NEIL ABERCROMBIE
GOVERNOR
STATE OF HAWAI'I

ALBERT "ALAPAKI" NAHALE-A
CHAIRMAN
HAWAIIAN HOMES COMMISSION

ROBERT J. HALL
DEPUTY TO THE CHAIRMAN

STATE OF HAWAI'I
DEPARTMENT OF HAWAIIAN HOME LANDS
P.O. BOX 1879
HONOLULU, HAWAI'I 96805

March 24, 2011

Gary Hooser
Director
Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Gary Hooser:

Subject: Draft Environmental Assessment for the Maku'u Farmers Market and Community Center
TMK: (3) 1-5-10:41, Maku'u, Puna, Hawai'i

The Department of Hawaiian Home Lands has reviewed the draft environmental assessment for the subject project, and anticipates a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability for this project in the next available OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, one (1) copy of the document in pdf format, one (1) copy of the Draft EA, and the project summary on disk. Please call Brian Nishimura at (808) 896-0593 and copy the Department if you have any questions.

Aloha and mahalo,

Albert "Alapaki" Nahale-a, Chairman
Hawaiian Homes Commission

DRAFT ENVIRONMENTAL ASSESSMENT AND ANTICIPATED FINDING OF NO SIGNIFICANT IMPACT

MAKU'U FARMERS MARKET AND COMMUNITY CENTER

Maku'u, Puna, Island of Hawaii

MARCH, 2011

PREPARED FOR:

MAKU'U FARMER'S ASSOCIATION

PREPARED BY:

BRIAN T. NISHIMURA, PLANNING CONSULTANT

101 AUPUNI STREET
SUITE 217
HILO, HAWAII 96720-4221

TABLE OF CONTENTS

1. Introduction

1.1 Purpose

The Maku'u Farmer's Association (MFA) has obtained management control of approximately 38 acres of land to construct and operate a cultural/community learning center and other related uses through License Agreement No. 649 and subsequent amendment executed with the Department of Hawaiian Home Lands (DHHL). License Agreement No. 649 was issued on January 4, 2006 and the first amendment to the agreement was executed on March 19, 2009. The License Agreement authorizes the MFA to construct and operate a cultural/community learning center and other related uses to service the Hawaiian homestead communities in East Hawaii. The MFA is currently utilizing approximately 9 acres of the property for a farmer's market and cultural learning center. Plans for a Maku'u Farmer's Association Community Center were included in the Department of Hawaiian Home Land's Maku'u Regional Plan which was approved by the Hawaiian Homes Commissionin 2008 and recently updated and approved in December 2010. The initial focus of the MFA, and the focus of this Environmental Assessment, is to further develop the Farmers' Market and a Community Center facility to provide a gathering place which enhances community identity, reflects and preserves Hawaiian culture and values while promoting small business enterprises. The Maku'u Regional Plan includes longer range objectives by expanding the uses to include Kūpuna Housing, a Social Agency Center, Retail/Commercial Space, a Comprehensive Health Center, Child Care Center, Visitor Center with overnight quarters and park space. The impacts of these longer range objectives will be evaluated in the future when specific plans are developed for implementation.

The anticipated use of federal and state funding, and the use of state land triggers environmental requirements for the preparation of an Environmental Assessment (EA), in accordance with Chapter 343, Hawaii Revised Statutes as well as the Environmental Laws and Authorities of 24 CFR 58. The purpose of this Environmental Assessment is to comply with both the state and federal environmental regulations.

1.2 Identification of Proposing Agency

Ms. Paula Kekahuna is the President of the Maku'u Farmer's Association whose mailing address is 15-2131 Keaau Pahoa Highway, Pahoa, Hawaii 96778.

1.3 Identification of Approving Agency

The Department of Hawaiian Home Lands (DHHL) is the approving agency and responsible entity for the proposed project. Albert "Alapaki" Nahale-a is the Chairman of the Hawaiian Homes Commission and his mailing address is PO Box 1879 Honolulu, Hawaii 96805.

1.4 Technical Description

The property is located in Maku'u, Puna, Island of Hawaii and identified as Tax Map Key: (3) 1-5-10: 41 (previously a portion of 1-5-10: 17). The subject property is situated on the makai side of the Kea'au – Pahoa Road (State Highway 13), approximately three miles north of Pahoa town. (Please see Figure 1 Location Map and Figure 2 Tax Plat Map) The subject property is situated within the State Land Use Agricultural District and designated "Village Commercial" by the

Department of Hawaiian Home Lands pursuant to the Memorandum of Agreement (MOA) between the County of Hawaii and the Department of Hawaiian Home Lands dated December 27, 2002. The project is consistent with land use designations identified in the Department's Hawai'I Island Plan approved in May 2002. The "Village Commercial" designation was confirmed in a letter dated December 22, 2008 from Micah A. Kane, Chairman of the Hawaiian Homes Commission to Christopher J. Yuen, Planning Director of the County of Hawaii.

This environmental assessment will address the impacts of the first phase of a priority project in the Maku'u Regional Plan which involves the first 9 acres immediately adjacent to the Kea'au-Pahoa Road and includes the Farmers Market, Māla (garden area) and the Community Center. (Please see the attached Maku'u Concept Development Master Plan. Initial work on the project began in 2001 and approximately 2/3 of 9 acre area has been developed including site clearing and grading, erecting canopy tents to accommodate approximately 125 venders, vehicle parking spaces, installation of County water service, installation of a restroom facility with septic system and construction of the Māla and cultural village.

The remaining area will be utilized to construct a community center which will be utilized for community gatherings, cultural workshops, agricultural related workshops, and business development workshops. The facility will also provide community access to a Certified Kitchen and Cooking Facility for start-up businesses, training, and fundraising opportunities as well as access to office equipment and computers. The Community Center is planned to be built in phases. Phase I will include approximately 3,000 square feet of floor space which will have two multi-purpose rooms and office. Phase II construction will include restrooms and storage space. Phase III will include one private and one public certified kitchen, storage space and an imu. The final phase will involve the construction of a 8,000 square foot great hall. (Please see attached site plan)

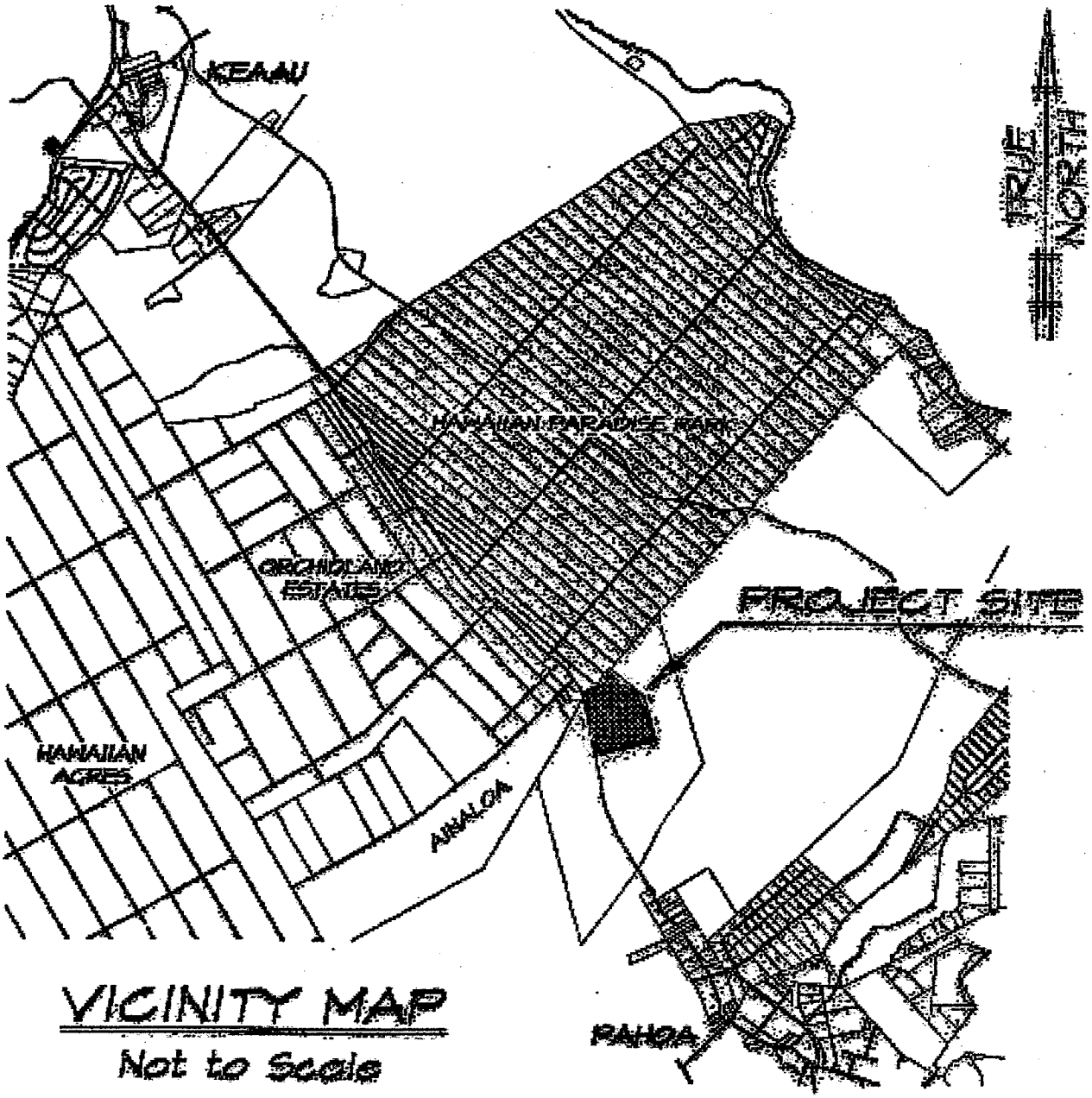


Figure 1. Vicinity Map

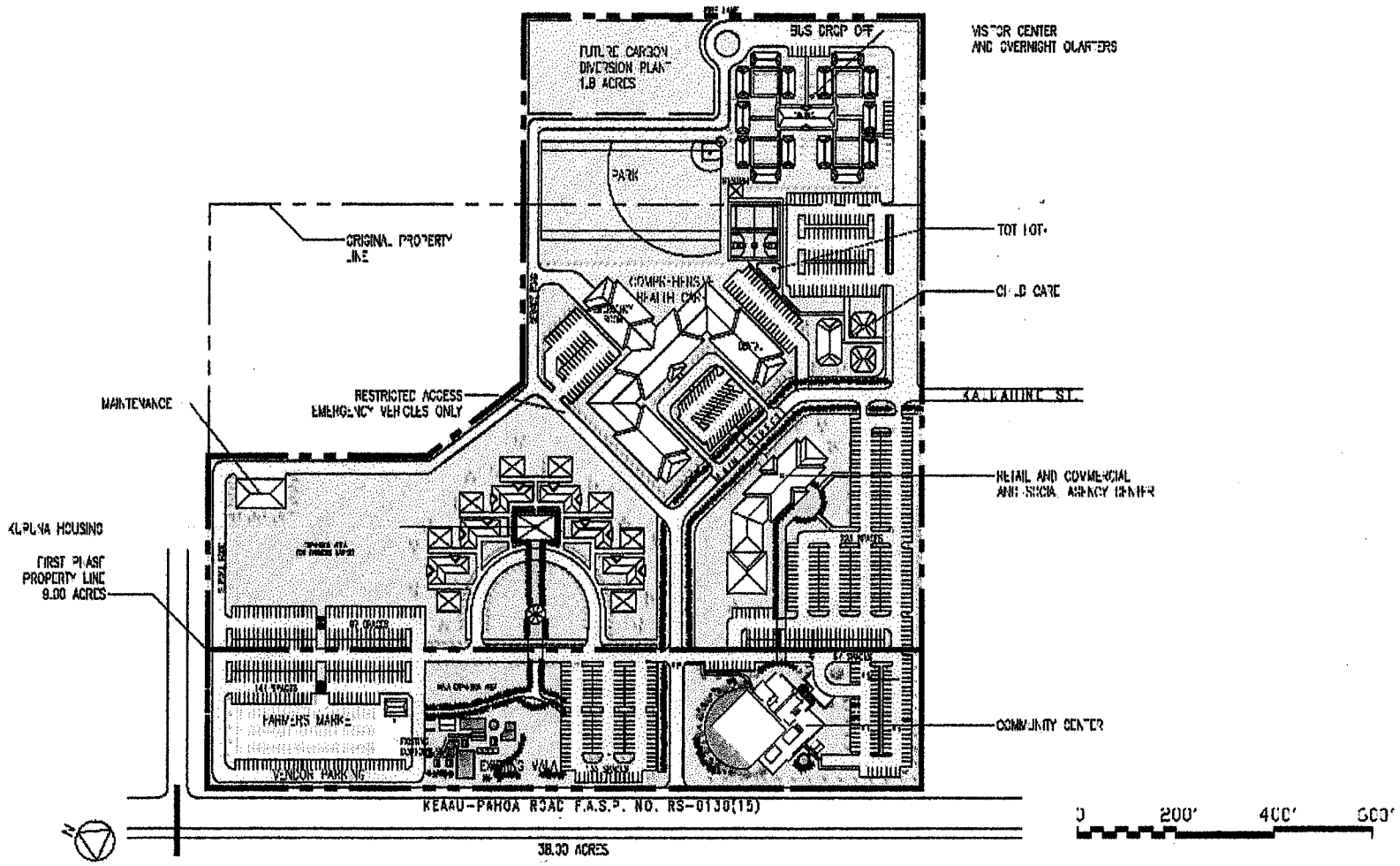


Figure 2. Makuu Master Plan

1.5 Project Background

1.5.1 Need for the Project

The Maku'u Farmers Association (MFA) is a community based non-profit 501(c) 3 organization with over 60 members and has been in existence since 1986. The MFA was formed by Native Hawaiian farmers who were awarded agricultural land parcels in 1985 by the Department of Hawaiian Home Lands (DHHL) in Maku'u, Puna, Island of Hawaii. During a two year time frame between1999-2000, the MFA was involved in an intensive planning effort to develop a strategy to address the high unemployment rate and limited resources in the Puna District. The MFA believed that self-sufficiency and self-actualization were essential to improving the quality of life and economic base of their community. The planning process identified a number of challenges facing the Maku'u including the following:

- Lack of financial resources
- Lack of opportunities to make money
- Lack of business knowledge and skills
- Lack of production in the Maku'u Homestead Community
- Little direct access to the retail market
- No businesses that are built on Hawaiian culture and values

The strategic planning process identified the Community Cultural Center and Farmers Market as the economic development project that would be the first step towards addressing the challenges identified. The mission statement of the MFA, developed during their planning effort is stated as follows:

> "The Maku'u Farmers Association will work together to create a vibrant recreational, cultural and civic center that demonstrates their cultural values and way of life to improve the quality of life and diversify the economic base of the community."

The Farmers Market and Community Center project will provide a gathering place that enhances community identity reflects and preserves Hawaiian culture and values while promoting small business enterprises that support the agricultural/residential community, especially those with low incomes and limited access to resources.

1.5.2 Land Use Designations

The subject property is situated within the State Land Use Agricultural District. The County General Plan Land Use Pattern Allocation Guide Map (LUPAG) designation for the project area is Extensive Agriculture. The zoning designation for the property is Village Commercial (CV). The project is also consistent with land use designations identified in the Department of Hawaiian Home Land's Hawai'i Island Plan approved in May 2002. It should be noted that the CV zoning for the subject property was designated by the Department of Hawaiian

Home Lands pursuant to the Memorandum of Agreement (MOA) between the County of Hawaii and the Department of Hawaiian Home Lands dated December 27, 2002. The County recognizes that under the provisions of the Hawaiian Homes Commission Act, 1920, as amended, the Department of Hawaiian Home Lands is not subject to the Land Use Law, Subdivision Code and Zoning Code. Upon a finding that certain zoning standards are appropriate for designated parcels, the Department will notify the County of those findings and develop the parcel in accordance with those standards.

The project area is not situated within the County's Special Management Area (SMA). The Puna Community Development Plan, adopted by Ordinance No. 08 116 in September, 2008 and amended by Ordinance No. 10-104 in November, 2010, has designated the Maku'u Homesteads area as a Community Village Center which is intended to accommodate "retail and personal services, repair shops; community park, elementary or middle school, community center and outdoor events area; bed-and-breakfast homes and small inns; elderly or other special needs housing; transit stop; medical clinic; walking and bicycling paths." The community village center designation includes the site of the Maku'u Farmer's Market as well as the remaining area leased to the Maku'u Farmers Association.

1.5.3 Listing of Permits and Approvals

Federal	
Federal Aviation Administration	Determination of No Hazard to Air Navigation
State of Hawaii	
Department of Health	Underground Injection Control Approval of Drywells Approval of Septic Systems
Department of Transportation	Approval of Driveway Connection(s)
County of Hawaii	
Department of Public Works	Approval of Project Construction Plans
Department of Water Supply	Approval of Project Construction Plans
Planning Department	Plan Approval Approval of Project Construction Plans

1.6 Agency and Public Consultation

The following public and private organizations and individuals were consulted during the preparation of this environmental assessment:

United States Fish and Wildlife Services, Division of Ecological Services
State of Hawaii, Department of Land and Natural Resources, Historic Preservation Division
State of Hawaii, Dept. of Land and Natural Resources, Division of Forestry and Wildlife
State of Hawaii, Department of Health

County of Hawaii, Planning Department
County of Hawaii, Department of Public Works
County of Hawaii, Department of Environmental Management
County of Hawaii, Department of Water Supply
County of Hawaii, Police Department
County of Hawaii, Fire Department

2. ENVIRONMENTAL SETTING

2.1 Physical Environment

2.1.1 Geology and Hazards

Environmental Setting

The project area is located on the lower eastern slope of Kilauea and consists of the Puna volcanic series (Stems and Macdonald, 1946). The Puna volcanic series consists mainly of basaltic lava flows.

The volcanic hazard as assessed by the United States Geological Survey for the project area is "3" on a scale of ascending risk 9 to 1 (Heliker 1990). Zone "3" includes the areas north of the upper east rift zone and both north and south of the southwest rift zone. The subject property is situated north of the lower east rift zone.

The island of Hawaii is one of the most seismically active areas in the world and has experienced more than twenty large earthquakes (magnitude 6 or larger) over the past 166 years. (Wyss and Koyanagi, 1992) Magnitude 6 earthquakes can be expected to cause structural damage to non-reinforced buildings. The Building Code rating for the entire island of Hawaii is seismic Zone 4 which has the highest risk for seismic activity.

Two significant hurricanes have affected the Island of Hawaii over the past 50 years. Damage from hurricanes result from coastal wave/surge and high winds. The project site is not within a coastal hazard area for hurricanes or tsunami inundation. The hazards from hurricane winds are far more extensive and unpredictable than the water hazard. Winds may blow from variable directions and may be amplified by topographic conditions. (County of Hawaii, 2003)

Impacts and Mitigation Measures

Although the proposed project site is situated within lava hazard zone 3, it is same designation as Keaau town or the City of Hilo. The town of Pahoa is in lava hazard zone 2. The volcanic hazard risks for the proposed site are the same or lower than any other alternative site within the service area for the lower Puna community.

The Hawaii County Building Code requires that all new structures be designed to resist forces to seismic Zone 4 standards. The proposed facilities will be built to these Zone 4 standards.

2.1.2 Soils

Environmental Setting

The soils of the project area are classified as pahoehoe lava flows (rLW) which is characterized as having a billowy, glassy surface that is relatively smooth. In some areas, however, the surface may be rough and broken. The Agricultural Capability Subclass rating for pahoehoe lava flows is VIIIs, nonirrigated, which includes "soils and landforms with

limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes." (U.S. Soil Conservation Service 1973)

Impacts

Although portions of the project area have been utilized by students learning about traditional Hawaiian agricultural practices, the soil characteristics of the site are not well suited for traditional agricultural field crops. The project site does not include prime or unique farmland of statewide or local importance

2.1.3 Climate

Environmental Setting

Hawaii's climate is generally characterized as mild with uniform temperatures, moderate humidity, and two identifiable seasons. The "summer" season, between May and October is generally warmer and drier. The "winter" season, between October and April is cooler and wetter. The project area is situated along the "windward" side of the Island of Hawaii which is exposed to northeasterly trade winds that causes relatively high rainfall (over 160 inches annually). (University of Hawaii Press, 1983)

Impacts

The climatic conditions of the project area will not have a significant impact on the proposed project.

2.1.4 Hydrology and Drainage

Environmental Setting

The project area is within the Pahoa aquifer system which has a sustainable yield of approximately 435 million gallons per day. The proposed project will not have an adverse impact on the sustainable yield of the aquifer.

According to the Department of Public Works, Engineering Division, the subject area is not mapped by the Federal Emergency Management Agency (FEMA) and is designated as Zone "X" – an area determined to be outside the 500-year flood plain (may include areas with unknown flood hazards).

Impacts and Mitigation Measures

The proposed use of the subject property for a farmers market and community center is not anticipated to have any significant adverse impact on hydrology and drainage. Any potential impacts may be mitigated by complying with State and County regulations. The Department of Public Works, Engineering Division provided the following comments regarding a preliminary drainage report prepared for the proposed project:

> "As detailed in the calculations within the *Preliminary Drainage Report,* five dry wells with a capacity of 6cfs each will be constructed to capture the subject's developmental runoff. Given the subject project is still in the planning phase, we can determine that the Preliminary Drainage Report, at this stage in the project design, satisfies the requirements

of Section 25-2-72(3). Construction plans are required and must be submitted for the review and approval of the director."

Construction drawings will be prepared and submitted for review and approval by the Department of Public Works.

2.1.5 Water Quality

Environmental Setting

There are no inland water bodies in the vicinity of the project area. The nearest coastal waters are situated approximately 6 miles east of the project site. The project area is not situated within or adjacent to a wetland identified by the U.S. Department of Interior, Fish and Wildlife Service or in an area designated by the U.S. Environmental Protection Agency as being supported by a sole source aquifer.

Impacts

The proposed project is not expected to have any direct impact on any streams, wetlands, aquifer resource or marine waters. The project site is not located within one mile of a listed Wild and Scenic River and will not have an effect on the natural, free flowing or scenic qualities of a river in the National Wild and Scenic Rivers System.

2.1.6 Flora and Fauna

Environmental Setting

Approximately six of the nine acres of the project area has been previously cleared and graded for the farmers market, parking and the māla. The vegetation of the remaining undisturbed area is comprised of ohia trees (*Metrosideros polymorpha*), ohelo (*Vaccinium reticulatium*), uluhe (*Dicranopteris linearis*), wild orchid (*Cattleya* spp.) and ferns and vines. The vegetation is typical of others in the Puna district characterized as 'Ohi'a/Uluhe Lowland Wet Forest. Previous Environmental Assessments prepared for the Makuu-Halona and Makuu-Popoki Residential Subdivision (2005) as well as the Maku'u Offsite Water System Phase 2 (2004) projects have found no candidate, proposed, or listed threatened or endangered species within areas of similar vegetation type as the subject property.

Faunal surveys conducted for the above-described Environmental Assessments did not detect any threatened, endangered, or candidate avian or mammalian species within their project areas. It was noted, however, that the Hawaiian hawk (*Buteo solitaries*) and Hawaiian hoary bat (*Lasiurus cinereus semotus*) could possibly exist in the vicinity. It was further noted that small numbers of the endangered endemic Hawaiian Petrel and threatened Newell's Shearwater may overfly the area between the months of May and October. Nevertheless, due to the extensive prior disturbance of the project site by earthmoving equipment, proximity to Highway 13 and proximity to the Maku'u Farmlots subdivision, it is highly unlikely that the project site contains any threatened, endangered, or candidate species.

Impacts

Based on the extensive prior disturbance of the project site, it is highly unlikely that any candidate, proposed, or listed threatened or endangered species as set forth in the Endangered

Species Act of 1973, as amended are present on the subject property. As such, the proposed project will not have any significant impact on any protected or native plant or animal species.

2.1.7 Air Quality

Environmental Setting

The air quality of the subject area is affected by pollutants derived from the volcanic emissions from the ongoing Kilauea emption. Other sources of air pollutants to a limited degree include vehicle exhaust emissions along the neighboring streets and property. In general, however, the ambient air quality of the project area meets all federal and state standards as evidenced by its designation as an "attainment" area by the State Department of Health, Clean Air Branch.

Impacts and Mitigation Measures

Short term impacts will result from the construction activity involved with developing the subject property including dust and exhaust from machinery and vehicles. Given the temporary nature of the construction time period, the potential impacts of these construction activities should be minimal. In addition, the contractor will be required to comply with all applicable state and County requirements, including the requirements to utilize best management practices to minimize dust impact and comply with provisions of Hawaii Administrative Rules, Chapter 11-60.1, "Air Pollution Control," and Section 11-60.1-33, Fugitive Dust.

2.1.8 Noise

Environmental Setting

Existing noise levels at the project site are typical of a rural residential setting fronting on a major thoroughfare. Existing noise levels are influenced by the traffic on the Keaau-Pahoa highway and agricultural equipment operating on surrounding properties. These noise levels are considered to be low to moderate exposures and well within guidelines for non-noise sensitive land uses.

Impacts and Mitigation Measures

Temporary noise impacts will occur from construction activities for the development of the property and are unavoidable. Mitigation measures can be taken, however, to minimize noise impacts including the use of mufflers and implementing construction curfew periods. All project activities must comply with the Administrative Rules of the Department of Health, Chapter 11-46, on "Community Noise Control".

Temporary noise impacts will also be generated during the course of responding to fire alarms as well as the use of the emergency helipad. These noise disturbances are unavoidable but will be intermittent and of short duration.

2.1.9 Scenic Resources

Environmental Setting

The view of Mauna Kea and Mauna Loa from the Pahoa-Keaau, Vocano-Keaau Roads, and various Puna subdivisions is listed as an example of natural beauty in the Hawaii County General Plan. These views will not be adversely affected by the development of the project site for a farmers market and community center.

Impacts and Mitigation Measures

Adequate setbacks from the Keaau-Pahoa highway will ensure that the view of Mauna Kea and Mauna Loa will not be adversely affected by the development of the project site.

2.1.10 Hazardous or Toxic Conditions

Environmental Setting

Approximately 640 acres in the vicinity of the project area were leased by the U.S. Navy and utilized as a target practice area during World War II and was known as the Popoki Target Area. Site visits for preliminary investigations of the Popoki Target Area were conducted in 1990 and 1991 and practice bombs were found on that site. Further Remedial Investigations were conducted in 2005 in which approximately 271 pounds of munitions debris were collected. The U.S. Army Corps of Engineers is now in the process of removal and disposal of all munitions-related items from the surface and down 2 feet. The two primary areas of concern identified during the preliminary investigations include the 93-acre bombing target area and the 15-acre maneuver area. Both areas will be cleared to allow personnel to sweep the area with the use of munitions detectors. Although the Popoki Target Area is situated adjacent to the project site, the U.S. Army Corps of Engineers have clearly stated that, "The planned farmers' market is outside of the areas of concern identified under this RI/FS." (Remedial Investigation/Feasibility Study)

Impacts

Based on the findings of the U.S. Army Corps of Engineer Remedial Investigation/Feasiblity Study, it is highly unlikely that any munitions debris is present within the project area. No other hazardous or toxic conditions are known to be present on the subject property.

2.2 Social, Cultural and Economic Setting

2.2.1 Socio-Economic Characteristics

Setting

Hawaii County's population increased by more than 56,000 persons between 1980 and 2000. Between 1980 and 1990, Hawaii Island's population increased by 30.7 percent, and increased by 23.6 percent between 1990 and 2000. The April 1, 2000 population figure for Hawaii County was 148,677 and the July, 2009 population had grown to 177,835 according to figures compiled by the County of Hawaii, Department of Research and Development.

The Puna district had a population of 31,335 in 2000 which represented approximately 21 percent of the total population for Hawaii Island. Between 1990 and the year 2000, the Puna district was the fastest growing district on the island with population increasing by 50.8 percent. By the year 2010, the County General Plan projected the population of the Puna District to be 42,591(County of Hawaii, 2005) This growth is largely the result of the

availability of relatively inexpensive residential sized lots and the proximity to the employment centers in the City of Hilo.

The primary economic activity in Puna is the agricultural industry which includes truck farming, papaya, anthurium and orchid production. Although the district enjoys some economic benefit from tourism, visitor accommodations are limited to small bed and breakfast and vacation rental operations.

Impacts

The Farmers Market and Community Center project will provide a gathering place that enhances community identity reflects and preserves Hawaiian culture and values while promoting small business enterprises that support the agricultural/residential community, especially those with low incomes and limited access to resources. The proposed action, in and of itself, will not generate growth, but provides the necessary support to sustain a growing population and economy in the region.

With regard to "environmental justice" considerations, the proposed project will not have a disproportionately high and adverse human health or environmental effect on minority and low-income populations. In fact, the proposed project will have a substantial positive impact on the social and economic welfare of the community by providing the necessary facilities that will increase MFA's capacity to provide training, education and business development opportunities for the community. The proposed project will have a positive impact on low income and minority persons living in the Puna district.

2.2.2 Adjacent Land Uses

Existing Setting

The project area is situated in an area with mixed residential and agricultural and uses. There are single family dwellings on parcels within the adjacent (south and east) Maku'u Farm Lots Subdivision. The adjacent property to north and east is leased to the Federal Aviation Administration (FAA) to operate an air traffic control beacon interrogator and a non-directional beacon. The on-site equipment is not manned except for weekly visits to inspect and monitor the equipment. The area immediately west of the project area, across State Highway 13, is a 640 acre parcel owned by the Department of Hawaiian Home Lands. The parcel is currently vacant and plans for the future use of the property are currently being re-evaluated.

The proposed project is not situated within an FAA-designated civilian airport Runway Clear Zone (RCZ), within a military airfield Clear Zone (CZ) or Accident potential Zone (APZ). The closest airport is the Hilo International Airport situated approximately 13 miles northwest of the project site.

Impacts and Mitigation Measures

The proposed Maku'u Community Center structure has been evaluated by the FAA and they have determined that the structure does not exceed obstruction standards and would not be a hazard to air navigation. Although the "DETERMINATION OF NO HAZARD TO AIR

NAVIGATION" expired on February 26, 2010, the MFA will re-submit plans to the FAA for review and approval prior to the commencement of construction.

The proposed project will not be inconsistent with the character of the mixed residential and agricultural uses of the surrounding properties. Any impacts on the surrounding properties due to noise and other disturbances can be mitigated by providing adequate setbacks, careful construction management practices and compliance with federal, state and county regulations.

2.3 Public Facilities and Services

2.3.1 Roads

Existing Setting

The Keaau-Pahoa Road (State Highway 130), fronting along the western border of the subject property, is a two-way, two-lane roadway with a right-of-way width of 80 feet. The pavement width is 22 feet wide with 8 foot wide shoulders. This highway is the primary transportation link between lower Puna and destinations within and beyond the Puna district.

Impacts and Mitigation Measures

Comments received during the pre-assessment consultation period from the State Department of Transportation raised many concerns regarding the potential traffic impacts generated by the development of the full 38 acre parcel leased to the Maku'u Farmers Association. Based in part on the comments received from the State Department of Transportation as well as other agencies during the pre-assessment consultation period, the scope of the Environmental Assessment was modified to address the impacts of the first phase of the Maku'u Regional Plan which involves only the first 9 acres immediately adjacent to the Kea'au-Pahoa Road. rather than the entire 38 acre parcel. The Environmental Assessment was modified to address the impacts of the Farmers Market, Māla (garden area) and the Community Center. The traffic impacts generated by the first phase project has been reduced significantly because the major traffic generators including the commercial, residential and service oriented uses will not be included at this time. In addition, the Farmer's Market is open only on Sundays when peak hour traffic volumes on the Keaau-Pahoa Road are 82% lower than during weekday peak hours. The traffic generated by the proposed Community Center will not have a significant impact on weekday peak hour traffic. The Traffic Impact Analysis Report (TIAR) prepared for the proposed project by The Traffic Management Consultant (TMC) indicated that, "The development of Maku'u Master Plan is expected to begin with the community center. The existing unsignalized access can be expected to support the existing Farmer's Market and the proposed community center. Subsequent development of any other major trip generation components of the Master Plan, such as the health center, retail space, office space, and child care center, will require further analysis on Keaau-Pahoa Road at the Project Access Driveway." (The complete TIAR is included as appendix B)

2.3.2 Water System

Existing Setting

Water is available from an existing 12-inch waterline along the Keaau-Pahoa Road. The Department of Water Supply has provided the following comments:

> "Please be informed that there is an existing 12-inch waterline within Kea'au-Pāhoa Road fronting the subject parcel. The parcel is currently served by a 5/8-inch meter, which is limited to a maximum daily usage of 600 gallons.
>
> "We have no objection to the proposed project; however, the applicant will be required to submit estimated maximum daily water usage calculations, prepared by a professional engineer licensed in the State of Hawaii, showing the anticipated water demand for the project. Based on the estimated demand, the owner/applicant may be required to install a larger or additional meter to accommodate the additional water usage created from the project.
>
> "The applicant/owner will also be required to install, on private property, a reduced pressure type backflow prevention assembly within five feet of any meter serving the property. The installation of the backflow prevention assembly must be inspected and approved by our Department before water service can be activated."

Impacts

The proposed project is not anticipated to have a significant adverse impact on the existing Department of Water Supply system serving the subject location. The necessary water use calculations will be provided to the Department of Water Supply as requested. All required improvements will be constructed in accordance with the requirements of the Department of Water Supply.

2.3.3 Protective Services

Existing Setting

A new Fire station and Police sub-station site is situated approximately two miles east of the project site along the Keaau-Pahoa Road. The Fire station has been opened while the Police sub-station is currently under construction. The existing Police sub-station is located within Pahoa town approximately three miles from the subject property.

Impacts

The proposed project will be in close proximity to the Fire station and Police sub-station and will not have an adverse impact on the protective services provided in the Puna district.

2.3.4 Power and Communication Systems

Setting

The project area is served by Hawaii Electric Light Company's (HELCO) power lines fronting the property. Telephone service is also available to the project site.

Impacts

The proposed action will not have any significant adverse impact on the power and communication systems serving the region.

2.3.5 Wastewater

Setting

The project area is not situated within the service limits of the County wastewater disposal system. All wastewater generated will be disposed into a septic system meeting with the approval of the Department of Health.

Impacts

The proposed action will not have any significant adverse impact regarding wastewater disposal.

2.3.6 Solid Waste

Setting

There is no municipal collection system for solid waste in the County of Hawaii. There is a solid waste transfer station situated in Pahoa southeast of the subject property.

Impacts

The proposed action will not have any significant adverse impact regarding solid waste.

2.4 Archaeology, Historic and Cultural Resources

Setting

Haun & Associates conducted an archaeological assessment of the subject property in November, 2009. A complete copy of the report is provided in Appendix C attached to the Environmental Assessment. The finding of the archaeological assessment is provided as follows:

> "No archaeological sites or features were identified within the project area. Two small non-cultural lava blisters were encountered. These were both carefully examined and one was found to contain evidence of recent cultivation. The other blister contained no cultural material or evidence of modifications. No further archaeological work is recommended for the property based on the survey results."

The archaeological assessment was transmitted to the State Historic Preservation Division of the Department of Land and Natural Resources in November, 2009. There has been no response from the State Historic Preservation Division regarding the archaeological assessment.

The archaeological assessment provides a general background of the project area and the Puna district as follows:

> "There is little mention of Makuu in Hawaiian traditional and legendary accounts. Crozier and Barrere (1071) note that in Puna, few pre-missionary traditions and legends survived because of intensive mission work by Reverend Titus Coan between 1835 and

the 1870s. Emory et al. (1959) suggest that Puna's traditional history is difficult to follow because of the dominating influence of the ruling families in the neighboring districts of Hilo and Ka'u. Handy and Handy(1972:542) state that Hawaiian traditions suggest that Puna 'was once Hawaii's richest agricultural region and that it is only in relatively recent time that volcanic eruption has destroyed much of its best land'.

Hua'a was the chief of Puna when it was seized by 'Umi-a-Liloa, unifying his control over the Island of Hawaii (Kamakau 1961). Hua'a was killed during a battle with one of 'Umi's warrior sons, Pi'i-mai-wa'a, at Kuolo in Kea'au. Kalani'opu'u unified his control over Hawaii Island when he gained control of Ka'u and Puna following Alapa'I's defeat in a battle at Mahinaakaka. During Kalani'opu'u's rule, the Puna chief, I-maka-koloa, attempted a revellion and seized the valuable products of the district including *o-o* and *mamo* bird features, hogs, fine mats made from pandanus blossoms and from young pandanus leaves, gray tapa cloth, and tapa cloth made from *mamaki* bark (Kamakau 1961).

"Following the death of Kalani'opu'u, in 1782, a dispute over ascendancy ensued culminating in the battle of Moku'ohai (Kamakau 1961, Kuykendall 1938). Following the battle, control over the island was divided between Keoua Ku'ahulu'ula, who held Ka'u and a portion of Puna; Keawema'uhili, who controlled the remainder of Puna, Hilo, and southern Hamakua; and Kamehameha, who controlled northern Hamakua, Kohala, and Kona. A feud between Keoua and Keawema'uhili in 1785, resulted in Keawema'uhili's death and the expansion of Keoua's territory, including the unification of Puna. The island was finally re-unified in 1791 when Kamehameha killed Keoua at Kawaihae. In 1790, a lava flow extended diagonally across Kaueleau from the northeast above Opihikao to the coast at Kamaili (Wolfe and Morris 2001).

"Early historic accounts document that Puna was well populated and intensively cultivated. In 1823, Ellis (1963) traveled along the coast from Kaimu to Kapoho, probably passing through, or very close to, the project area. At Kaimu, there was a sandy beach and village with an estimated 725 occupants. Also described, are plantations and groves of coconuts and *kou*. Ellis estimated that the population of Kaimu and nearby villages was approximately 2,000. Ellis described a village surrounded by plantations at Kamaili, which is immediately south of Kaueleau, where they were given taro and potatoes. Other crops noted by Ellis in Puna included bananas and sugar cane. In 1841, the Wilkes Expedition passed through an inland portion of Kaueleau (Burchard 1994).

"The following summarizes Burchard (1994) discussion of Puna's later history. Prior to the 1870s, foreign influence in Puna primarily was limited to missionaries. In the late 1870s, Robert Rycroft moved to Pohoiki and built a home, wharf, sawmill, jail and courthouse. He later began growing coffee in the area and built a coffee mill. In the mid-1880s, the government began selling land in Puna for homesteads. Most of the homestead land was acquired for coffee cultivation in the 1890s.

"Puna Sugar Company was established in 1900 in nearby Kapoho. Between 1900 and the 1930s, the population of the region grew dramatically with the expansion of sugar cane cultivation, pineapple production, the timber industry, and other commercial developments. In the early 1900s, the Hilo Railroad Company developed a rail system from Hilo Town to Puna. In 1907, the Hawaiian Mahogany Lumber Co. was established

by James B. Castle to provide railroad ties to the mainland United States. A mill was built at Pahoa and lands being cleared for sugar cane cultivation provided a steady supply of timber. The mill lost its contract to provide railroad ties in 1913 because the ties did not last as long as anticipated. The mill was leased for sugar plantation use in 1917.

"By the ;ate 1920s, concern over forest depletion and watershed maintenance lead to the creation of the Puna, Nanawale, and Malama-Ki Forest Reserves. Handy and Handy (1972) citing oral historical sources, indicate that in the 1930s there were homesteading areas in 'Opihikao, Kaueleau, Kamaili, Ke'eke'e, Kehena, and Keauohana. Dry land taro was grown throughout the inland portions of these *ahupua'a*. A particular taro cultivation method, *pa-hala*, is described for the area from Kalapana to Kamaili. The method involved excavating a hole in a'a lava in a pandanus grove. The hole was then filled with weeds, which were allowed to rot for six weeks or more. A taro cutting (*huli*) was wrapped in pandanus leaves and planted in the hole. After the cutting produced three or four leaves, the pandanus brances were cut to provide sunlight and the taro plant was covered with pandanus leaves. After the cutting produced three or four leaves, the pandanus branches were cut to provide sunlight and the taro plant was covered with pandanus leaves. After the pandanus leaves were sufficiently dry, the leaves were burned reducing them ash that provided nourishment to the taro plant, which grew tall enough to hide a man beneath the leaves.

"Puna Sugar Company continued in operation until the early 1980s. Beginning in the late 1950s, real estate development, along with tourism and diversified agriculture gradually replaced plantation agriculture in Puna. A portion of the present project area is currently in use as a farmer's market."

The Maku'u Farmers Association is utilizing the subject property to host cultural events, workshops and classes that reflects and preserves Hawaiian culture and values. These events have included cultural workshops featuring lei making, lauhala weaving, hula, lapa'au, lomi lomi, medicinal herb usage, canoe making, construction of traditional shelters, plant propagation, planting and harvesting methods, and many others. The proposed project will enhance an opportunity for additional classes and workshops which promote and preserve Hawaiian culture and values.

Impacts

The archaeological consultant has determined that no archaeological sites or features were identified within the project area. As such, it is anticipated that no historic sites or features would be affected by the implementation of the proposed project. This finding has been transmitted to the State Historic Preservation Office (SHPO) for their review and concurrence. No response from the SHPO has been received to date. In addition, the proposed project will have a positive impact on preserving and perpetuating Hawaiian cultural activities and values.

3. SUMMARY OF POTENTIAL ADVERSE ENVIRONMENTAL IMPACTS AND PROPOSED MITIGATION MEASURES

3.1 Short Term Impacts

Construction Activity

Impacts: Short term impacts will result from the proposed construction activity for the Farmers Market and Community Center project including increased noise levels, dust and exhaust from machinery.

Mitigation: Given the relative short construction time period involved in developing the proposed facilities, the potential impacts of the construction activities should be minimal. In addition, the contractor(s) will be required to comply with all applicable state and County requirements including the State Department of Health regulations and any requirements to utilize best management practices to minimize impacts.

3.2 Long Term Impacts

Natural Hazards:

Impacts: The project area is situated in volcanic hazard zone 3, one of the more seismically active areas in the world, and an area that may be exposed to hurricanes and strong winds.

Mitigation: Although the proposed project site is situated within lava hazard zone 3, it is same designation as Keaau town or the City of Hilo. The town of Pahoa is in lava hazard zone 2. The volcanic hazard risks for the proposed site are the same or lower than any other alternative site within the service area for the lower Puna community.

The Hawaii County Building Code requires that all new structures be designed to resist forces to seismic Zone 4 standards. The proposed facilities will be built to these Zone 4 standards.

The Hawaii County Building Code requires that all new structures be designed to resist forces to seismic Zone 4 standards. The proposed facilities will also be hardened to the extent feasible to minimize the hazards from hurricanes and strong wind.

Drainage:

Impacts: County requirements stipulate that, all development generated runoff be disposed on site and cannot be directed toward any adjacent properties.

Mitigation: A drainage report will be prepared and any recommended drainage system will be constructed with the approval of the Department of Public Works. The contractor(s) will be responsible for obtaining all necessary permits to comply with all drainage requirements, including any requirements to utilize best management practices to minimize any potential impacts.

Roadways and Traffic:

Impacts: Concerns have been raised regarding additional traffic generated on the Keaau-Pahoa Road by the development of the 38 acre site leased to the Maku'u Farmers Association.

Mitigation: In response to the traffic concerns, the scope of the Environmental Assessment was modified to address the impacts of the first phase of the Maku'u Regional Plan which involves only the first 9 acres immediately adjacent to the Kea'au-Pahoa Road rather than the entire 38 acre parcel. The Environmental Assessment was modified to address the impacts of the Farmers Market, Māla (garden area) and the Community Center. This modification has significantly reduced the traffic impacts that will be generated because the major traffic generators including the commercial, residential and service oriented uses will not be included at this time. The Farmer's Market is open only on Sundays when peak hour traffic volumes on the Keaau-Pahoa Road are 82% lower than during weekday peak hours. In addition, the traffic generated by the proposed Community Center will not have a significant impact on weekday peak hour traffic.

The Traffic Impact Analysis Report (TIAR) prepared for the proposed project indicated that, "The Project Access Driveway is expected to operate at satisfactory Levels of Service during the AM and PM weekday peak hours of traffic with the proposed project. Traffic improvements at the intersection of Keaau-Pahoa Road and the Project Access Driveway are not recommended at this time." The TIAR further states that, "Subsequent development of any other major trip generation components of the Master Plan, such as the health center, retail space, office space, and child care center, will require further analysis on Keaau-Pahoa Road at the Project Access Driveway."

4. ALTERNATIVES

4.1 No Action Alternative

The no action alternative would result in the property being returned to the Department of Hawaiian Home Lands. Any future alternative uses of the site would be evaluated as part of the Department's Regional Planning effort for the district.

4.2 Alternative Sites

Although alternative sites within the Puna District are available, the likely impacts of the proposed uses will not be significantly different than at the present location. Furthermore, none of the potential alternative sites would have the advantages of the infrastructure available at the present location including a channelized intersection, County water and restroom facility. As such, all potential alternative sites will be significantly more expensive to utilize for the proposed uses.

5. DETERMINATION, FINDINGS AND REASONS FOR SUPPORTING DETERMINATION

5.1 Significance Criteria

According to the Department of Health Rules (11-200-12), an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and long-term effects. In making the determination, the Rules establish "Significance Criteria" to be used as a basis for identifying whether significant environmental impact on the environment if it meets anyone of the following thirteen criteria.

1. **Involves an irrevocable commitment to loss or destruction of any natural or cultural resources.**

   The proposed project involves approximately 9 acres of land immediately adjacent to the Kea'au-Pahoa Road to develop a Farmers Market, Māla (garden area) and a Community Center. Approximately 2/3 of the area has been previously cleared and graded and has been used for the Farmers Market and Māla. The remaining area will be utilized to construct a community center which will be utilized for community gatherings, cultural workshops, agricultural related workshops, and business development workshops. As such, the resources of the property will be utilized to enhance natural or cultural resources for the community.

2. **Curtails the range of beneficial uses of the environment.**

   Approximately 2/3 of the project site has been previously cleared and graded and the existing vegetation is primarily composed of alien species. The Māla area has been utilized to host cultural events, workshops and classes that reflects and preserves Hawaiian culture and values. These events have included cultural workshops featuring lei making, lauhala weaving, hula, lapa'au, lomi lomi, medicinal herb usage, canoe making, construction of traditional shelters, plant propagation, planting and harvesting methods, and many others. The proposed project will expand opportunities for beneficial uses of the environment.

3. **Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS; and any revisions thereof and amendments thereto, court decisions, or executive orders.**

   The proposed action is consistent with the Environmental Policies established in Chapter 344, HRS, and the National Environmental Policy Act.

4. **Substantially affects the economic or social welfare of the community or state.**

   The proposed action will have a positive impact on the economic and social welfare of the community. The Farmers Market and Community Center project will provide a gathering place that enhances community identity, reflects and preserves Hawaiian culture and values while promoting small business enterprises that support the

agricultural/residential community, especially those with low incomes and limited access to resources. The proposed action, in and of itself, will not generate growth, but provides necessary support to sustain a growing population and economy in the region.

5. **Substantially affects public health.**

   The proposed action will not have a substantial adverse impact on public health. In fact, the proposed facilities within the community center will improve sanitation of prepared foods and products by making available approved certified kitchen facilities to the community. Potential noise, air, water and drainage impacts during constructionwill be addressed through careful construction management practices and compliance with federal, state and County requirements.

6. **Involves substantial secondary impacts, such as population changes or effects on public facilities.**

   The proposed project will not have any substantial secondary impacts because it is not a generator of growth. Rather, the proposed action will support and sustain a growing population and economy in the region.

7. **Involves a substantial degradation of environmental quality.**

   The Maku'u Farmer's Market and community center will have modern energy efficient designs including current lighting fixtures as well as water conservation plumbing fixtures. The proposed project will comply with all governmental regulations and will not involve a substantial degradation of environmental quality.

8. **Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions.**

   As stated previously, the proposed action will not have any substantial secondary impacts and is consistent with the Department of Hawaiian Home Lands Maku'u Regional Plan and the County's Puna Regional Plan. The proposed action does not involve a commitment for larger actions and will not induce other actions having a cumulative effect on the environment.

9. **Substantially affects a rare, threatened or endangered species or its habitat.**

   The project site has been extensively disturbed by earthmoving equipment and does not have any candidate, proposed, or listed threatened or endangered species on the property. As such, the proposed action will not have any substantial adverse effect on any rare~ threatened or endangered species or its habitat.

10. **Detrimentally affects air or water quality or ambient noise levels.**

    Short term impacts will result from the proposed action including increased noise levels, dust and exhaust from machinery involved in the construction of project improvements. Given the relative short construction time period the potential impacts of these construction activities should be minimal. The contractor(s) will be required to comply with all applicable federal, state and County requirements, including complying with

State Department of Health regulations and any requirements to utilize best management practices to minimize all impacts.

11. **Affects or is likely to suffer damage by being located in an environmentally sensitive area, such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters.**

    The project site is not situated in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters. However, the project area is situated in volcanic hazard zone 3, one of the more seismically active areas in the world, and an area that may be exposed to hurricanes and strong winds. Nevertheless the volcanic hazard of the project site is comparable to that of the City of Hilo and is less hazardous than zone 2 because situated further away from the lower east rift zone of Kilauea. As such, the volcanic hazard risk for the proposed site is the same or lower than any other alternative site within the lower Puna community. The Hawaii County Building Code requires that all new structures be designed to resist forces to seismic Zone 4 standards.

12. **Substantially affects scenic vistas and view planes identified in county or state plans or studies.**

    Adequate setbacks from the Keaau-Pahoa highway will ensure that the view of Mauna Kea and Mauna Loa will not be adversely affected by the development of the project site for the Maku'u Farmer's Market and community center.

13. **Requires substantial energy consumption.**

    The proposed project will not require substantial energy consumption,

5.2 Findings

Based on the foregoing information presented, it is anticipated that the proposed Maku'u Farmer's Market and community center will not have a significant effect. As such, a determination of a Finding of No Significant Impact for the proposed action is appropriate.

5.3 Reasons Supporting Determination

The nature and scale of the proposed action is such that no significant environmental effects are anticipated. Potential impacts, if any, can be mitigated through careful construction management practices and compliance with all governmental requirements including those of the State Department of Health and the County Department of Public Works.

REFERENCES

County of Hawaii, Planning Department, *General Plan* 2005.

County of Hawaii, Planning Department, *Puna Community Development Plan* as amended, 2010.

County of Hawaii, Department of Research and Development, *Data Book,*, Internet Edition 2010.

County of Hawaii, *Hazard Mitigation Plan: Natural Hazards,* 2003.

Department of Hawaiian Home Lands, *Maku'u Regional Plan*, 2008

Heliker, C. 1990. *Volcano and Seismic Hazards on the Island of Hawaii.* Washington: GPO

University of Hawaii Department of Geography. 1983. *Atlas of Hawaii.* University of Hawaii Press, Honolulu.

U.S. Soil Conservation Service. 1973. *Soil Survey of the Island of Hawaii, State of Hawaii.* Washington: U.S.D. A.

Stearns, H.T. and Macdonald G.A. 1946. *Geology and Ground-Water Resources of the Island of Hawaii.* Bulletin 9, Hawaii Division of Hydrography. Advertiser Publishing Co., Ltd. Honolulu.

Wyss, M. and Koyanagi, R. Y., *Isoseismal maps, macroseismic epicenters, and estimated magnitudes of historical earthquakes in the Hawaiian Islands*: U.S. Geological Survey Bulletin 2006, 1992.

APPENDIX A – REPRODUCTION OF COMMENTS MADE DURING THE PRE-ASSESSMENT CONSULTATION PERIOD AND RESPONSES TO THE COMMENTS

1. State of Hawaii, Department of Health, June 15, 2010.

   Response: Letter from Brian T. Nishimura to Newton Inouye, January 12, 2011.

2. State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife June 23, 2010.

   Response: Letter from Brian T. Nishimura to Paul J. Conry, January 12, 2011.

3. County of Hawaii, Fire Department, June 24, 2010.

   Response: Letter from Brian T. Nishimura to Darryl J. Oliveira, January 12, 2011.

4. County of Hawaii, Department of Environmental Management, June 28, 2010.

   Response: Letter from Brian T. Nishimura to Frank J. DeMarco, January 12, 2011.

5. County of Hawaii, Police Department June 29, 2010.

   Response: Letter from Brian T. Nishimura to Derek D. Pacheco, January 12, 2011.

6. State of Hawaii, Department of Land and Natural Resources, Historic Preservation Division, June 30, 2010.

   Response: Letter from Brian T. Nishimura to Ms. Pua Aiu, PhD., January 12, 2011.

7. County of Hawaii, Planning Department, August 17, 2010.

   Response: Letter from Brian T. Nishimura to Ms. Bobby Jean Leithead-Todd, January 12, 2011.

8. State of Hawaii, Department of Transportation, August 19 and September 8, 2010.

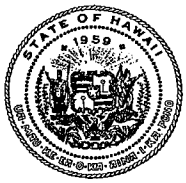
   Response: Letter from Brian T. Nishimura to Glenn Okimoto, January 12, 2011.

9. County of Hawaii, Department of Water Supply, August 25, 2010.

   Response: Letter from Brian T. Nishimura to Milton D. Pavao, January 12, 2011.

LINDA LINGLE
GOVERNOR

CHIYOME L. FUKINO, M.D.
Director of Health



STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 916
HILO, HAWAII 96721-0916

June 15, 2010

Mr. Brian T. Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221

Subject: Pre-Environmental Assessment consultation
Maku'u Farmers Association Community Center
Tax Map Key (3) 1-5-10:41 Maku'u, Puna, Island of Hawaii

If the total sewage flow of the entire project exceeds 15,000 gallons per day, a sewage treatment plant and sewer collection system will be required. If the total sewage flow is less than 15,000 gallons per day, then on-site wastewater system can be installed.

Dispensing site locations and food preparation areas would need to meet the requirements of Chapter 12, Food Establishment Sanitation Code. The applicant may call Ph. 933-0917 to discuss the content of this communication.

Construction activities must comply with the provisions of Hawaii Administrative Rules,Chapter 11-46, "Community Noise Control."

1. The contractor must obtain a noise permit if the noise levels from the construction activities are expected to exceed the allowable levels of the rules.

2. Construction equipment and on-site vehicles requiring an exhaust of gas or air must be equipped with mufflers.

3. The contractor must comply with the requirements pertaining to construction activities as specified in the rules and the conditions issued with the permit.

Should there be any questions on this matter, please contact the Department of Health at 933-0917.

Underground Injection Systems (Ph. 586-4258) which receive wastewater or storm runoffs from the proposed development need to address the requirements of Chapter 23, Hawaii State Department of Health Administrative Rules, Title 11, "Underground Injection Control."

Potable water should be available to serve these buildings.

Sincerely,

Newton Inouye
Acting District Environmental Health
Program Chief, Hawaii District

WORD:Maku'uFarmersAssnCommunityCenter.my

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 12, 2011

Newton Inouye, Acting District Environmental Health
Program Chief, Hawaii District
Department of Health
PO Box 916
Hilo, Hawaii 96721-0916

Subject: Pre-Environmental Assessment Comment Letter
Maku'u Farmers Association Community Center
TMK: (3) 1-5-10: 41

Dear Mr. Inouye:

This is in response to your letter dated June 15, 2010, providing comments regarding the above-described matter. We apologize for the delay in our response which is due in part to a re-evaluation of the proposed project and a decision to reduce the scope of the Environmental Assessment. Our initial description of the proposed project involved the proposed development of the entire 38 acre parcel. We have developed a draft environmental assessment that addresses the impacts of only the first phase of the Maku'u Regional Plan which involves the first 9 acres immediately adjacent to the Kea'au-Pahoa Road and includes the Farmers Market, Māla (garden area) and the Community Center. (Please see the attached Maku'u Concept Development Master Plan) The Maku'u Regional Plan includes longer range objectives for the remainder of the 38 acres including Kūpuna Housing, a Social Agency Center, Retail/Commercial Space, a Comprehensive Health Center, Child Care Center, Visitor Center with overnight quarters and park space. The impacts of these longer range objectives will be evaluated in the future when specific plans are developed for implementation.

We appreciate your comments regarding sewage treatment, food sanitation code and construction noise control. Please be advised that the proposed project will comply with the applicable requirements.

Should you have any questions, additional comments or concerns regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF FORESTRY AND WILDLIFE
1151 PUNCHBOWL STREET, ROOM 325
HONOLULU, HAWAII 96813
TEL (808) 587-0166 FAX (808) 587-0160

June 23, 2010

Mr. Brian T. Nishimura
Planning Consultant
101 Aupuni St., Suite 217
Hilo, HI 96720-4221

Subject: Proposed Makuu Farmers Association Community Center, Makuu, Puna, Hawaii, TMK (3) 1-5-010:041

Dear Mr. Nishimura,

Thank you for your letter inviting comments from our agency regarding pre-environmental assessment consultation for the subject project. At the present time, the Division of Forestry and Wildlife does not have comments on this proposed project.

If you have questions please contact our Hilo office at 808-974-4221.

Sincerely,

Paul J. Conry, Administrator
Division of Forestry and Wildlife

c: DOFAW Hawaii Branch

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 12, 2011

Mr. Paul J. Conry, Administrator
Division of Forestry and Wildlife
Department of Land and Natural Resources
1151 Punchbowl St., Room 325
Honolulu, Hawaii 96813

Subject: Pre-Environmental Assessment Comment Letter
Maku'u Farmers Association Community Center
TMK: (3) 1-5-10: 41

Dear Mr. Conry:

This is in response to your letter dated June 23, 2010, indicating that the Division of Forestry and Wildlife did not have any comments on the proposed project. We apologize for the delay in our response which is due in part to a re-evaluation of the proposed project and a decision to reduce the scope of the Environmental Assessment. Our initial description of the proposed project involved the proposed development of the entire 38 acre parcel. We have developed a draft environmental assessment that addresses the impacts of only the first phase of the Maku'u Regional Plan which involves the first 9 acres immediately adjacent to the Kea'au-Pahoa Road and includes the Farmers Market, Māla (garden area) and the Community Center. (Please see the attached Maku'u Concept Development Master Plan) The Maku'u Regional Plan includes longer range objectives for the remainder of the 38 acres including Kūpuna Housing, a Social Agency Center, Retail/Commercial Space, a Comprehensive Health Center, Child Care Center, Visitor Center with overnight quarters and park space. The impacts of these longer range objectives will be evaluated in the future when specific plans are developed for implementation.

Thank you for taking the time to respond to the initial request for comments. Should you have any questions, comments or concerns regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

William P. Kenoi
Mayor

Darryl J. Oliveira
Fire Chief

Glen P. I. Honda
Deputy Fire Chief

County of Hawai'i
HAWAI'I FIRE DEPARTMENT
25 Aupuni Street • Suite 2501 • Hilo, Hawai'i 96720
(808) 932-2900 • Fax (808) 932-2928

June 24, 2010

Mr. Brian Nishimura, Planning Consultant
101 Aupuni Street
Suite 217
Hilo, Hawai'i 96720

SUBJECT: PRE-ENVIRONMENTAL ASSESSMENT CONSULTATION
MAKU'U FARMERS ASSOCIATION COMMUNITY CENTER
TMK: (3) 1-5-10:41

In regards to the above-mentioned project, the following shall be in accordance:

Fire apparatus access roads shall be in accordance with UFC Section 10.207:

"**Fire Apparatus Access Roads**

"**Sec. 10.207.** (a) **General.** Fire apparatus access roads shall be provided and maintained in accordance with the provisions of this section.

"(b) **Where Required.** Fire apparatus access roads shall be required for every building hereafter constructed when any portion of an exterior wall of the first story is located more than 150 feet from fire department vehicle access as measured by an unobstructed route around the exterior of the building.

"**EXCEPTIONS:** 1. When buildings are completely protected with an approved automatic fire sprinkler system, the provisions of this section may be modified.

"2. When access roadways cannot be installed due to topography, waterways, nonnegotiable grades or other similar conditions, the chief may require additional fire protection as specified in Section 10.301 (b).

"3. When there are not more than two Group R, Division 3 or Group M Occupancies, the requirements of this section may be modified, provided, in the opinion of the chief, fire-fighting or rescue operations would not be impaired.

"More than one fire apparatus road may be required when it is determined by the chief that access by a single road may be impaired by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

"For high-piled combustible storage, see Section 81.109.

"(c) **Width.** The unobstructed width of a fire apparatus access road shall meet the requirements of the appropriate county jurisdiction.

"(d) **Vertical Clearance.** Fire apparatus access roads shall have an unobstructed vertical clearance of not less than 13 feet 6 inches.

"**EXCEPTION:** Upon approval vertical clearance may be reduced, provided such reduction does not impair access by fire apparatus and approved signs are installed and maintained indicating the established vertical clearance.

"(e) **Permissible Modifications.** Vertical clearances or widths required by this section may be increased when, in the opinion of the chief, vertical clearances or widths are not adequate to provide fire apparatus access.

"(f) **Surface.** Fire apparatus access roads shall be designed and maintained to support the imposed loads of fire apparatus and shall be provided with a surface so as to provide all-weather driving capabilities." (20 tons)

"(g) **Turning Radius.** The turning radius of a fire apparatus access road shall be as approved by the chief." (45 feet)

"(h) **Turnarounds.** All dead-end fire apparatus access roads in excess of 150 feet in length shall be provided with approved provisions for the turning around of fire apparatus.

"(i) **Bridges.** When a bridge is required to be used as access under this section, it shall be constructed and maintained in accordance with the applicable sections of the Building Code and using designed live loading sufficient to carry the imposed loads of fire apparatus.

"(j) **Grade.** The gradient for a fire apparatus access road shall not exceed the maximum approved by the chief." (15%)

"(k) **Obstruction.** The required width of any fire apparatus access road shall not be obstructed in any manner, including parking of vehicles. Minimum required widths and clearances established under this section shall be maintained at all times.

"(l) **Signs.** When required by the fire chief, approved signs or other approved notices shall be provided and maintained for fire apparatus access roads to identify such roads and prohibit the obstruction thereof or both."

Water supply shall be in accordance with UFC Section 10.301(c):

"(c) **Water Supply.** An approved water supply capable of supplying required fire flow for fire protection shall be provided to all premises upon which buildings or portions of buildings are hereafter constructed, in accordance with the respective county water requirements. There shall be provided, when required by the chief, on-site fire hydrants and mains capable of supplying the required fire flow.

"Water supply may consist of reservoirs, pressure tanks, elevated tanks, water mains or other fixed systems capable of providing the required fire flow.

"The location, number and type of fire hydrants connected to a water supply capable of delivering the required fire flow shall be protected as set forth by the respective county water requirements. All hydrants shall be accessible to the fire department apparatus by roadways meeting the requirements of Section 10.207.

DARRYL OLIVEIRA
Fire Chief

GA:lpc

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 12, 2011

Darryl J. Oliveira, Fire Chief
County of Hawaii
Fire Department
25 Aupuni Street, Suite 103
Hilo, Hawaii 96720-2037

Subject: Pre-Environmental Assessment Comment Letter
Maku'u Farmers Association Community Center
TMK: (3) 1-5-10: 41

Dear Chief Oliveira:

This is in response to your letter dated June 24, 2010, providing comments regarding the above-described matter. We apologize for the delay in our response which is due in part to a re-evaluation of the proposed project and a decision to reduce the scope of the Environmental Assessment. Our initial description of the proposed project involved the proposed development of the entire 38 acre parcel. We have developed a draft environmental assessment that addresses the impacts of only the first phase of the Maku'u Regional Plan which involves the first 9 acres immediately adjacent to the Kea'au-Pahoa Road and includes the Farmers Market, Māla (garden area) and the Community Center. (Please see the attached Maku'u Concept Development Master Plan) The Maku'u Regional Plan includes longer range objectives for the remainder of the 38 acres including Kūpuna Housing, a Social Agency Center, Retail/Commercial Space, a Comprehensive Health Center, Child Care Center, Visitor Center with overnight quarters and park space. The impacts of these longer range objectives will be evaluated in the future when specific plans are developed for implementation.

With regard to your comments regarding fire apparatus access roads UFC Section 10.207 and water supply UFC Section 10.301(c), please be advised that the proposed project will comply with the subject requirements.

We appreciate your response to the initial request for comments. Should you have any questions, additional comments or concerns regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

William P. Kenoi
Mayor

William T. Takaba
Managing Director

Lono A. Tyson
Director

Ivan M. Torigoe
Deputy Director

County of Hawai'i

DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
25 Aupuni Street • Hilo, Hawai`i 96720
(808) 961-8083 · Fax (808) 961-8086
http://co.hawaii.hi.us/directory/dir_envmng.htm

June 28, 2010

Mr. Brian T. Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, HI 96720

RE: Pre-Environmental Assessment Consultation
Maku`u Farmers Association Community Center
TMK:1-5-10:41 Maku`u, Puna

Dear Mr. Nishimura,

We have no comments to offer on the subject project.

Thank you for allowing us to review and comment on this project.

Best Regards and Aloha,

Lono A. Tyson
DIRECTOR

12659R

County of Hawai'i is an Equal Opportunity Provider and Employer.

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 12, 2011

Mr. Frank J. DeMarco, P.E., Director
Department of Environmental Management
25 Aupuni Street
Hilo, Hawaii 96720

Subject: Pre-Environmental Assessment Comment Letter
Maku'u Farmers Association Community Center
TMK: (3) 1-5-10: 41

Dear Mr. DeMarco:

This is in response to a letter dated June 28, 2010, from your department indicating that the Department of Environmental Management did not have any comments on the proposed project. We apologize for the delay in our response which is due in part to a re-evaluation of the proposed project and a decision to reduce the scope of the Environmental Assessment. Our initial description of the proposed project involved the proposed development of the entire 38 acre parcel. We have developed a draft environmental assessment that addresses the impacts of only the first phase of the Maku'u Regional Plan which involves the first 9 acres immediately adjacent to the Kea'au-Pahoa Road and includes the Farmers Market, Māla (garden area) and the Community Center. (Please see the attached Maku'u Concept Development Master Plan) The Maku'u Regional Plan includes longer range objectives for the remainder of the 38 acres including Kūpuna Housing, a Social Agency Center, Retail/Commercial Space, a Comprehensive Health Center, Child Care Center, Visitor Center with overnight quarters and park space. The impacts of these longer range objectives will be evaluated in the future when specific plans are developed for implementation.

We appreciate the Department's response to the initial request for comments. Should you have any questions, comments or concerns regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

William P. Kenoi
Mayor

Harry S. Kubojiri
Police Chief

Paul K. Ferreira
Deputy Police Chief

County of Hawaii

POLICE DEPARTMENT
349 Kapiolani Street • Hilo, Hawaii 96720-3998
(808) 935-3311 • Fax (808) 961-8865

June 29, 2010

Brian T. Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, HI 96720-4221

Dear Mr. Nishimura:

SUBJECT: PRE-ENVIRONMENTAL ASSESSMENT CONSULTATION
MAKU'U FARMERS ASSOCIATION COMMUNITY CENTER
TAX MAP KEY (3) 1-5-10:41 MAKU'U, PUNA, ISLAND OF HAWAII

In response to your letter regarding the Pre-Environmental Assessment Consultation of the proposed Maku'u Farmers Association Community Center to be located off Route 130, staff has the following concerns after conducting a site visit.

The success of the current Maku'u Farmers Market generates traffic congestion in the area from vendors and customers which will only be compounded with the projected development to the area. Although there are currently plans to improve portions of Route 130 (Keaau to Pahoa highway), it has not yet been finalized if this will include the portion of the highway fronting this proposed development. There is an existing median left turn lane for Pahoa bound traffic to turn into the area, as well as a median acceleration lane for traffic exiting the area to head Pahoa bound.

What is needed is a shoulder acceleration lane for traffic exiting the area to head Keaau bound, as well as a shoulder right turn lane for Keaau bound traffic slowing to enter the area. For the roadway exiting the Maku'u Farmers Market, separate left and right turn lanes should be established to expedite traffic flow.

If you have any questions regarding this matter, please contact Captain Samuel Jelsma, Commander of the Puna Patrol Division at 966-5835.

Sincerely,

DEREK D. PACHECO
ASSISTANT POLICE CHIEF
AREA I OPERATIONS BUREAU

SJ:lli

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 12, 2011

Derek D. Pacheco, Assistant Police Chief
County of Hawaii
Police Department
349 Kapiolani Street
Hilo, Hawaii 96720-3998

Subject: Pre-Environmental Assessment Comment Letter
Maku'u Farmers Association Community Center
TMK: (3) 1-5-10: 41

Dear Assistant Chief Pacheco:

This is in response to your letter dated June 29, 2010, providing comments regarding the above-described matter. We apologize for the delay in our response which is due in part to a re-evaluation of the proposed project and a decision to reduce the scope of the Environmental Assessment. Our initial description of the proposed project involved the proposed development of the entire 38 acre parcel. We have developed a draft environmental assessment that addresses the impacts of only the first phase of the Maku'u Regional Plan which involves the first 9 acres immediately adjacent to the Kea'au-Pahoa Road and includes the Farmers Market, Māla (garden area) and the Community Center. (Please see the attached Maku'u Concept Development Master Plan) The Maku'u Regional Plan includes longer range objectives for the remainder of the 38 acres including Kūpuna Housing, a Social Agency Center, Retail/Commercial Space, a Comprehensive Health Center, Child Care Center, Visitor Center with overnight quarters and park space. The impacts of these longer range objectives will be evaluated in the future when specific plans are developed for implementation.

We appreciate your comments regarding traffic entering and exiting the project area. One of major issues which led to the reduction in the scope of the project was traffic concerns raised by your department as well as the Department of Transportation. The Traffic Impact Analysis Report (TIAR) prepared for the proposed project by The Traffic Management Consultant (TMC) indicated that, "The development of Maku'u Master Plan is expected to begin with the community center. The existing unsignalized access can be expected to support the existing Farmer's Market and the proposed community center. Subsequent development of any other major trip generation components of the Master Plan, such as the health center, retail space, office space, and child care center, will require further analysis on Keaau-Pahoa Road at the Project Access Driveway." It should be further noted that the State Department of Transportation has indicated that, "A request for the proposed different and more intensive use of

the current access shall be submitted in writing to the DOT Highways Division Right-of-Way Branch for review and approval."

Should you have any questions, additional comments or concerns regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

LINDA LINGLE
GOVERNOR OF HAWAII

LAURA H. THIELEN
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

RUSSELL Y. TSUJI
FIRST DEPUTY

KEN C. KAWAHARA
DEPUTY DIRECTOR - WATER

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
601 KAMOKILA BOULEVARD, ROOM 555
KAPOLEI, HAWAII 96707

June 30, 2010

Mr. Brian T. Nishimura, Planning Consultant
1010 Aupuni Street, Suite 217
Hilo, Hawai`i 96720
(btnishi@hawaiiantel.net)

LOG NO: 2010.2357
DOC NO: 1006TD37
Archaeology

Dear Mr. Nishimura:

Subject: **Chapter 6E-8 and National Historic Preservation Act Section 106 Review – Pre-Environmental Assessment Consultation for the Maku'u Farmers Association Community Center, Kūpuna Housing, Retail/Commercial Space, and Health Center Maku'u Ahupua'a, Puna District, Island of Hawai'i TMK: (3) 1-5-010: 041**

Thank you for requesting our comments prior to preparation of an Environmental Assessment (EA) for the proposed development, to be located on a 38-acre parcel adjacent to the Hawaiian Paradise Park subdivision. The project area is a portion of former TMK Parcel 1-5-010: 017 and is predominantly vacant land with a 9-acre area developed for an existing farmer's market and cultural learning center. According to your letter dated June 10, 2010, the project is located on State Land (DHHL), and use of federal and state funding is anticipated.

We have no record of archaeological surveys, inspections or assessments being conducted within this parcel. One prior survey (1977) for the existing FAA tower site, was conducted within the larger Parcel 17. Our inventory of historic properties indicates that there are a number of known sites within the vicinity, including habitation and burial caves, *ahu* (found within the FAA access road), agricultural complexes, trails, ceremonial complexes, and habitation complexes. We therefore expect that historic properties will be present in areas that have not been previously disturbed by mechanized land alteration; and that caves could occur, regardless of the extent of modern land alteration. Therefore, we recommend that an archaeological assessment be conducted of the project area prior to the completion of the EA, so that findings can be incorporated into the document. If historic properties are identified during the assessment, an archaeological inventory survey will be required, and mitigation measures agreed upon prior to our approval of any land alteration permits.

We also recommend that consultation with Native Hawaiian Organizations take place as part of the EA preparation, pursuant to the Section 106 process for federally funded undertakings. Please contact Theresa K. Donham at 933-7653 if you have any questions regarding this letter.

Aloha,

Nancy A. McMahon

Nancy McMahon, Deputy SHPO/State Archaeologist
and Historic Preservation Manager
Historic Preservation Division

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 11, 2011

Ms. Pua Aiu, PhD., Administrator
State Historic Preservation Division
601 Kamokila Blvd., # 555
Kapolei, Hawaii 96707

Subject: Chapter 6E-8 and National Historic Preservation Act Section 106 Review
Response to Letter dated June 30, 2010 (LOG NO: 2010.2357, DOC NO: 1006TD37)
Applicant: Maku'u Farmers Association
Tax Map Key: (3) 1-5-10: 41

Dear Ms. Aiu:

This is in response to the Pre-Environmental Assessment Consultation letter sent by your office dated June 30, 2010 regarding the subject property. We apologize for the delay in our response which is due in part to a re-evaluation of the proposed project and a decision to reduce the scope of the Environmental Assessment. Our initial description of the proposed project involved the proposed development of the entire 38 acre parcel. We have developed a draft environmental assessment that addresses the impacts of only the first phase of the Maku'u Regional Plan which involves the first 9 acres immediately adjacent to the Kea'au-Pahoa Road and includes the Farmers Market, Māla (garden area) and the Community Center. (Please see the attached Maku'u Concept Development Master Plan) The Maku'u Regional Plan includes longer range objectives for the remainder of the 38 acres including Kūpuna Housing, a Social Agency Center, Retail/Commercial Space, a Comprehensive Health Center, Child Care Center, Visitor Center with overnight quarters and park space. The impacts of these longer range objectives will be evaluated in the future when specific plans are developed for implementation.

The letter of June 30, 2010 from your office indicates that, "We have no record of archaeological surveys, inspections or assessments being conducted within this parcel." Please be advised that an archaeological assessment for the subject property prepared by Haun & Associates was submitted to your office for review on November 16, 2009. The archaeological consultant has determined that no archaeological sites or features were identified within the project area. As such, the draft environmental assessment anticipates that no historic sites or features would be affected by the implementation of the proposed project. We are seeking your review of the archaeolgical assessment and an offical determination on addressing the Chapter 6E-8 and National Historic Preservation Act Section 106 requirements.

Thank you for your assistance in addressing this matter. Should you have any questions, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

William P. Kenoi
Mayor

BJ Leithead Todd
Director

Margaret K. Masunaga
Deputy

County of Hawai'i

PLANNING DEPARTMENT
Aupuni Center • 101 Pauahi Street, Suite 3 • Hilo, Hawai'i 96720
Phone (808) 961-8288 • Fax (808) 961-8742

August 17, 2010

Mr. Brian T. Nishimura
101 Aupuni Street, Suite 217
Hilo HI 96720

Dear Mr. Nishimura:

SUBJECT: Pre-Draft Environmental Assessment Consultation
Project: Makuu Farmers Association Community Center
Land Owner: Hawaiian Home Land
Tax Map Key: 1-5-10:41, Makuu, Puna, Hawai'i

The Makuu Farmers Association (MFA) has executed a License Agreement (No. 649) with the Department of Hawaiian Home Lands (DHHL) to construct and operate a cultural/community learning center and other related uses to service the Hawaiian homestead communities in East Hawai'i.

The MFA is currently utilizing approximately 9 acres of the 38 acre parcel for a farmer's market and cultural learning center. Initial focus is to develop the Farmers Market and Community Center structure to provide a gathering place which enhances community identity, reflects and preserves Hawaiian culture and values which promoting small business enterprises.

We have the following to offer on the subject parcel:

1. It is designated Agricultural by the State Land Use Commission.

2. The General Plan's Land Use Pattern Allocation Guide Map designation is Extensive Agriculture which is described as *"Lands not classified as Important Agricultural Land. Includes lands that are not capable of producing sustained, high agricultural yields without the intensive application of modern farming methods and technologies due to certain physical constraints such as soil*

composition, slope, machine tillability and climate. Other less intensive agricultural uses such as grazing and pasture may be included in the Extensive Agriculture category."

3. The County zoning is Village Commercial (CV-38). According to the Hawai'i County Zoning Code Section 25-5-120, "*The CV (village commercial) provides for a broad range or variety of commercial and light industrial uses that are necessary to serve the population in rural areas where the supplementary support of the general business uses and activities of a central commercial district is not readily available.*"

4. Plan Approval is required prior to construction of any new structure.

5. The parcel is not located within the County's Special Management Area.

6. A *Memorandum of Agreement Between the County of Hawaii and the Department of Hawaiian Home Lands* (MOA) was adopted by Resolution No. 19-03 and became effective December 30, 2002. Discussion on the provisions of the MOA should be included in the draft environmental assessment.

7. The Puna Community Development Plan was adopted by the County of Hawaii as Ordinance No. 08 116, effective September 10, 2008. A discussion of the proposed project as it relates to this plan should be included in the Environmental Assessment.

If you have questions, please contact Esther Imamura of this office at 961-8139.

Sincerely,

BJ LEITHEAD TODD
Planning Director

ETI
P:\Public\Wpwin60\ETI\Eadraftpre-Consul\Nishimura Makuu Farmers CC 1-5-10-41.Rtf

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 12, 2011

Ms. Bobby Jean Leithead-Todd, Director
County of Hawaii
Planning Department
101 Pauahi Street, Suite 3
Hilo, Hawaii 96720-3043

Subject: Pre-Environmental Assessment Comment Letter
Maku'u Farmers Association Community Center
TMK: (3) 1-5-10: 41

Dear Ms. Leithead-Todd:

This is in response to your letter dated August 17, 2010, providing comments regarding the above-described matter. We apologize for the delay in our response which is due in part to a re-evaluation of the proposed project and a decision to reduce the scope of the Environmental Assessment. Our initial description of the proposed project involved the proposed development of the entire 38 acre parcel. We have developed a draft environmental assessment that addresses the impacts of only the first phase of the Maku'u Regional Plan which involves the first 9 acres immediately adjacent to the Kea'au-Pahoa Road and includes the Farmers Market, Māla (garden area) and the Community Center. (Please see the attached Maku'u Concept Development Master Plan) The Maku'u Regional Plan includes longer range objectives for the remainder of the 38 acres including Kūpuna Housing, a Social Agency Center, Retail/Commercial Space, a Comprehensive Health Center, Child Care Center, Visitor Center with overnight quarters and park space. The impacts of these longer range objectives will be evaluated in the future when specific plans are developed for implementation.

We appreciate your comments regarding the land use designations, Plan Approval requirements, Memorandum of Agreement with the Department of Hawaiian Home Lands and the Puna Community Development Plan. The Draft Environmental Assessment will address these issues as requested.

Should you have any questions, additional comments or concerns regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
JIRO A. SUMADA

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

IN REPLY REFER TO:

STP 8.0192

August 19, 2010

Mr. Brian Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221

Dear Mr. Nishimura:

Subject: Maku'u Farmers Association Community Center
Pre-Consultation for a Draft Environmental Assessment (DEA)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project, which proposes to construct and operate a cultural/community learning center and other related uses on 38 acres located three miles north of Pahoa town. Access to the project is from Keaau-Pahoa Road and Kaluahine Street.

Given the location of the subject project, the State highway, Keaau-Pahoa Road will be impacted. DOT Highways Division is still conducting its review of the subject project and will provide additional comments as necessary.

1. DOT recommends that the DEA discuss and evaluate project impacts to the State highway (Keaau-Pahoa Road) facilities, such as, but not limited to: inconvenience to the public; types of construction vehicles and equipment used at the job site; construction hours.

2. Please note that the applicant should work with the DOT Highways Division, Hawaii District Office regarding permits for oversized equipment/overweight loads and submission of construction plans for any work done within the State highway right-of-way, which must conform to nationally accepted design standards and completed at no cost to the State.

DOT appreciates the opportunity to provide initial comments on the subject project. When a DEA of the project is completed, DOT requests four (4) copies of the document be provided for staff review and any necessary approvals. If there are any questions, please contact

Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 587-2356.

Very truly yours,

BRENNON T. MORIOKA, Ph.D., P.E.
Director of Transportation

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
JIRO A. SUMADA

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

IN REPLY REFER TO:

STP 8.0222

September 8, 2010

Mr. Brian Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221

Dear Mr. Nishimura:

Subject: Maku'u Farmers Association Community Center
Pre-Consultation for a Draft Environmental Assessment (DEA)

The State Department of Transportation (DOT) previously commented on the DEA for the subject project in its letter STP 8.0192 dated August 19, 2010 (attached), and now offers the following supplemental highways comments:

1. The request mentions that plans for a Maku'u Farmers' Association Community Center were included in the Department of Hawaiian Home Land's Maku'u Regional Plan, which was completed in 2008. We note that the plan was not provided to the Department of Transportation (DOT) for review and comment.

2. The Maku'u Regional Plan states on page 23 under Potential Projects, Road Improvements, that "The Maku'u Farmers' Market depends heavily on drive-by traffic for its business. However, heavy travel along the highway makes it difficult to access the site by either a left turn from the east-bound lane, or to slow down in the west-bound direction to make a right. Vehicular entry and exit has now created a significant safety hazard to motorists, and requires intersection improvements. Urgency in executing the project remains as the funds appropriated by the legislature will lapse at the end of this fiscal year." The safety issues and funding for intersection improvements should be discussed in the DEA.

3. Route 130, Keaau-Pahoa Road is a two-lane minor arterial with a 55 mph speed limit in the vicinity of the proposed expansion project. Arterials are intended for rapid, efficient transportation between regions. To increase safety and capacity, the number of accesses to Route 130 should be restricted to major street intersections to the extent feasible.

4. DOT's Keaau-Pahoa Road Improvement Project, which may widen the highway from two lanes to four lanes with turn lanes at major intersections, is still in the planning and environmental stage.

5. The expansion of uses will impact traffic flow and safety on Route 130 and may generate very short trips on Route 130 from the DHHL Maku'u residential subdivision across the highway from the project.

6. The DEA should discuss and evaluate alternatives for better traffic circulation and safer access to the project. These alternatives might include closing the driveway and accessing the parcel from a street on either side of the site instead of from the highway or restricting the driveway to right turns in and right turns out with all left turn movements at the Route 130 intersection with Ka Ohuwalu Drive.

7. A Traffic Impact Analysis Report (TIAR) is required for DOT's review and acceptance. It should discuss the impacts on the existing intersection of Keaau-Pahoa Road and Ka Ohuwalu Drive in addition to the proposed direct access driveway and include a Warrant Study to determine the necessity of a traffic signal. Recommendations for mitigation should evaluate the need for turn lanes for both east bound and west bound traffic to enter and exit the site.

8. Mitigation should include specific alternative means of transportation to and from the project site.

9. The DEA should discuss alternatives for greater connectivity with the Maku'u farm lots subdivision and the DHHL residential subdivision on the mauka side of Route 130 across from the proposed project. DHHL should explore and discuss the possibility of providing a street that connects to the DHHL farm lots subdivision makai of the project. The current driveway access to Route 130 from the farmers market may not be appropriate for the more intensive planned uses.

10. The parking lots should be configured so that cars do not back out on to Route 130. A ten-foot wide no vehicular access planting strip must be provided along the boundary with the Keaau-Pahoa Road except at a permitted access.

11. A request for the proposed different and more intensive use of the current access shall be submitted in writing to the DOT Highways Division Right-of-Way Branch for review and approval.

12. All required improvements directly attributable to the project must be planned, designed and constructed to current State requirements and be provided at no cost to DOT. A permit is required for work in the State highway right-of-way. No additional storm water runoff will be permitted in the State highway right-of-way. Development of more than one acre requires a National Pollutant Discharge Elimination System (NPDES) permit.

DOT appreciates the opportunity to provide supplemental comments on the subject project. When the DEA for the project is completed, DOT requests that at least four (4) hard, paper copies of the document in addition to electronic media (i.e. CD-ROM) be provided. If there are any questions, including a need to meet with Highways Division Staff on the above comments, please contact Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 587-2356.

Very truly yours,

BRENNON T. MORIOKA, Ph.D., P.E.
Director of Transportation

Attachment: STP ltr 8.0192 dated 8/19/10

LINDA LINGLE
GOVERNOR

BRENNON T. MORIOKA
DIRECTOR

Deputy Directors
MICHAEL D. FORMBY
FRANCIS PAUL KEENO
JIRO A. SUMADA

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

IN REPLY REFER TO:
DIR 0721
STP 8.0192

August 19, 2010

Mr. Brian Nishimura
Planning Consultant
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221

Dear Mr. Nishimura:

Subject: Maku'u Farmers Association Community Center
Pre-Consultation for a Draft Environmental Assessment (DEA)

Thank you for requesting the State Department of Transportation's (DOT) review of the subject project, which proposes to construct and operate a cultural/community learning center and other related uses on 38 acres located three miles north of Pahoa town. Access to the project is from Keaau-Pahoa Road and Kaluahine Street.

Given the location of the subject project, the State highway, Keaau-Pahoa Road will be impacted. DOT Highways Division is still conducting its review of the subject project and will provide additional comments as necessary.

1. DOT recommends that the DEA discuss and evaluate project impacts to the State highway (Keaau-Pahoa Road) facilities, such as, but not limited to: inconvenience to the public; types of construction vehicles and equipment used at the job site; construction hours.

2. Please note that the applicant should work with the DOT Highways Division, Hawaii District Office regarding permits for oversized equipment/overweight loads and submission of construction plans for any work done within the State highway right-of-way, which must conform to nationally accepted design standards and completed at no cost to the State.

DOT appreciates the opportunity to provide initial comments on the subject project. When a DEA of the project is completed, DOT requests four (4) copies of the document be provided for staff review and any necessary approvals. If there are any questions, please contact

Mr. David Shimokawa of the DOT Statewide Transportation Planning Office at telephone number (808) 587-2356.

Very truly yours,

BRENNON T. MORIOKA, Ph.D., P.E.
Director of Transportation

SLP:km

bc: HWY, HWY-H, HWY-P, STP(SLP)

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 12, 2011

Mr. Glenn Okimoto, Acting Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Subject: Pre-Environmental Assessment Comment Letter
Maku'u Farmers Association Community Center
TMK: (3) 1-5-10: 41

Dear Mr. Okimoto:

This is in response to letters dated August 19, 2010 and September 8, 2010 from your department providing comments regarding the above-described matter. We apologize for the delay in our response which is due in part to a re-evaluation of the proposed project and a decision to reduce the scope of the Environmental Assessment. Our initial description of the proposed project involved the proposed development of the entire 38 acre parcel. We have developed a draft environmental assessment that addresses the impacts of only the first phase of the Maku'u Regional Plan which involves the first 9 acres immediately adjacent to the Kea'au-Pahoa Road and includes the Farmers Market, Māla (garden area) and the Community Center. (Please see the attached Maku'u Concept Development Master Plan) The Maku'u Regional Plan includes longer range objectives for the remainder of the 38 acres including Kūpuna Housing, a Social Agency Center, Retail/Commercial Space, a Comprehensive Health Center, Child Care Center, Visitor Center with overnight quarters and park space. The impacts of these longer range objectives will be evaluated in the future when specific plans are developed for implementation.

We appreciate your comments regarding traffic generated from the proposed project and the impacts to the State Highway (Keaau-Pahoa Road). One of major issues which led to the reduction in the scope of the project was traffic concerns raised by your department. The following addresses the specific comments provided in the follow up letter dated September 8, 2010:

1. The Department of Hawaiian Home Land's Maku'u Regional Plan was not provided to the Department of Transportation for review and comment. Your comment is noted and will be passed on to the Department of Hawaiian Home Lands. We understand that the Department of Transportation has been involved in subsequent meetings to discuss the Regional Plan.

2. A reference is made to the Maku'u Regional Plan's discussion of potential road improvements regarding vehicular entry and exit to the Maku'u Farmers' Market. Since the adoption of the Regional Plan in 2008, intersection improvements have been completed which provides exclusive left-turn and right-turn lanes on Keaau-Pahoa Road at the project access driveway.

3. The number of accesses to Route 130 should be restricted to major street intersections to the extent feasible. The proposed project intends to utilize the existing access that has been allowed and in use. No new access to Route 130 is being requested.

4. DOT's Keaau-Pahoa Road Improvement Project, which may widen the highway from two lanes to four lanes with turn lanes at major intersections, is still in the planning and environmental stage. The status of the State's road improvement project is acknowledged.

5. The proposed project will impact traffic flow and safety on Route 130 and may generate very short trips on Route 130 from the DHHL Maku'u residential subdivision across the highway from the project. The DHHL will not be pursuing a residential project across the highway at this time. The DHHL is in the process of evaluating alternative uses for those lands. In addition, the Traffic Impact Analysis Report (TIAR) prepared for the proposed project by The Traffic Management Consultant (TMC) indicated that, "The development of Maku'u Master Plan is expected to begin with the community center. The existing unsignalized access can be expected to support the existing Farmer's Market and the proposed community center. Subsequent development of any other major trip generation components of the Master Plan, such as the health center, retail space, office space, and child care center, will require further analysis on Keaau-Pahoa Road at the Project Access Driveway."

6. Alternatives for better traffic circulation and safer access to the project. We believe that the channelized intersection improvements that have already been made to the existing access driveway have addressed the access concerns previously raised. In addition, the reduction in the scope of the project, the fact that the Farmers' Market operates only on Sunday and that community center activities will have minimal impacts on peak hour traffic volumes further reduces the traffic impacts generated by the proposed project. We agree that better traffic circulation alternatives need to be evaluated if and when more intensive use of the 38 acre parcel is contemplated.

7. Traffic Impact Analysis Report. The TIAR will be submitted for DOT's review and acceptance. Please see response to item 6 above.

8. Alternative means of transportation to and from the project site. We believe that the reduction in scope of the project has greatly reduced the potential traffic impacts of the proposed project. As such, this mitigation measure is not warranted at this time.

9. Alternative for greater connectivity. See response to item 6 above.

10. Parking lot configuration and no vehicular access planting strip. The proposed project will comply with these requirements.

11. Request for different and more intensive use of the current access must be submitted to DOT for review and approval. The proposed project will comply with this requirement.

12. Permits and Requirements. The proposed project will obtain the necessary permits and comply with the applicable requirements of the Department of Transportation.

Should you have any questions, additional comments or concerns regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAI'I
345 KEKŪANAŌ'A STREET, SUITE 20 • HILO, HAWAI'I 96720
TELEPHONE (808) 961-8050 • FAX (808) 961-8657

August 25, 2010

Brian T. Nishimura, Planning Consultant
101 Aupuni Street, Suite 217
Hilo, HI 96720-4221

PRE-ENVIRONMENTAL ASSESSMENT CONSULTATION
MAKU'U FARMERS ASSOCIATION COMMUNITY CENTER
TAX MAP KEY 1-5-010:041

We have reviewed the subject Pre-Environmental Assessment Consultation and have the following comments.

Please be informed that there is an existing 12-inch waterline within Kea'au-Pāhoa Road fronting the subject parcel. The parcel is currently served by a 5/8-inch meter, which is limited to a maximum daily usage of 600 gallons.

We have no objection to the proposed project; however, the applicant will be required to submit estimated maximum daily water usage calculations, prepared by a professional engineer licensed in the State of Hawaii, showing the anticipated water demand for the project. Based on the estimated demand, the owner/applicant may be required to install a larger or additional meter to accommodate the additional water usage created from the project.

The applicant/owner will also be required to install, on private property, a reduced pressure type backflow prevention assembly within five feet of any meter serving the property. The installation of the backflow prevention assembly must be inspected and approved by our Department before water service can be activated.

Should there be any questions, you may contact Mr. Finn McCall of our Water Resources and Planning Branch at 961-8070, extension 255.

Sincerely yours,

Milton D. Pavao, P.E.
Manager

FM:dfg

BRIAN T. NISHIMURA, PLANNING CONSULTANT
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720-4221
Phone: (808) 935-7692 Fax: (808) 935-6126 E-mail: btnishi@hawaiiantel.net

January 12, 2011

Mr. Milton D. Pavao, Manager
County of Hawaii
Department of Water Supply
345 Kekuanaoa Street, Suite 20
Hilo, Hawaii 96720

Subject: Pre-Environmental Assessment Comment Letter
Maku'u Farmers Association Community Center
TMK: (3) 1-5-10: 41

Dear Mr. Pavao:

This is in response to your letter dated August 25, 2010, providing comments regarding the above-described matter. We apologize for the delay in our response which is due in part to a re-evaluation of the proposed project and a decision to reduce the scope of the Environmental Assessment. Our initial description of the proposed project involved the proposed development of the entire 38 acre parcel. We have developed a draft environmental assessment that addresses the impacts of only the first phase of the Maku'u Regional Plan which involves the first 9 acres immediately adjacent to the Kea'au-Pahoa Road and includes the Farmers Market, Māla (garden area) and the Community Center. (Please see the attached Maku'u Concept Development Master Plan) The Maku'u Regional Plan includes longer range objectives for the remainder of the 38 acres including Kūpuna Housing, a Social Agency Center, Retail/Commercial Space, a Comprehensive Health Center, Child Care Center, Visitor Center with overnight quarters and park space. The impacts of these longer range objectives will be evaluated in the future when specific plans are developed for implementation.

We appreciate your comments regarding water availability and improvements that may be required. The proposed project will comply with the applicable requirements of the Department of Water Supply.

Should you have any questions, additional comments or concerns regarding this matter, please do not hesitate to contact me.

Sincerely,

Brian T. Nishimura, Planning Consultant

APPENDIX B – TRAFFIC IMPACT ANALYSIS REPORT

TRAFFIC ACCESS ANALYSIS REPORT
FOR THE PROPOSED

MAKU`U MASTER PLAN - PHASE 1

PUNA, HAWAII

TAX MAP KEY: (3) 1-5-10: 41

PREPARED FOR

BRIAN NISHIMURA, PLANNING CONSULTANT

NOVEMBER 29, 2010

PREPARED BY

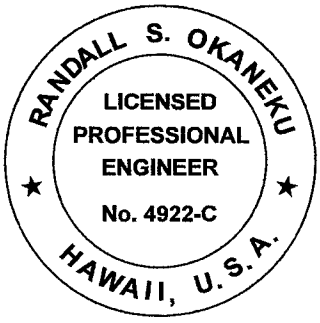
TMC THE TRAFFIC MANAGEMENT CONSULTANT

TRAFFIC ACCESS ANALYSIS REPORT
FOR THE PROPOSED

MAKU`U MASTER PLAN - PHASE 1

PUNA, HAWAII

TAX MAP KEY: (3) 1-5-10: 41



TMC

THE TRAFFIC MANAGEMENT CONSULTANT
RANDALL S. OKANEKU, P.E., PRINCIPAL * 1188 BISHOP STREET, SUITE 1907 * HONOLULU, HI 96813

Table of Contents

List of Figures

Page

TRAFFIC ACCESS ANALYSIS REPORT
FOR THE PROPOSED
MAKU`U MASTER PLAN - PHASE 1
PUNA, HAWAII
TAX MAP KEY: (3) 1-5-10: 41

I. Introduction

A. Project Description

The Maku`u Farmer's Association (MFA) has obtained management control of approximately 38 acres of land to construct and operate a cultural/community learning center, and other related uses, through a license agreement with the Department of Hawaiian Home Lands (DHHL). The License Agreement authorizes the MFA to construct and operate uses to service the Hawaiian homestead communities in East Hawaii. The property is located in Maku`u, Puna, Island of Hawaii and identified as Tax Map Key: (3) 1-5-10: 41. The subject property is situated on the makai (north) side of the Kea`au – Pahoa Road (State Highway 13), approximately three miles north of Pahoa town.

The MFA is currently utilizing approximately 9 acres of the property for a Farmer's market and cultural learning center. Plans for a Maku`u Farmer's Association Community Center were included in the DHHL Maku`u Regional Plan, which was completed in 2008. The initial focus of the MFA is to continue to operate the Farmer's Market and develop a Community Center facility to provide a gathering place, which enhances community identity, reflects and preserves Hawaiian culture and values, while promoting small business enterprises.

The Maku`u Regional Plan includes longer range objectives by expanding the uses to include kūpuna housing, a social agency center, a retail/commercial space, a comprehensive health center, a child care center, a visitor center with overnight quarters and park space. A preliminary site plan has been developed, which lays out the various uses on a conceptual basis.

This Traffic Access Analysis Report analyzes only the first 9 acres, immediately adjacent to the Kea`au-Pahoa Road, which includes the existing Farmer's Market and Māla (garden area), and the proposed community center. The traffic impacts of the long-range objectives will be evaluated in the future when specific plans are developed for implementation. Site access will be provided by an existing channelized intersection on Keaau-Pahoa Road. Figure 1 depicts the vicinity of the project. The proposed site plan is depicted on Figure 2.

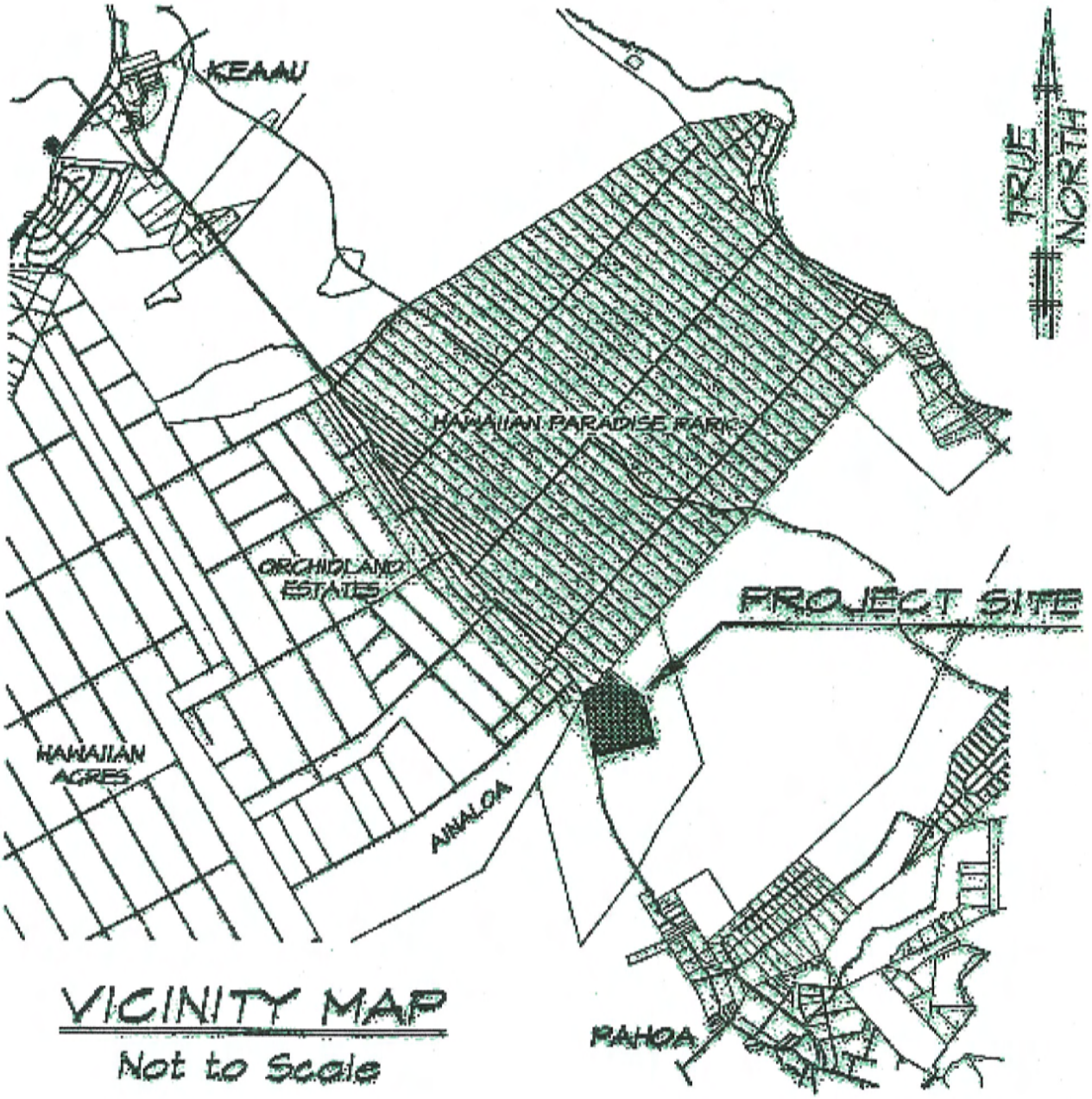


Figure 1. Vicinity Map

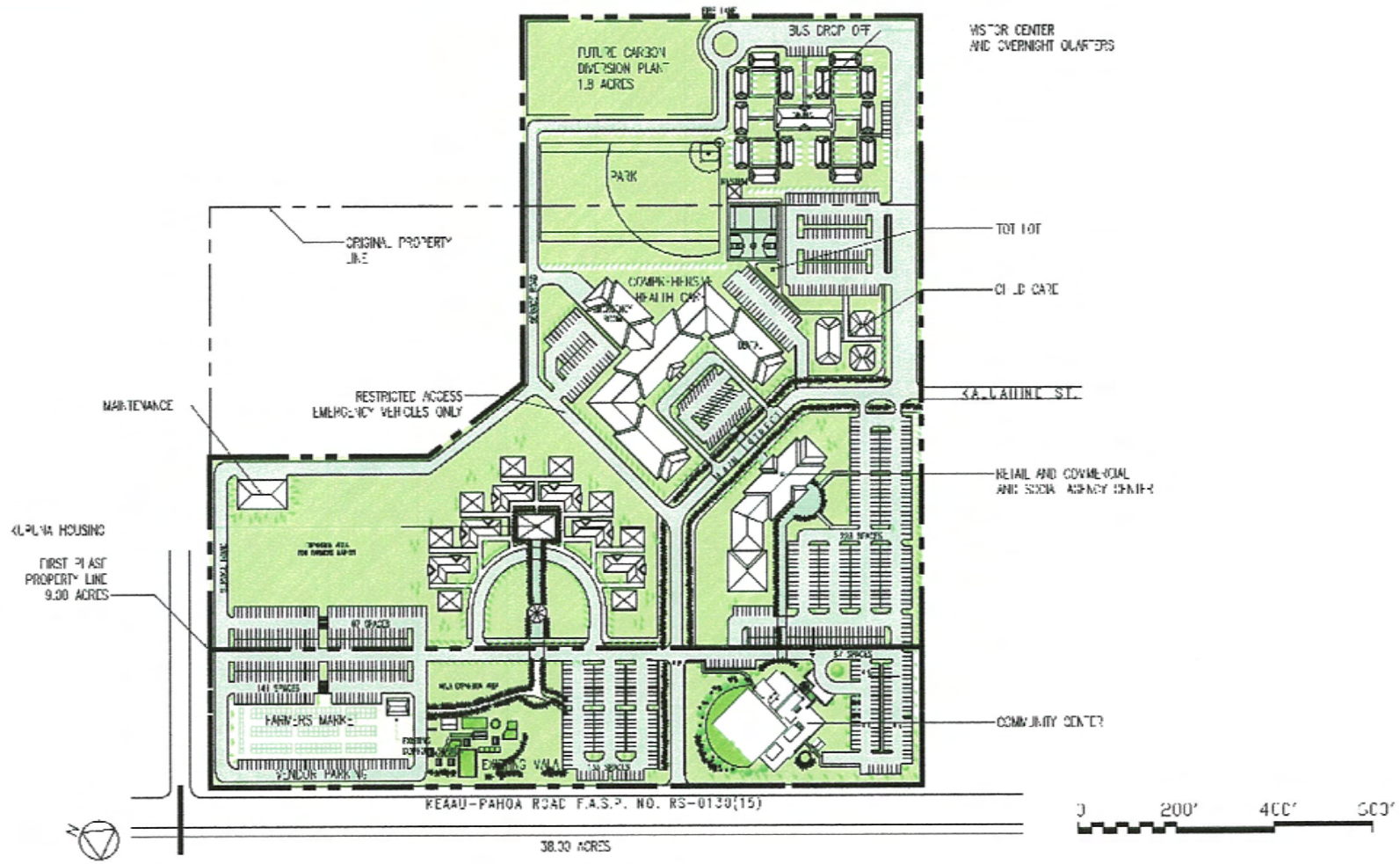


Figure 2. Makuu Master Plan

B. Purpose and Scope of the Study

The purpose of this study is to analyze the traffic impacts, resulting from the development of the proposed Maku`u Master Plan - Phase 1. This report presents the findings and recommendations of the study. The scope of this study includes:

1. Description of the proposed project.
2. Evaluation of existing roadways and traffic conditions.
3. Development of trip generation characteristics of the proposed project.
4. Analysis of future traffic conditions without the proposed project.
5. Identification and analysis of traffic impacts resulting from the development of the proposed project.
6. Recommendations of improvements, as necessary, that would mitigate the traffic impacts identified in this study.

C. Methodologies

1. Capacity Analysis Methodology

The highway capacity analysis, performed for this study, is based upon procedures presented in the Highway Capacity Manual (HCM), published by the Transportation Research Board, 2000. HCM defines Level of Service (LOS) as "a quality measure describing operational conditions within a traffic stream". Several factors may be included in determining LOS, such as: speed, travel time, freedom to maneuver, traffic interruptions, driver comfort, and convenience. LOS's "A", "B", and LOS "C" are considered satisfactory Levels of Service. LOS "D" is generally considered a "minimum acceptable" operating Level of Service. LOS "E" is an undesirable condition, and LOS "F" is an unacceptable condition. The Level of Service for a two-lane highway is based upon the average speed and the "percent time-spent-following" (PTSF). PTSF is a result of vehicle platoons following slow-moving vehicles, combined with limited opportunities for passing vehicles. Intersection LOS is primarily based upon average delay (d), which is expressed in terms of average seconds of delay per vehicle. The capacity analysis worksheets are attached in the Appendix. Table 1 summarizes the LOS criteria.

Table 1. Level of Service Criteria (HCM)				
LOS	Two-Lane Highway		At-Grade Intersections Delay	
	PTSF (%)	Average Speed (mph)	Signalized Control (d)	Unsignalized Control (d)
A	≤ 35	> 55	≤ 10	≤ 10
B	> 35 – 50	> 50 – 55	> 10 – 20	> 10 – 15
C	> 50 – 65	> 45 – 50	> 20 – 35	> 15 – 25
D	> 65 – 80	> 40 – 45	> 35 – 55	> 25 – 35
E	> 80	≤ 40	> 55 – 80	> 35 – 50
F	v/c > 1.00	Varies	> 80	> 50

2. Trip Generation Methodology

The trip generation methodology is based upon generally accepted techniques developed by the Institute of Transportation Engineers (ITE) and published in Trip Generation, 8th Edition. ITE trip rates are developed by correlating the total vehicle trip generation data with recreation community centers, such as the vehicle trips per hour (vph) per 1,000 square feet of gross floor area.

II. Existing Conditions

A. Roadways

Keaau-Pahoa Road is the primary arterial highway in the Puna area on the island of Hawaii. Keaau-Pahoa Road is a two-way, two-lane highway, between Keaau and Pahoa. The posted speed on Keaau-Pahoa Road is 45 miles per hour (mph).

The Project Access Driveway is stop-controlled at its Tee-intersection with Keaau-Pahoa Road. Exclusive left-turn and right-turn lanes are provided on Keaau-Pahoa Road at the Project Access Driveway.

Kaohuwalu Street is a two-way, two-lane local roadway. Kaohuwalu Street is stop-controlled at its Tee-intersection with Keaau-Pahoa Road, immediately south of the Project Access Driveway intersection. Exclusive left-turn and right-turn lanes are provided on Keaau-Pahoa Road at Kaohuwalu Street.

B. Existing Peak Hour Traffic Volumes and Operating Conditions

1. Field Investigation and Data Collection

Manual traffic count surveys were conducted on Keaau-Pahoa Road at Kaohuwalu Street on November 3-4, 2009, during the AM and PM peak periods of weekday traffic – from 6:45 AM to 8:30 AM and from 3:45 PM to 6:00 PM. The

Project Access Driveway was closed during the field investigation. The traffic data are presented in the Appendix.

Weekday (10/19/2010) and Sunday (10/17/2010) traffic data on Keaau-Pahoa Road (Station C2F), south of Waste Station Road, were obtained from DOT. The Sunday peak hour traffic occurred between 12:00 PM and 1:00 PM with Keaau-Pahoa Road carrying 1,588 vehicles per hour (vph) total for both directions. The weekday (AM) peak hour traffic volume was 2,889 vph, i.e. 82 percent higher than the Sunday peak hour of traffic. Therefore, the Sunday peak hour traffic was not included in this analysis.

2. Existing AM Peak Hour Traffic

The AM peak hour of traffic occurred between 7:15 AM and 8:15 AM. Keaau-Pahoa Road carried about 1,270 vehicles per hour (vph), total for both directions. The peak direction of traffic was split between the southbound and northbound directions. Kaohuwalu Street carried a total of about 40 vph at Keaau-Pahoa Road, during the existing AM peak hour of traffic.

Keaau-Pahoa Road operated at LOS "D" with a v/c ratio of 0.44. Kaohuwalu Street operated at LOS "B" at Keaau-Pahoa Road. Figure 3 depicts the existing AM peak hour traffic volumes and the results of the capacity analysis.

3. Existing PM Peak Hour Traffic

The existing PM peak hour of traffic occurred between 4:30 PM and 5:30 PM. Keaau-Pahoa Road carried about 1,220 vph, total for both directions The peak direction of traffic was southbound with a 60 percent/40 percent split. Kaohuwalu Street carried a total of about 30 vph at Keaau-Pahoa Road, during the existing AM peak hour of traffic.

During the existing PM peak hour of traffic, the intersection of Keaau-Pahoa Road operated at LOS "D" with a v/c ratio of 0.39. Kaohuwalu Street operated at LOS "B" at Keaau-Pahoa Road. The existing PM peak hour traffic volumes and the results of the capacity analysis are depicted on Figure 4.

III. Future Traffic Conditions

A. External Traffic

The ambient growth in traffic was derived from historic traffic data collected by the State Department of Transportation (DOT) on Keaau-Pahoa Road from 1992 through 2007. Linear regression techniques were applied to the DOT data, which indicated that the traffic on Keaau-Pahoa Road grew at an annual rate of about 2.5 percent. A multiplier factor of 1.25 was uniformly applied to the existing peak hour traffic demands to estimate the Year 2019 peak hour traffic demands without the proposed project.

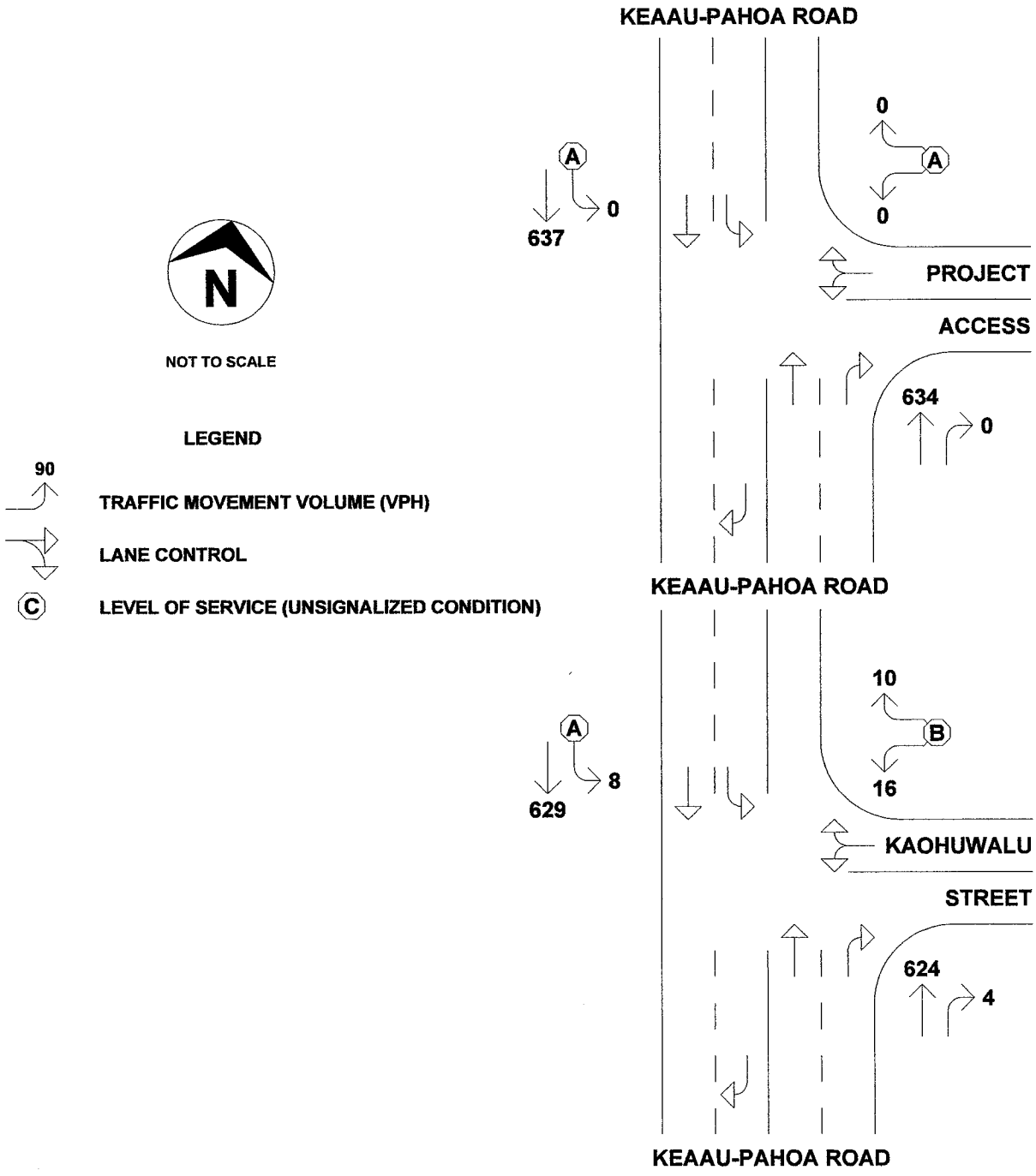


Figure 3. Existing AM Peak Hour Traffic

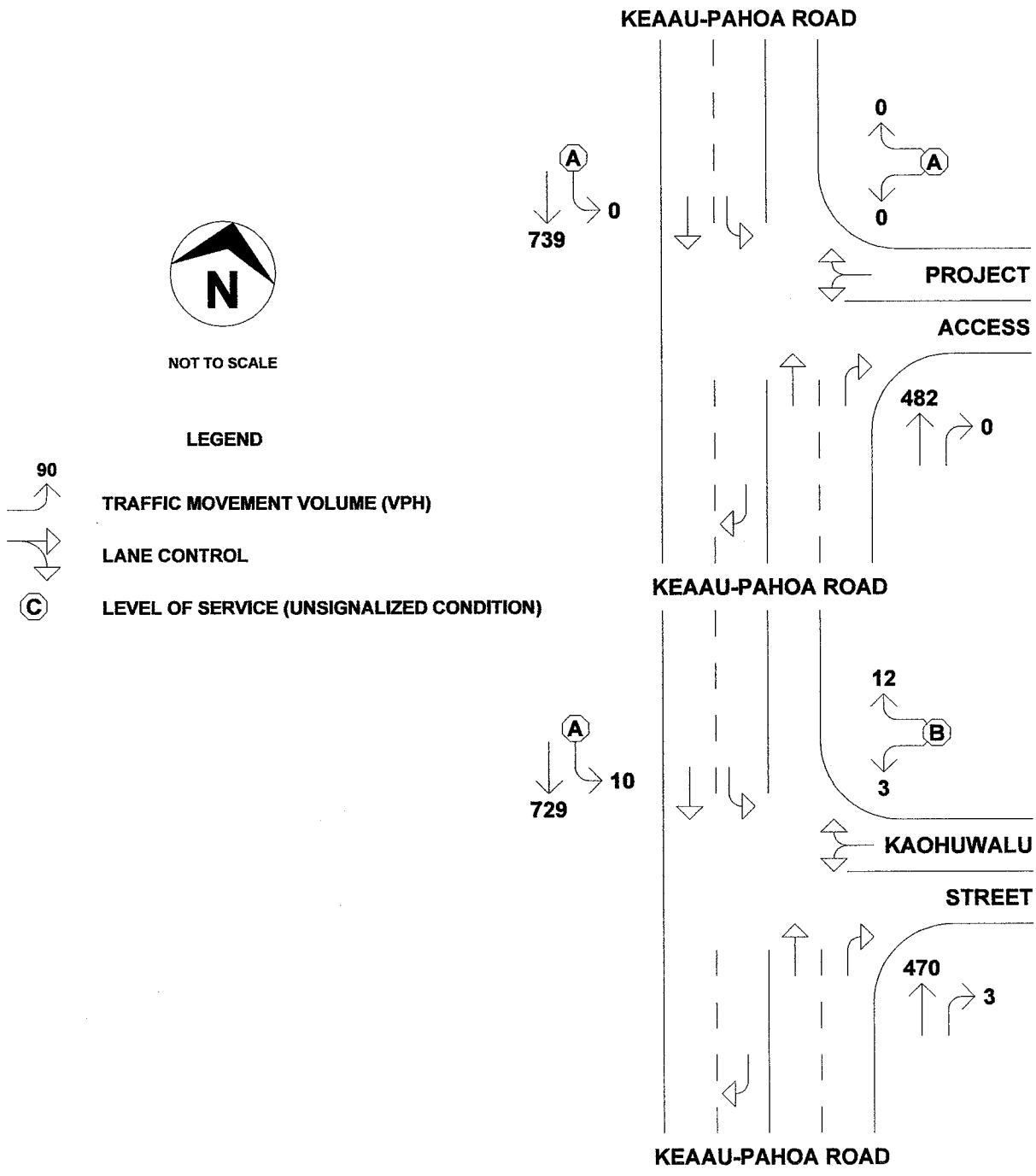


Figure 4. Existing PM Peak Hour Traffic

B. AM Peak Hour Traffic Analysis Without Project

During the AM peak hour of traffic without the proposed project, the Keaau-Pahoa Road is expected to operate at LOS "E" with a v/c ratio of 0.50. Kaohuwalu Street at Keaau-Pahoa Road is expected to operate at LOS "C", during the AM peak hour of traffic without the proposed project. Figure 5 depicts the AM peak hour traffic without the proposed project and the results of the capacity analysis.

C. PM Peak Hour Traffic Analysis Without Project

Keaau-Pahoa Road is expected to operate at LOS "D" with a v/c ratio of 0.48, during the PM peak hour of traffic without the proposed project. During the PM peak hour of traffic without the proposed project, Kaohuwalu Street is expected to operate at LOS "B" at Keaau-Pahoa Road. The PM peak hour traffic without the proposed project and the results of the capacity analysis are depicted on Figure 6.

IV. Traffic Access Analysis

A. Site-Generated Traffic

1. Trip Generation Characteristics

The proposed Maku`u Community Center is expected to generate a total of 25 vph – 15 vph entering the site and 10 vph exiting the site, during the AM peak hour of traffic. During the PM peak hour of traffic, the proposed project is expected to generate 17 vph entering the site and 28 vph exiting the site, for a total of 45 vph. The existing Farmer's Market is not included in this analysis, since it is open only on Sundays, when the peak hour traffic is about one half of the weekday peak hour traffic.

2. Trip Distribution

The trip distribution is based upon existing traffic patterns and the U. S. Census population distribution for the State of Hawaii. The AM and PM peak hour site-generated traffic assignments for the proposed project are depicted on Figures 7 and 8, respectively.

B. AM Peak Hour Traffic Access Analysis With Project

Keaau-Pahoa Road is expected to operate at LOS "E", with a v/c ratio of 0.56, during the AM peak hour of traffic with the proposed project The Project Access Driveway at Keaau-Pahoa Road is expected to operate at LOS "C". Kaohuwalu Street is expected to operate at LOS "C" at Keaau-Pahoa Road. The AM peak hour traffic with the proposed project and the results of the capacity analysis are depicted on Figure 9.

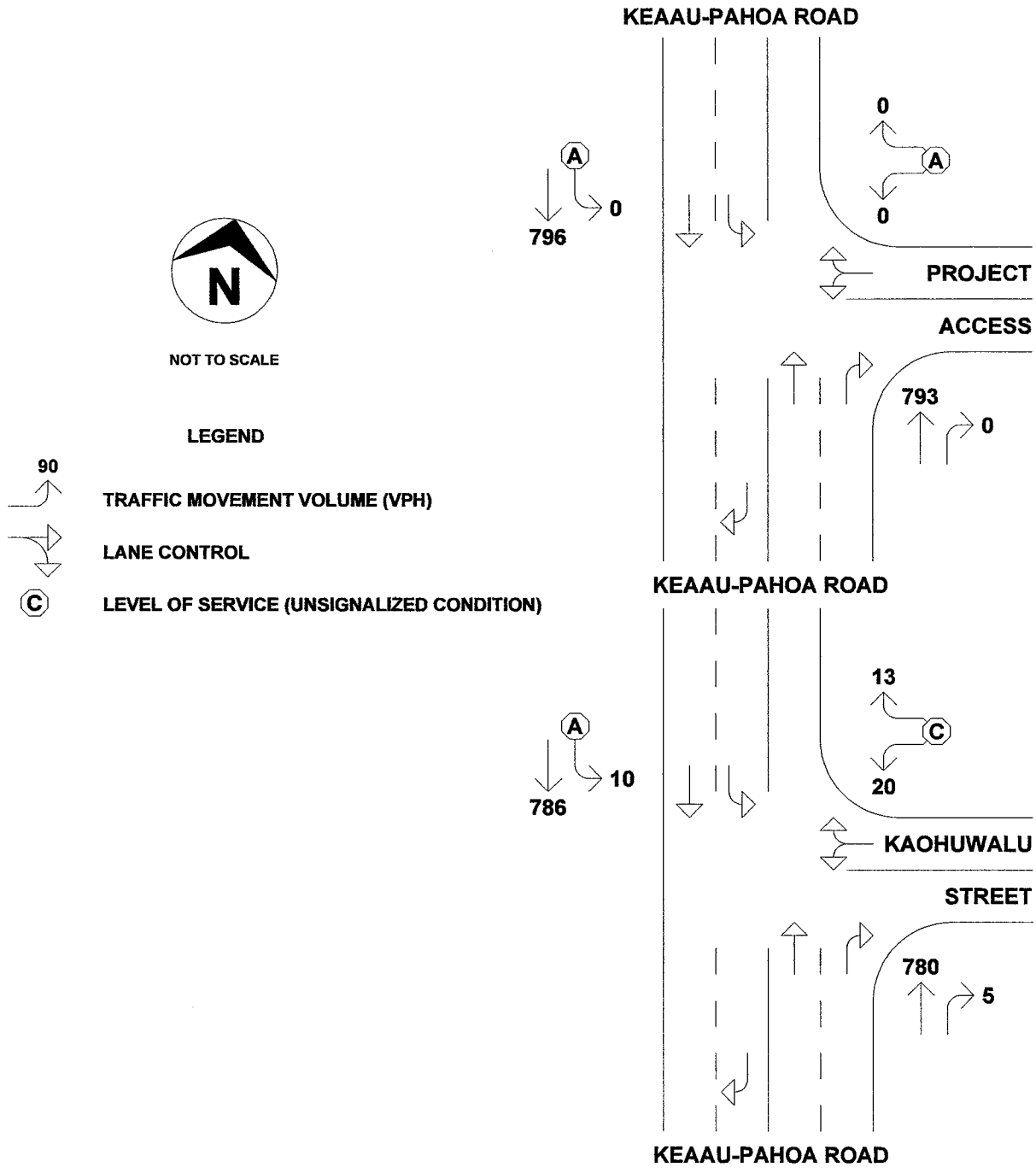


Figure 5. AM Peak Hour Traffic Without Project

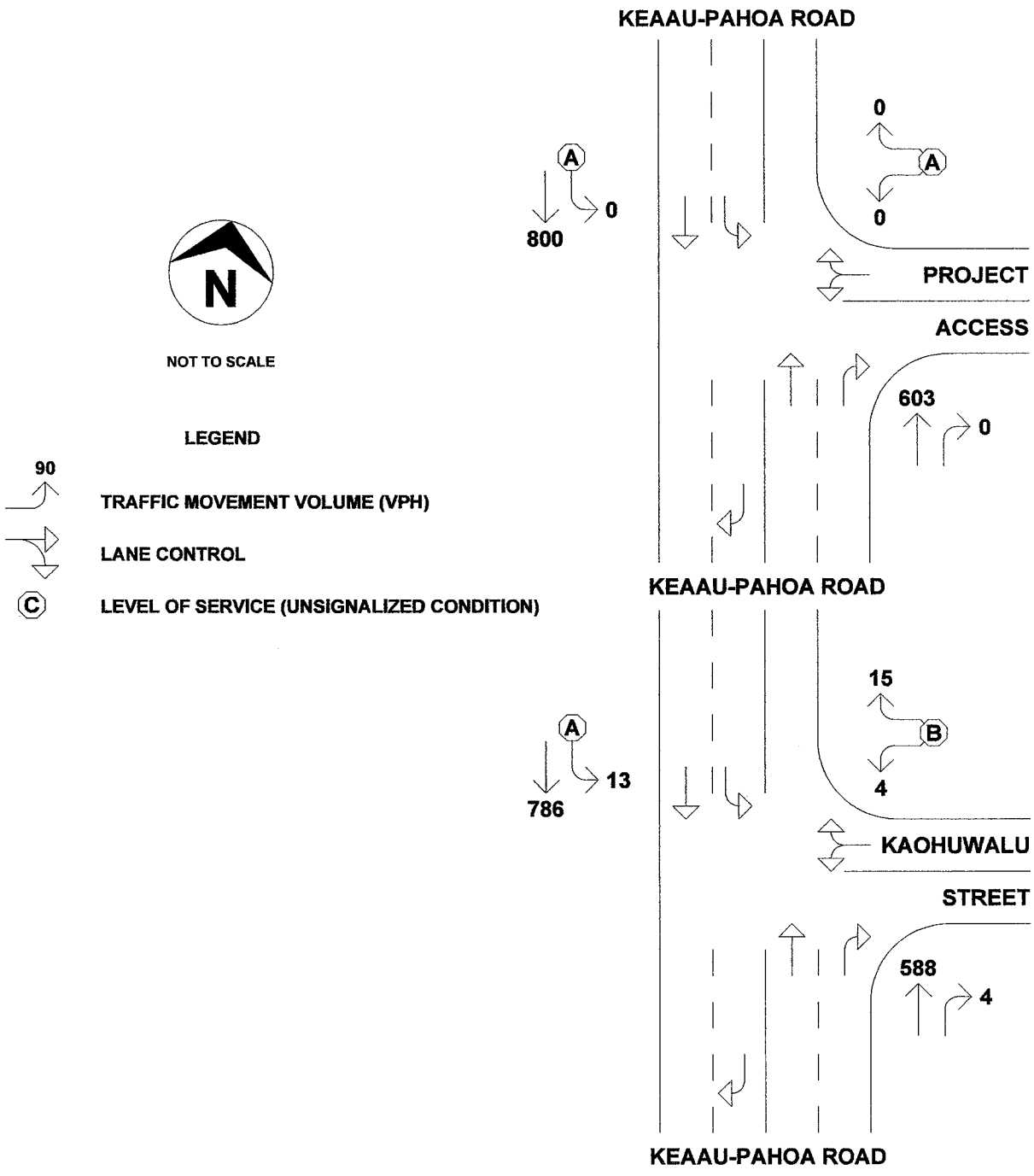


Figure 6. PM Peak Hour Traffic Without Project

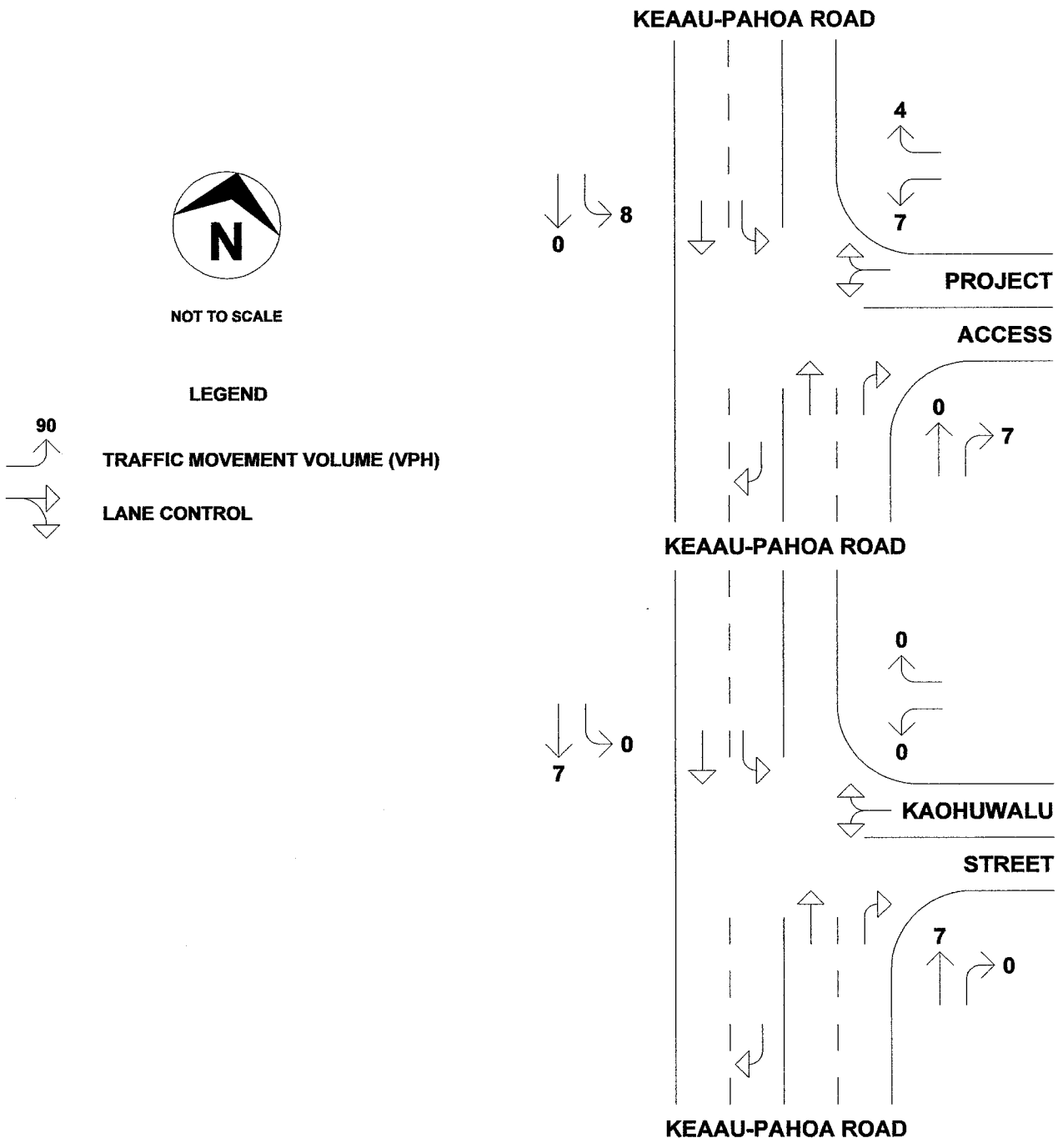


Figure 7. AM Peak Hour Site Traffic Assignment

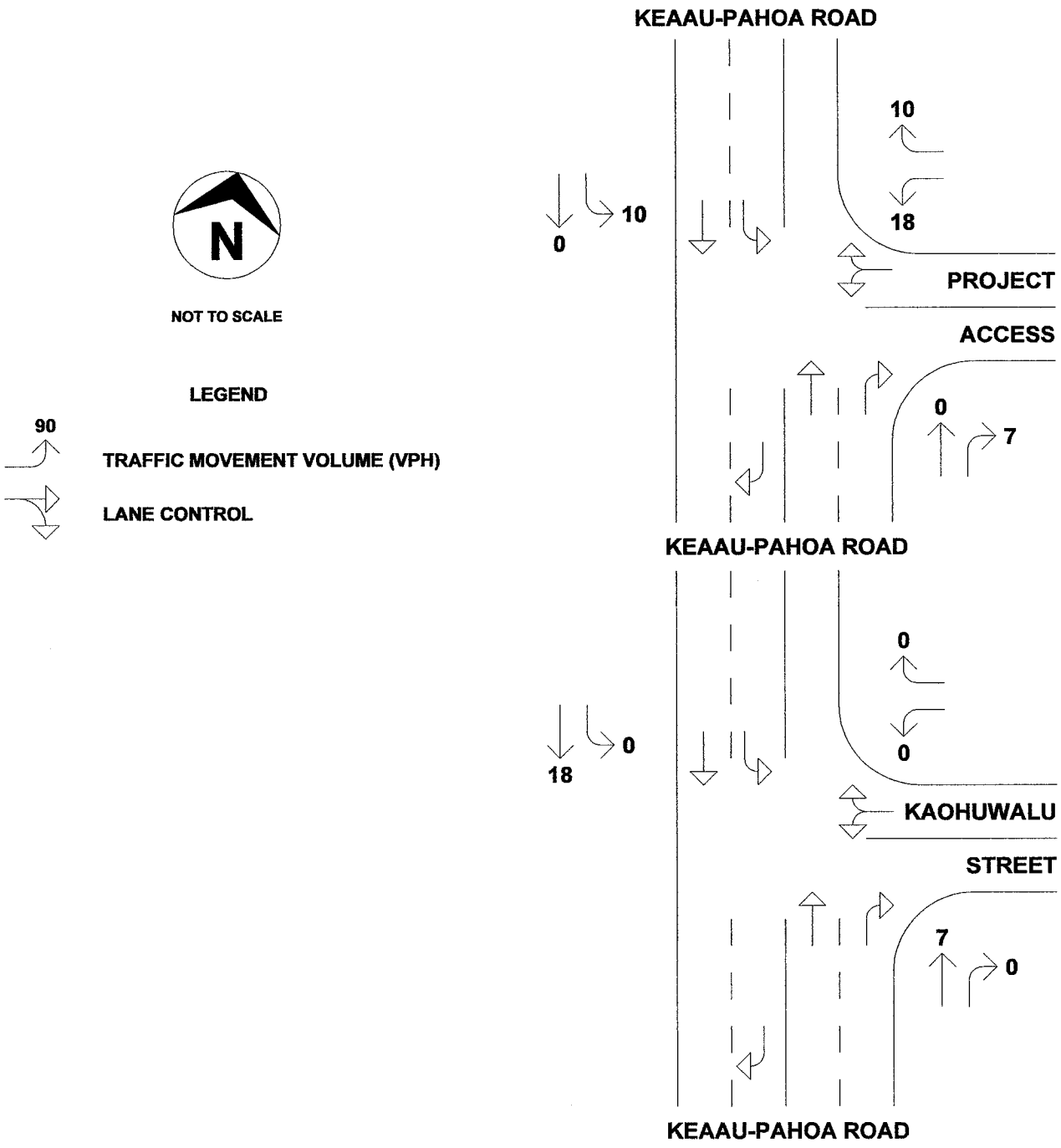


Figure 8. PM Peak Hour Site Traffic Assignment

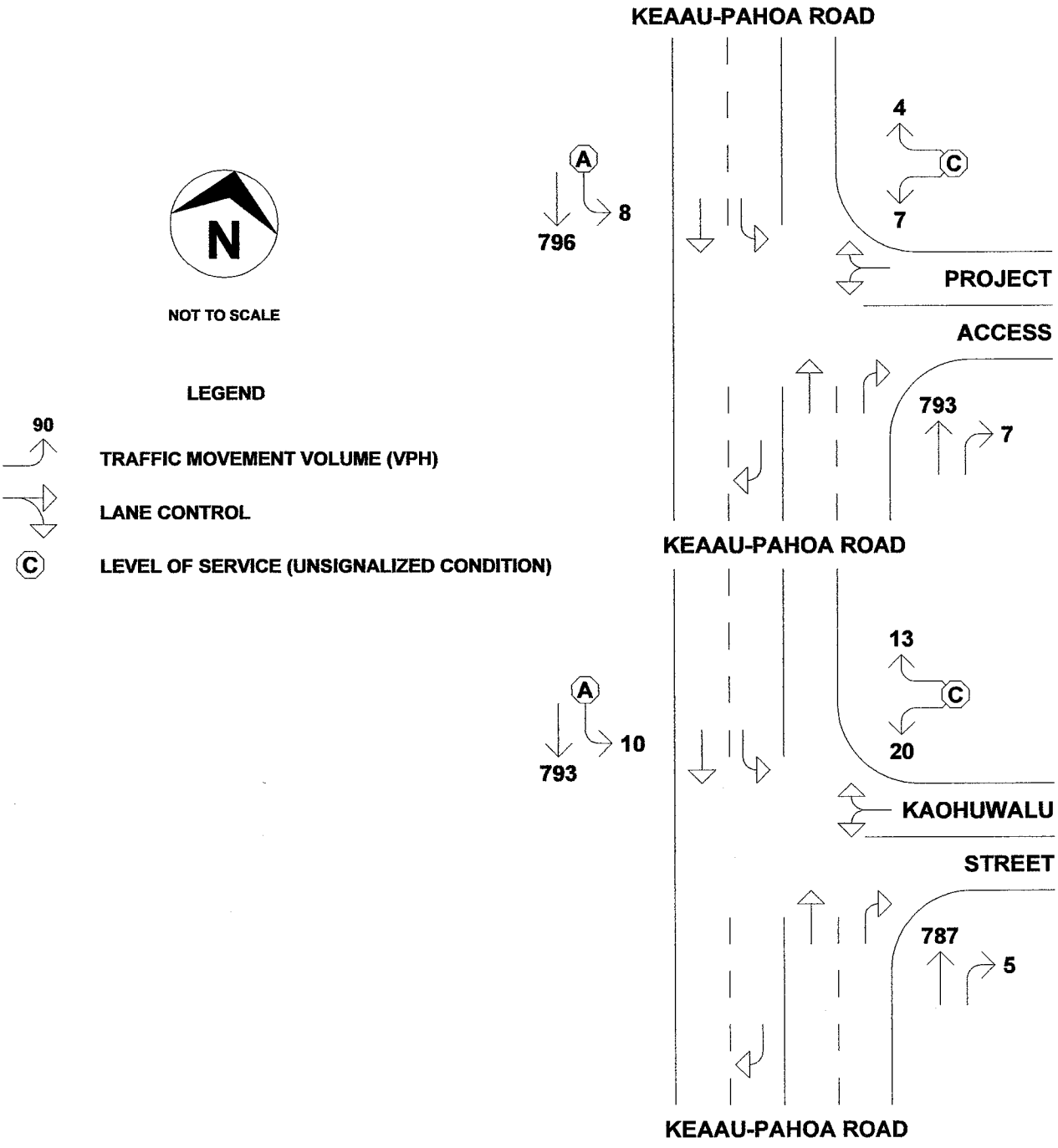


Figure 9. AM Peak Hour Traffic With Project

C. PM Peak Hour Traffic Access Analysis With Project

During the PM peak hour of traffic with the proposed project, Keaau-Pahoa Road is expected to operate at LOS "E" with a v/c ratio of 0.49. The Project Access Driveway is expected to operate at LOS "C" at Keaau-Pahoa Road. Kaohuwalu Street is expected to operate at LOS "C" at Keaau-Pahoa Road, during the PM peak hour with the proposed project. Figure 10 depicts the PM peak hour traffic with the proposed project and the results of the capacity analysis.

V. Recommendations and Conclusions

A. Recommendations

The Project Access Driveway is expected to operate at satisfactory Levels of Service during the AM and PM weekday peak hours of traffic with the proposed project. Traffic improvements at the intersection of Keaau-Pahoa Road and the Project Access Driveway are not recommended at this time.

B. Conclusions

The development of Maku`u Master Plan is expected to begin with the community center. The existing unsignalized access can be expected to support the existing Farmer's Market and the proposed community center. Subsequent development of any other major trip generation components of the Master Plan, such as the health center, retail space, office space, and child care center, will require further analysis on Keaau-Pahoa Road at the Project Access Driveway.

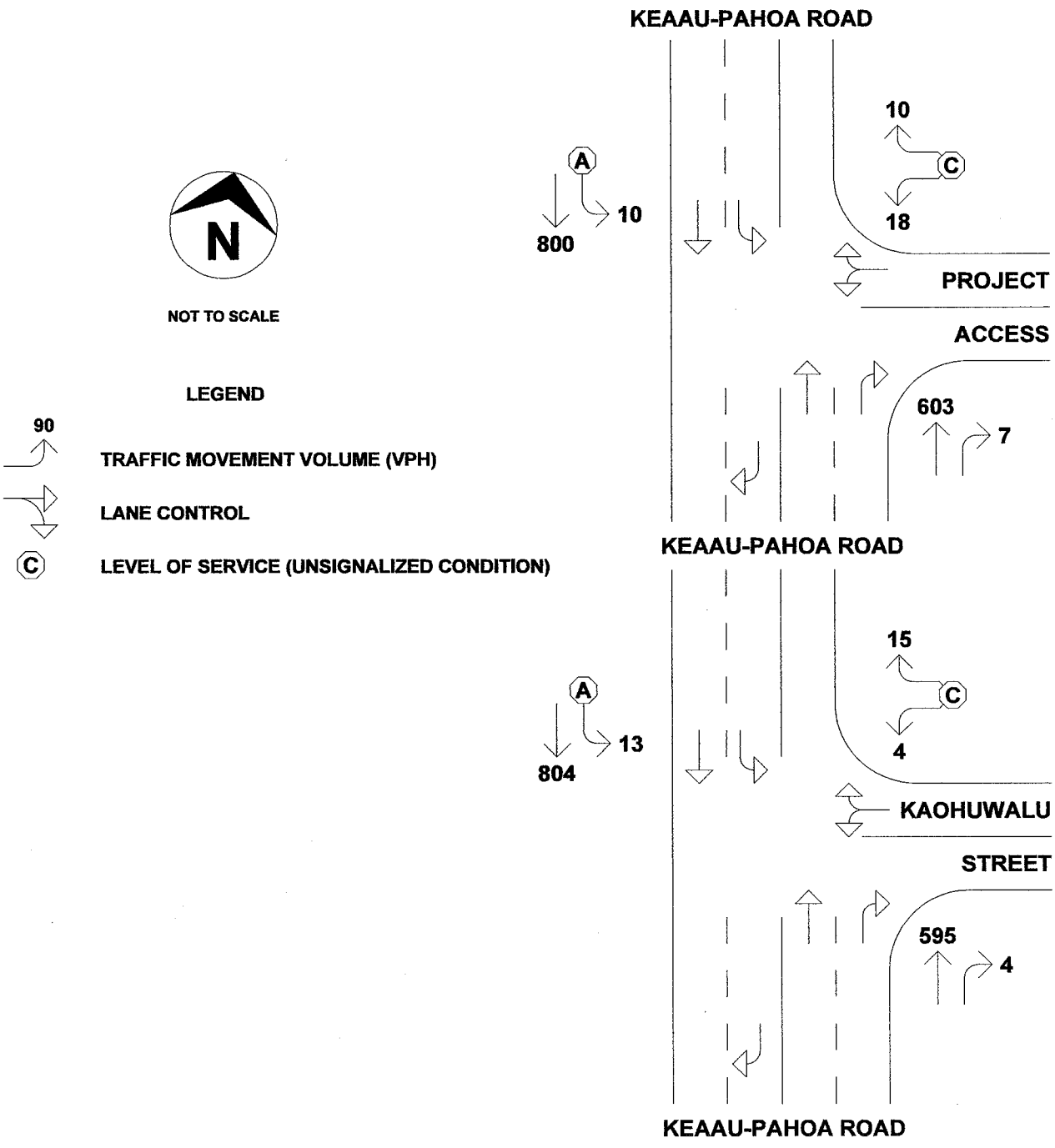


Figure 10. PM Peak Hour Traffic With Project

TRAFFIC ACCESS ANALYSIS REPORT
FOR THE PROPOSED

MAKU`U MASTER PLAN - PHASE 1

PUNA, HAWAII

APPENDIX A

TRAFFIC COUNT DATA

TRAFFIC COUNT DATA **FILE NAME: Pahoa Rd**

PROJECT: Aloha Surf Hotel
LOCATION: Honolulu, Hawaii
E-W STREET Pahoa Road
N-S STREET: Kaohuwalu St

PERIOD: AM Peak
NORTH:
TECHNICIAN: Video
DATE: 11/4/09

		Pahoa Road						Kaohuwalu St							
TIME		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	TOTAL	HRLY
6:45	7:00	0	88	0	0	124	0	0	0	0	0	0	0	212	
7:00	7:15	11	92	0	0	176	2	0	0	0	6	0	2	289	
7:15	7:30	6	135	0	0	157	1	0	0	0	9	0	4	312	
7:30	7:45	1	156	0	0	133	1	0	0	0	4	0	3	298	1111
7:45	8:00	1	178	0	0	173	0	0	0	0	1	0	2	**355**	1254
8:00	8:15	0	160	0	0	161	2	0	0	0	2	0	1	326	1291
8:15	8:30	11	114	0	0	178	3	0	0	0	6	0	0	312	1291
AM PEAK HOUR															
7:15	**8:15**	**8**	**629**	**0**	**0**	**624**	**4**	**0**	**0**	**0**	**16**	**0**	**10**	**1291**	**1291**
PHF		**2.00**	**0.88**	**N/A**	**N/A**	**0.90**	**N/A**	**N/A**	**N/A**	**N/A**	**4.00**	**N/A**	**1.25**	**0.91**	**PHF**

TRAFFIC COUNT DATA **FILE NAME: Pahoa Rd**

PROJECT: Aloha Surf Hotel
LOCATION: Honolulu, Hawaii
E-W STREET Pahoa Road
N-S STREET Kaohuwalu St

PERIOD: PM Peak
NORTH:
TECHNICIAN: Video
DATE: 11/3/09

		Pahoa Road						Kaohuwalu St							
TIME		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	TOTAL	HRLY
15:45	16:00	1	172	0	0	139	2	0	0	0	1	0	2	317	
16:00	16:15	2	170	0	0	142	1	0	0	0	0	0	1	316	
16:15	16:30	4	158	0	0	109	1	0	0	0	0	0	0	272	
16:30	16:45	4	191	0	0	137	1	0	0	0	0	0	3	**336**	1241
16:45	17:00	3	171	0	0	115	0	0	0	0	1	0	3	293	1217
17:00	17:15	2	192	0	0	117	0	0	0	0	1	0	4	316	1217
17:15	17:30	1	175	0	0	101	2	0	0	0	1	0	2	282	**1227**
17:30	17:45	3	167	0	0	116	0	0	0	0	2	0	0	288	1179
17:45	18:00	0	154	0	0	84	0	0	0	0	4	0	0	242	1128
PM PEAK HOUR															
16:30	**17:30**	**10**	**729**	**0**	**0**	**470**	**3**	**0**	**0**	**0**	**3**	**0**	**12**	**1227**	**1241**
PHF		**0.63**	**0.95**	**N/A**	**N/A**	**0.86**	**0.75**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**1.00**	**0.91**	**PHF**

TRAFFIC ACCESS ANALYSIS REPORT
FOR THE PROPOSED

MAKU`U MASTER PLAN - PHASE 1

PUNA, HAWAII

APPENDIX B

CAPACITY ANALYSIS WORKSHEETS

UNSIGNALIZED INTERSECTION ANALYSIS

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	634	0	0	637
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.91	0.92	0.92	0.89
Hourly flow rate (vph)	0	0	697	0	0	716
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1412	697			697	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1412	697			697	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	152	441			899	

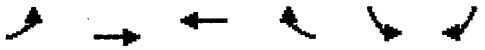
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	697	0	0	716
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.41	0.00	0.00	0.42
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	16	10	624	4	8	629
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	1.00	1.00	0.90	0.92	1.00	0.88
Hourly flow rate (vph)	16	10	693	4	8	715
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1424	693			698	
vC1, stage 1 conf vol	693					
vC2, stage 2 conf vol	731					
vCu, unblocked vol	1424	693			698	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	98			99	
cM capacity (veh/h)	363	443			899	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	26	693	4	8	715
Volume Left	16	0	0	8	0
Volume Right	10	0	4	0	0
cSH	390	1700	1700	899	1700
Volume to Capacity	0.07	0.41	0.00	0.01	0.42
Queue Length 95th (ft)	5	0	0	1	0
Control Delay (s)	14.9	0.0	0.0	9.0	0.0
Lane LOS	B			A	
Approach Delay (s)	14.9	0.0		0.1	
Approach LOS	B				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	739	482	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.95	0.86	0.92	0.92	0.92
Hourly flow rate (vph)	0	778	560	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	560				1338	560
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	560				1338	560
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1011				169	528

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	778	560	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.46	0.33	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		0.0
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	729	470	3	3	12
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.63	0.95	0.86	0.75	1.00	1.00
Hourly flow rate (vph)	16	767	547	4	3	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	TWLTL			
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	551				1346	547
vC1, stage 1 conf vol					547	
vC2, stage 2 conf vol					799	
vCu, unblocked vol	551				1346	547
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	98
cM capacity (veh/h)	1019				371	537

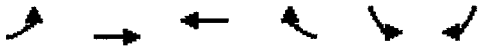
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	16	767	547	4	15
Volume Left	16	0	0	0	3
Volume Right	0	0	0	4	12
cSH	1019	1700	1700	1700	493
Volume to Capacity	0.02	0.45	0.32	0.00	0.03
Queue Length 95th (ft)	1	0	0	0	2
Control Delay (s)	8.6	0.0	0.0	0.0	12.5
Lane LOS	A				B
Approach Delay (s)	0.2		0.0		12.5
Approach LOS					B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	796	793	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.89	0.91	0.92	0.92	0.92
Hourly flow rate (vph)	0	894	871	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	871				1766	871
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	871				1766	871
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	774				92	350

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	894	871	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.53	0.51	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		0.0
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	786	780	5	20	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	0.88	0.90	0.92	1.00	1.00
Hourly flow rate (vph)	10	893	867	5	20	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		NoneTWLTL				
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	872				1780	867
vC1, stage 1 conf vol					867	
vC2, stage 2 conf vol					913	
vCu, unblocked vol	872				1780	867
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				93	96
cM capacity (veh/h)	773				288	352

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	10	893	867	5	33
Volume Left	10	0	0	0	20
Volume Right	0	0	0	5	13
cSH	773	1700	1700	1700	310
Volume to Capacity	0.01	0.53	0.51	0.00	0.11
Queue Length 95th (ft)	1	0	0	0	9
Control Delay (s)	9.7	0.0	0.0	0.0	18.0
Lane LOS	A				C
Approach Delay (s)	0.1		0.0		18.0
Approach LOS					C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	800	603	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.95	0.86	0.92	0.92	0.92
Hourly flow rate (vph)	0	842	701	0	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	701				1543	701
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	701				1543	701
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	896				126	439

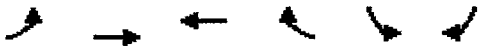
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	0	842	701	0	0
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.50	0.41	0.00	0.00
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS					A
Approach Delay (s)	0.0		0.0		0.0
Approach LOS					A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	13	786	588	4	4	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.63	0.95	0.86	0.75	1.00	1.00
Hourly flow rate (vph)	21	827	684	5	4	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		NoneTWLTL				
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	689				1552	684
vC1, stage 1 conf vol					684	
vC2, stage 2 conf vol					869	
vCu, unblocked vol	689				1552	684
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	97
cM capacity (veh/h)	905				327	449

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	21	827	684	5	19
Volume Left	21	0	0	0	4
Volume Right	0	0	0	5	15
cSH	905	1700	1700	1700	416
Volume to Capacity	0.02	0.49	0.40	0.00	0.05
Queue Length 95th (ft)	2	0	0	0	4
Control Delay (s)	9.1	0.0	0.0	0.0	14.1
Lane LOS	A				B
Approach Delay (s)	0.2		0.0		14.1
Approach LOS					B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	8	796	793	7	7	4
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.89	0.91	0.92	0.92	0.92
Hourly flow rate (vph)	9	894	871	8	8	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		NoneTWLTL				
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	879				1783	871
vC1, stage 1 conf vol					871	
vC2, stage 2 conf vol					912	
vCu, unblocked vol	879				1783	871
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	99
cM capacity (veh/h)	769				288	350

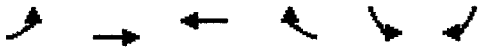
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	9	894	871	8	12
Volume Left	9	0	0	0	8
Volume Right	0	0	0	8	4
cSH	769	1700	1700	1700	308
Volume to Capacity	0.01	0.53	0.51	0.00	0.04
Queue Length 95th (ft)	1	0	0	0	3
Control Delay (s)	9.7	0.0	0.0	0.0	17.2
Lane LOS	A				C
Approach Delay (s)	0.1		0.0		17.2
Approach LOS					C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	793	787	5	20	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	0.88	0.90	0.92	1.00	1.00
Hourly flow rate (vph)	10	901	874	5	20	13
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	880				1796	874
vC1, stage 1 conf vol					874	
vC2, stage 2 conf vol					921	
vCu, unblocked vol	880				1796	874
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				93	96
cM capacity (veh/h)	768				285	349

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	10	901	874	5	33
Volume Left	10	0	0	0	20
Volume Right	0	0	0	5	13
cSH	768	1700	1700	1700	307
Volume to Capacity	0.01	0.53	0.51	0.00	0.11
Queue Length 95th (ft)	1	0	0	0	9
Control Delay (s)	9.7	0.0	0.0	0.0	18.1
Lane LOS	A				C
Approach Delay (s)	0.1		0.0		18.1
Approach LOS					C

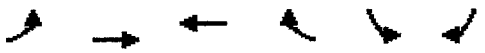
Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	800	603	7	18	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.95	0.86	0.92	0.92	0.92
Hourly flow rate (vph)	11	842	701	8	20	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		NoneTWLTL				
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	701				1565	701
vC1, stage 1 conf vol					701	
vC2, stage 2 conf vol					864	
vCu, unblocked vol	701				1565	701
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				94	98
cM capacity (veh/h)	896				328	439

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	11	842	701	8	30
Volume Left	11	0	0	0	20
Volume Right	0	0	0	8	11
cSH	896	1700	1700	1700	360
Volume to Capacity	0.01	0.50	0.41	0.00	0.08
Queue Length 95th (ft)	1	0	0	0	7
Control Delay (s)	9.1	0.0	0.0	0.0	15.9
Lane LOS	A				C
Approach Delay (s)	0.1		0.0		15.9
Approach LOS					C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	13	804	595	4	4	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.63	0.95	0.86	0.75	1.00	1.00
Hourly flow rate (vph)	21	846	692	5	4	15
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage veh)		2	2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	697				1579	692
vC1, stage 1 conf vol					692	
vC2, stage 2 conf vol					888	
vCu, unblocked vol	697				1579	692
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				99	97
cM capacity (veh/h)	899				321	444

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1
Volume Total	21	846	692	5	19
Volume Left	21	0	0	0	4
Volume Right	0	0	0	5	15
cSH	899	1700	1700	1700	411
Volume to Capacity	0.02	0.50	0.41	0.00	0.05
Queue Length 95th (ft)	2	0	0	0	4
Control Delay (s)	9.1	0.0	0.0	0.0	14.2
Lane LOS	A				B
Approach Delay (s)	0.2		0.0		14.2
Approach LOS					B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

TRAFFIC ACCESS ANALYSIS REPORT
FOR THE PROPOSED

MAKU`U MASTER PLAN - PHASE 1

PUNA, HAWAII

APPENDIX C

CAPACITY ANALYSIS WORKSHEETS

TWO-LANE HIGHWAY ANALYSIS

HCS+: Two-Lane Highways Release 5.4

Two-Way Two-Lane Highway Segment Analysis

Analyst	Randall S. Okaneku
Agency/Co.	Traffic Management Consultant
Date Performed	12/30/2009
Analysis Time Period	Existing AM Peak Hour
Highway	Keaau-Pahoa Road
From/To	West of Kaohuwalu Street
Jurisdiction	State of Hawaii
Analysis Year	2009
Description	Maku`u Master Plan

Input Data

Highway class	Class 1				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	50	%
Grade: Length		mi	Access points/mi	4	/mi
Up/down		%			

Two-way hourly volume, V	1271		veh/h
Directional split	50	/ 50	%

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.998	
Two-way flow rate,(note-1) vp	1415	pc/h
Highest directional split proportion (note-2)	708	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	1.0	mi/h
Free-flow speed, FFS	59.0	mi/h
Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATS	47.0	mi/h

Percent Time-Spent-Following		
Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1412	pc/h
Highest directional split proportion (note-2)	706	
Base percent time-spent-following, BPTSF	71.1	%
Adj.for directional distribution and no-passing zones, fd/np	6.0	
Percent time-spent-following, PTSF	77.1	%

Level of Service and Other Performance Measures		
Level of service, LOS	D	
Volume to capacity ratio, v/c	0.44	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.4

Two-Way Two-Lane Highway Segment Analysis

Analyst	Randall S. Okaneku
Agency/Co.	Traffic Management Consultant
Date Performed	12/30/2009
Analysis Time Period	Existing PM Peak Hour
Highway	Keaau-Pahoa Road
From/To	West of Kaohuwalu Street
Jurisdiction	State of Hawaii
Analysis Year	2009
Description	Maku`u Master Plan

Input Data

Highway class	Class 1				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.91	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	50	%
Grade: Length		mi	Access points/mi	4	/mi
Up/down		%			

Two-way hourly volume, V	1122	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.998	
Two-way flow rate,(note-1) vp	1235	pc/h
Highest directional split proportion (note-2)	704	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	1.0	mi/h
Free-flow speed, FFS	59.0	mi/h
Adjustment for no-passing zones, fnp	1.3	mi/h
Average travel speed, ATS	48.1	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1233	pc/h
Highest directional split proportion (note-2)	703	
Base percent time-spent-following, BPTSF	66.2	%
Adj.for directional distribution and no-passing zones, fd/np	7.8	
Percent time-spent-following, PTSF	74.0	%

Level of Service and Other Performance Measures

Level of service, LOS	D	
Volume to capacity ratio, v/c	0.39	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.4

Two-Way Two-Lane Highway Segment Analysis

Analyst	Randall S. Okaneku
Agency/Co.	Traffic Management Consultant
Date Performed	12/30/2009
Analysis Time Period	AM Peak Hour Without Project
Highway	Keaau-Pahoa Road
From/To	West of Kaohuwalu Street
Jurisdiction	State of Hawaii
Analysis Year	2014
Description	Maku`u Master Plan

Input Data

Highway class	Class 1				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	50	%
Grade: Length		mi	Access points/mi	4	/mi
Up/down		%			

Two-way hourly volume, V	1589	veh/h	
Directional split	50 / 50	%	

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.998	
Two-way flow rate, (note-1) vp	1769	pc/h
Highest directional split proportion (note-2)	885	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	1.0	mi/h
Free-flow speed, FFS	59.0	mi/h
Adjustment for no-passing zones, fnp	0.9	mi/h
Average travel speed, ATS	44.4	mi/h

Percent Time-Spent-Following		
Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1766	pc/h
Highest directional split proportion (note-2)	883	
Base percent time-spent-following, BPTSF	78.8	%
Adj.for directional distribution and no-passing zones, fd/np	4.4	
Percent time-spent-following, PTSF	83.2	%

Level of Service and Other Performance Measures		
Level of service, LOS	E	
Volume to capacity ratio, v/c	0.55	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.4

Two-Way Two-Lane Highway Segment Analysis

Analyst	Randall S. Okaneku
Agency/Co.	Traffic Management Consultant
Date Performed	12/30/2009
Analysis Time Period	PM Peak Hour Without Project
Highway	Keaau-Pahoa Road
From/To	West of Kaohuwalu Street
Jurisdiction	State of Hawaii
Analysis Year	2019
Description	Maku`u Master Plan

Input Data

Highway class	Class 1				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.91	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	50	%
Grade: Length		mi	Access points/mi	4	/mi
Up/down		%			

Two-way hourly volume, V	1403	veh/h
Directional split	57 / 43	%

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.998	
Two-way flow rate,(note-1) vp	1545	pc/h
Highest directional split proportion (note-2)	881	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	1.0	mi/h
Free-flow speed, FFS	59.0	mi/h
Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATS	46.0	mi/h

Percent Time-Spent-Following		
Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1542	pc/h
Highest directional split proportion (note-2)	879	
Base percent time-spent-following, BPTSF	74.2	%
Adj.for directional distribution and no-passing zones, fd/np	5.6	
Percent time-spent-following, PTSF	79.8	%

Level of Service and Other Performance Measures		
Level of service, LOS	D	
Volume to capacity ratio, v/c	0.48	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.4

Two-Way Two-Lane Highway Segment Analysis

Analyst	Randall S. Okaneku
Agency/Co.	Traffic Management Consultant
Date Performed	12/30/2009
Analysis Time Period	AM Peak Hour With Project
Highway	Keaau-Pahoa Road
From/To	West of Kaohuwalu Street
Jurisdiction	State of Hawaii
Analysis Year	2019
Description	Maku`u Master Plan

Input Data

Highway class	Class 1				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.90	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	50	%
Grade: Length		mi	Access points/mi	4	/mi
Up/down		%			

Two-way hourly volume, V	1603	veh/h	
Directional split	50 / 50	%	

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.998	
Two-way flow rate,(note-1) vp	1785	pc/h
Highest directional split proportion (note-2)	893	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	1.0	mi/h
Free-flow speed, FFS	59.0	mi/h
Adjustment for no-passing zones, fnp	0.9	mi/h
Average travel speed, ATS	44.3	mi/h

Percent Time-Spent-Following

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1781	pc/h
Highest directional split proportion (note-2)	891	
Base percent time-spent-following, BPTSF	79.1	%
Adj.for directional distribution and no-passing zones, fd/np	4.3	
Percent time-spent-following, PTSF	83.4	%

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.56	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

HCS+: Two-Lane Highways Release 5.4

Two-Way Two-Lane Highway Segment Analysis

Analyst	Randall S. Okaneku
Agency/Co.	Traffic Management Consultant
Date Performed	12/30/2009
Analysis Time Period	PM Peak Hour With Project
Highway	Keaau-Pahoa Road
From/To	West of Kaohuwalu Street
Jurisdiction	State of Hawaii
Analysis Year	2019
Description	Maku`u Master Plan

Input Data

Highway class	Class 1				
Shoulder width	6.0	ft	Peak-hour factor, PHF	0.91	
Lane width	12.0	ft	% Trucks and buses	2	%
Segment length	0.0	mi	% Recreational vehicles	0	%
Terrain type	Level		% No-passing zones	50	%
Grade: Length		mi	Access points/mi	4	/mi
Up/down		%			

Two-way hourly volume, V	1428	veh/h	
Directional split	57 / 43	%	

Average Travel Speed

Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.1	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor,	0.998	
Two-way flow rate,(note-1) vp	1572	pc/h
Highest directional split proportion (note-2)	896	pc/h
Free-Flow Speed from Field Measurement:		
Field measured speed, SFM	-	mi/h
Observed volume, Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, BFFS	60.0	mi/h
Adj. for lane and shoulder width, fLS	0.0	mi/h
Adj. for access points, fA	1.0	mi/h
Free-flow speed, FFS	59.0	mi/h
Adjustment for no-passing zones, fnp	1.0	mi/h
Average travel speed, ATS	45.8	mi/h

Percent Time-Spent-Following		
Grade adjustment factor, fG	1.00	
PCE for trucks, ET	1.0	
PCE for RVs, ER	1.0	
Heavy-vehicle adjustment factor, fHV	1.000	
Two-way flow rate,(note-1) vp	1569	pc/h
Highest directional split proportion (note-2)	894	
Base percent time-spent-following, BPTSF	74.8	%
Adj.for directional distribution and no-passing zones, fd/np	5.4	
Percent time-spent-following, PTSF	80.2	%

Level of Service and Other Performance Measures		
Level of service, LOS	E	
Volume to capacity ratio, v/c	0.49	
Peak 15-min vehicle-miles of travel, VMT15	0	veh-mi
Peak-hour vehicle-miles of travel, VMT60	0	veh-mi
Peak 15-min total travel time, TT15	0.0	veh-h

Notes:
1. If vp >= 3200 pc/h, terminate analysis-the LOS is F.
2. If highest directional split vp >= 1700 pc/h, terminate analysis-the LOS is F.

APPENDIX C – ARCHAEOLOGICAL ASSESSMENT

Report 682-111609

DRAFT-1

ARCHAEOLOGICAL ASSESSMENT

PORTION OF TMK: (3) 1-5-10:17

LOT A-2-A-1,LAND OF MAKU'U

PUNA DISTRICT, ISLAND OF HAWAI'I

By:

Alan E. Haun, Ph.D.

And

Dave Henry, B. S.

Prepared for:

Mr. Brian Nishimura
101 Aupuni Street, Suite 217
Hilo, Hawaii 96720

November 2009

Haun & Associates

Archaeological, Cultural, and Historical Resource Management Services
73-1168 Kahuna A'o Road, Kailua-Kona, Hawai'i 96740 Phone: 982-7755 Fax: 325-1520

Introduction

At the request of Mr. Brian Nishimura, Haun & Associates has prepared an archaeological assessment for 38-acre portion of TMK: (3) 1-5-10:17 located in the Land of Makuu, Puna District, Island of Hawai'i (*Figures 1* and *2*). The objective of the survey was to satisfy historic preservation regulatory review requirements of the Department of Land and Natural Resources-Historic Preservation Division (DLNR-SHPD), as contained within Hawaii Administrative Rules, Title 13, DLNR, Subtitle 13, State Historic Preservation Rules (2003).

No archaeological sites or features were identified during the survey, therefore the project is documented as an archaeological assessment pursuant to Chapter 13-284-5(5A). As required, this report contains a description of the project area and field methods.

Project Area Description

The project area is comprised of a roughly L-shaped c. 38-acre portion of TMK: (3) 1-5-10:17. The parcel is bordered along the western side by the Keaau-Pahoa Road, by undeveloped land to the east and south, and by a communication tower facility and access road to the north. The project area varies in elevation from c. 470 to 502 ft.

The western portion of the project area is comprised of the existing Maku'u Farmer's Market facility. This area mechanically leveled with separate areas for vendor stalls and parking (*Figure 3*). The farmer's market area is 10.1 acres in size and comprises 27% of the total project area.

The remaining portion of the project area is undisturbed and consists of slightly sloping terrain that angles to the northeast. The vegetation is comprised of *ohia* trees (*'ohi'a lehua*), *ohelo* (*Vaccinium* reticulatum), *uluhe* (false staghorn fern – *Dicranopteris* linearis), wild orchid (*Cattleya* spp.) and ferns and vines. (*Figure 4*). The soil throughout the parcel is comprised of pahoehoe lava. According to Sato et al. (1973:34) "pahoehoe lava has no soil covering and is typically bare of vegetation except for mosses and lichens. In the areas of higher rainfall, however, scattered ohia trees, ohelo berry and aalii have gained a foothold in cracks and crevices". According to Wolfe and Morris the lava flow is from Kilauea dating from 750 to 2,000 years ago (2001).

A bulldozed road extends from along the eastern side of the farmer's market to the southeast, terminating at the north end of Kaluahine Place (see *Figure* 2). A guard rail with a locked gate is located at the end of this road (*Figure 5*).

Methods

The survey fieldwork was conducted on October 7, 2009 under the direction of Dr. Alan Haun. Approximately 4 labor-days were required to complete the fieldwork portion of the project. The archaeological investigation of the project area consisted of a 100% surface examination with the surveyors walking transects at 8-10 meter intervals. Ground surface visibility throughout the project area was fair.

Background

The project area is located within the *ahupua'a* of Makuu in the Puna District of Hawaii Island. Puna was once comprised of six chiefdoms created by the son of `Umi-a-Liloa. According to Orr, the district, "lies between Hilo to the north and Ka'u to the south; from Kapoho the most easterly point to the uplands that extend to the great central heights of Mauna Loa to the coastal shores of Keaau" (2004:46).

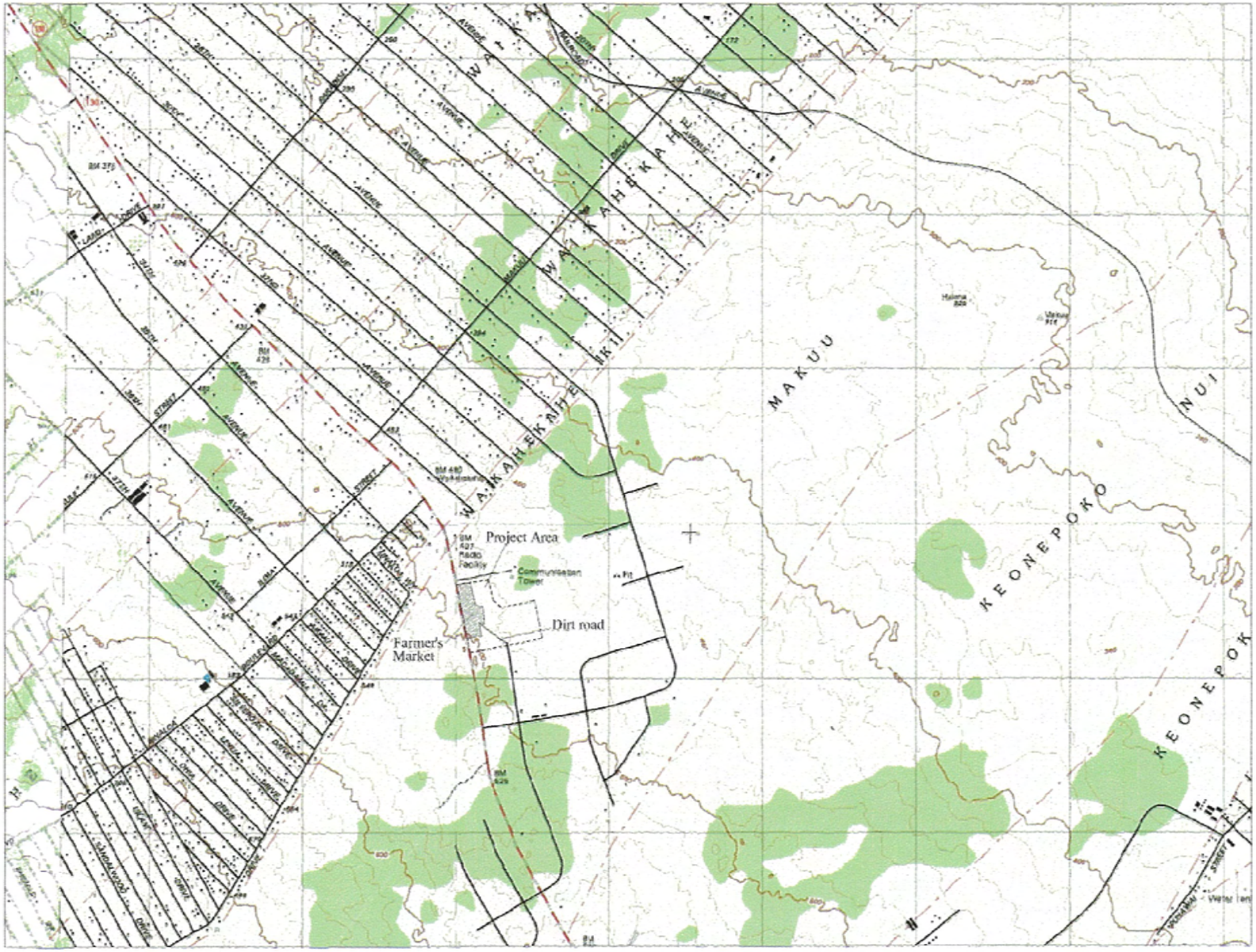


Figure 1 . Portion of USGS North Pahoa Quadrangle showing Project Area

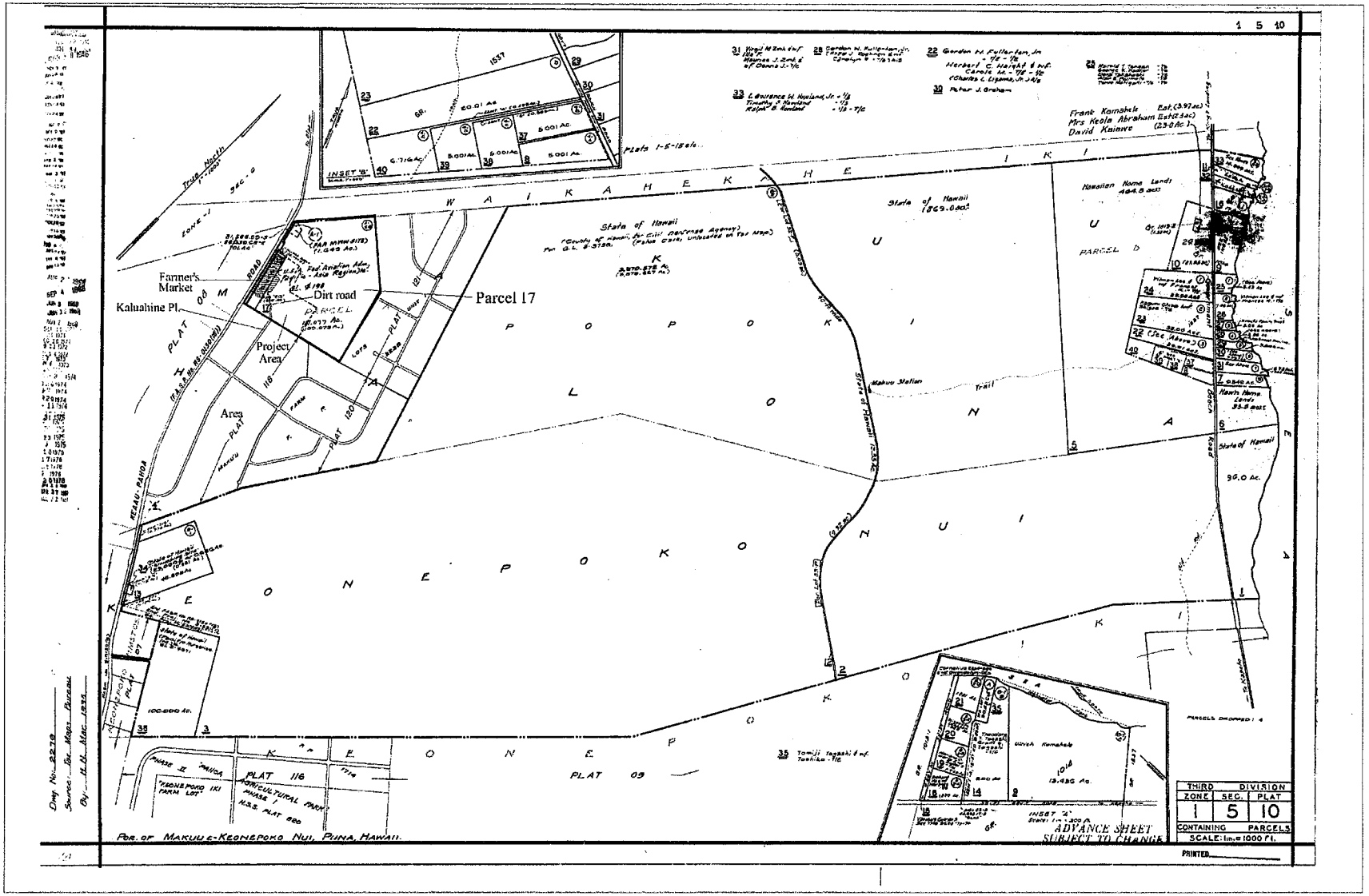


Figure 2. Tax Map Key 1-5-10 showing Project Area

Figure 3. Bulldozed Farmer's Market Area, view to east

Figure 4. Gate at end of Kaluahine Place with Project Area Vegetation in background, view to north

Figure 5. Project Area Vegetation, view to east

There is little mention of Makuu in Hawaiian traditional and legendary accounts. Crozier and Barrere (1971) note that in Puna, few pre-missionary traditions and legends survived because of intensive mission work by Reverend Titus Coan between 1835 and the 1870s. Emory et al. (1959) suggest that Puna's traditional history is difficult to follow because of the dominating influence of the ruling families in the neighboring districts of Hilo and Ka'u. Handy and Handy (1972:542) state that Hawaiian traditions suggest that Puna "was once Hawaii's richest agricultural region and that it is only in relatively recent time that volcanic eruption has destroyed much of its best land".

Hua'a was the chief of Puna when it was seized by 'Umi-a-Liloa, unifying his control over the Island of Hawaii (Kamakau 1961). Hua'a was killed during a battle with one of 'Umi's warrior sons, Pi'i-mai-wa'a, at Kuolo in Kea'au. Kalani`opu`u unified his control over Hawaii Island when he gained control of Ka'u and Puna following Alapa'i's defeat in a battle at Mahinaakaka. During Kalani`opu`u's rule, the Puna chief, I-maka-koloa, attempted a rebellion and seized the valuable products of the district including *'o'o* and *mamo* bird features, hogs, fine mats made from pandanus blossoms and from young pandanus leaves, gray tapa cloth, and tapa cloth made from *mamaki* bark (Kamakau 1961).

Following the death of Kalani`opu`u, in 1782, a dispute over ascendancy ensued culminating in the battle of Moku'ohai (Kamakau 1961, Kuykendall 1938). Following the battle, control over the island was divided between Keoua Ku'ahulu'ula, who held Ka'u and a portion of Puna; Keawema'uhili, who controlled the remainder of Puna, Hilo, and southern Hamakua; and Kamehameha, who controlled northern Hamakua, Kohala, and Kona. A feud between Keoua and Keawema'uhili in 1785, resulted in Keawema'uhili's death and the expansion of Keoua's territory, including the unification of Puna. The island was finally re-unified in 1791 when Kamehameha killed Keoua at Kawaihae. In 1790, a lava flow extended diagonally across Kaueleau from the northeast above Opihikao to the coast at Kamaili (Wolfe and Morris 2001).

Early historic accounts document that Puna was well populated and intensively cultivated. In 1823, Ellis (1963) traveled along the coast from Kaimu to Kapoho, probably passing through, or very close to, the project area. At Kaimu, there was a sandy beach and village with an estimated 725 occupants. Also described, are plantations and groves of coconuts and *kou*. Ellis estimated that the population of Kaimu and nearby villages was approximately 2,000. Ellis described a village surrounded by plantations at Kamaili, which is immediately south of Kaueleau, where they were given taro and potatoes. Other crops noted by Ellis in Puna included bananas and sugar cane. In 1841, the Wilkes Expedition passed through an inland portion of Kaueleau (Burtchard 1994).

The following summarizes Burtchard (1994) discussion of Puna's later history. Prior to the 1870s, foreign influence in Puna primarily was limited to missionaries. In the late 1870s, Robert Rycroft moved to Pohoiki and built a home, wharf, sawmill, jail and courthouse. He later began growing coffee in the area and built a coffee mill. In the mid-1880s, the government began selling land in Puna for homesteads. Most of the homestead land was acquired for coffee cultivation in the 1890s.

Puna Sugar Company was established in 1900 in nearby Kapoho. Between 1900 and the 1930s, the population of the region grew dramatically with the expansion of sugar cane cultivation, pineapple production, the timber industry, and other commercial developments. In the early 1900s, the Hilo Railroad Company developed a rail system from Hilo Town to Puna. In 1907, the Hawaiian Mahogany Lumber Co. was established by James B. Castle to provide railroad ties to the mainland United States. A mill was built at Pahoa and lands being cleared for sugar cane cultivation provided a steady supply of timber. The mill lost its contract to provide railroad ties in 1913 because the ties did not last as long as anticipated. The mill was leased for sugar plantation use in 1917.

By the late 1920s, concern over forest depletion and watershed maintenance lead to the creation of the Puna, Nanawale, and Malama-Ki Forest Reserves. Handy and Handy (1972) citing oral historical sources, indicate that in the 1930s there were homesteading areas in 'Opihikao, Kaueleau, Kamaili, Ke'eke'e, Kehena, and Keauohana. Dry land taro was grown throughout the inland portions of these *ahupua'a*. A particular taro cultivation method, *pa-hala,* is described for the area from Kalapana to Kamaili. The method involved excavating a hole in a'a lava in a pandanus grove. The hole was then filled with weeds, which were allowed to rot for six weeks or more. A taro cutting (*huli*) was wrapped in pandanus leaves and planted in the hole. After the cutting produced three or four leaves, the pandanus branches were cut to provide sunlight and the taro plant was covered with pandanus leaves. After the pandanus leaves were sufficiently dry, the leaves were burned reducing them ash that provided nourishment to the taro plant, which grew tall enough to hide a man beneath the leaves.

Puna Sugar Company continued in operation until the early 1980s. Beginning in the late 1950s, real estate development, along with tourism and diversified agriculture gradually replaced plantation agriculture in Puna. A portion of the present project area is currently in use as a farmer's market.

Findings

No archaeological sites or features were identified within the project area. Two small non-cultural lava blisters were encountered. These were both carefully examined and one was found to contain evidence of recent cultivation. The other blister contained no cultural material or evidence of modification. No further archaeological work is recommended for the property based on the survey results.

References

Burtchard, G.C.
1994 Archaeological in the Kilauea East Rift Zone. Part 1: Land Use Model and Research Design and Part II. A Preliminary Sample survey. Kapoho, Kamaili and Kilauea Geothermal Subzones.

Crozier, S. and D. Barrere
1971 Archaeological and Historical Survey of the Ahupua'a of Puulaa, Puna, Hawaii. Bishop Museum Department of Anthropology Report 71-1.

DLNR (Department of Land and Natural Resources)
2003 Hawaii Administrative Rules, Title 13. Dept. of Land and Natural Resources, Subtitle 13, State Historic Preservation Division Rules.

Ellis, W.
1963 Journal of William Ellis, Narrative of a Tour of Hawaii, or Owhyee...Honolulu: Advertiser Publishing Company.

Emory, K., W. Bonk and Y. Sinoto
1959 Hawaiian Archaeology: Fishhooks. Bernice P. Bishop Museum Special Publication 47, Honolulu.

Handy, E.S.C., and E.G. Handy
1972 *Native Planters in Old Hawaii: Their Life, Lore, and Environment.* B.P. Bishop Museum Bulletin 233. Bishop Museum Press. Honolulu.

Kamakau, S.M.
1961 *Ruling Chiefs of Hawaii.* Kamehameha Schools Press. Honolulu.

Kuykendall, R.S.
1938 The Hawaiian Kingdom 1778-1854. Foundation and Transformation. Honolulu: University Press of Hawaii.

Sato, H.H., W. Ikeda, R. Paeth, R. Smythe, and M. Takehiro, Jr.
1973 *Soil Survey of the Island of Hawaii, State of Hawaii.* U.S. Department of Agriculture, Soil Conservation Service and University of Hawaii Agricultural Experiment Station. Washington, D.C.: Government Printing Office.

Wolfe, E.W., and J. Morris
2001 Geologic Map of the Island of Hawaii. U.S. Department of the Interior, U.S. Geological Survey. Miscellaneous Investigations Series.