks are tending to focus on mixed-uses, with significant commercial components. Based on comparison with communities of similar size elsewhere, it is estimated that more than 100 acres of heavy (general) industrial lands will be needed in West Hawai'i over the next two decades. The Petition Area provides an excellent location, and would be the only currently proposed alternative to meet these market needs.

*Market Absorption of Proposed Project's Lots*

Based on historic and prevailing market trends, and the anticipated movements in the West Hawai'i industrial/business sector, the market study estimated that it would take about 10 years marketing and exposure time to successfully absorb the 102 gross acres of industrial/mixed-use lands in the first phase and the 50-plus acres of the quarry and heavy (general) industrial lands. The second increment, comprising 82.8 acres of industrial/mixed-use, would require an additional nine to ten years. The final 43 acres of industrial/mixed use would be absorbed over a subsequent four to six years. The entire development would take 23-plus years to be fully absorbed.

In summary, the conclusions of the market analysis were that the property enjoys an appropriate and exceptionally competitive location between two existing industrial/business parks. It is centrally sited within the emerging Kailua-Kona to Keahole industrial/commercial corridor, an area that has demonstrated strong appeal among regional businesses. The property enjoys direct access to and extensive frontage along West Hawai'i's main thoroughfare, Queen Ka'ahumanu Highway. The interior roads will connect with the street system of the nearby developments. It is a natural in-fill site that has already demonstrated the ability to support a quarry/heavy industrial operation. It will fit in well with the existing and proposed industrial/business uses nearby at Honokohau, Kohanaiki and Kealakehe. By every market perspective it is a favorable location for the proposed use.

The project would provide considerable benefit to consumers through widening competition, and no adverse market impacts are expected.

4.3.4.2 Economic Impact Analysis

The economic impact analysis accomplished for this EIS (see App. 9 for full discussion) focused on employment and income.

*Existing Conditions*

Historically, the Big Island's primary employment sector has been agriculturally oriented. During the 1980s, construction and service sector jobs associated with the growth of the tourist industry, especially the major resort and hotel properties in West Hawai'i, began to dominate the job market. This was reinforced by the demise of sugar and its jobs, although the prolonged downturn of the early to mid-1990s produced a slump across all economic sectors, as employment in hotels on the Big Island fell from 6,600 in 1991 to 5,550 by 1995.

The sector has experienced meaningful recovery since late 1996, and is within a definite upcycle, particularly on the Kohala Coast. The infusion of West Coast dollars into the resort economy has spurred employment in the service and construction sectors. Population growth

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and business diversification have resulted in a multi-faceted and flexible labor pool in West Hawai'i, although workers are not always fully employed, as Table 4-9 indicates. The latest unemployment figures for the Big Island show a dramatic drop to less than six percent.

**Table 4-9  
Unemployment Figures, State and Hawai'i County 1993 to Present**

	1993	1994	1995	1996	1997	1998	1999
Hawai'i State	3.8%	5.2%	6.0%	5.7%	6.4%	5.4%	5.6%
Hawai'i County	5.9%	9.6%	7.8%	8.6%	10.2%	8.0%	9.6%

Source: State of Hawai'i Department of Labor and Industrial Relations. All figures year-end.

*Impacts and Mitigation Measures*

The economic impact analysis (see App. 9) calculated that the project would bring an estimated \$329.62 million in direct development capital into West Hawai'i over the 34-year build-out period for the project. The analysis calculated infrastructure and building construction, and allocated them over the three phases of the project. Based on this, the project would infuse an anticipated \$9.69 million annually into the Big Island building industry on average over the build-out period. This is the equivalent of a 3.5 to 6.5 percent boost over recent yearly construction levels during the mid to late 1990s.

Although employment in the depleted West Hawai'i construction trades is beginning to rise for the first time in a decade, there is a continuing instability in the Hawai'i economy, with limited favorable aspects from an employment perspective. The subject development would be a substantive component of any major recovery.

The development of the Kaloko-Honokohau Business Park (subdivision, infrastructure development, building the improvements, and business operations) would create 174,683 worker years of employment during the 34 years required to build-out the project, paying total wages in excess of \$5.2 billion in year 2000 dollars (Table 4-10). Thereafter, the operating businesses would generate 6,915 permanent jobs on site and an additional 3,357 off-site jobs, with total annual wages of \$298.75 million. The project would lower unemployment in the construction trades by 15 to 25-plus percent during its building process, and the permanent on-site employees would represent about five percent of the total county workforce three decades hence, making the business park a substantial employment source. The direct economic impact of the undertaking would total more than \$5.2 billion during the development time-frame, with indirect impacts of more than twice this amount as the capital, wages and profits flow through West Hawai'i. The operating businesses would collect an estimated \$839 million annually in gross revenues, and overall the project has the potential to be a diverse, foundational component in the Big Island economy.

Table 4-10  
Total Economic Impact, Selected Years and Overall, Years 1-34

Development Year	1	5	10	20	30	1-34
Annual Wages	\$1,150,000	\$30,500,625	\$80,515,625	\$180,145,625	\$272,524,063	\$5,213,423,563
Contractors' Profit	\$275,000	\$1,075,000	\$1,075,000	\$1,075,000	\$975,000	\$32,962,500
Suppliers' Profit	\$82,500	\$430,000	\$430,000	\$430,000	\$390,000	\$13,095,000
Total Base Impact	\$1,507,500	\$32,005,625	\$82,020,625	\$182,050,625	\$273,889,063	\$5,259,481,063
Multiplier Ratio	2.0	2.0	2.0	2.0	2.0	2.0
Total Overall Impact	\$3,015,000	\$64,011,250	\$164,041,250	\$364,101,250	\$547,778,125	\$10,518,962,125

Source: Appendix 9: In Constant Year-2000 Dollars

In summary, the development of the Kaloko-Honokohau Business Park would result in significant expenditures that would favorably impact the West Hawai'i economy on both a direct and indirect basis, increasing the level of capital investment and capital flow in the region, which would in turn create employment and widen the tax base. The economic impact is highly beneficial and requires no mitigation.

Modified Alternative Impacts and Mitigation

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. There would be fewer jobs, less income, and less receipts of state income and general excise tax. Property tax receipts would be less, bringing less money to the County of Hawai'i. State and County expenditures would also be less. Although Area D accounts for about 12 percent of the total property, under the main alternative it is slated for development last. Therefore the reduction of economic benefits (jobs, income and tax receipts) as well as economic impacts (State and County expenditures) would be considerably less than this proportion considered over the time frame of the next several decades.

Secondary and Cumulative Effects: As with direct effects, secondary economic impacts - including expenditures by Business Park employees, re-investment of profits by businesses, and other factors - are highly favorable. The cumulative impact of this project when considered with other developments on the island of Hawai'i will be to provide complementary diversification of employment and the range of competitively priced goods and services; again, this is a beneficial effect.

4.3.4.3 Public Cost-Benefit Assessment

4.3.4.3.1 Introduction and Methodology

The purpose of this analysis is to determine how the proposed project would potentially impact public agency resources, and then quantify (where possible) the costs of providing

expanded services to the project, versus the economic benefits that accrue to the community through an increase in local and state tax payments.

For most developments, potential direct costs to governmental services and programs include police protection, fire protection, public oversight agencies, infrastructure services, recreational demands, educational needs, infrastructure costs, and various other services and financial commitments. However, as a privately built industrial project, many of these costs would not be increased on the State or County levels as a result of the proposed Kaloko-Honokohau Business Park. There would be no increased educational or recreational needs directly attributable to the subject development; the major public infrastructure items (highway and primary water/sewer mains) are already in place; and the development would require no specific public subsidies, welfare services, bonding or capital improvements.

Direct tax benefits to the state and county coffers would primarily flow from the project and its operation over time from three major sources:

- Real Property Taxes
- Gross Excise Tax Receipts
- State Income Taxes

The primary method used in this analysis for the calculation of public costs is the *actual cost basis*, which considers the need that the proposed project's improvements and users would create for expansion of existing public services. An alternative method for determining public costs is through *per capita expenditures* incurred by the State of Hawai'i and Hawai'i County in accordance with the de facto population area of the jurisdiction. This is founded on the principal that each individual on the island equitably benefits from all governmental costs, regardless of type or focus throughout the day, with each new member of the community (whether resident or visitor) creating a proportionate new cost burden in their daily home and working life. The per capita method is an atypical approach for most industrial/commercial developments, as most costs are viewed as accruing to residential aspects of a person's lifestyle and land use. However, the cost analysis included consideration of per capita expenditures in order to demonstrate the overall public fiscal impact potential of the proposed subject project even when viewed from this maximum potential cost perspective. (See App. 9 for rationale and detailed explanation of methods, and for worksheets associated with calculations of figures reported below).

#### 4.3.4.3.2 Public Costs

##### *Actual Costs*

The County of Hawai'i would directly incur certain types of cost increases as a result of the Kaloko-Honokohau Business Park, primarily related to emergency services. Analysis

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of response frequencies, time/cost data, and discussions with affected agencies allowed calculation of the annual costs on a stabilized basis after project build-out. Each year, activities in the Petition Area would induce police services worth \$188,750, fire protection services of \$189,000, and emergency medical response services of \$78,000. The other substantial actual cost would be for road maintenance, at \$50,000 annually.

The total annual cost to the County on a stabilized basis at build-out of the subject development would be \$505,750. This cost was calculated on an escalating basis over time, beginning at 10 percent in Year 3, and increasing in accordance with the number of operating businesses in the business park.

State of Hawai'i costs would include highway frontage work, health inspections of food service establishments and other minor oversight duties. An allowance of \$200,000 per year was made for these items, increasing to the stabilized level as the park is built out.

### *Per Capita Costs*

According to the state Financial Services database, the State expects to spend a total of \$6.7 billion on services, salaries, infrastructure, and financing in 2000. The total de facto population in the State on an average daily basis at year-end 1999 was about 1,380,000 persons, including residents, tourists, and military personnel. The per capita expenditure by the state would thus be about \$4,855 for 2000, an increase of over four percent from 1999. From 1979 through 1999, costs increased at a rate of just over five percent annually compounded.

The average daily worker population in the Petition Area at build-out would be 6,715 persons, a figure reached in Year 34 of the development process. Assuming that each worker spends about one-quarter of their life on the job (or at their place of employment), the allocated state cost per worker would be \$1,214 per year. The total "costs" to the public purse at stabilization by the project using the per capita allowance method would be \$8.152 million in constant Year 2000 dollars.

At build-out, the first phase of development would have some 2,830 permanent workers (non-construction) equating to a total cost to the state of \$3.44 million. The second phase an additional 2,383 workers and an associated cost of \$2.89 million, and the third phase, an additional 1,502 workers and cost of \$1.82 million.

Analyzed on a similar basis, the County of Hawai'i's budget in the year 2000 was \$186,264,404, which represents a compounded annual growth rate of 4.83 percent from 1995 onwards. The 2000 de facto population on the Big Island was some 161,000 persons (comprised of 145,000 residents and 16,000 visitors). The resulting de facto per capita county expenditure for 2000 was therefore about \$1,157.

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Assuming 25 percent of the total County cost per resident as the share for each worker while on the job, the average annual amount spent by Hawai'i County to support the workers at the proposed Kaloko-Honokohau Business Park would be \$289 per worker.

Application of this figure to the total on-site worker population at build-out yields \$1,940,635 annually in costs to the County government on a stabilized basis (6,715 workers times \$289). This would be comprised of Phase 1 costs of \$817,870, Phase 2 costs of \$688,687 and Phase 3 allocated expenses of \$434,078.

### *Total Costs*

On an actual cost basis (the most applicable analytical method for a business park), the State and County expenses associated with the subject development would range from \$75,575 in Year 3 of the project (the first year of business occupancy) to a stabilized maximum of \$555,750 at build-out in Year 34 in year 2000 dollars. Phase 1 costs at completion would be \$419,313. It is assumed that costs would reach the stabilized projection level by the build-out of Phase 2.

On a per capita allowance basis (which, it should again be noted, is an atypical perspective and an absolute maximum accounting of all direct, indirect and inferred costs), the total governmental costs to the State and County would be \$10.092 million annually.

### 4.3.4.3.3 Public Benefits

#### *County Real Property Taxes*

Property taxes paid by landowners in the subject project were calculated using the 1999-2000 tax rates for both land and buildings, improved and unimproved. Assessed values for the lots are based on an average sales prices of \$4 per square foot for quarry/heavy industrial lots, and a range of \$8 to \$17 per square foot for the industrial and mixed-use industrial/commercial lots in the three phases, with the most valuable being those having highway frontage or located near the main entrance. The improvement assessments are based on the projected development and construction costs of the finished buildings (at \$1,625,000 for the industrial and mixed-use structures and \$1,000,000 for the heavy industrial buildings). This estimate is conservative, because it likely understates the assessments on the improvements, as market value often exceeds reproduction expense.

A taxation rate for the industrial/mixed use of \$10.00 annually per \$1,000 of assessed value was assumed. The improvements would be classified as industrial or commercial with a tax rate of \$8.50 per \$1,000 of assessment. Land taxes are based on an unserviced value of \$50,000 per acre for 337 useable acres of the subject site in Years 1 and 2,

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increasing to \$57,212,000 per acre in Year 3 as the Phase 1 subdivision infrastructure is finished and lots are absorbed at market prices. The unserviced phases remain assessed at \$50,000 per acre until developed. The assessed values of the finished improvements are added as of the year of their construction.

All real property value of the subject holding is assumed to be vested in the completed "salable" components, with no assessment placed against open spaces, roads, or other community systems.

The total real property tax to be paid to Hawai'i County in 2000 dollars ranges from \$168,500 in Year 1 of development, to a stabilized level of \$6,990,019 at build-out in Year 34 and beyond. Phase 1 would generate \$3.41 million annually in property taxes, Phase 2 an additional \$2.26 million, and Phase 3 another \$1.32 million. The aggregate taxes paid over the 34-year study time-frame would be \$128.59 million.

### *State Income Tax*

The State would receive income taxes from two sources:

- Wages of workers employed in the construction, maintenance, and operation of the Kaloko-Honokohau Business Park components; and
- Corporate profits from contractors and suppliers serving the construction and maintenance phases of the development, and as generated by on-going industrial, commercial, and quarrying operations.

According to DBEDT data, individual State of Hawai'i income tax liability as a ratio to gross income has ranged from 5.62 to 5.80 percent during the past decade, with the more current figures tending toward the mid- to upper-end of the range. The analysis employed an effective tax rate of 5.80 percent of gross income for individual workers and full-time residents. The effective tax rate for the corporate income is estimated at 2.00 percent of gross operating profits, based on available DBEDT statistics.

The total income tax revenues to be received by the state are projected at \$76,850 in the first year of construction increasing to a maximum level at Year 34 of \$18.42 million annually in constant 2000 dollars. On a stabilized basis, after build-out, the incomes of permanent onsite and offsite workers, combined with operating onsite businesses, would yield an annual state income tax of \$18.42 million. On a phase-by-phase breakdown, the initial increment annual income taxes paid would stabilize at build-out at \$7.96 million, the Phase 2 taxes would be \$6.42 million, and the Phase 3 income taxes are estimated at \$4.04 million. Over the 34-year study period, the cumulative income taxes paid are estimated at \$317.53 million.

The analysis did not include any corporate income or other taxes which would be paid by Lanihau as a result of its profits from undertaking the Kaloko-Honokohau Business Park

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development, or from the secondary jobs created by the discretionary spending of workers and businesses. It should be noted that such items have the potential to be substantial contributions to the State coffers.

### *State Gross Excise Tax*

This 4.166 percent of expenditures tax was applied against:

- Total estimated construction contract costs;
- Total gross sales of the industrial, mixed-use commercial and quarrying businesses; and
- Discretionary expenditures by the worker population of the subject (estimated at 40 percent of total wages).

The anticipated State excise tax receipts arising from the subject development would grow from an estimated \$201,426 in the first year of development to a peak of \$40,068,223. Over the 34-year study period, the receipts would total \$688.9 million and stabilize at circa \$40.0 million per year.

Phase 1 stabilized excise tax revenues would be an estimated \$16.92 million (excluding construction items); Phase 2 would be \$14.28 million; and Phase 3, \$8.79 million.

The analysis did not include any excise tax revenues associated with the direct, local "multiplier effect" expenditures on the Big Island, or those created in the secondary market by the suppliers to the operating businesses or secondary worker expenditures.

### *Total Public Benefits (Revenues)*

In constant 2000 dollars, the aggregate annual tax revenues flowing from the subject development at full project build-out range from:

- \$168,500 to \$6,990,019 per year for the County of Hawai'i, stabilizing over time at the higher figure, totaling \$128.59 million over the 34-year development projection time-frame;
- \$278,276 to \$58,483,971 annually for the State of Hawai'i, stabilizing at \$58,416,274 million per year, and cumulatively at \$1.006 billion over the 34-year projection period; and
- \$446,776 to \$65,473,900 per year for total tax receipts (County and State), totaling \$1.135 billion for the first three-plus decades of the Kaloko-Honokohau Business Park community.

#### 4.3.4.3.4 Cost-Benefit Analysis: Summary

As with most large scale privately-built industrial/commercial projects, the subject development has the potential to be a major net contributor to the tax base of the State

and Hawai'i County. Minimally, on an actual cost basis, the level of services required from the State (not directly reimbursed through user costs/fees) are estimated to be less than \$200,000 annually by build-out in year 2000 dollars. For the County, which would provide emergency services (the primary cost), the actual yearly costs on a stabilized basis at build-out would be an estimated \$505,750. Maximally, if viewed on a per capita allowance basis, as a portion of all governmental costs associated with every person throughout the day (which is atypical, as most costs are generally viewed as accruing to a place of residence), the total costs to the State would be \$8.152 million per year, and \$1.940 million to the County. Regardless of the cost perspective, each level of government would see a large revenue benefit, as the stabilized revenues flowing to the State would be more than \$58.48 million annually, and some \$6.990 million to the County each year. (Detailed, year-by-year tables of public cost-benefit are contained in Tables VI-1 and VI-2 of App. 9).

*The net benefit to the state at completion after 34 years would be from \$50.2 to \$58.2 million per year, and to the county it would be from \$5.05 to \$6.48 million annually. Individually, each of the three phases of the park would generate a net revenue benefit for both the County and the State, and in no single year would there be a shortfall by either governmental entity.*

#### 4.3.5 Roads and Traffic

##### *Existing Facilities*

The Petition Area borders Queen Ka'ahumanu Highway, a two-lane arterial highway with right-of-way capacity for expansion to a six-lane highway with additional frontage roads (Fig. 4-7). It is the primary highway along the South Kohala and North Kona coasts, connecting Kailua-Kona with Kona International Airport, and extending north to the Kawaihae Harbor area and resort areas, including the Four Seasons at Hualalai, Waikoloa Beach Resort, Mauna Lani Resort and Mauna Kea Beach Resort.

Other major roadways that provide access to the vicinity of the project site include Mamalahoa Highway and Hina Lani Street (Fig 4-7). Access to the Petition Area itself is currently via an existing road to the quarry. This road, which is called North Access Road to distinguish it from a future South Access Road, has exclusive left- and right-turn lanes, and left- and right-turn acceleration lanes at its intersection with Queen Ka'ahumanu Highway.

Mamalahoa Highway is a two-lane arterial highway located several miles mauka of Queen Ka'ahumanu Highway. It provides the primary route between Waimea and Kailua-Kona. Hina Lani Street is a two-lane collector roadway that provides mauka-makai access between Queen Ka'ahumanu Highway and Mamalahoa Highway. Hina

Lani Street intersects both highways at stop-controlled, Tee-intersections. Kamanu and Kanalani Streets intersect Hina Lani Street at stop-controlled Tee-intersections and provide access to Kaloko Industrial Park.

*Planned Future Access to the Petition Area*

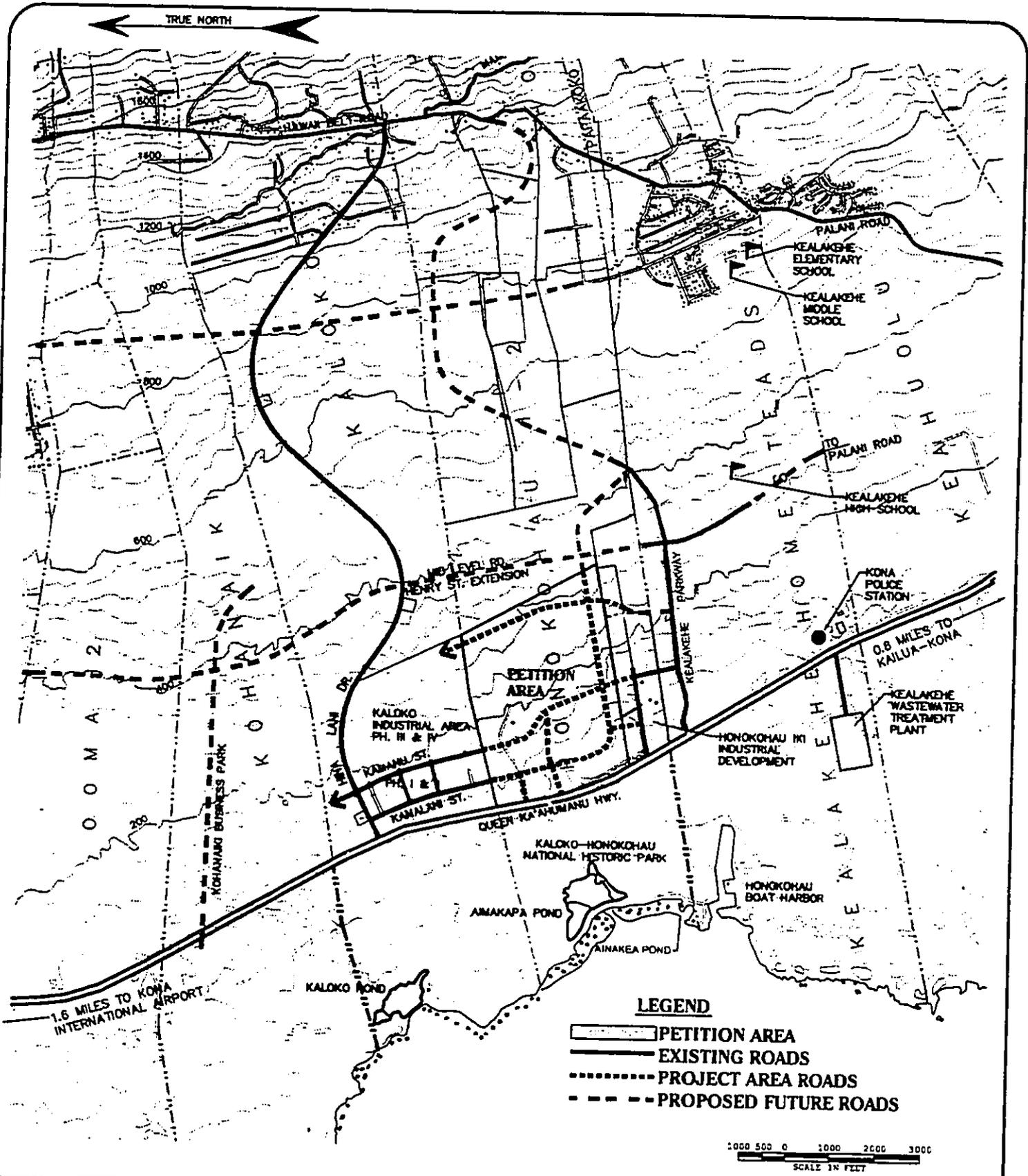
Two intersections off the Queen Ka'ahumanu Highway would provide access to the project area. One is the existing road to the quarry and related uses (North Access), and the other would be built opposite the access to the Kaloko-Honokohau National Historical Park entry (South Access). Lateral access from adjacent commercial/industrial areas would be provided through the proposed extension of the existing Kamanu and Kanalani Streets between Hina Lani Street and Kealakehe Parkway (Fig. 4-7). With respect to "Main Street" as shown on the Keahole to Kailua Development Plan's Circulation Plan, the proposed Kamanu Street Extension will allow for connection between Kealakehe Parkway and Hina Lani Street, and fulfill the basic function of "Main Street." In addition, a second collector road extending from the Honokohau Business Park area in the south to the Kaloko Industrial area in the north through the Phase 3 area has been included to provide additional circulation options consistent with the Keahole to Kailua Development Plan.

*Government-Planned Facilities in Region*

The Hawai'i County General Plan Facilities Map and the *Keahole to Kailua Development Plan's* Roadway Plan identify the future proposed road network for the study area. This proposed network is shown in Fig. 4-7. Major roadways proposed include:

- Widening Queen Ka'ahumanu from two to four lanes between Palani Road and Kona International Airport;
- Extending Kealakehe Parkway to Mamalahoa Highway;
- Extending Kealakaa Street to Kaiminani Street;
- Extending "Mid-Level Road" between Palani Road and Kaiminani Street; and
- Constructing other roads to provide circulation within the study area.

The Hawai'i Long Range Land Transportation Plan (HLRLTP) was prepared for the Hawai'i DOT in 1998. The plan evaluated the regional transportation needs based upon population, employment and visitor number forecasts, and it identified improvements that would be required to address the traffic needs by the year 2020. The HLRLTP establishes priorities and a general schedule for the provision of major road improvements with the County. As shown in Table 4-11, the HLRLTP identified various roads within the study area for development.



# ROADWAY SYSTEM

PREPARED FOR: LANIHAU PROPERTIES  
 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE: LANIHAU PROPERTIES AND HAWAII COUNTY GENERAL PLAN

KALOKO-HONOKOHAU BUSINESS PARK  
 HONOKOHAU 1ST & 2ND  
 NORTH KONA, HAWAII

FIGURE # 4-7  
 PAGE NO. 4-105

Table 4-11  
Planned Roadways

No.	Facility	Location	Description/Improvements	Priority
34b	Henry Street Extension (Mid Level Road)	Kealakehe Parkway to Hina Lani Street	New two lane highway with intersection improvements as required	Tier 1 (by 2005)
44	Queen Ka'ahumanu Highway	Kona International Airport to Palani Road	Widen existing two-lane highway to four-lane divided highway with intersection improvements	Tier 1 (by 2005)
39	Kealakehe Parkway	Kealakehe Parkway Terminus to Hawai'i Belt Road	New two-lane highway including intersection improvements as required.	Tier 2 (by 2010)

Source: Hawai'i Long Range Land Transportation Plan (HLRLTP) Hawai'i DOT, 1998.

In February of 2002 the State Department of Transportation (HDOT) announced that in June 2003 work would commence on widening Queen Ka'ahumanu Highway to a four-lane divided highway between Henry Street and Kona International Airport. The first phase of the project will extend between Henry Street and Kealakehe Parkway (entirely to the south of Petition Area) and will take about two years to complete. The timetable for the balance of the project has not been set. As part of the design for these improvements, Lanikai has agreed to relocate the main access for the Kaloko-Honokohau Business Park on Queen Ka'ahumanu Highway approximately 700 feet to the south, (the South Access Road) directly across from the existing access to the Kaloko-Honokohau National Historical Park (See Fig. 2-1). HDOT is proposing to be responsible for fully improving this intersection with traffic signals and turning lanes as part of this agreement.

*Traffic Impact Analysis Report (TIAR)*

A traffic impact assessment was conducted in order to identify potential traffic impacts resulting from the proposed project and to recommend improvements to mitigate such impacts (Appendix 11). Field investigations took place during morning (6:30 – 9:30 AM) and afternoon (2:00 PM – 5:30 PM) peak traffic periods in October 1999. The following intersections were among those surveyed:

- Queen Ka'ahumanu Highway and Hina Lani Street
- Hina Lani Street and Kanalani Street
- Hina Lani Street and Kamanu Street
- Mamalahoa Highway and Hina Lani Street

Existing Traffic

The Transportation Research Board's concept of Level of Service (LOS) was used to qualitatively evaluate traffic conditions. Six Levels of Service ranging from ideal "A" to unacceptable "F" were recognized.

Most intersections within the study area operated at satisfactory Levels of Service (i.e., "C" or better) during the 7:15 AM -8:15 AM peak hour of traffic (Table 4-12). Queen Ka'ahumanu Highway and Mamalahoa Highway operated at an overall LOS "D" and "E" respectively during this period. During the 4:00 PM – 5:00 PM peak, the Hinalani-Kanalani Street intersection operated at LOS "F", and the left-turn movement from Hinalani Street onto Queen Ka'ahumanu Highway operated at LOS "F" (Table 4-12). All other intersections within the study area operated at satisfactory Levels of Service ("C" or better) during the PM peak hour. Queen Ka'ahumanu Highway and Mamalahoa Highway themselves operated at LOS "E" during this period.

**Table 4-12  
Existing Traffic Conditions**

Intersection	Movement	AM LOS	PM LOS
Queen Ka'ahumanu Hwy at Hina Lani St.	Eastbound (LT)	A	A
Hina Lani St. to Queen Ka'ahumanu Hwy	Northbound (RT)	B	B
	Southbound (LT)	D	F
Kanalani St. at Hina Lani St.	Eastbound (RT)	C	F
	Westbound (LT)	C	F
Kamanu St. at Hina Lani St.	Eastbound (RT)	A	B
	Westbound (LT)	A	B
Mamalahoa Hwy at Hina Lani St.	Westbound (LT)	B	A
Hina Lani St. at Mamalahoa Hwy.	Southbound (RT)	C	B
	Northbound (LT)	C	C

Source: Appendix 11

*Future Traffic Assumptions*

The HLRLTP estimated that by the year 2020, the average daily traffic (ADT) on Queen Ka'ahumanu Highway would increase to 29,300 vehicles per day (vpd) between Kona International Airport at Keahole Point and Kealakehe Parkway. ADT on Mamalahoa Highway was forecast to increase to 18,400 vpd. These figures represent about a 3.4 percent annual increase in regional traffic, using 1999 as the base year. The HLRLTP was used as the basis for establishing regional traffic.

Although expanded development was an integral factor in the HLRLTP forecasts, in order to provide conservative estimates that would account for worst-case local traffic generation, the traffic analysis for the project used the HLRLTP figures as the baseline traffic. It then *added* traffic that would be generated from both the proposed project, from the Kaloko Industrial Park Phases III and IV, and from all other developments in the Hina Lani Street area that would likely be operational by the years 2010 and 2020 (refer to Section 2.6 for a list and description of these projects, and Appendix 11 for discussion of traffic generation related to them).

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The TIAR also took into account those roadway projects that are likely to be implemented (independent of the proposed project) in the next 20 years, by the State or County of Hawai'i, as discussed above under "Government-Planned Facilities in Region," or by the developers expanding of the Kaloko Industrial Park (Wilson Okamoto 2000). Completion of various roadway projects has been assumed in the traffic analysis:

By the year 2010:

- Queen Ka'ahumanu Highway will be widened from two to four lanes from Henry Street to Kona International Airport Access Road.
- The intersection of Queen Ka'ahumanu Highway and Hina Lani Drive will be signalized. The intersection of Queen Ka'ahumanu Highway and the Kaloko-Honokohau National Historical Park Access Road will also be signalized. The latter intersection will also be improved to provide exclusive left- and right-turn lanes on northbound and southbound Queen Ka'ahumanu Highway.<sup>1</sup>
- Eastbound Hina Lani Street will be widened/restriped at Kanalani Street to provide a channelized right-turn lane, and westbound Hina Lani St. will be widened/restriped at Kanalani Street to provide an exclusive left-turn lane. Eastbound Hina Lani Street will also be widened to provide a right-turn deceleration lane at Kamanu Street.
- As recommended in the Kaloko TIAR (Wilson-Okamoto 2000, App. G):  
1) Kanalani Street will be widened/restriped at Hina Lani Street to provide separate right- and left- turn lanes; 2) Westbound Hina Lani Street will be widened/restriped at Kamanu Street to provide an exclusive left-turn lane and a median storage lane; and 3) Kamanu Street will be widened/restriped at Hina Lani St. to provide exclusive left turn and right turn lanes.
- Mamalahoa Highway will be signalized at its intersection with Hina Lani Street, and southbound Mamalahoa Highway will be widened to provide an exclusive right-turn lane at Hina Lani Street.

By the year 2020,

- Kealakehe Parkway will be widened at Queen Ka'ahumanu Highway to provide an exclusive left-turn lane.
- Exclusive left-turn lanes will be built on eastbound Kealakehe Parkway at the extended Kamanu Street, and separate left- and right-turn lanes would be built on the extended Kamanu Street at Kealakehe Parkway.

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<sup>1</sup> DOT has agreed to construct these improvements as part of the Queen Ka'ahumanu Highway Widening Project in return for agreement by Lanihau to locate its main access to the Petition Area to coincide with the Kaloko-Honokohau National Historical Park entrance. As part of this agreement DOT may restrict use of the North Access Road intersection, once the South Access Road improvements to the Project Area have been completed.

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- One or more continuous north-south roadways will be built between Palani Road and Kealakehe Parkway, such as the Henry St. Extension, Kealakaa Drive, or Waena Drive.
- Mamalahoa Highway will be widened in both directions at its intersection with Hina Lani Street to provide two through lanes.
- Eastbound Hina Lani Street will be widened to provide a channelized right turn deceleration lane to Kamanu Street.
- Eastbound Hina Lani Street will be widened to provide a right turn acceleration lane from Kamanu Street.

*Year 2010 Traffic Analysis*

The traffic analysis considered the combined traffic from the general "background" increase between now and 2010, traffic generated from the proposed project and the Kaloko Industrial Park Phases III and IV, and traffic generated from other developments operating on the expected road network for various key intersections (Table 4-13).

**Table 4-13  
Traffic Conditions at Year 2010, With and Without Project**

Intersection	Without Project		With Project	
	AM	PM	AM	PM
<b>Queen Ka'ahumanu Highway at</b>				
Hina Lani St.	B	C	B	C
North Access	<u>C</u>	<u>D</u>	<u>B</u>	<u>B</u>
South Access (KHNHP Access)	B	A	B	C
Kealakehe Parkway	N/A	M/A	N/A	N/A
<b>Hina Lani Street at</b>				
Kanalani St.	<u>C</u>	<u>F</u>	<u>E</u>	<u>D</u>
Kamanu St.	<u>F</u>	<u>F</u>	<u>F</u>	<u>F</u>
Mamalahoa Hwy	<u>F</u>	<u>F</u>	C	D
<b>Kealakehe Parkway at</b>				
Kamanu St.	N/A	N/A	N/A	N/A

Source: Appendix 11. Note: A - Intersection LOS (Signalized Condition)  
A - Critical Movement LOS (Unsignalized Condition)  
 N/a - Not applicable (not included in the analysis)

*Year 2010 Peak Hour Traffic Without Project*

The key intersection in the project area - Queen Ka'ahumanu Highway and Hina Lani Street - is expected to operate at an overall LOS "B" during the AM peak traffic hour, and LOS "C" during the PM peak traffic hour. The Queen Ka'ahumanu Highway's intersections with North and South Access Roads will generally have good LOS, except for an LOS "D" in PM peak at North Access Road. The Hina Lani Street intersections

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with the sidestreets entering the Kaloko Industrial Park will have fairly poor LOS at the peak hours, and the Mamalahoa Highway intersection with Hina Lani will have LOS F at both peaks.

### *Year 2010/ Phase 1 Peak Hour Traffic: Impacts of the Proposed Project and Mitigation*

In order to mitigate the effects of the proposed project, Lanihau will contribute their fair and reasonable pro-rata funding and/or construction of regional transportation improvements and programs. The following "project-related improvements" are proposed to be completed as part of the Phase 1 development activities:

- Westbound South Access Road would be provided with three lanes at its intersection with Queen Ka'ahumanu Highway.
- The right-turn deceleration and acceleration lanes on northbound Queen Ka'ahumanu Highway at the North Access Road would be lengthened.
- Kanalani Street would be extended from the northern boundary of the Petition Area to intersect with the North and South Access Roads.
- Kamanu Street would be extended from the northern boundary of the Petition Area to intersect with the North and South Access Roads.

The projections for the year 2010 listed in Table 4-13 and described below assume the completion of both non-project and project-related roadway improvements.

Comparing with and without-project scenarios, the key intersection of Queen Kaahumanu Highway and Hina Lani Street is expected to have the same satisfactory levels during the AM and PM peaks as without the project. The road improvements that the project would involve would result in satisfactory LOS at these intersections at all peak hours. Peak hour AM and PM LOS at the intersections off Hina Lani Street will stay at roughly the same unsatisfactory levels as without the project. The Hina Lani Street - Mamalahoa Highway intersection would improve from unsatisfactory to satisfactory levels.

In conclusion, the peak hour increase in vehicles generated by the year 2010 by the proposed Kaloko-Honokohau Business Park is expected to impact traffic on existing roadways in the area. The traffic improvements recommended here, in addition to those associated with other projects, are expected to mitigate the traffic impacts resulting from this project.

### *Year 2020 Traffic Analysis*

As with 2010, the traffic analysis considered the combined traffic from the general "background" increase between now and 2020, traffic generated from the proposed project and the Kaloko Industrial Park Phases III and IV, and traffic generated from all other developments operating on the expected road network for various key intersections. Table 4-14 shows these projections.

**Table 4-14  
Traffic Conditions at Year 2020, With and Without Project**

Intersection	Without Project		With Project	
	AM	PM	AM	PM
<b>Queen Ka'ahumanu Highway at</b>				
Hina Lani St.	C	D	B	B
North Access	<u>D</u>	<u>F</u>	<u>B</u>	<u>B</u>
South Access (KHNHP Access)	B	B	C	D
Kealakehe Parkway	D	E	C	D
<b>Hina Lani Street at</b>				
Kanalani St.	D	<u>F</u>	<u>F</u>	<u>F</u>
Kamanu St.	<u>F</u>	<u>F</u>	<u>F</u>	<u>F</u>
Mamalahoa Hwy	<u>C</u>	<u>C</u>	D	C
<b>Kealakehe Parkway at</b>				
Kamanu St.	<u>C</u>	<u>B</u>	C	F

Source: Appendix 11. Note: A - Intersection LOS (Signalized Condition)  
A - Critical Movement LOS (Unsignalized Condition)

*Year 2020 Peak Hour Traffic Without Project*

Level of Service at the Queen Ka'ahumanu Highway and Hina Lani Street intersection would have deteriorated somewhat by 2020 to barely acceptable - overall LOS "C" - during the AM peak traffic hour, and LOS "D" during the PM peak traffic hour. The Queen Ka'ahumanu Highway's intersections with North Access Road would be good - LOS "B" at both peaks - but the South Access Road would have an LOS "D" at the PM peak.

Similar to 2010, the Hina Lani Street intersections with the sidestreets entering the Kaloko Industrial Park would have fairly poor LOS at the peak hours, and the Mamalahoa Highway intersection with Hina Lani Street would have LOS "F" at both peaks.

*Year 2020/Phase 2 & 3 Peak Hour Traffic: Impacts of the Proposed Project and Mitigation*

In order to mitigate the effects of the proposed project, Lanikai will contribute its fair and reasonable pro-rata funding and/or construction of regional transportation improvements and programs. The following "project-related improvements" are proposed to be completed as part of the Phase 2 and 3 development activities: (see Fig. 4-7):

- Northbound Queen Ka'ahumanu Highway would be widened at the South Access Road in the vicinity of the intersection to provide an additional through-traffic lane.

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- Southbound Queen Ka'ahumanu Highway would be widened at the South Access Road in the vicinity of the intersection to provide an additional through-traffic lane.
- A median storage lane would be built on mauka-bound Kealakehe Parkway at Kamanu Street.
- A channelized right-turn lane would be built on makai-bound Kealakehe Parkway at Kamanu Street.

The following projections for the year 2020 (see Table 4-14) assume the completion of both non-project and project-related roadway improvements listed above.

Comparing the with and without-project scenarios, the Queen Ka'ahumanu Highway and Hina Lani Street intersection would improve as a result of the diversification of entry points to the general area that would be provided by the improvements in the Petition Area, offsetting the increase in traffic that these improvements would bring. Because of the project, Level of Service would improve at this key intersection to LOS "B" at both the AM and PM peak. LOS at the North Access Road would also improve relative to the without-project scenario. LOS at the South Access Road, however, would decline, although to levels that are still somewhat acceptable. Peak hour LOS would also improve at the main intersection on Kealakehe Parkway - that of Queen Ka'ahumanu Highway - relative to the without-project scenario. LOS at Kealakehe Parkway's lesser intersection with Kamanu Street, however, would decline somewhat.

Peak hour AM and PM LOS at the intersections off Hina Lani Street would stay at roughly the same unsatisfactory levels as without the project. The Hina Lani Street - Mamalahoa Highway intersection would decline slightly to barely acceptable LOS.

In conclusion, the peak hour increase in vehicles generated by the year 2020 by the proposed Kaloko-Honokohau Business Park is expected to impact traffic on existing roadways in the area. The traffic improvements recommended here, in addition to those associated with other projects, would mitigate these impacts and result in an overall improvement from the without-project scenario. Although not all intersections would improve in LOS, and some would decline, the major intersections of Queen Ka'ahumanu Highway with Hina Lani Street and Kealakehe Parkway would be less congested with the project than without it.

During the next twenty years, it is likely that additional roadways will be constructed within the Petition Area, in addition to those identified in the HLRLTP priority list. These future roads will continue to provide alternative routes for traffic to flow within the study area as well as to the adjacent areas. This will improve roadway circulation and therefore reduce the anticipated impacts within the Petition Area as they are implemented. Improvements that are not identified in the HLRLTP priority list but which may be completed include:

- The Mid-Level Arterial (Henry Street Extension) will be extended from Kealakehe Parkway to Kaiminani Drive; and
- Kealakaa Drive will be extended from its existing terminus to Kaiminani Drive.

Modified Alternative Impacts and Mitigation

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. This will reduce the overall generation of traffic from the project. Although Area D accounts for about 12 percent of the total property, under the main alternative it is slated for development last, and therefore the reduction of traffic would be considerably less than 12 percent considered over the time frame of the next several decades. There would also be less incentive and opportunity for the implementation of the County's proposed roadway network in this area, which includes the construction of a new connector road through a portion of Area D.

Secondary and Cumulative Impacts: The proposed project's traffic would accumulate with traffic from other developments to cause increases that have the potential to produce congestion, if not mitigated. The methodology for the Traffic Impact Analysis discussed in this section incorporated secondary and cumulative perspectives. In other words, the evaluation of impacts and formulation of mitigation measures accounted for traffic from not only the Petition Area but also from all reasonably foreseeable projects in the area, including the Kaloko Industrial Park Phases III and IV. Importantly, the analysis determined that, given implementation of the proposed mitigation measures, there would be a general improvement in overall Level of Service.

4.3.6 Air Quality

4.3.6.1 Background

*Environmental Setting*

The climate of the Kailua-to-Keahole area is mild and semi-arid due to its location on the leeward side of the island. Average annual rainfall is about 20-30 inches. Winds in the area exhibit a daily reversal, with light sea breezes during the daytime (peaking in the afternoon) and a shallow mountain drainage wind from the east at night. Wind speeds are generally light and seldom exceed an average daily speed of 10 miles per hour. Light and variable westerly "kona" winds occasionally replace this pattern, most often in winter (UH-Hilo, Dept. of Geography 1998). Air quality in the study area is currently mostly affected by emissions from motor vehicles, industry and natural sources. Volcanic emissions of sulfur dioxide (SO<sub>2</sub>) from Kilauea Volcano convert into particulate sulfate, forming a volcanic haze, locally called vog. Vog becomes trapped in the Kona atmosphere because of the diurnal wind reversal, which creates a largely closed airshed system. In addition, major manmade air pollution sources include oil-fired power plants,

which emit SO<sub>2</sub>, nitrogen oxides (NO<sub>x</sub>), and particulate matter (PM), and motor vehicles, which emit carbon monoxide (CO), NO<sub>x</sub>, and hydrocarbons (an ozone precursor), as well as small amounts of other pollutants.

The major industrial source of air pollution in the project vicinity is Hawai'i Electric Light Company's Keahole Power Plant, which is located about 5 miles to the north. Air pollution emissions from Keahole Power Plant consist mostly of sulfur dioxide and oxides of nitrogen. Queen Ka'ahumanu Highway, which borders the project site on the makai side, is the region's major arterial roadway. Prevailing onshore winds during the daytime when traffic is heaviest tend to carry emissions from motor vehicles traversing this roadway toward the Petition Area.

#### *Ambient Air Quality Standards*

Federal and State air quality standards seek to limit ambient concentrations of particulate matter, SO<sub>2</sub>, NO<sub>2</sub>, CO, O<sub>3</sub> (ozone), and lead. In addition, there are State standards for hydrogen sulfide (H<sub>2</sub>S). These ambient air quality standards (AAQS) are specified in Section 40, Part 50 of the Code of Federal Regulations (CFR) and Chapter 11-59 of the Hawai'i Administrative Rules.

Table 4-15 summarizes State and national (federal) air quality standards. National AAQS are stated in terms of primary and secondary standards. National primary standards are designed to protect the public health with an "adequate margin of safety." National secondary standards define levels of air quality necessary to protect the public welfare from "any known or anticipated adverse effects of a pollutant." Secondary public welfare impacts may include such effects as decreased visibility, diminished comfort levels, or other potential injury to the natural or human environment. In contrast to the national standards, State AAQS are given in terms of a single standard that is designed "to protect public health or welfare and to prevent the significant deterioration of air quality." State of Hawai'i AAQS are in some cases considerably more stringent than comparable national AAQS, in particular, for 1-hour carbon monoxide and ozone levels.

The State and federal governments periodically monitor air quality to determine whether it meets the AAQ standards. Areas that do not meet these standards are termed non-attainment areas. The entire State of Hawai'i is considered to have acceptable air quality and is thus an attainment area.

#### *Local Air Quality Data*

The State of Hawai'i operates a network of air quality monitoring stations around the State. Systematic data are not available for most criteria pollutants in Kona, except for particulates and sulfur dioxide, which are of concern because of their association with vog. The data are derived from the Kona station, located on the campus of Konawaena High School, 14 miles south of the Petition Area. As indicated in Table 4-15, measurements of sulfur dioxide concentrations at this location during 1999 were consistently low, with an annual average concentration of 6 mg/m<sup>3</sup>,

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which represents about 8 percent of the State and national standard. The second-highest 3-hour and 24-hour concentrations (which are most relevant to the standards) were 43 and 18 mg/m<sup>3</sup>, respectively; these are less than 5 percent of the applicable standards. No exceedances of the State/national 3-hour and 24-hour AAQS for sulfur dioxide were recorded. The annual average particulate concentration for 1999 was 15 mg/m<sup>3</sup>, which equates to about 30 percent of the State/national standard. The second-highest 24-hour concentration of particulate matter, 27 mg/m<sup>3</sup>, is about 18 percent of the State/national standard, and there were no violations of the State/national AAQS during the 1999 monitoring period.

**Table 4-15  
Summary of State of Hawai'i and National Ambient Air Quality Standards**

Pollutant	Units	Averaging Time	Maximum Allowable Concentration		
			National Primary	National Secondary	State of Hawai'i
Particulate Matter <sup>a</sup>	µg/m <sup>3</sup>	Annual	50	50	50
		24 Hours	150 <sup>b</sup>	150 <sup>b</sup>	150 <sup>b</sup>
Sulfur Dioxide	µg/m <sup>3</sup>	Annual	80		80
		24 Hours	365 <sup>b</sup>		365 <sup>b</sup>
		3 Hours	-	1300 <sup>b</sup>	1300 <sup>b</sup>
Nitrogen Dioxide	µg/m <sup>3</sup>	Annual	100	100	70
Carbon Monoxide	mg/m <sup>3</sup>	8 Hours	10 <sup>b</sup>	-	5 <sup>b</sup>
		1 Hour	40 <sup>b</sup>	-	10 <sup>b</sup>
Ozone	µg/m <sup>3</sup>	1 Hour	235 <sup>b</sup>	235 <sup>b</sup>	100 <sup>b</sup>
Lead	µg/m <sup>3</sup>	Calendar Quarter	1.5	1.5	1.5
Hydrogen Sulfide	µg/m <sup>3</sup>	1 Hour	-	-	35 <sup>b</sup>

<sup>a</sup>Particles less than or equal to 10 microns aerodynamic diameter

<sup>b</sup>Not to be exceeded more than once per year

At this time, there are no reported measurements of lead, ozone, nitrogen dioxide or carbon monoxide in the project vicinity. These are primarily motor vehicle related air pollutants. Lead, ozone and nitrogen dioxide typically are regional scale problems; concentrations of these contaminants generally have not been found to exceed AAQS elsewhere in the State. Carbon

monoxide air pollution, on the other hand, typically is a microscale problem caused by congested motor vehicular traffic. In traffic congested areas such as urban Honolulu, carbon monoxide concentrations have been found to occasionally exceed the State AAQS. Present concentrations of carbon monoxide in the study area are estimated later in this section based on computer modeling of motor vehicle emissions.

**Table 4-16**  
**Annual Summaries of Air Quality Measurements for Kealakekua Station**

Parameter / Location	1999 Data
<b>Sulfur Dioxide / Kealakekua, Kona</b>	
Period of Sampling (months)	12
3-Hour Averaging Period:	
No. of Samples	2,859
Highest Concentration (mg/m <sup>3</sup> )	60
2 <sup>nd</sup> Highest Concentration (mg/m <sup>3</sup> )	43
No. of State AAQS Exceedances	
24-Hour Averaging Period:	
No. of Samples	360
Highest Concentration (mg/m <sup>3</sup> )	18
2 <sup>nd</sup> Highest Concentration (mg/m <sup>3</sup> )	18
No. of State AAQS Exceedances	
Annual Average Concentration (mg/m <sup>3</sup> )	6
<b>Particulate (PM-10) / Kealakekua, Kona</b>	
Period of Sampling (months)	12
24-Hour Averaging Period:	
No. of Samples	47
Highest Concentration (mg/m <sup>3</sup> )	28
2 <sup>nd</sup> Highest Concentration (mg/m <sup>3</sup> )	27
No. of State AAQS Exceedances	
Annual Average Concentration (mg/m <sup>3</sup> )	15

Source: State of Hawai'i Department of Health, *Annual Summary, Hawai'i Air Quality Data, 1999*

It is generally accepted that all criteria pollutants are well within standards, at least on a regional basis. The adequate air quality for pollutants other than particulates is mainly influenced by the isolation of the island from any outside sources of pollution. However, CO criteria may be exceeded on occasion near high-volume intersections during periods when traffic congestion and poor dispersion conditions coincide.

4.3.6.2 Short-Term Air Quality Impacts and Mitigation Measures

Short-term direct and indirect impacts on air quality could potentially occur due to project construction, principally through: 1) fugitive dust from vehicle movement and soil excavation; and 2) exhaust emissions from on-site construction equipment.

Fugitive dust emissions may arise from the grading and dirt-moving activities associated with site clearing and preparation work. The State of Hawai'i Air Pollution Control Regulations (Chapter 11-60, HAR) prohibit visible emissions of fugitive dust from construction activities beyond the property line. Thus, an effective dust control plan for the project construction phase is essential.

Adequate fugitive dust control can usually be accomplished by the establishment of a frequent watering program to keep bare-dirt surfaces in construction areas from becoming significant sources of dust. In dust-prone or dust-sensitive areas, other control measures such as limiting the area that can be disturbed at any given time, applying chemical soil stabilizers, mulching and/or using wind screens may be necessary. Control regulations further stipulate that open-bodied trucks be covered at all times when in motion if they are transporting materials that could be blown away. Haul trucks tracking dirt onto paved streets from unpaved areas is often a significant source of dust in construction areas. Some means to alleviate this problem, such as road cleaning or tire washing, may be appropriate. Paving of parking areas and/or establishment of landscaping as early in the construction schedule as possible can also lower the potential for fugitive dust emissions.

On-site mobile and stationary construction equipment also will emit air pollutants from engine exhausts. The largest of this equipment is usually diesel-powered. Nitrogen oxide emissions from diesel engines can be relatively high compared to gasoline-powered equipment, but the standard for nitrogen dioxide is set on an annual basis and is not likely to be violated by short-term construction equipment emissions. Carbon monoxide emissions from diesel engines, on the other hand, are low and should be relatively insignificant compared to vehicular emissions on nearby roadways.

In addition, to avoid air quality impacts from slow-moving construction vehicles traveling to and from the site on major roadways, heavy construction equipment should be moved on-site during periods of low traffic volume.

4.3.6.3 Long Term Air Quality Impacts

4.3.6.3.1 Roadway Traffic Air Quality Impacts

After construction is completed, use of the proposed facilities will result in increased motor vehicle traffic on nearby roadways, potentially causing long-term impacts to ambient air quality in the project vicinity. Motor vehicles with gasoline-powered engines are significant sources of carbon monoxide. They also emit nitrogen oxides and other contaminants.

To evaluate the potential long-term indirect ambient air quality impacts, computerized emission and atmospheric dispersion models were used to estimate ambient carbon monoxide

concentrations along roadways leading to and from the project. Carbon monoxide is selected for modeling because it is both the most stable and the most abundant of the pollutants generated by motor vehicles. Furthermore, carbon monoxide air pollution is generally considered to be a microscale problem that can be addressed locally to some extent, whereas nitrogen oxides air pollution is generally regarded as a regional issue that cannot be addressed by any single new development.

For this project, five scenarios were selected for the carbon monoxide modeling study: (1) year 2000 with present conditions, (2) year 2010 without the project, (3) year 2010 with the project, year 2020 without the project and (5) year 2020 with the project. Year 2010 is the expected date for completion of Phase 1 of the project, and year 2020 is the expected date for full project buildout. To begin the modeling study, critical receptor areas in the vicinity of the project were identified for analysis. Generally speaking, roadway intersections are the primary concern because of traffic congestion and associated vehicular emissions. For this study, two of the same intersections identified by the project traffic engineers as being impacted by the project were selected for air quality analysis. These included the following:

- Queen Ka'ahumanu Highway at South Access Road
- Queen Ka'ahumanu Highway at Hina Lani Street

Intersection configurations and traffic conditions at these two locations are detailed in the Traffic Impact Analysis Report (TIAR) (Appendix 11). It should be noted that the Queen Ka'ahumanu Highway/South Access Road intersection, which will provide entrance to both the Business Park and the Kaloko-Honokohau National Historical Park, does not currently exist. Thus, only the 2010 and 2020 scenarios were studied for this location.

The main objective of the modeling study was to estimate maximum 1-hour average carbon monoxide concentrations for each of the five scenarios studied. To evaluate the significance of the estimated concentrations, a comparison of the predicted values for each scenario can be made. Comparison of the estimated values to the national and State AAQS was also used to provide another measure of significance.

Maximum carbon monoxide concentrations typically coincide with peak traffic periods. The traffic impact assessment report evaluated morning and afternoon peak traffic periods. These same periods were evaluated in the air quality impact assessment.

The EPA computer model MOBILE5A (U.S. EPA 1999) was used to calculate vehicular carbon monoxide emissions for each scenario. This sophisticated model incorporates factors for vehicle type mix, hot/cold starts, and ambient air temperatures, each of which were customized for the proposed project. After computing vehicular carbon monoxide emissions through the use of MOBILE5A, these data were then input to an atmospheric dispersion model, CAL3QHC (U.S. EPA 1992). The model simulates vehicular movement, vehicle queuing and atmospheric dispersion of vehicular emissions near roadway intersections. It is designed to predict 1-hour average pollutant concentrations near roadway intersections based on input traffic and emission data, roadway/receptor geometry and meteorological conditions.

Input peak-hour traffic data were obtained from the TIAR data worksheets (App. 11). These included vehicle approach volumes, saturation capacity estimates, intersection laneage and signal timings. All emission factors that were input to CAL3QHC for free-flow traffic were obtained from MOBILE5A, based on an assumed free-flow vehicle speeds of 45 mph on Queen Ka'ahumanu Highway, 35 mph on Hina Lani Street and 25 mph on the South Access Road and the National Park access road.

Model roadways were set up to reflect roadway geometry, physical dimensions and operating characteristics. Model receptor sites were located about 10 meters from the traveled portion of intersections, 1.8 meters above ground to simulate levels within the normal human breathing zone.

Input meteorological conditions for this study were defined to provide "worst-case" results, i.e., very stable atmospheric conditions and low wind speeds of 1 meter per second with a wind direction resulting in the highest predicted concentration.

#### *Conservativeness of Estimates*

It is important to note that the results presented below reflect several highly conservative assumptions concerning both traffic movement and worst-case meteorological conditions. First, a wind blowing steadily from one direction at a speed of 1 meter per second is extremely unlikely and may occur only once a year or less. Substituting steady winds of 2 meters per second, which is still conservative, the computed carbon monoxide concentrations would be only about half the values given below. The 8-hour estimates are also conservative in that it is unlikely that anyone would occupy the assumed receptor sites (within 3 m of the roadways) for a period of 8 hours. These assumptions are used to model extreme, worst-case conditions.

#### *Predicted Worst-Case 1-Hour Concentrations*

Table 4-17 summarizes the estimated worst-case 1-hour morning and afternoon ambient carbon monoxide (CO) concentrations, which can be compared directly to the State and national AAQS. Estimated worst-case CO concentrations are presented in the table for five scenarios: Year 2000 with existing traffic, Year 2010 without the project, Year 2020 without the project, Year 2010 with the project and Year 2020 with the project. The locations of these estimated worst-case 1-hour concentrations all occurred at or very near the indicated intersections.

As indicated in the table, the highest estimated 1-hour concentration for the present (2000) case was 5.1 mg/m<sup>3</sup>. This would occur during the afternoon peak-traffic hour near the intersection of Queen Ka'ahumanu Highway and Hina Lani Street. The predicted worst-case 1-hour concentration for the 2000 scenario was well within both the national AAQS of 40 mg/m<sup>3</sup> and the State AAQS of 10 mg/m<sup>3</sup>. For the years 2010 and 2020 without the proposed project, values increase because of the expected increase in ambient traffic, but still remain within both the national AAQS. For 2020, the State AAQS would be exceeded at the South Access Road intersection in the AM peak.

Table 4-17  
Estimated Worst-Case 1-Hour and 8-Hour Carbon Monoxide Concentrations

Roadway Intersection	Year/Scenario									
	2000 Present		2010 Without Project		2020 Without Project		2010 With Project		2020 With Project	
Queen Ka'ahumanu Highway at South Access Road	<i>1 Hour</i>		<i>1 Hour</i>		<i>1 Hour</i>		<i>1 Hour</i>		<i>1 Hour</i>	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
	-	-	6.8	4.3	6.3	3.9	10.6	8.2	12.6	10.7
	<i>8 Hour</i>		<i>8 Hour</i>		<i>8 Hour</i>		<i>8 Hour</i>		<i>8 Hour</i>	
	-	-	3.4		3.2		5.3		6.3	
Queen Ka'ahumanu Highway at Hina Lani Street	<i>1 Hour</i>		<i>1 Hour</i>		<i>1 Hour</i>		<i>1 Hour</i>		<i>1 Hour</i>	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
	4.7	5.1	7.8	6.0	10.2	6.7	7.6	6.4	9.6	7.0
	<i>8 Hour</i>		<i>8 Hour</i>		<i>8 Hour</i>		<i>8 Hour</i>		<i>8 Hour</i>	
	2.6		3.9		5.1		3.8		4.8	

Source: Appendix 12.

Notes:

	<u>1-hour</u>	<u>8-hour</u>
National AAQS	10	5
Hawai'i State AAQS	40	10

Compared to the 2010 without-project case, predicted worst-case concentrations for 2010 with the project were substantially higher at the intersection of Queen Ka'ahumanu Highway and the South Access, but slightly lower at the intersection of Queen Ka'ahumanu Highway and Hina Lani Street. Potential exceedance of the State standard was indicated at the intersection of Queen Ka'ahumanu Highway and the South Access, but compliance with both State and national standards was predicted at the intersection of Queen Ka'ahumanu Highway and Hina Lani Street.

Predicted worst-case 1-hour concentrations for the 2020 with-project scenario were substantially higher at the South Access intersection with Queen Ka'ahumanu Highway compared to the 2020 without-project case, but nearly unchanged at the Hina Lani Street intersection with Queen Ka'ahumanu Highway. Similar to the 2010 with-project scenario, exceedance of the State standard would occur at the intersection of Queen Ka'ahumanu Highway and the South Access, but compliance with both State and national standards was predicted at the intersection of Queen Ka'ahumanu Highway and Hina Lani Street.

*Predicted Worst-Case 8-Hour Concentrations*

Worst-case 8-hour carbon monoxide concentrations are also shown in Figure 4-17. For the 2000 scenario, the estimated worst-case 8-hour carbon monoxide concentration for the study area was

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2.6 mg/m<sup>3</sup> at the intersection of Queen Ka'ahumanu Highway and Hina Lani Street. This is under the State standard of 5 mg/m<sup>3</sup> and the national standard of 10 mg/m<sup>3</sup>.

For the Year 2010 without-project scenario, the predicted worst-case concentrations are substantially higher than the estimated existing worst-case concentration at Hina Lani Street but still meet both the national and State AAQS. In the year 2020 without the project, the worst-case concentrations were predicted to decrease slightly to 3.2 mg/m<sup>3</sup> at the intersection of Queen Ka'ahumanu Highway and the South Access Road, and to increase to 5.1 mg/m<sup>3</sup> at the intersection of Queen Ka'ahumanu Highway and Hina Lani Street. Areas near the Hina Lani Street intersection would potentially exceed the State standard but remain in compliance with the less stringent national standard.

For the 2010 with-project scenario, predicted worst-case concentrations would remain nearly unchanged at Hina Lani Street compared to without-project values, but would increase substantially at the South Access. With the project in the year 2010, the area near Hina Lani Street would continue to comply with State and national standards while the area near the South Access intersection with Queen Ka'ahumanu Highway would potentially exceed the more stringent State standard. In the year 2020 with the project, worst-case concentrations were predicted to increase by about 20 to 25 percent at both locations studied compared to the 2010 with-project case. Similar to the 2010 with-project case, areas near the South Access would potentially exceed the State standard while complying with the national standard. Areas near Hina Lani Street would continue to comply with both State and national standards, although the predicted worst-case concentration is only slightly under the State limit.

In summary, the project would generate air quality impacts that are relatively minor and within all national standards. State standards would be exceeded during peak hours at some intersections under worst-case meteorological conditions. Considering the land use context, no additional mitigation measures other than those employed to improve Level of Service, described in Section 4.3.5 above, are necessary.

### 4.3.6.3.2 Business Park Air Quality Impacts

Air pollution emissions from commercial/industrial facilities that might locate at the proposed business park could potentially result in direct impacts on air quality. While the specific residents of the mixed-use commercial/light industrial portion of the proposed project have not yet been identified, it is expected that they would not have the potential to emit substantial amounts of air pollution. The types of businesses that are expected to locate within the mixed-use commercial/light industrial area of the project are listed in Tables 2-1a and 2-1b.

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None of the permitted uses within the mixed-use commercial/light industrial area have the potential to emit significant amounts of air pollution. Within the Quarry Area, permitted industries with potential to emit air pollution will likely be limited primarily to concrete or asphalt batching and mixing plants or yards. Such facilities typically emit particulate matter, sulfur dioxide, carbon monoxide and nitrogen oxides.

Without specific information concerning stockpile sizes and locations, as well as stack heights, gas temperatures, exit velocities and emission rates, air quality impacts from the potential industrial facilities that will be located within the proposed business park cannot be quantitatively estimated. At the present time, such detailed information is not available. However, State of Hawai'i air pollution control rules (Chapter 11-60, HAR) require that any activity that causes air pollution must obtain written approval from the director of the Hawai'i Department of Health. This written approval generally involves applying for a permit to construct and operate a facility that emits air pollution. At the time of application, detailed information must be provided by the applicant concerning the type and nature of any air pollution emissions and the emission control technology that would be utilized. Depending on the magnitudes of the project emissions and other factors, air quality impact analyses and/or air quality monitoring may be required before the application to construct/operate is approved. Thus, although an assessment of potential direct impacts from project air pollution emissions cannot be done at this time, State rules may require that such analyses be performed at a later date when specific businesses apply to locate and operate at the proposed business park. Mitigation measures would be formulated at that time.

### 4.3.6.3.3 Air Quality Impacts from Electrical Generation and Solid Waste

The proposed project also will cause indirect air pollution emissions from power generating facilities as a consequence of electrical power usage. The peak electrical demand of the project when fully developed is expected to reach 6,500 (kilowatt-hours) (kW). Assuming the average demand is approximately one-half the peak demand, the annual electrical demand of the project will reach approximately 28 million kWh. Electrical power for the project will most probably be provided mainly by oil-fired generating facilities, but some of the project power may also be derived from photovoltaic (which will be encouraged), geothermal energy, wind power or other sources. In order to meet the electrical power needs of the proposed project, power generating facilities will likely be required to burn more fuel; hence, more air pollution will be emitted at these facilities. Given in Table 4-18 are estimates of island-wide emissions for 1993 and indirect air pollution emissions that would result from the project electrical demand, assuming all power is provided by burning more fuel oil at local power plants. The estimated indirect emissions from project electrical demand would amount to less than one percent of the present air pollution emissions occurring on Hawai'i Island, even if all power is assumed to be derived from oil.

Table 4-18  
Estimated Indirect Air Pollution Emissions from Electrical Demand

Air Pollutant	Island-Wide Emission Rate (tons/year) (all sources)	Project Emission Rate (tons/year)
Particulate	39,468	8
Sulfur Dioxide	9,345	70
Carbon Monoxide	12,912	6
Volatile Organics	27,291	<1
Nitrogen Oxides	1,680	31

Source: U.S. EPA emission factors for utility boilers (U.S. EPA 1995).

Note: Assumes electrical demand of 28 million kilowatt-hrs per year and low-sulfur oil used to generate power.

Solid waste generated by the proposed development when fully completed and occupied is not expected to exceed about 6,300 tons per year. Currently, all solid waste on the island is buried at solid waste landfills. Thus, assuming this continues to be the method for solid waste disposal, the only associated air pollution emissions will derive from trucking the waste to the landfill and burying it. These emissions should be relatively minor.

Modified Alternative Impacts and Mitigation

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. Air quality impacts would be reduced through the reduction of motor vehicle traffic, emissions from businesses, electricity generation and solid waste disposal. Although Area D accounts for about 12 percent of the total property, under the main alternative it is slated for development last. Therefore the reduction of air quality impacts would be considerably less than this proportion considered over the time frame of the next several decades.

*Secondary and Cumulative Impact:*

The estimated direct and indirect emissions of existing and planned projects in the West Hawai'i region do not appear to have the potential to cause exceedances of national or State AAQS on a regional basis. Nor would individual construction projects tend to combine to produce adverse temporary impacts, given adherence to dust control and other construction-related measures. Individual intersections that experience congestion from motor vehicle traffic may exceed certain standards, as they do now. These are best addressed through road improvements that better the Level of Service.

The project does not have the potential to cause air quality to worsen in an appreciable manner such that it approaches federal or State standards for any criteria pollutants. For example, presently on the island of Hawai'i a total of about 40,000 tons per year of particulate matter is emitted by manmade sources. Under a worst-case scenario of oil-fired power plants, electricity generated from the project would produce about 8 tons of particulate matter per year, or an increase of about 0.02 percent above current output. The highest concentrations of particulate matter at the air quality monitoring station Kealakekua during recent years measure only about 20 to 30 percent of the standards. The relationship between ambient concentrations and manmade emissions is not strictly linear; however, on a regional basis it can be crudely estimated that an increase or decrease in regional emissions will result in a roughly commensurate increase or decrease in the ambient concentrations of an air pollutant. Thus, in this case, an increase in the ambient concentration of particulates of about 0.02 percent might result. In terms of approaching air quality standards, the difference would be so small (0.02 percent of 20 to 30 percent) as to be virtually negligible and impossible to measure against the background day-to-day variation. There would thus be no measurable regional differences in the highest concentrations of particulates, which would presumably continue to peak at levels on the order of 20 to 30 percent of standards.

#### 4.4 Public Facilities and Services

##### 4.4.1 Utilities and Energy

###### *Existing Facilities*

Verizon Hawai'i Tel currently provides telephone service for the region from the switching facilities in Kailua-Kona, with trunk cables on the 69 Kv lines along the east (mauka) side of Queen Ka'ahumanu Highway. Sun Cablevision provides cable television service in West Hawai'i. There is presently no cable television service in the vicinity of the Petition Area, with the nearest service at Villages of Lai'opua, several miles to the southeast.

Electrical power is provided by Hawai'i Electric Light Company (HELCO), a privately owned utility company regulated by the State Public Utilities Commission. HELCO's Keahole generating plant, along with generating facilities in East Hawai'i, provides electrical capacity to West Hawai'i. The peak electrical demand of the project when fully developed is expected to reach 6,500 kilowatts (kW). Assuming the average demand is approximately one-half the peak demand, the annual electrical demand of the project will reach approximately 28 million kilowatt-hours (kWh).

It should also be noted that the Petition Area, along with most of West Hawai'i, receives between 200 and 250 watts per cm<sup>2</sup> in insolation (solar radiation) (UH-Hilo 1998:50). Daytime

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temperatures are frequently higher than 85 degrees Fahrenheit. This has favorable implications for both passive and active use of sunlight, and also indicates a high need for air conditioning and/or alternative cooling strategies. This has several implications in terms of energy:

- Solar water heating is highly practical at the present.
- Buildings that provide for passive cooling, daylighting and similar measures will yield substantial energy use reductions.
- Photovoltaic power is a distinct possibility.

### *Impacts and Mitigation Measures*

Electrical, telephone and cable television services are provided by privately owned utilities regulated by the PUC. These companies are responsible to plan for and provide services as demand arises. As demand increases with development in the region, the public utilities are expected to develop facilities to meet that demand.

The project's estimated buildout annual electrical demand of 28 million kWh represents 2.8 percent of the total current energy delivered by the HELCO system (HELCO generation plus purchase power), which totaled 1,013,610,116 kWh in 1999 and 1,047,609,750 kWh in 2000 (Hawai'i County R&D 2000: Table 1-4). As the project develops, its actual proportional use of HELCO's output will be smaller, as HELCO's capacity grows and the project slowly expands electrical demand. HELCO has stated that based on coordination with the project's electrical engineers, the utility will have the capacity to supply the Business Park with its electricity requirements.

Demand for energy in Hawai'i County continues to rise. HELCO's current strategy for meeting energy needs of the next 20 years involve 141 megawatts (MW), which will be met through a combination of conventional power plants (oil and coal fired), with an unknown portion of renewable energy (solar, wind, hydroelectric, geothermal, and ocean thermal energy conversion). It is likely that legislation will be passed within the next five years requiring Hawai'i utilities to maintain a renewable energy portfolio in which various renewables jointly provide a set proportion of the load.

The State of Hawai'i has been identified by the U.S. Department of Energy as the top state market for grid-tied photovoltaic energy production (<http://www.nrel.gov/research/pv/cust-sited.html>). This is based on its high insolation and simultaneously high energy costs. On the island of Hawai'i, electric energy currently costs 17 cents per kilowatt hour, compared to less than 10 cents for much of the mainland. Among its many benefits, photovoltaic power has the potential to

reduce dependence on fossil fuel and improve air quality.

Because of its location in a highly insolated area of the Big Island, the proposed development should also prepare for the eventuality that photovoltaic electricity production will be cost effective. The "break-even" point for homes and businesses in Hawai'i that are currently connected to the grid is considered by energy experts to be on the horizon (Ibid.). This will occur through interaction of key factors including technology improvements, fossil fuel energy price increases, tax credits, renewable energy profile credits, load profiles, and electrical distribution changes such as net metering, which allows small scale generators to sell their excess energy back to the utility at retail rates. The break-even point may come soon for businesses with peak loads during the daytime hours, when direct use of energy avoids the extra costs associated with storage.

The potential for the use of solar power in the Petition Area varies by application type. Businesses in the Petition Area are somewhat likely to use solar water heaters, particularly if existing tax credits remain in place to encourage such use. The potential for photovoltaic electricity generation is currently low, because of the relatively high initial investment costs, the requirement to maintain systems, and the overall higher cost per kilowatt hour compared to conventional electrical power acquired from the utility. Various studies by the U.S. Department of Energy, state energy offices, energy institutes and private businesses have estimated that photovoltaic costs well exceed costs of production by fossil fuels (see <http://www.nrel.gov/pvmat/pvmatcost.html>; [www.sandia.gov/pv/proj/case2.htm](http://www.sandia.gov/pv/proj/case2.htm), [www.solarexpert.com/grid-tie/solar-advantages.html](http://www.solarexpert.com/grid-tie/solar-advantages.html)). However, advances in solar technology, increases in oil prices, and/or government policy encouraging adoption (i.e., rebates and tax incentives could increase the potential for Business Park tenants to adopt photovoltaic technologies.

In addition, there is great potential for daylighting and use of passive cooling design (window tinting, natural ventilation, etc.), and similar measures that can provide for substantial energy use reductions and better working environments. Energy efficiency design may also provide economic benefits. HELCO currently offers "Commercial and Industrial Energy Efficiency Programs" that give participants direct cash incentives for energy conservation measures beyond current standard practice for both retrofit and new construction projects. These include space cooling, motors, lighting, and customized incentives.

It is important to recognize that actual building construction will be accomplished incrementally over the course of two decades by individual lot owners or lessees. Each owner's energy requirements, ability to amortize capital investments (such as solar photovoltaic devices), and other characteristics will naturally differ. The electrical energy picture is also likely to change dramatically during the next twenty years. The following mitigation measure will provide a flexible framework for promoting energy efficiency:

It is therefore recommended that the applicant prepare a *detailed energy information packet* for all prospective tenants and initial lot buyers. The packet will provide a basic overview of the energy

issues including photovoltaic opportunities, solar water heating, passive and active energy conservation strategies, and "designing for solar" (i.e., planning buildings and parking lots to accommodate potential solar facilities and avoiding the need for future retrofits). It would also provide contact names and numbers for private sector, government, and non-governmental organizations that can provide assistance and information. This may prove especially useful to out-of-State prospective tenants who may be unaware of Hawai'i's unique climatic conditions and high energy costs. This information would assist tenants and initial buyers in planning buildings that could account for the challenges and opportunities of the high insolation environment and could contribute to the energy efficiency of the island as a whole.

Modified Alternative Impacts and Mitigation

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. The demand for electricity would be reduced through the reduction of businesses requiring electrical power. Although Area D accounts for about 12 percent of the total property, under the main alternative it is slated for development last. Therefore the reduction in demand for electricity would be considerably less than this proportion considered over the time frame of the next several decades. No appreciable difference in impact exists relative to the provision of telecommunications and cable television services.

Secondary and Cumulative Impacts: The project will combine with similar projects to induce a need for additional electrical generation facilities on the island, whether based in East or West Hawai'i. This may take the form of petroleum-based plants, or renewable sources such as solar, geothermal, or wind power. It is the responsibility of the electrical utility, under broader guidance from the Public Utilities Commission, to determine the appropriate mode of additional power sources, and the appropriate mix of demand- and supply-side management strategies.

4.4.2 Water Supply

*Existing Facilities*

Potable water is currently available to the Petition Area by the County of Hawai'i Department of Water Supply (DWS) from its North Kona Water System. Presently, the area is serviced by a 12-inch waterline within Queen Ka'ahumanu Highway.

*Impacts and Mitigation Measures*

For facility planning purposes, water use was calculated by applying the DWS "Water System Standards" to projected uses. This resulted in an estimated demand of 1,120,000 gallons per day (GPD). This figure will be used to assist engineers in sizing storage and transmission facilities, and will be used by the County in assessing the amount of aquifer and water system capacity that the proposed project would involve. However, based on very similar land use elsewhere in Kona,

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along with information from the existing quarry and related operations, it is estimated that upon full development of the Petition Area, a more realistic average daily water demand would be 367,000 GPD (Table 4-19).

Additional water improvements would be required to serve the Petition Area at full build-out. These improvements would include source, transmission and storage facilities. The County of Hawai'i has prepared the *Hawai'i County Water Use and Development Plan (1991)*, which identifies the long range water facility improvements that would be required to service the study area through the next several decades. The proposed Petition Area water system improvements would be coordinated with the DWS and developed in accordance to their standards and requirements.

**Table 4-19  
Estimated Water Use and Wastewater Flow**

Phase	Area		Land Use		Water Use and Wastewater Flow		
	Gross Area (acres)	Net Area (acres)	Zoning	Completion Date	Estimated Water Use (GPD)	Factor (% of water use)	Amount (GPD)
1 A	101.77	100	MG	2010	60,000	.60	36,000
1 B	102.43	75	MCX	2010	112,500	.60	67,500
2	97.89	72	MCX	2020	108,000	.60	64,800
3	34.894	25	MCX	2020+	37,500	.60	22,500
<b>Totals</b>	<b>336.984</b>	<b>280</b>			<b>367,000*</b>		<b>190,800*</b>

Source: Appendix 3.

Notes: The figures above are based on actual water use in the existing quarry and related activities, combined with analysis of actual water use from similar developments. For water facility planning purposes, the Hawai'i County Department of Water Supply standards were used (resulting in higher estimates of water use); for wastewater facility planning purposes, the Department of Public Works standards were used (resulting in higher estimates of wastewater flow). See appropriate sections for discussion.

*Modified Alternative Impacts and Mitigation*

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. The demand for potable water would be reduced by approximately 37,000 GPD. The buildout demand would thus be about 331,000 GPD, or roughly 90 percent of the demand under the main alternative. However, as Area D under the main alternative is slated for development last, the reduction in demand for potable water would be considerably less than this proportion considered over the time frame of the next several decades.

Secondary and Cumulative Impacts: As government plans have specified and development projects have begun to fulfill, the Keahole-to-Kailua area is growing. The project would encourage the continued growth of the economy and the provision of jobs to existing and planned residents of West Hawai'i. All community plans for the area explicitly call for growth in this specific area and have considered water supply infrastructure to accommodate this growth.

The State Commission on Water Resource Management (CWRM) has estimated the North Kona aquifer (identified as the Hualalai aquifer) as having a sustainable yield of approximately 56 million gallons per day (MGD) (Hawai'i State Commission on Water Resources Management database). The sustainable yield is defined as "the forced withdrawal rate of groundwater from an aquifer that can be sustained indefinitely without affecting either quality of the pumped water or the volume rate of pumping".

The water use of the Petition Area is estimated at approximately 367,000 gallons per day. This usage will be needed over the estimated 20-year building out of the industrial lots/areas.

The CWRM's Draft Hawaii County Water Use and Development Plan (Hawai'i County Department of Water Supply 1991) estimated the total future water needs within the North Kona region, including the Petition Area, at approximately 38 MGD. This estimate was based on the projects based on system water sales records, discussions with government agencies and private parties, available development plans and other public information. The plan acknowledges the growth potential for the area north of Kailua-Kona extending to State lands at Pu'uwa'awa'a, including the Petition Area. The long term projected water use within the Petition Area represents approximately 1 percent of the total of the total estimated water demand in the North Kona region.

According to the State's North Kona Water Master Plan (Hawai'i State DLNR 1995), the average day water demand was 4.22 MGD. The plan further projected that a total of 13.11 MGD will be required by 2015. This master plan presents a water system development strategy to provide the necessary water resources for the region. In addition, the Keahole to Kailua Development Plan includes a Water Supply Plan to meet the estimated 23.8 MGD requirements at full build-out of the Keahole to Kailua Development area, including the Petition Area and surrounding lands.

The total buildout of the Keahole to Kailua Development area represents approximately 40 percent of the sustainable yield of the Hualalai aquifer. The projected water usage from the Petition Area represents less than 0.5 percent of the sustainable yield.

The proposed project has thus been considered by State and County agencies during planning for sustainable use of the aquifer, and its implementation would not result in withdrawals in excess of sustainable yields nor preclude other planned uses. Furthermore, prior to any final subdivision

approval or development of any industrial uses, the Petitioner will be required to obtain approval from the County Department of Water Supply that adequate water source, distribution and transmission facilities are available to serve any proposed development.

#### 4.4.3 Wastewater

##### *Existing Facilities*

There are currently no sewer lines serving the Petition Area. The nearest sewer line is within a portion of the Kealakehe Parkway and serves Kealakehe High School and the vicinity. The majority of the existing uses and activities within the adjacent Kaloko Industrial Park are on cesspool sewage systems. The State Department of Health (DOH) no longer allows cesspools for domestic or commercial treatment in the study area. New developments must utilize either septic systems or a sewage treatment plant (STP), depending on the amount of effluent.

The County's Kealakehe Wastewater Treatment Plant is located approximately two miles south of the project site on the west (makai) side of Queen Kaahumanu Highway. The six-year old plant currently has 5.3 million gallons per day (MGD) of treatment capacity and is operating at approximately 20 percent of this capacity. According to the *Keahole to Kailua Development Plan* (Hawai'i County Planning Dept. 1991:4-12), expansion to an average flow of 8 MGD is expected. Sludge generated by the plant is disposed of at the Pu'uuanahulu Landfill.

The Hawai'i County Department of Public Works has initiated planning for the extension of the sewer collection system north to provide service to the Kaloko-Honokohau National Historical Park and developments to the north, including the Petition Area and the Kaloko Industrial Park. There are no firm plans or schedule for the implementation of the proposed sewer line extension.

##### *Impacts and Mitigation Measures*

For wastewater facility planning purposes, the Hawai'i County Department of Public Works "Wastewater Design Standards" were applied to projected uses, which resulted in an estimated flow of 896,000 GPD. This figure will be used to assist engineers in sizing lines, pumping facilities, etc., and will also be used by the County to determine how much of the sewage treatment system's capacity the proposed project would utilize. However, based on very similar land use elsewhere in Kona, along with information from the existing quarry and related operations, it is estimated that upon full development of the Petition Area, a more realistic average daily wastewater flow would be approximately 200,000 GPD (see Table 4-19).

Until the sewer lines are extended to connect to the Kealakehe WWTP, wastewater disposal would be in accordance with the Chapter 62, Hawai'i Administrative Rules. These rules require

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the use of individual wastewater treatment systems (IWS) in unsewered areas, including septic tanks or aerobic units with disposal systems. Until such time as the permanent connection to the Kealakehe WWTP is provided, Lanihau shall require the use of an Individual Wastewater System (IWS) with an enhanced treatment system to remove nitrates and phosphorus. The IWS and absorption field shall be designed to remove no less than 92% of the Total Nitrogen as well as offering additional phosphorus removal. The existing quarry operation and related uses shall be required to provide an IWS meeting with these standards within one year of issuance of the boundary reclassification. Lanihau will develop and participate in a Wastewater Treatment System Maintenance Agreement to assure appropriate operation and maintenance of the IWS.

Furthermore, in preparation for eventual connection to the Kealakehe WWTP, Lanihau will build sewer lines as part of the subdivision infrastructure. The County of Hawai'i's Department of Environmental Management has initiated the process to establish an improvement district to extend sewer lines into the Petition Area and surrounding lands. Lanihau is committed to participate in the improvement district on a fair and equitable basis. Upon connection of the Petition Area to the WWTP, all individual lots therein shall connect to the WWTP, whether or not an interim wastewater treatment system has been installed.

### Modified Alternative Impacts and Mitigation

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. Wastewater production would be reduced by approximately 22,000 GPD. The buildout production would thus be about 168,000 GPD, or roughly 90 percent of the volumes under the main alternative. However, as Area D under the main alternative it is slated for development last, the reduction in wastewater production would be considerably less than this proportion considered over the time frame of the next several decades.

Secondary and Cumulative Impacts: According to the *Keahole to Kailua Development Plan*, the cumulative amount of wastewater anticipated to be generated in the region is over 9 MGD. The Kealakehe WWTP is designed to accommodate up to 8 MGD. Beyond 8 MGD, the Kealakehe WWTP capacity can be expanded by conversion of the treatment process from aerated lagoons. The development of the additional capacity would reduce and/or eliminate the use of septic systems and cesspools in much of the study area, including those existing systems in the areas mauka of the Kaloko-Honokohau National Historical Park. Accordingly, the long term impact would be to improve groundwater quality by directing wastewater to the Kealakehe WWTP. It should also be noted that as part of the long range planning for the Kealakehe WWTP, the County is reviewing its options for a water reuse plan. This may include the construction of a transmission system to carry the treated sewer effluent to the north of the existing plant to provide water for irrigation and other uses (Hawai'i County DPW: 1999).

4.4.4 Solid Waste

*Existing Facilities*

Presently, solid waste from the region is disposed of at the County of Hawai'i's Pu'u Anahulu landfill located approximately 18 miles north of the Petition Area in Waikoloa. In 1993, the initial 5-acre increment of the 150-acre landfill was opened with a projected capacity of six to 11 years. Additional 5-acre increments are expected to be required every several years thereafter. The former Kailua (Kealakehe) Landfill is presently used as a transfer station where refuse collected from residential areas is compacted for transport to the Pu'u Anahulu landfill. In addition, there is a green waste facility within the study area that currently accepts vegetation matter generated in the West Hawai'i region. It is anticipated that this green waste operation will continue during the foreseeable future.

*Impacts and Mitigation Measures*

Using standard assumptions concerning industrial/commercial facilities of a population density of 40 persons per acre and a waste generation rate of 5 to 6 pounds/per capita/day, the annual solid waste at buildout for 270 acres would be 7,100 to 8,500 tons. This can be substantially reduced through recycling and greenwaste programs. Recycling and composting have been the fastest growing methods of waste management in the U.S. over the last ten years, accounting for 27 percent of waste management in the late 1990s (McCarthy 1998). Lanikai will encourage all lot buyers and tenants to practice recycling, including construction and demolition waste. It is also likely that State law will soon mandate some form of recycling. As such, no substantial impact to the municipal solid waste collection and disposal system are anticipated during construction and operation of the proposed development. It is anticipated that refuse from the Petition Area would be collected by private services that would transport the waste to the landfill and green waste sites.

The 2002 draft addendum to the *Integrated Solid Waste Management Plan (Hawai'i County Department of Public Works 1993)* stated that the annual disposal rate in West Hawai'i is currently 34,526 tons per year. The total island of Hawai'i waste disposal is 67,246 tons per year.

The addendum also states that Pu'u'anahulu landfill contains more than 12,000,000 cubic yards (or about 1,998,000 tons) of capacity, "which should be enough to accommodate the current waste stream for the first half of the 21st century. The landfill has enough capacity for the current waste stream from both the west and east sides of the island for about 30 years. These estimates will change if the rate of disposal changes. The population of the County is bound to increase, and with population growth, there will be growth in the rate of waste generation. However, diversion of waste by recycling and the use of waste reduction technologies would reduce the waste stream and extend the life of the landfill."

As stated above, the waste stream of the proposed Kaloko Honokohau Business Park that would enter the landfill would be between 4,473 and 5,355 tons per year at full build-out – a maximum of about 0.27 percent of the remaining capacity of the Pu`uanahulu Landfill. Assuming that full build-out progresses at an even pace and is complete approximately 30 years in the future, the total waste stream over the next fifty years would be about 187,000 tons, or about 9.4 percent of the landfill's capacity.

*Modified Alternative Impacts and Mitigation*

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. Solid waste production would be reduced by approximately 850 - 1,000 tons annually at full build out. Although Area D accounts for about 12 percent of the total property, under the main alternative it is slated for development last. Therefore the reduction in solid waste production would be considerably less than this proportion considered over the time frame of the next several decades.

Secondary and Cumulative Impacts: The landfill at Pu`u Anahulu is expected to have the capacity to handle municipal solid waste from West Hawai`i for the foreseeable future. Waste management strategies are evolving rapidly, and it is expected that less land- intensive, locally based solutions will emerge within the next two decades to help solve the solid waste problem in Hawai`i.

4.4.5 Police, Fire, Emergency, and Medical Services

*Existing Services*

Kealakehe Police Station is located on Queen Ka`ahumanu Highway 1.5 miles south of the Petition Area. Eight patrol units with over 50 officers are assigned in three-watches, providing 24-hour service to North and South Kona.

The Kailua-Kona Fire Station is located about 3 miles away from the Petition Area at the intersection of Palani Road and Queen Ka`ahumanu Highway. The station provides service for all of North Kona, and assists with fire emergencies in adjacent districts. Ladder trucks, tankers, a rescue boat and an ambulance are available. Three 24-hour shifts with nine firefighters each provide service, and they can be assisted by crews and equipment from Keauhou, South Kohala, and Waikoloa.

Kona Community Hospital, located 10 miles to the south in Kealahou, has 75 beds and provides basic hospital services for all of Kona, including the Petition Area. North Hawai`i Community Hospital, Hilo Hospital, and Honolulu hospitals also serve specialty needs.

*Impacts and Mitigation Measures*

Any new development brings with it demand for such services, as police must respond to traffic accidents and criminal complaints, and fire and emergency personnel must respond to fires,

hazardous material situations, and medical emergencies. The economic impact analysis (App. 9) discussed the proposed land use with agencies and used response frequencies and time/cost data to calculate the annual additional costs that such services would involve on a stabilized basis after project build-out. Each year, activities in the Petition Area would induce police services worth \$188,750, fire protection services of \$189,000, and emergency medical response services of \$78,000. These levels of service increase are not substantial, and would not burden the police, fire, emergency, and hospital systems. It is important to note that the very substantial real property and other tax contributions would more than compensate for extra costs and would furthermore enable improvement and expansion of such services.

Modified Alternative Impacts and Mitigation

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. The demand for police, fire, emergency and medical services would be reduced through the reduction of businesses requiring such services. Although Area D accounts for about 12 percent of the total property, under the main alternative it is slated for development last. Therefore the reduction in demand for police, fire, emergency and medical services would be considerably less than this proportion considered over the time frame of the next several decades.

Secondary and Cumulative Impacts: As government plans have specified and development projects have begun to fulfill, the Keahole-to-Kailua area is growing. Additional police, fire and medical facilities would be required. The *Keahole-to-Kailua Development Plan's* Land Use Plan (see Fig. 2-3) shows civic and business centers in the Queen Liliuokalani Trust development area. The residential and educational uses planned for the Keahole State Lands would also provide a potential location for expanded services. It is expected that these and other residential developments would provide rational and appropriate sites for these facilities when demand requires it.

4.4.6 Recreational Services and Facilities

*Existing Facilities*

Other than the Kaloko-Honokohau National Historical Park, located immediately makai of the Petition Area, and the playing fields at Kealakehe High School to the south, no public or private parks or other recreational areas exist within the Petition Area or any immediately surrounding properties. The National Park is primarily important for its interpretation of cultural properties, but also has hiking trails and beaches.

The North Kona District contains a number of other parks and recreational facilities, including several within one to ten miles of the Petition Area: Honokohau Harbor, with its recreational boating facilities; Kekaha Kai State Park, a wilderness park with extensive unspoiled beaches; and the complex at the Old Kona Airport. Old Kona Airport State Park contains a number of passive uses as well as a large pavilion. The Old Kona Airport County Park contains a gymnasium, a swimming pool, five baseball fields, two soccer fields, two football fields, four tennis courts, a skateboard facility, and other active components.

*Impacts and Mitigation Measures*

In general, it can be stated that no significant impacts on recreational facilities or services would occur, because the project would not create a substantial influx of population, but instead would draw employees primarily from the existing workforce. Impacts from any new residents drawn to the area by employment in the project's businesses would presumably be mitigated by the considerable State and County taxes that business sales and employment would generate, which result in a highly favorable benefit/cost ratio (see Section 4.3.4).

*Modified Alternative Impacts and Mitigation*

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. As the project has essentially no effect on recreational services or facilities, apart from indirect effects generated by increased population and more than paid for by increased State and County tax revenues, there is no difference in impact between the main alternative and the modified alternative.

Secondary and Cumulative Impacts: As stated above, Keahole-to-Kailua area is growing in accordance with State and County plans. Additional recreational facilities and services would be required. The *Keahole-to-Kailua Development Plan's* Land Use Plan (see Fig. 2-3) shows a number of areas within residential areas where additional facilities are likely to be built. It is expected that such developments would provide rational and appropriate sites for these facilities when demand requires it.

4.4.7 Educational Services and Facilities

*Existing Facilities*

Kealakehe Elementary, Kealakehe Intermediate, and Kealakehe High School, located approximately two miles to the south, are the public schools that serve the study area (Fig. 1-1). The elementary school served about 900 students in the 1999-2000 school year, about 85 percent of its capacity. The intermediate school had nearly 1,100 students and was also at about 85 percent capacity. The high school had about 1,120 students and is similar in terms of its capacity.

*Impacts and Mitigation Measures*

No significant impacts on schools would result from the proposed project, as little direct population increase would be attributed to the project, and the considerable net benefit in terms of State taxes would help fund schools. Any business park-type project in the area would have some potential to impact Kealakehe High School through proximity impacts such as noise, air quality, and traffic. These areas are covered in separate sections above. In general, it can be stated that because of the limited nature and extent of such impacts, no adverse impacts to the noise, air

quality, or traffic, or any other aspect of the environment for Kealakehe High School students, teachers, staff and parents, would occur. In particular, it should be noted that implementation of the project and its associated traffic mitigation measures would *improve* Level of Service at the intersection of Kealakehe Parkway and Queen Ka'ahumanu Highway, which provides access to the high school (see Section 4.3.5).

Modified Alternative Impacts and Mitigation

Under the modified alternative, Area D, the 45-acre piece at the mauka end of the property, would not be developed. As the project has essentially no effect on educational services or facilities, apart from indirect effects generated by increased population and more than paid for by increased State and County tax revenues, there is no difference in impact between the main alternative and the modified alternative.

Secondary and Cumulative Impacts: As stated above, Keahole-to-Kailua area is growing in accordance with State and County plans. Additional educational facilities will be required. The *Keahole-to-Kailua Development Plan's* Land Use Plan (see Fig. 2-3) shows a number of areas within planned mid-level residential areas where schools would be located. It is expected that these and other residential developments will provide rational and appropriate sites for these facilities when demand requires it.

**PART 5: CONSISTENCY WITH GOVERNMENT PLANS AND POLICIES**

**5.1 The Hawai'i State Plan.**

**5.1.1 Plan**

Adopted in 1978 and last revised in 1991 (Hawai'i Revised Statutes, Chapter 226, as amended), the *Hawai'i State Plan* establishes a set of themes, goals, objectives and policies that are meant to guide the State's long-run growth and development activities. The three themes that express the basic purpose of the *Hawai'i State Plan* are individual and family self-sufficiency, social and economic mobility and community or social well-being. §226-4 sets forth goals associated with the *Hawai'i State Plan*:

- (1) A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai'i's present and future generations.
- (2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
- (3) Physical, social, and economic well-being, for individuals and families in Hawai'i, that nourishes a sense of community responsibility, of caring, and of participation in community life.

The aspects of the plan most pertinent to the proposed classification are the following:

- §226-10 *Objective and policies for the economy--potential growth activities.* (a) Planning for the State's economy with regard to potential growth activities shall be directed towards achievement of the objective of development and expansion of potential growth activities that serve to increase and diversify Hawai'i's economic base. To achieve the potential growth activity objective, it shall be the policy of this State to (among other actions):
  - (1) Facilitate investment and employment in economic activities that have the potential for growth such as diversified agriculture, aquaculture, apparel and textile manufacturing, film and television production, and energy and marine-related industries.
  - (2) Expand Hawai'i's capacity to attract and service international programs and activities that generate employment for Hawai'i's people.
  - (5) Promote Hawai'i's geographic, environmental, social, and technological advantages to attract new economic activities into the State.
  - (6) Provide public incentives and encourage private initiative to attract new industries that best support Hawai'i's social, economic, physical, and environmental objectives.
  - (11) Increase research and development of businesses and services in the telecommunications and information industries.
- §226-11 *Objectives and policies for the physical environment--land-based, shoreline, and marine resources.* Planning for the State's physical environment with regard to

land-based, shoreline, and marine resources shall be directed towards achievement of prudent use of Hawai'i's land-based, shoreline, and marine resources and effective protection of Hawai'i's unique and fragile environmental resources. To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of the State to:

- (1) Exercise an overall conservation ethic in the use of Hawai'i's natural resources.
  - (2) Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.
  - (3) Take into account the physical attributes of areas when planning and designing activities and facilities.
  - (4) Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.
  - (5) Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.
  - (6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai'i.
  - (7) Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.
  - (8) Pursue compatible relationships among activities, facilities, and natural resources.
  - (9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.
- *§226-12 Objective and policies for the physical environment—scenic, natural beauty, and historic resources.* Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multi-cultural/historical resources. To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of the State to:
    - (1) Promote the preservation and restoration of significant natural and historic resources.
    - (2) Provide incentives to maintain and enhance historic, cultural, and scenic amenities.
    - (3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.
    - (4) Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage.
    - (5) Encourage the design of developments and activities that complement the natural beauty of the islands.
  - *§226-13 Objectives and policies for the physical environment—land, air, and water quality.* Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards maintenance and pursuit of improved quality in Hawai'i's land, air, and water resources, and greater public awareness and appreciation of Hawai'i's environmental resources. To achieve the land, air, and water quality objectives, it shall be the policy of the State to (among other actions):

- (2) Promote the proper management of Hawai`i's land and water resources.
- (3) Promote effective measures to achieve desired quality in Hawai`i's surface, ground, and coastal waters.
- (4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawai`i's people.
- (5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.
- (6) Encourage design and construction practices that enhance the physical qualities of Hawai`i's communities.
- (7) Encourage urban developments in close proximity to existing services and facilities.
- (8) Foster recognition of the importance and value of the land, air, and water resources to Hawai`i's people, their cultures and visitors.

#### 5.1.2 Discussion

The proposed reclassification is highly consistent with the goals, objectives and policies of the *Hawai`i State Plan* calling for continued expansion and diversification of economic activities and opportunities. The proposed industrial and commercial activities would support the stability of existing economic sectors such as tourism and also provide a good location and setting for support businesses for the burgeoning sectors such as telecommunications and ocean-related technology.

In terms of the goals, objectives and policies related to protecting the environment and scenic and historic resources, it should be emphasized that the limited supply of suitable land in Hawai`i results in virtually all new development being constrained to occur in environmentally sensitive areas. In Kona, native biota, historic sites, valuable viewplanes, and sensitive coastal waters are unavoidable. Given this context, the proposed reclassification is basically consistent with the *Hawai`i State Plan's* goals of preserving these resources. The area is mauka of Queen Ka`ahumanu Highway, with the Kaloko-Honokohau National Historical Park providing an open-space buffer between the highway and the sea. The area is between two other commercial-industrial areas, and does not represent an intrusion of developed area into a pristine landscape, because the area has a long history of quarrying and related industrial activity. It takes advantage of existing and proposed road, water and sewage facilities. Proposed design and landscaping would provide an attractive roadway frontage with a landscaped buffer that mitigates the "industrial" look and does not conflict with views from the National Park of the scenic summit and upper slopes of Hualalai. Water quality effects can be limited to levels that do not cause any substantial adverse impacts through implementation of Best Management Practices and eventual connection to the Kealakehe Wastewater Treatment Plan or other facilities that provide advanced wastewater treatment. All burials, and all historic sites that have been determined to be significant for preservation, will be preserved. Finally, the proposed reclassification is consistent with the regional plans for the area, which call for development of this area in mixed industrial and commercial uses.

5.2 Hawai'i State Land Use Law

All land in the State of Hawai'i is classified into one of four major land use districts – urban, rural, agricultural and conservation – by the State Land Use Commission, pursuant to Chapter 205, HRS. The entire Petition Area is within the State conservation district.

HRS Section 205-2 requires the Land Use Commission to group contiguous land areas suitable for inclusion in one of these four major districts. It further provides that in establishing the boundaries of urban districts, those lands that are now in urban use and a sufficient reserve area for foreseeable urban growth shall be included, and that in establishing the boundaries of the districts in each county, the Land Use Commission shall give consideration to the master plan or general plan of the county.

The General Plan and other County and State land use plans are discussed in detail in Sections 5.4 through 5-9, but in general, the Petition Area is contiguous to land in the urban district to the north (Kaloko Industrial Park, Phases I and II), the south (Honokohau- Iki industrial uses) and to the west (Kaloko-Honokohau National Historical Park and Honokohau Boat Harbor). (See Fig. 2-2 for State land use districts in the study area). There is also currently pending before the Land Use Commission a petition for a district boundary amendment for the Phase 3 and IV increments of the Kaloko Industrial Park. Under the County of Hawai'i's *Keahole-to-Kailua Development Plan*, the Petition Area is designated for "Limited Industrial" uses. The Petition Area has likewise been designated for "Industrial" and "Urban Expansion" on the Land Use Pattern Allocation Guide (LUPAG) map of the *Hawai'i County General Plan*. The Petition Area is also identified as within the areas appropriate for future urban expansion in the State Office of Planning's *West Hawai'i Regional Plan*, and was recommended for reclassification to the urban district in the Office of Planning's State Land Use District Boundary Review in 1992.

In accordance with HRS Section 205-17, in its review of any petition for reclassification of district boundaries, the Land Use Commission must specifically consider the following decision making criteria:

1. *The extent to which the proposed reclassification conforms to the applicable goals, objectives and policies of the Hawai'i state plan and relates to the applicable priority guidelines of the Hawai'i state plan and the adopted functional plans.*

Discussion: The proposed project's relationship to the Hawai'i State Plan is provided in Section 5.1.

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2. *The extent to which the proposed reclassification conforms to the applicable district standards.*

Discussion: The proposed project's relationship to urban district standards is given below.

3. *The impact of the proposed reclassification on the following areas of state concern:*
- Preservation or maintenance of important natural systems or habitats.*
  - Maintenance of valued cultural, historical, or natural resources.*
  - Maintenance of other natural resources relevant to Hawai'i's economy, including but not limited to, agricultural resources.*
  - Commitment of state funds and resources.*
  - Provision for employment opportunities for all income groups, particularly the low, low-moderate, and gap groups.*

Discussion Either because of their absence or through mitigation, the proposed project would not impact in any substantially adverse way natural ecosystems, rare, threatened or endangered species, burials or archaeological sites important for preservation in place, or other valued, cultural, historical or natural resources. No important agricultural resources exist. State funds or resources would not be committed. A commercial/industrial park provides a wide spectrum of employment opportunities, including entry-level, skilled and unskilled labor, service and clerical, and professional.

For main discussion, reader is referred to appropriate sections of the EIS and a summary in Section 5.1.

4. *The representations and commitments made by the petitioner in securing a boundary change.*

Discussion Such representations will be examined in the course of the processing and review of the Petition.

Pursuant to Section 15-15-18, Hawai'i Administrative Rules ("HAR"), in determining the boundaries for the urban district, the Land Use Commission is directed to use the following standards:

1. *It shall include lands characterized by "city-like" concentrations of people, structures, streets, urban level of services and other related land uses.*

The Petition Area is approximately 3 miles from the major commercial and urban center of West Hawai'i, Kailua-Kona, and approximately 3.5 miles south of the Kona International Airport at Keahole. It is contiguous to an existing concentration of urban uses, including streets and other urban level of infrastructure.

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2. *It shall take into consideration the following specific factors:*
- *Proximity to centers of trading and employment except where the development would generate new centers of trading and employment.*
  - *Availability of basic services such as schools, parks, wastewater systems, solid waste disposal, drainage, water, transportation systems, public utilities, and police and fire protection.*
  - *Sufficient reserve areas for foreseeable urban growth.*

The Petition Area is adjacent to the Kaloko Industrial Park to the north and the Honokohau industrial developments to the south. Approximately 232 acres within the Petition Area is already in or approved for urban quarry and quarry-related uses. As discussed in Section 4.4., all basic public services are available to the Petition Area.

3. *It shall include lands with satisfactory topography, drainage, and reasonably free from the danger of any flood, tsunami, unstable soil condition, and other adverse environmental effects.*

The topography and drainage of the Petition Area is satisfactory and the area is reasonably free from flooding, tsunami hazards, unstable soil conditions and other adverse environmental factors.

4. *Land contiguous with existing urban areas shall be given more consideration than non-contiguous land, and particularly when indicated for future urban use on state or county general plans.*

The Petition Area is contiguous to existing urban areas, and is indicated for future urban use in the *Hawai'i County General Plan*, the *West Hawai'i Regional Plan* of the Office of Planning, and the County of Hawai'i's *Keahole-to-Kailua Development Plan*.

5. *It shall include lands in appropriate locations for new urban concentrations and shall give consideration to areas of urban growth as shown on the state and county general plans.*

The reclassification of the Petition Area is consistent with State and County land use plans, including the *Hawai'i County General Plan*.

6. *It may include lands which do not conform to the standards in paragraphs (1) to (5):*  
*-When surrounded by or adjacent to existing urban development, and only when those lands represent a minor portion of the district.*

The reclassification of the Petition Area to urban conforms to the standards in paragraphs (1) through (5).

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7. *It shall not include lands, the urbanization of which will contribute toward scattered spot urban development, necessitating unreasonable investment in public infrastructure or support services.*

The Petition Area is contiguous to existing urban districts and reclassification will not result in scattered spot urban development, nor necessitate unreasonable investment in public infrastructure or support services.

8. *It may include lands with a general slope of twenty percent or more if the commission finds that those lands are desirable and suitable for urban purposes and that the design and construction controls, as adopted by any federal, state, or county agency, are adequate to protect the public health, welfare and safety, and the public's interests in the aesthetic quality of the landscape.*

The Petition Area extends mauka from Queen Ka'ahumanu Highway in a moderate slope, between 5 to 8 percent, with elevation rising from approximately 40 to approximately 320 feet above sea level.

**5.3 Coastal Zone Management**

**5.3.1 Hawai'i Coastal Zone Management Objectives**

The purpose of Chapter 205A, HRS, is to preserve, protect, develop and where possible enhance the resources of the coastal zone, which is defined to include the entire State.

The objectives of the Hawai'i Coastal Zone Management Program are the following:

*Recreational Resources:* Provide coastal recreational opportunities accessible to the public;

*Historic Resources:* Protect, preserve, and where desirable, restore those natural and man-made historic and prehistoric resources in the CZM that are significant in Hawaiian and American history and culture;

*Scenic and Open Space Resources:* Protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources;

*Coastal Ecosystems:* Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems;

*Economic Uses:* Provide public or private facilities and improvements important to the State's economy in suitable locations;

*Coastal Hazards:* Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence; and

*Managing Development:* Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

### 5.3.2 Discussion

The proposed reclassification has implications for a number of CZM objectives. *Historic resources* of significance would be protected and preserved under a plan approved by the Hawai'i State Historic Preservation Division. Although coastal *open space* is not in any way impacted by the project, any development in the area has the potential to impact views of and from the coastline. The proposed project includes design elements that ensure minimal interference with such views. *Coastal ecosystems* in the area are dependent upon the preservation of water quality in groundwater, anchialine ponds, and marine waters. Hydrological modeling indicates that water quality alterations would not adversely impact the biota if mitigation measures are implemented and properly enforced. *Coastal economic uses* and *coastal hazards* would not be affected. *Managing development* is accomplished through the review procedures that accompany a Petition to Amend a Land Use District Boundary, including this EIS. Given the substantial commitment to mitigation measures, the proposed reclassification would not substantially impact these coastal zone resources and appears to be consistent with the objectives of the program.

## 5.4 Hawai'i County General Plan

### 5.4.1 General Plan Goals, Objectives, Policies and Standards and Principles

The *General Plan* for the County of Hawai'i is a policy document expressing the broad goals and policies for the long-range development of the Island of Hawai'i. The plan was adopted by ordinance in 1989. The County of Hawai'i is currently undertaking a mandatory review of the General Plan. A draft of the *County of Hawai'i General Plan Revision Program* was released in January 2001, and the plan is in review. Any proposed revisions to the General Plan must be adopted by Ordinance, which would require public hearings and action by the Hawai'i County Planning Commission and the Hawai'i County Council.

The currently adopted *General Plan* is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai'i. Section 4 of the *General Plan* includes a discussion of general goals. In Section 5 courses of action for individual districts are proposed.

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The elements of the *General Plan* most applicable to the project are the following:

### *Economic Element*

#### Goals

- o The County shall provide an economic environment which allows new, expanded, or improved economic opportunities that are compatible with the County's natural and social environment.

#### Policies

- o The County of Hawai'i shall strive for diversification of its economy by strengthening existing industries and attracting new endeavors.

### *Environmental Quality Element*

#### Goals

- o Maintain and, if feasible, improve the existing environmental quality of the island.

### Flood Control and Drainage Element

#### Goals

- o Protect human life.
- o Prevent damage to man-made improvements.
- o Control pollution.
- o Reduce surface water and sediment runoff.

#### Policies

- o All development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works.

### *Historic Sites Element*

#### Goals

- o Protect and enhance the sites, buildings and objects of significant historical and cultural importance to Hawai'i.

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Policies

- o The County of Hawai'i shall require both public and private developers of land to provide a historical survey prior to the clearing or development of land when there are indications that the land under consideration has historical significance.

*Natural Beauty Element*

Goals

- o Protect scenic vistas and view planes from becoming obstructed.

Policies

- o The County shall consider structural setback from major thoroughfares and highways and shall establish development and design guidelines to protect important viewplanes.

*Public Utilities Element*

Goals

- o Ensure that adequate, efficient and dependable public utility services will be available to users.

Policies

- o The County shall seek State and Federal funds to assist in financing the construction of proposed sewer systems.

*Transportation Element*

Goals

- o Provide a transportation system whereby people and goods can move efficiently, safely, comfortably and economically.

*Land Use Element (Industrial Uses)*

Goals

- o Designate and allocate industrial areas in appropriate proportions and in keeping with the social, cultural, and physical environments of the County.

Policies

- o The County shall support the creation of industrial parks in appropriate locations as an alternative to strip development.
- o Through its zoning powers, the County shall locate industrial areas convenient to transportation facilities, and provide a variety of industrial zoned districts and lot sizes, depending on the needs of the industries and the communities.
- o The County shall attempt to improve the aesthetic quality of industrial sites and protect amenities of adjacent areas by requiring landscaping, open spaces, buffer zones, and design guidelines.

5.4.2 Discussion

The proposed reclassification is highly consistent with the goals, objectives and policies of the *Hawai'i County General Plan*. The Petition Area is well served by existing infrastructure and is strategically located along a major thoroughfare. The proposed industrial and commercial activities would support the stability of existing economic sectors such as tourism and also provide a good location and setting for support businesses for burgeoning sectors such as telecommunications and ocean-related technology. The improved economic opportunities would be compatible with the County's natural and social environment and would help diversify the County's economy by strengthening existing industries and attracting new endeavors.

In terms of the goals, objectives and policies related to protecting the environment, pollution prevention, and scenic and historic resources, it should be emphasized that the limited supply of suitable land in Hawai'i results in virtually all new development being constrained to occur in environmentally sensitive areas. In Kona, native biota, historic sites, valuable viewplanes, and sensitive coastal waters are unavoidable. Water quality effects can be limited to levels that do not cause adverse impacts through implementation of Best Management Practices and eventual connection to the Kealakehe Wastewater Treatment Plan or other facilities that provide advanced wastewater treatment. Given this, direct and indirect effects to biological resources would be negligible. Historic resources would be protected through following the recommendation of the archaeological inventory survey, and ensuring that known burials, and all historic sites that have been determined to be significant for preservation, would be preserved. Given this context, the proposed reclassification is consistent with the *Hawai'i County General Plan's* goals of preserving and protecting these resources.

The area is mauka of Queen Ka'ahumanu Highway, with the Kaloko-Honokohau National Historical Park providing an open-space buffer between the highway and the sea. The area is between two other commercial-industrial areas, and does not represent an intrusion of developed area into a pristine landscape, because the area has a long history of quarrying and related industrial activity. It takes advantage of existing and proposed road, water and sewage facilities. Proposed design and landscaping would provide an attractive roadway frontage with a landscaped buffer that mitigates the "industrial" look and does not conflict with views from the National Park to the scenic summit and upper slopes of Hualalai.

The proposed reclassification is consistent with the regional plans for the area, which call for development of this area in mixed industrial and commercial uses.

#### 5.5 Hawai'i County General Plan Land Use Pattern Allocation Guide (LUPAG)

The LUPAG map component of the *General Plan* is a graphic representation of the Plan's goals, policies, and standards as well as of the physical relationship between land uses. It also establishes the basic urban and non-urban form for areas within the planned public and cultural facilities, public utilities and safety features, and transportation corridors. Lands in the Petition Area are designated on this map as *Urban Expansion* and *Industrial Uses* (see Fig. 2-2).

The Petition Area has been designated as *Industrial* and *Urban Expansion* by the *General Plan Land Use Pattern Allocation Guide Map*. These designations are described by the General Plan as follows:

**Industrial Area:** These areas include uses such as manufacturing and processing, wholesaling, large storage and transportation facilities and light industrial uses.

**Urban Expansion:** Allows for a mix of high density, medium density, low density, industrial and/or open designations in areas where new settlement patterns may be desirable, but where the specific settlement pattern and mix of uses have not yet been determined.

The proposed development in the Petition Area is consistent with these land use designations. The *Facilities Map* of the General Plan identifies, among other public facilities, existing and proposed highways. Three parallel mauka-makai secondary arterial roads that would connect the Queen Ka'ahumanu Highway with the Mamalahoa Highway are depicted. A mid-level road running perpendicular to these roads is also depicted, extending between Ka'iminani Street and Palani Road. Section 4.3.5 assesses the Petition Area's relationship to the overall circulation plan for the study area, and shows that the project would help fulfill several general objectives broadly illustrated in the Facilities Map.

#### 5.6 Hawai'i County Zoning

The Hawai'i County General Plan is also the basis for Ordinance No. 63, the County Comprehensive Zoning Ordinance, which was adopted in 1967. Zoning for the entire Petition Area is Open. Assuming approval of the Urban reclassification by the State Land Use Commission, the required zone changes for specific urban land uses will be sought.

5.7 West Hawai'i Regional Plan

This plan (Hawai'i OSP 1989) represents an attempt to coordinate planning efforts among State agencies that have programs, facilities and other interests in the region. The basic purposes are to respond more effectively to emerging needs and critical problems, to coordinate capital improvements within a regional planning framework, and to provide guidance in State land use decision-making processes. The plan recognizes the need to develop industrial and commercial facilities in this portion of Kona. It also seeks to steer urban development away from areas in which critical natural resources such as native forest, valuable agricultural lands, and sensitive coastal waters would be adversely impacted. The proposed project is highly consistent with the *West Hawai'i Regional Plan*.

5.8 Keahole to Kailua Development Plan

The *Keahole to Kailua Development Plan*, adopted by the County Council by Resolution No. 296-91, is intended to carry out the *General Plan* goals and policies related to the development of the portion of North Kona between Keahole Point and Kailua-Kona between Mamalahoa Highway and the shoreline. The stated goals of the Land Use Plan are to:

- Provide a framework for the future growth and development of the Keahole-to-Kailua area;
- Provide a framework for infrastructure plans and cost estimates for the rational and cost-effective development of the area;
- Provide a basis for coordinated public-private implementation of major infrastructure projects; and
- Provide a framework for State and County action on designating lands for urban development.

The Land Use Plan (Figure 2-3) designates the Petition Area for Limited Industrial uses. The Plan further describes these areas as follows:

“There are two existing light industrial parks within the project area: the older leasehold industrial park adjacent to Kailua Village and the fee simple industrial park at Kaloko, just mauka of Queen Ka'ahumanu Highway.

The Land Use Plan does not recommend the expansion of the leasehold industrial park. Instead, the Plan shows the expansion of the Kaloko industrial park at Kaloko and *Honokohau mauka*” (emphasis added).

The proposed uses within the Petition Area are consistent with the Land Use Plan of the *Keahole to Kailua Development Plan* (see Fig. 2-3). This plan specifically calls for the expansion of the industrial uses in the general area to include the Honokohau Lands.

5.9 OSP State Land Use District Boundary Review

In 1992 the Hawai'i State Office of State Planning conducted a "statewide, comprehensive, policy-oriented examination of State land use district classifications" (Hawai'i OSP 1992). The review recommended that the Petition Area be reclassified from Conservation to Urban as part of the proposed Keahole-to-Kailua Urban area (Recommendation No.34). The proposed project is a fulfillment of that recommendation, which recognized the ongoing use of the area for quarrying and related uses, and also the importance of providing a sufficient supply of lands zone for industrial/commercial uses. Since 1992, the need for such lands has become greater, and the recommendation is more valid than ever.

**PART 6: ENVIRONMENTAL IMPACT STATEMENT FINDINGS**

**6.1 Probable Unavoidable Adverse Environmental Effects**

Chapter 343 of the Hawai'i Revised Statutes (HRS) is the basis for the environmental impact process in the State of Hawai'i. The implementing regulations for this law, Title 11, Chapter 200, Hawai'i Administrative Rules (HAR), contains the following requirements:

- 11-200-17(j): The draft EIS shall include in a separate and distinct section a description of the relationship between local short-term uses of humanity's environment and the maintenance and enhancement of long-term productivity.
- 11-200-17(k): The draft EIS shall include in a separate and distinct section a description of all irreversible and irretrievable commitments of resources....
- 11-200-17(n): The draft EIS shall include a separate and distinct section that summarizes unresolved issues....

This chapter addresses these requirements of the State of Hawai'i EIS law.

The proposed reclassification and subsequent development of an industrial and commercial subdivision would create mostly limited adverse environmental impacts which can be essentially fully mitigated by the measures planned to be implemented at the site. However, the following two lists include those short-term and long-term impacts that are expected to be unavoidable. Refer to Chapter 4 for full explanation of impacts and mitigation measures.

**6.1.1 Unavoidable Adverse Short-Term Impacts**

Despite mitigation:

1. Negligible temporary increases in soil erosion would result from construction operations, and a negligible amount of soil would be carried off-site through wind.
2. Operation of construction equipment, trucks, and worker vehicles may temporarily impede traffic in the area during the construction period.
3. Negligible release of air contaminants would occur from construction equipment. Small amounts of dust may be generated during dry periods as a result of construction operation.
4. The visual character of the area would be affected by construction activities and by the presence of construction equipment.
5. Noise levels would increase during construction activities.

6.1.2 Unavoidable Adverse Long-Term Impacts

1. Rock and soil would be altered by grading, excavation, and mounding activities at the site during construction. Since soil cover on the site is very sparse, soil would be imported to cover cleared and graded land for planting landscaping materials, except for areas left in natural vegetation.
2. Modifications to the current topography would be made at the site to accommodate project development.
3. The vegetation, which is basically alien and disturbed but contains some native species, would be removed and replaced with development and landscaping.
4. Although all archaeological sites significant for preservation would be able to be preserved, sites significant for data recovery only would be destroyed.
5. Water quality characteristics, including salinity and nutrients, would be very slightly altered, although not in a way or to an extent that would produce adverse biological impacts.

6.2 Relationship Between Short-Term Use of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

No short-term exploitation of resources that would entail negative long-term consequences has been identified for the project. All substantial adverse impacts resulting from the project are capable of mitigation to minor levels using reasonable measures. The principal long-term benefit is the development of an economically beneficial industrial and commercial subdivision located in a suitable area in terms of environmental protection and community planning.

6.3 Irreversible and Irretrievable Commitments of Resources

The project would involve the irretrievable commitment of certain natural, social and fiscal resources. Major resource commitments include land, money, construction materials, labor and energy. No valuable or unique natural vegetation, wetlands, or Prime Farmland would be lost. Some archaeological sites important for data recovery only would be impacted. The impact of using these resources should, however, be weighed against the economic benefits to the residents of the County and State and the consequences resulting from taking no action. The commitment of resources required to accomplish the project includes labor and materials which are primarily nonrenewable and irretrievable. The operation of the project would also include the consumption of petroleum-derived fuels, which also represents an irretrievable commitment of resources.

6.4 Unresolved Issues

There are no unresolved issues.

Final EIS: Kaloko-Honokohau Business Park

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Marine Research Consultants	Kaneohe	Aquatic Biology
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Reggie David, Rana Productions	Kailua-Kona	Fauna
Cultural Surveys, Inc.	Honolulu	Archaeology
The Hallstrom Group	Honolulu	Market Study & Economic
The Traffic Management Consultant	Honolulu	Traffic
B.D. Neal & Associates	Kailua-Kona	Air Quality

REFERENCES

Council on Environmental Quality (CEQ). 1997. *Considering Cumulative Effects Under NEPA*. Washington: CEQ.

Federal Register. 1998. Department of the Interior, Fish and Wildlife Service. *Threatened and Endangered Wildlife and Plants*. 50 CFR 17:11 and 17:12 - October 1, 1998. Chapter 1: 101-215.

Fleischer, E. J. , P. R. Noss, P. T. Kostechki, and E. J. Calabrese, 1986. "Evaluating the Subsurface Fate of Organic Chemicals of Concern Using the SESOIL Environmental Fate Model." *Proceedings of the Third Eastern Regional Groundwater Conference*. National Water Well Association, Springfield, MA, 29-31 July 1986.

Forrander, A. 1973. *An Account of the Polynesian Race: Its Origin and Migrations*. Tokyo: Charles E. Tuttle Co., Inc

Gagne, W., and L. Cuddihy. 1990. "Vegetation." Pp. 45-114 in W.L. Wagner, D.R. Herbst, and S.H. Sohmer, eds., *Manual of the Flowering Plants of Hawai`i*. 2 vols. Honolulu: University of Hawai`i Press.

Giambelucca, T.W., M.A Nullet, and T.A. Schroeder. 1986. *Rainfall Atlas of Hawai`i*. Honolulu: Hawai`i Department of Land and Natural Resources.

Hawai`i County Department of Water Supply. 1991. *Hawai`i County Water Use and Development Plan (Plan Revision Draft)*. Hilo.

Hawai`i County Planning Department. 1989. *The General Plan, County of Hawai`i*. Hilo.

Hawai`i County Planning Department. 1991. *Keahole to Kailua Development Plan*. Hilo.

Hawai`i County Department of Public Works (DPW). 1970. *Storm Drainage Standards*. Hilo.

Hawai`i County DPW. 1999. *Kealakehe Wastewater Treatment Plan Effluent Reuse Master Plan*. Hilo.

Hawai`i State DLNR (Department of Land and Natural Resources). 1986. *Indigenous Wildlife, Endangered and Threatened Wildlife and Plants, and Introduced Wild Birds*. Hawai`i State DLNR Administrative Rule dated August 28, 1986.

**Final EIS: Kaloko-Honokohau Business Park**

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- Hawai'i State Department of Transportation (DOT), Airports Division. 1990. Keahole Airport Traffic Circulation Plan. Honolulu.
- Hawai'i State Office of State Planning (OSP). 1989. *West Hawai'i Regional Plan*. Honolulu.
- Hawai'i State OSP. 1991. *Hawai'i State Plan*. Honolulu.
- Hawai'i State OSP. 1992. *State Land Use District Boundary Review. Hawai'i*. Honolulu.
- Heliker, C. 1990. *Volcanic and Seismic Hazards on the Island of Hawai'i*. Washington: U.S. GPO.
- Ellis, W. 1963. *Journal of William Ellis*. Honolulu: Advertiser Publishing Co., Ltd.
- Fi, J.P. 1959. *Fragments of Hawaiian History*. Honolulu: Bishop Museum Press.
- Kamakau, S. 1961. *Ruling Chiefs of Hawai'i*. Honolulu: Kamehameha Schools Press.
- Kinney, H.W. 1913. *The Island of Hawai'i*. Hilo: Published by Henry Wadsworth Kinney.
- Malo, D. 1951. *Hawaiian Antiquities*. Honolulu, B.P. Bishop Museum.
- Maly, K. 2000. *Nā Honokōhau: Nā Hono I Nā Hau 'Elua (Honokōhau: Bays of the Two Wind-born Dews)* 2 Vols. Hilo: Kumu Pono Associates.
- McCarthy, J.E. 1998. *Solid Waste Issues in the 105th Congress* The Committee for the National Institute for the Environment: Environment and Natural Resources Policy Division. Washington, D.C.
- Oki, D.S., Tribble, G. W., Souza, W. R., and Bolke, E. L. 1999. "Ground Water Resources in Kaloko-Honokohau National Historical Park, Island of Hawai'i, and Numerical Simulation of the Effects of Ground-Water Withdrawals." *USGS Water-Resources Investigations Report 99-4070*. Honolulu: U.S. Geological Survey.
- Robins, J., Collins, J., Chiogioji, R., Carlson, I., Masterson, I, Creed V., Borthwick. D., and H. Hammatt. 2000. *An Archaeological Inventory Survey of an Approximately 803-acre Subject Parcel in the Ahupua'a of Honokōhau I and II, North Kona District, Island of Hawai'i (TMK 7-4-08: Por. 5, 13, 30, 36)*, 3 vols. Kailua, HI: Cultural Surveys Hawai'i.

**Final EIS: Kaloko-Honokohau Business Park**

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Sato, H.H. et al. 1973. *Soil Survey of Island of Hawai'i, State of Hawai'i*. Washington, D.C.: U.S.D.A. Soil Conservation Service.

University of Hawai'i at Hilo, Dept. of Geography. 1998. *Atlas of Hawai'i*. 3rd ed. Honolulu: University of Hawai'i Press.

U.S. Bureau of the Census. 1991. *1990 Census of Population, General Population Characteristics*. 1990 CP-1-13. Washington: GPO.

U.S. Environmental Protection Agency (EPA). 1992. *User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections*. Ann Arbor, Michigan: USEPA Office of Air and Radiation, Office of Mobile Sources, Emission Control Technology Division, Test and Evaluation Branch.

U.S. EPA. 1995. *Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources, Fifth Edition, AP-42*. Research Triangle Park, NC: EPA.

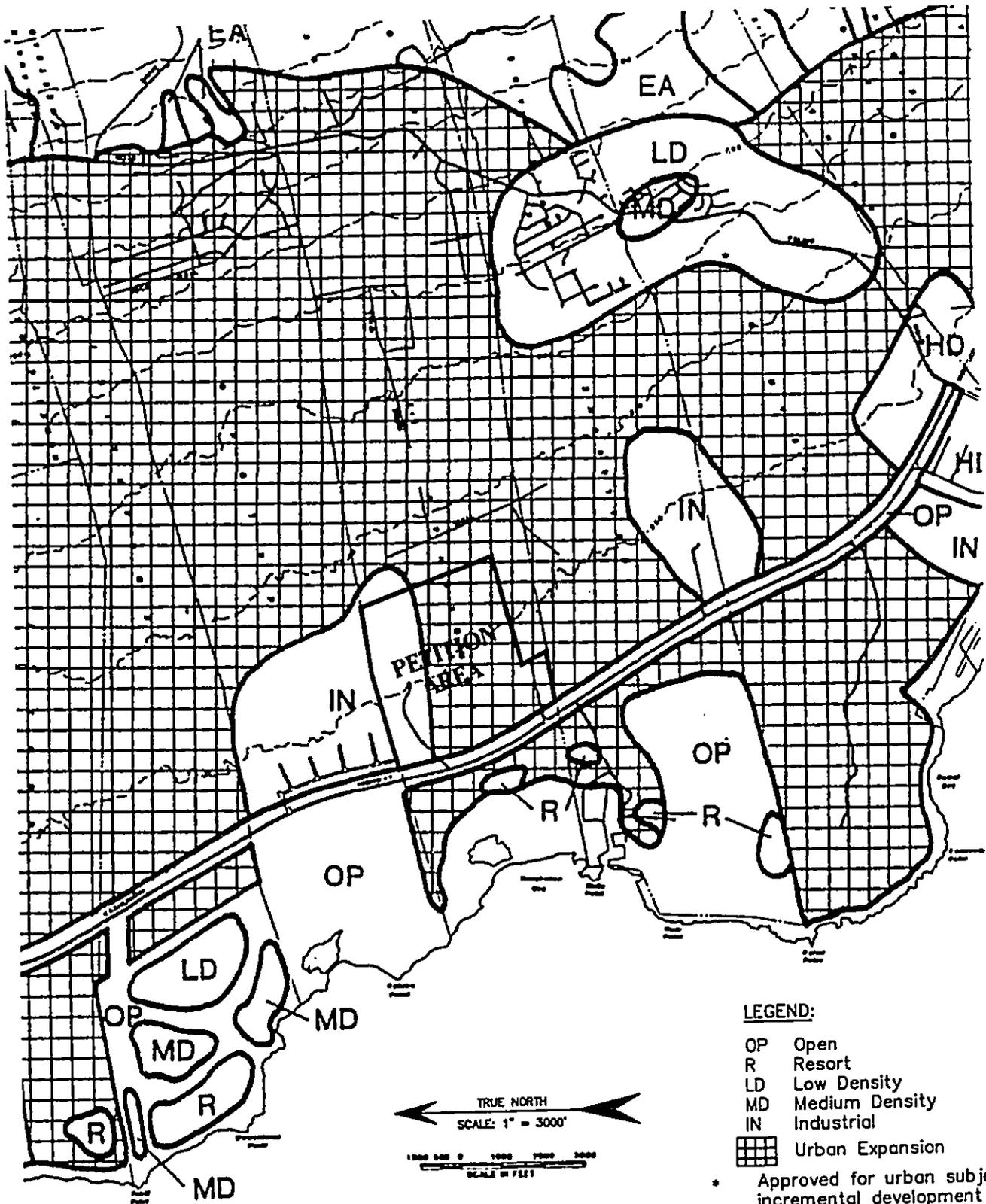
U.S. EPA. 1999. *User's Guide to MOBILE5A (Mobile Source Emission Factor Model)*. Ann Arbor, Michigan: USEPA Office of Air and Radiation, Office of Mobile Sources, Emission Control Technology Division, Test and Evaluation Branch.

Wilkes, C. 1845. *Narrative of the United States Exploring Expedition During the Years 1838-1842, Under the Command of C. Wilkes, U.S.N.* Vol. 4. Philadelphia: Lea and Blanchard.

Wilson-Okamoto & Associates. 2000. *Final Environmental Impact Statement, Kaloko Industrial Park, Phases III and IV*. Prep. For TSA International. Honolulu.

Wolfe, E.W., and J. Morris. 1996. *Geologic Map of the Island of Hawai'i*. USGS Misc Investigations Series Map I-2524-A. Washington, D.C.: U.S. Geological Survey.

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**LEGEND:**

- OP Open
- R Resort
- LD Low Density
- MD Medium Density
- IN Industrial
-  Urban Expansion

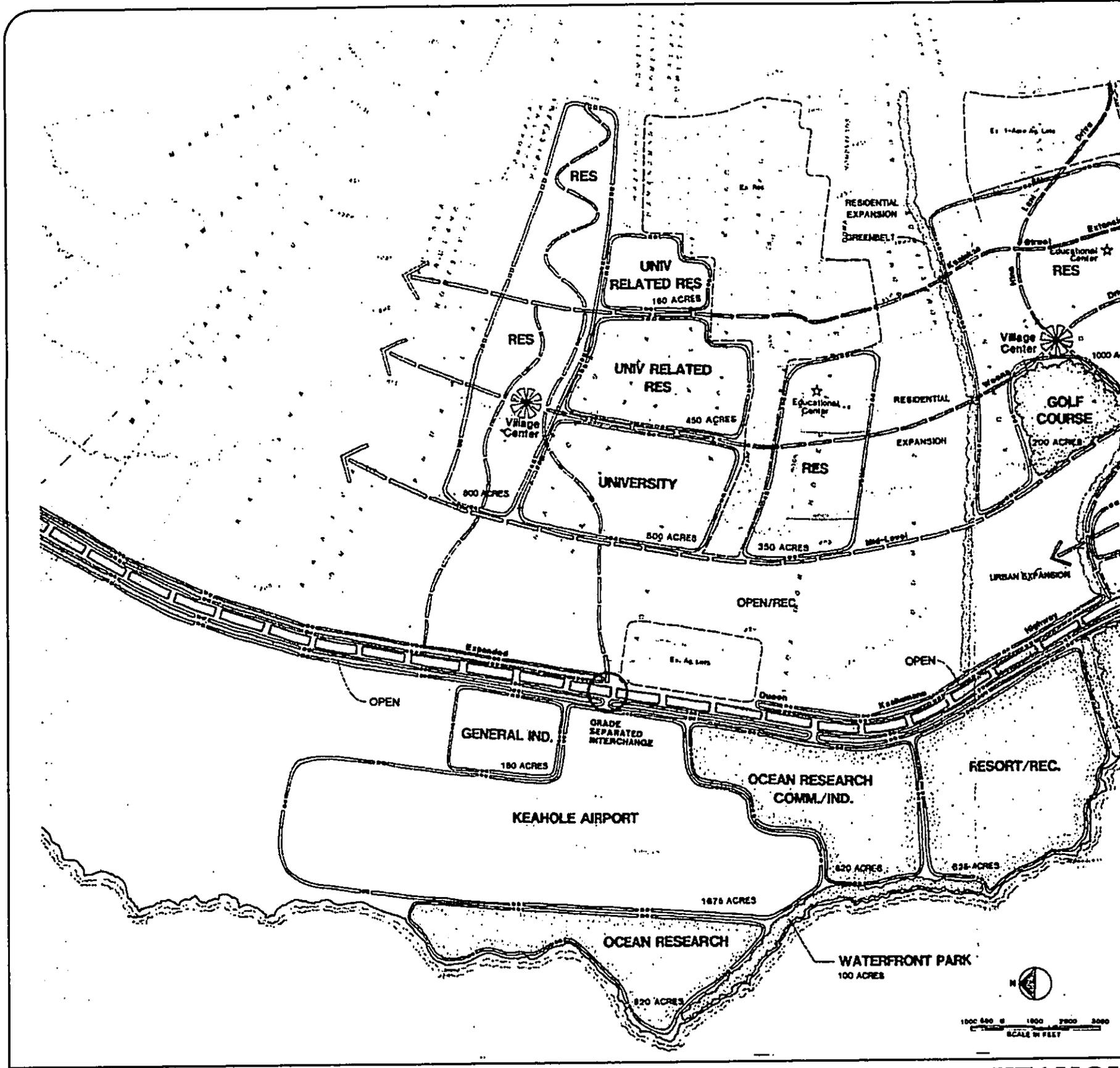
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**COUNTY GENERAL PLAN**  
**LAND USE PATTERN ALLOCATION GUIDE MAP**

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 PREPARED BY: AKINAKA & ASSOCIATES, LTD.  
 SOURCE: HAWAII COUNTY GENERAL PLAN

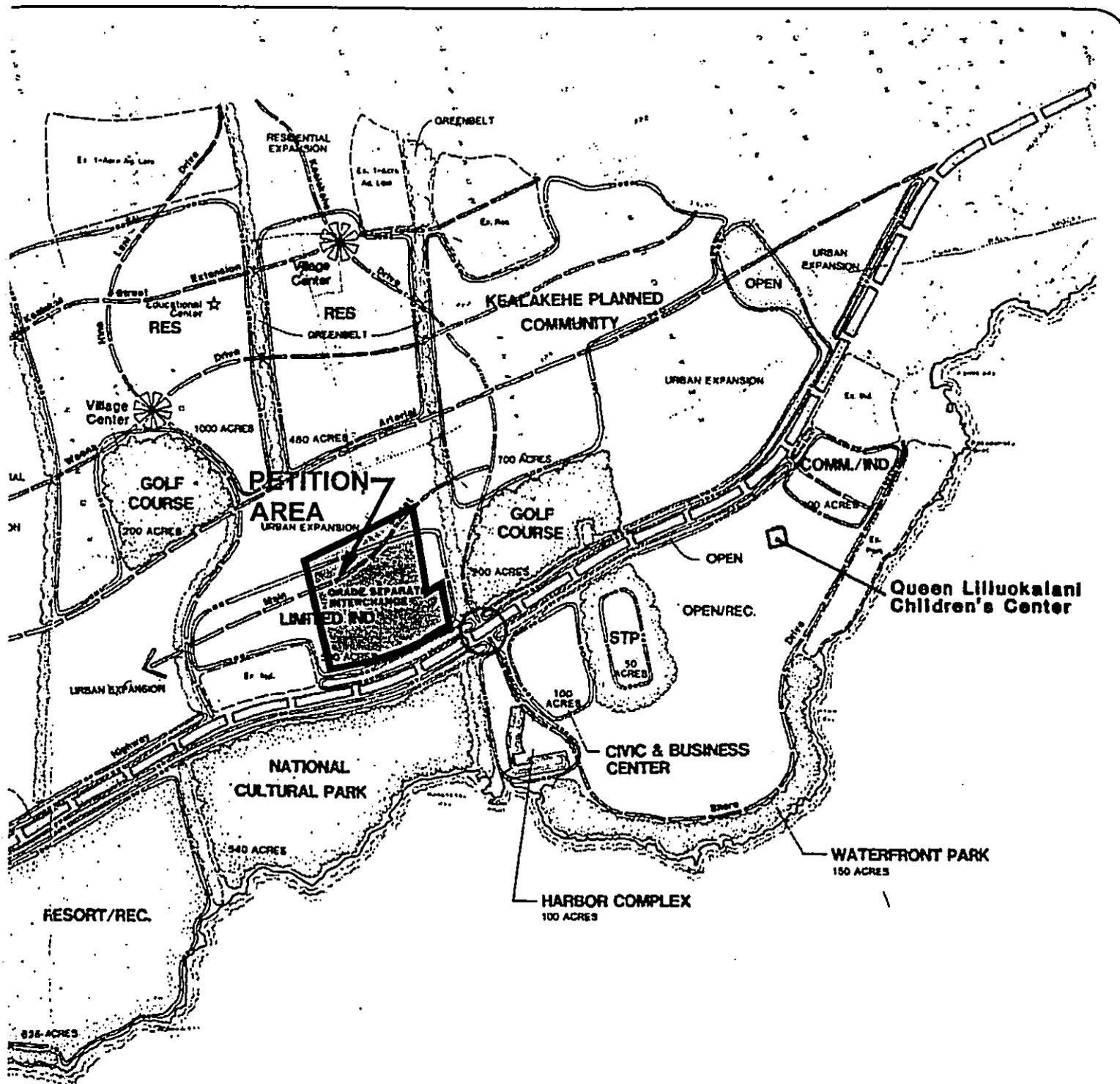
KALOKO-HONOKOHAU BUSINESS PARK  
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 NORTH KONA, HAWAII

**FIGURE # 2-2**  
**PAGE NO. 2-7**



# KEAHOLE LAND USE

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 SOURCE: KEAHOLE



**LAND USE PLAN**  
 KEAHOLE TO KAILUA DEVELOPMENT PLAN  
 NORTH KONA DISTRICT, COUNTY OF HAWAII

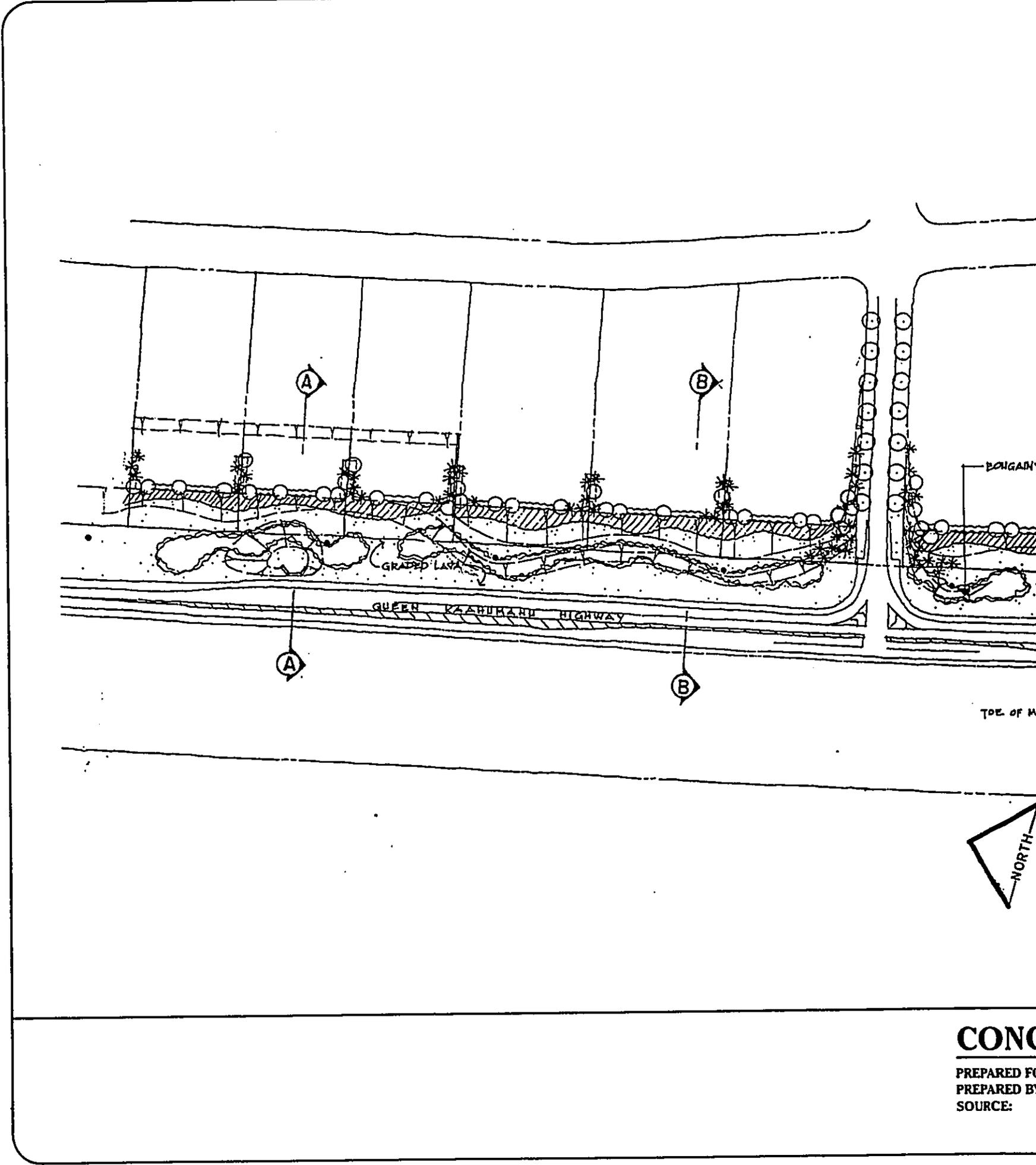
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 County of Hawaii  
 BY: R. M. Towill Corporation  
 Honolulu, Hawaii  
 MAY 10, 1990

**KEAHOLE TO KAILUA**  
**LAND USE PLAN**

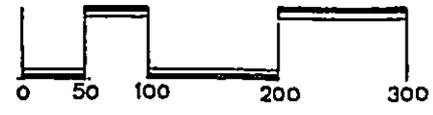
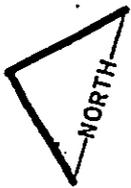
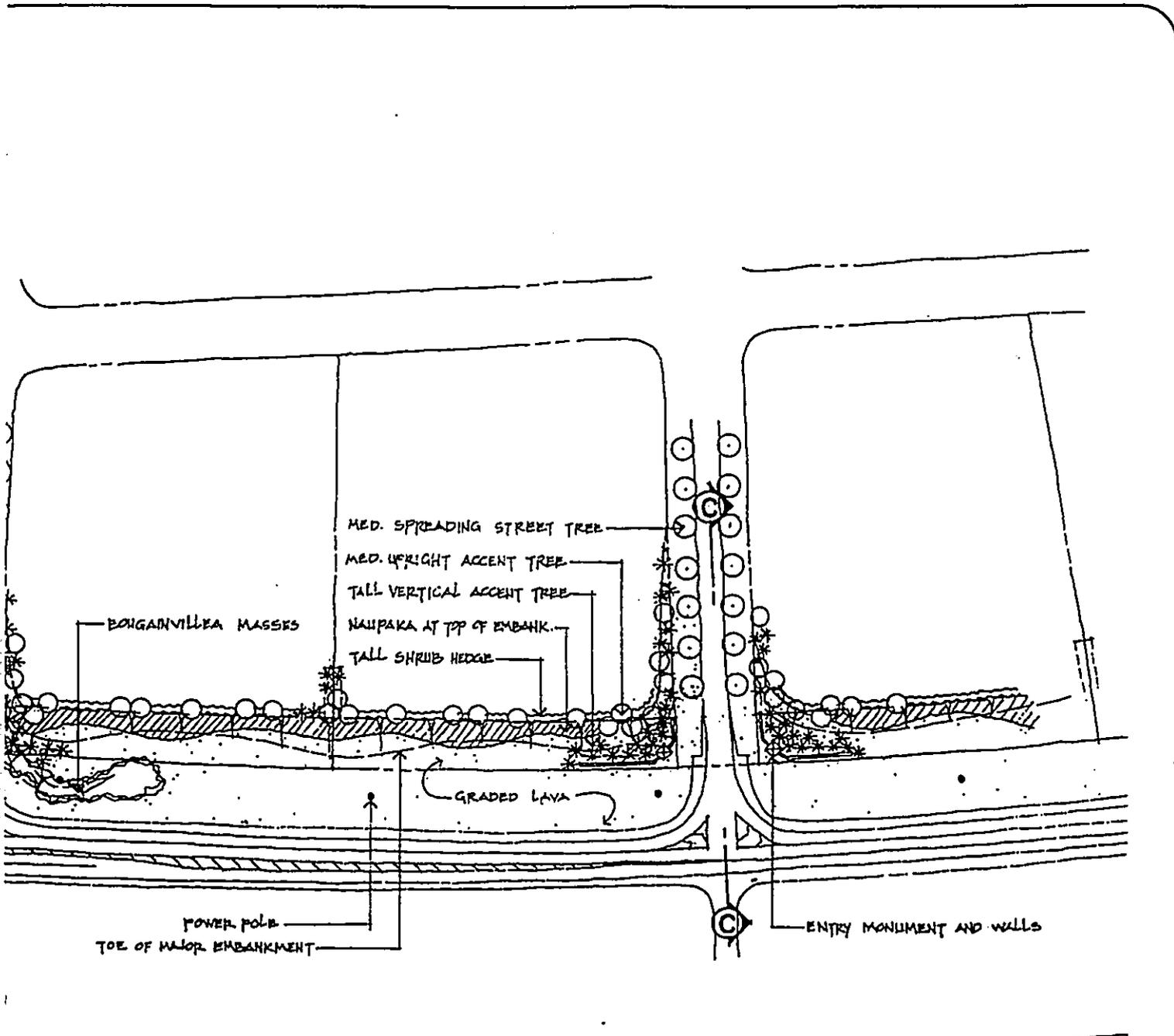
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 SOURCE: KEAHOLE TO KAILUA DEVELOPMENT PLAN

**KALOKO-HONOKOHAU BUSINESS PARK**  
**HONOKOHAU 1ST & 2ND**  
**NORTH KONA, HAWAII**

**FIGURE # 2-3**  
**PAGE NO. 2-8**



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# CONCEPTUAL LANDSCAPE PLAN

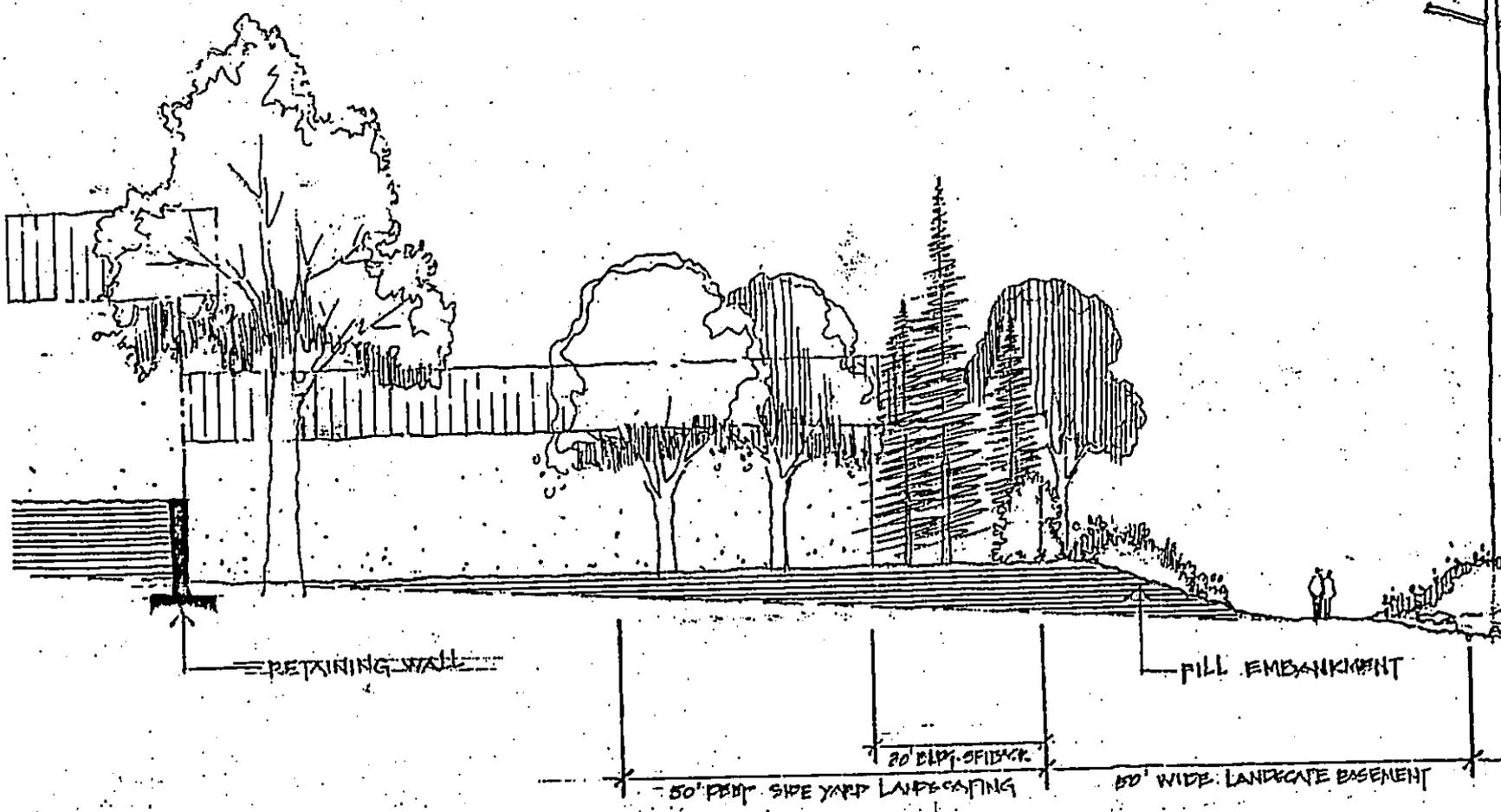
KALOKO HONOKOHAU BUSINESS PARK

## CONCEPTUAL LANDSCAPE PLAN

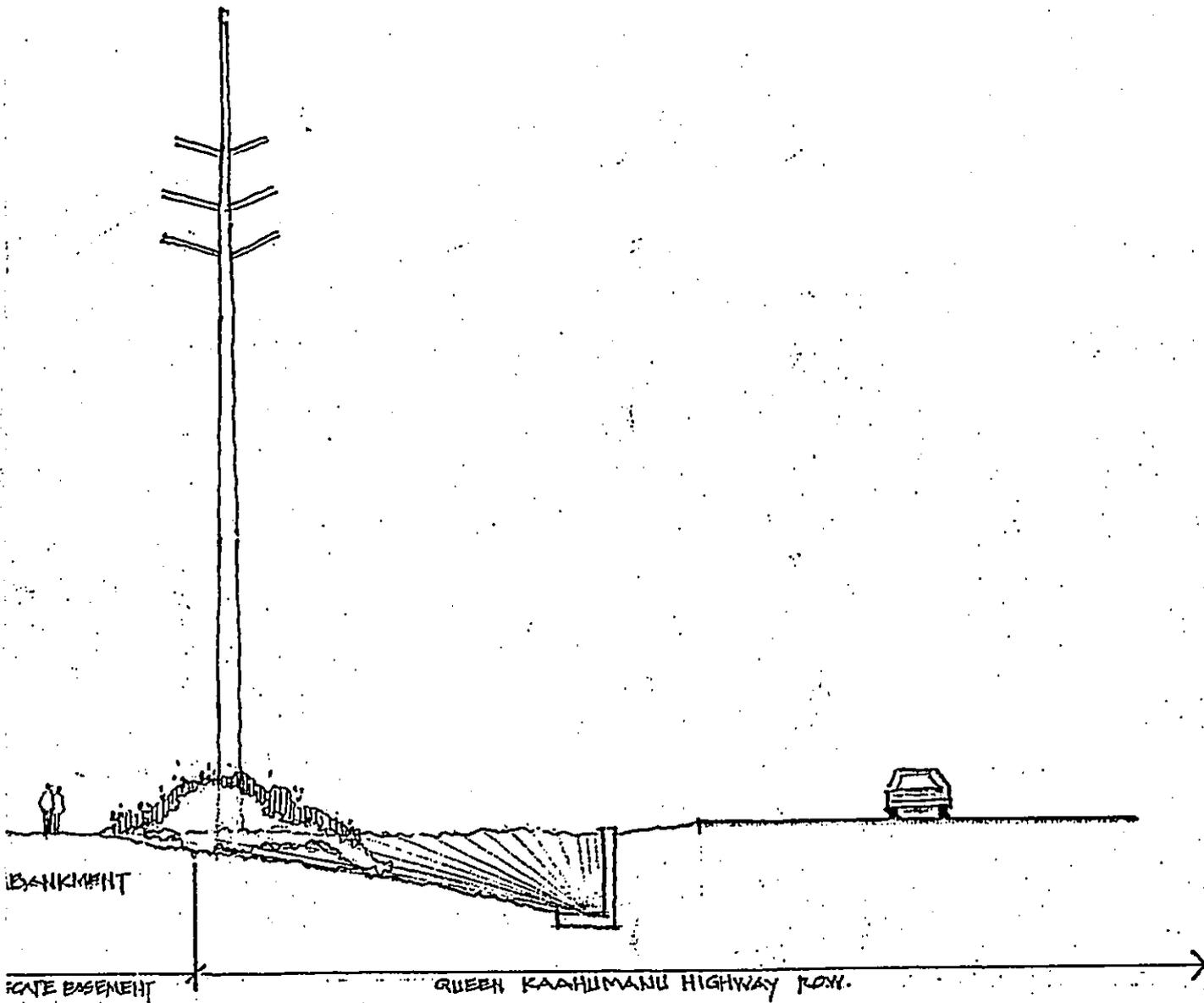
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FIGURE # 4-4g  
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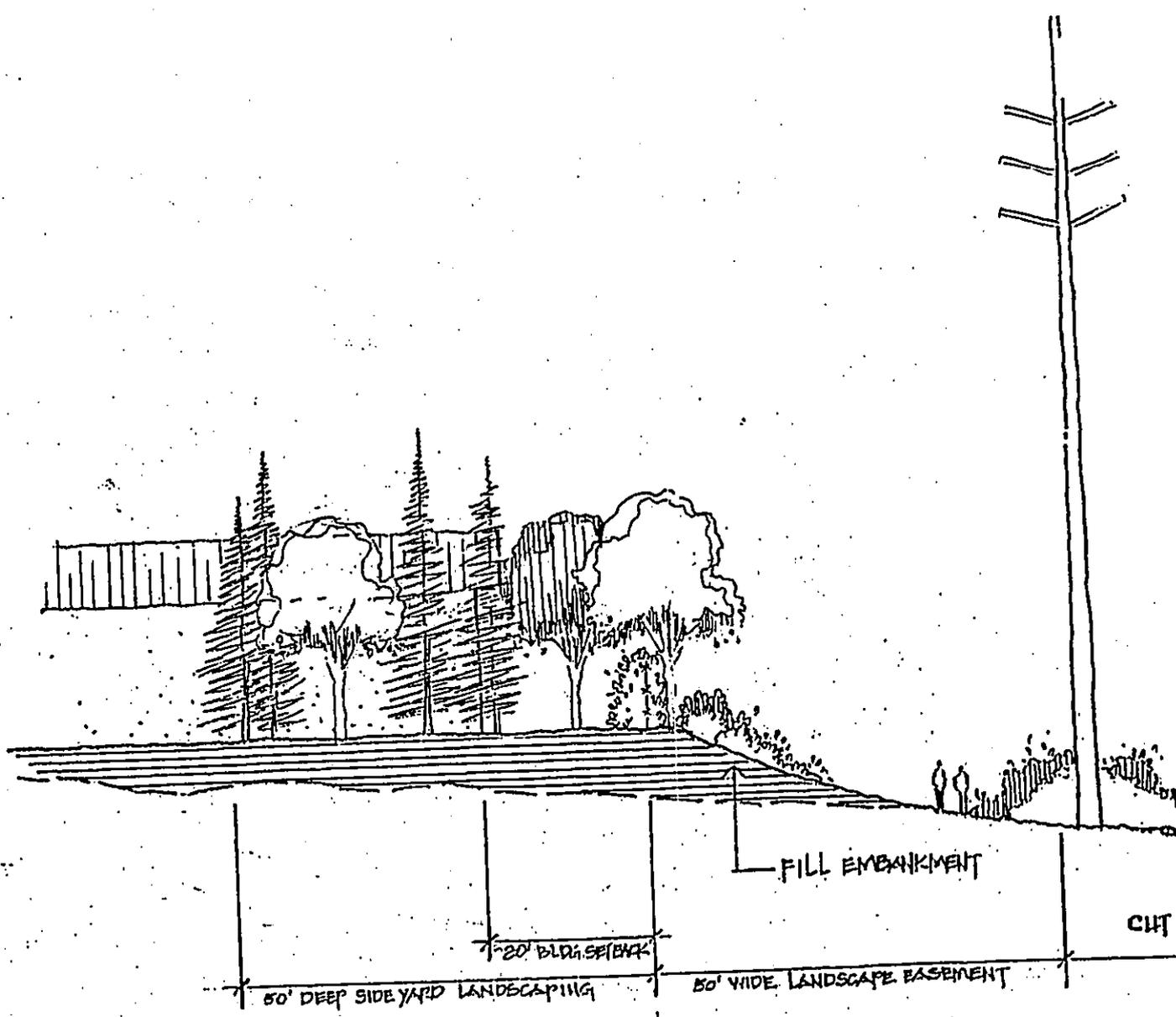
**SECTION A-A**

**CONCEPTUAL LANDSCAPE PLAN**  
**SECTION AA**

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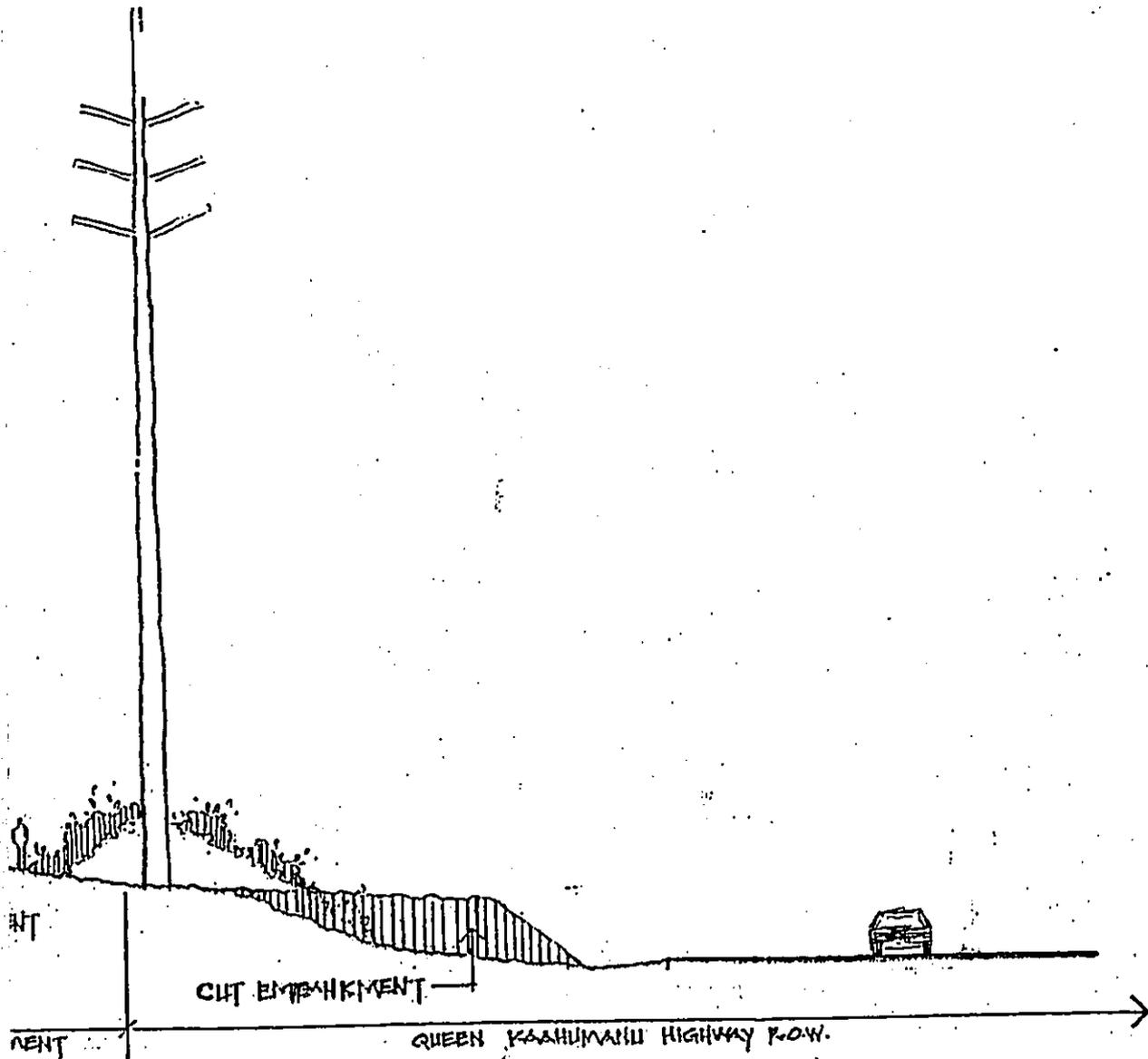
**FIGURE # 4-4h**  
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**SECTION B-B**

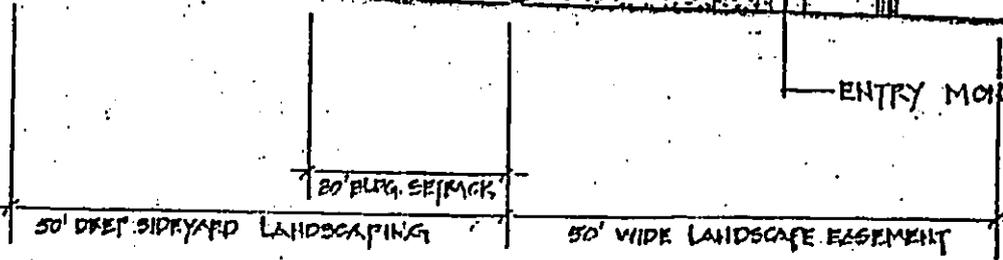
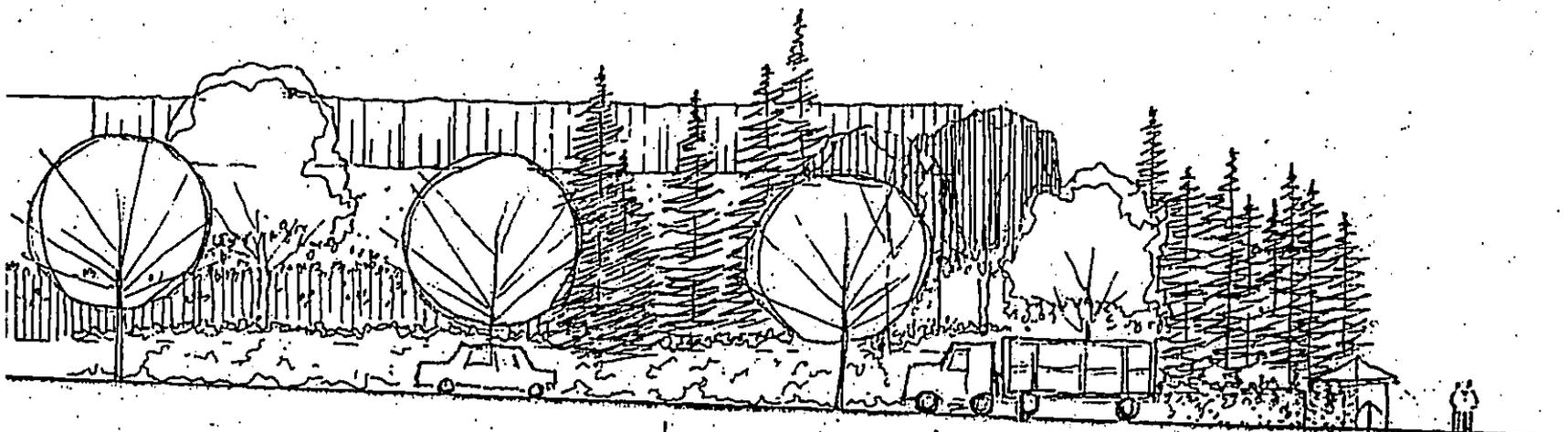
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**SECTION BB**

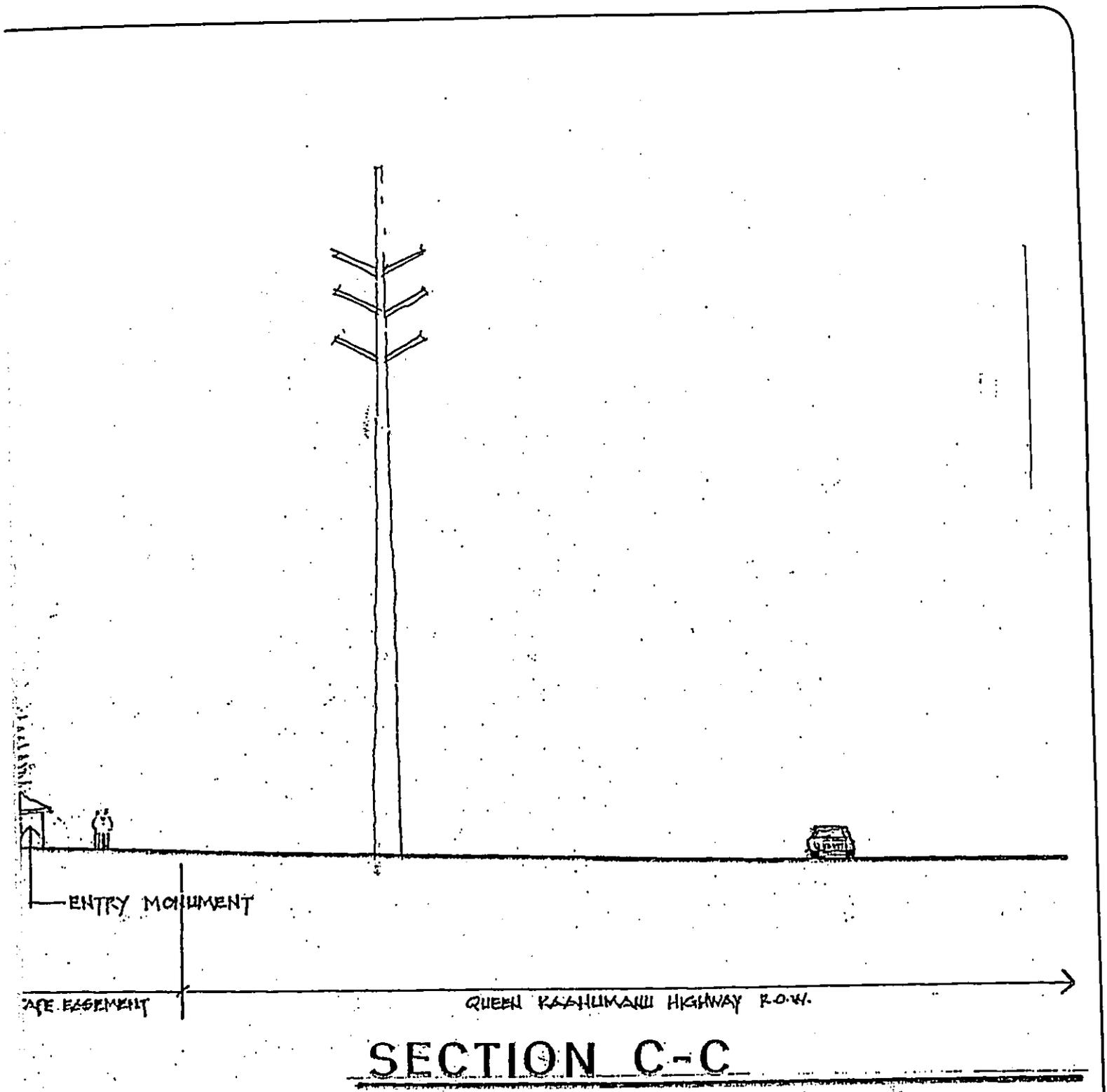
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 NORTH KONA, HAWAII

**FIGURE # 4-41**  
 PAGE NO. 4-61



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**CONCEPTUAL LANDSCAPE PLAN**  
**SECTION CC**

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 NORTH KONA, HAWAII

**FIGURE # 4-4j**  
 PAGE NO. 4-62