APPENDIX

A

MARKET ASSESSMENT

MIKI BASIN INDUSTRIAL PARK:
MARKET ASSESSMENT

MIKI BASIN INDUSTRIAL PARK:
MARKET ASSESSMENT

PREPARED FOR:

Pūlama Lāna‘i

PREPARED BY:

Plasch Econ Pacific LLC

September 2021

Contents

Executive Summary ..... **ES- 1**

Part I: Introduction and Proposed Project ..... **I- 1**

1. Introduction ..... **I- 1**

a. Content and Purpose ..... I- 1

b. Methodology ..... I- 1

c. Organization of the Report ..... I- 2

d. Economic Consultant ..... I- 2

2. Project Overview ..... **I- 2**

a. Project Location ..... I- 2

b. Project Description ..... I- 2

c. Development Period ..... I- 3

d. Land Classifications and Required Approvals ..... I- 3

Part II: Lāna‘i’s Economy and Socio-Economic Conditions ..... **II- 1**

1. Economic Overview ..... **II- 1**

2. Socio-Economic Conditions ..... **II- 1**

a. Population ..... II- 1

b. Households ..... II- 2

c. Housing ..... II- 2

d. Income and Education ..... II- 3

3. Economic Role of Shipping ..... **II- 3**

4. Implications to the Demand for Industrial Land ..... **II- 3**

Part III: Market for Industrial Land ..... **III- 1**

1. Supply of Industrial Land ..... **III- 1**

2. Market Conditions ..... **III- 2**

a. Annual Absorption of Industrial Land ..... III- 2

b. Vacancy Rates ..... III- 2

c. Industrial Land Sales and Values ..... III- 2

d. Industrial Rents ..... III- 3

3. Demand for Industrial Land ..... **III- 3**

a. Current Industrial Uses ..... III- 3

b. Committed Industrial Uses, Miki 200 ..... III- 3

c. Typical Industrial Activities ..... III- 4

d. Land Required for Typical Industrial Activities ..... III- 5

e. Industrial Activities After 2030 ..... III- 7

f. Summary ..... III- 7

4. Conclusions ..... **III- 7**

References ..... **R- 1**

Figures

I-1. Project Location, Lāna‘i ..... I- 4

I-2. Project Location, Miki Basin ..... I- 5

I-3. Site Plan ..... I- 6

Part II Tables: Socio-Economic Conditions

II-1. Demographic Characteristics, County of Maui and Island of Lāna‘i: 2010 and 2013–2017 Estimates

II-2. Income and Education, County of Maui and Island of Lāna‘i: 2010–2014 and 2015–2019 Estimates

EXECUTIVE SUMMARY

1. PROJECT DESCRIPTION

The Miki Basin Industrial Park (the **Project** or **Miki 200**) is a proposed master-planned development on a 200-acre centrally located site in the Miki Basin area on the island of Lāna‘i, Hawai‘i. Consistent with the Lāna‘i Community Plan, Miki 200 will include 100 acres designated Light Industrial and 100 acres designated Heavy Industrial. It will be Lāna‘i’s first large-scale industrial park. Lot sizes may range from less than a half-acre to 20 acres or more. Also, rental space may be available in industrial buildings if built. Infrastructure may include internal roads, water, power, sewers, drainage, etc.

Miki 200 will provide space for the relocation and/or expansion of existing industrial activities on Lāna‘i, land and warehouses for storing goods and equipment, and land and buildings to accommodate industrial activities new to Lāna‘i.

2. PROJECTED SUPPLY AND USE OF INDUSTRIAL LAND

The future supply and use of industrial land on Lāna‘i is projected to be as follows:

	Acres
— **Miki 200** (proposed)	
• Committed	
+ Infrastructure	20.0
+ Renewable energy	127.0
+ Concrete/rock-crushing facility	14.5
+ Asphalt plant	12.5
• Typical industrial activities	7.6
• Vacant (projected development after 2030)	18.4
• **Total Miki 200**	**200.0**
— **Existing Industrial Projects** (acreage includes infrastructure): Pūlama Lāna‘i Central Services, Miki 20, HECO, and Kaumalapau Harbor	
• Currently used (excludes 1.6 acres in temporary use)	21.9
• Available in the future, pending a Land Court Subdivision Approval	11.6
• **Total Existing Industrial Land**	**33.5**
— **Total Industrial Land, Proposed and Existing**	**233.5**

3. MARKET FOR MIKI 200

Miki 200 will provide much needed industrial land on Lāna‘i, and a much needed industrial park. Currently, vacant industrial land is not available on the island.

Regarding market feasibility, commitments are in place for 174 acres (87%) of the Project area. An additional 7.6 acres for “typical industrial activities” will increase the projected demand to 181.6 acres (91%) by 2030. About 18.4 acres at Miki 200 will accommodate the demand for industrial land beyond 2030. More importantly, this acreage will provide industrial land approved for development and may have major infrastructure in order to take immediate advantage of any new economic opportunities which may arise, thereby diversifying Lāna‘i’s economy.

MIKI BASIN INDUSTRIAL PARK: MARKET ASSESSMENT

PART I: INTRODUCTION AND PROPOSED PROJECT

1. INTRODUCTION

a. Content and Purpose

Miki Basin Industrial Park (the **Project** or **Miki 200**) is a proposed master-planned development on a 200-acre site located in the Miki Basin area on the island of Lānaʻi, Hawaiʻi. This report addresses the anticipated market for the Project. Its purpose is to provide the community, State of Hawaiʻi (**State**) officials and County of Maui (**County**) officials with relevant information about the market on Lānaʻi for an industrial park.

b. Methodology

The market assessment covers:

- The existing supply of industrial land on Lānaʻi based on an inventory of industrial land on Lānaʻi.
- Market conditions for industrial land on Lānaʻi.
- The anticipated demand for industrial land based on committed and anticipated uses. Committed uses were provided by Pūlama Lānaʻi. Anticipated uses are based on per-capita space requirements.

Socio-economic conditions on Lānaʻi are also provided in order to provide insight into possible adjustments to the demand for industrial land. Information is provided on Lānaʻi's population, housing, incomes, education, economic activities, employment and labor force. Data were obtained from the 2010 census by the U.S. Census Bureau, and from the American Community Survey ("**ACS**"). The ACS is an ongoing survey that provides up-to-date information about the nation's population. The ACS includes questions that were not included in the 2010 decennial census but were included in the 2000 census. The most up-to-date available data from the ACS are five-year estimates from 2015-2019.

Dollar amounts are expressed in terms of 2019 purchasing power and market conditions, thereby reflecting conditions prior to COVID-19. Dollar amounts after 2019 are not increased to account for inflation, appreciation in property values, or changes in market conditions.

c. Organization of the Report

The report is divided into three Parts:

- Part I: Introduction and Proposed Project
- Part II: Lānaʻi's Economy and Socio-Economic Conditions
- Part III: Market for Industrial Land

All Figures in this report are embedded in the text, while all tables are at the end.

d. Economic Consultant

The analysis was conducted by Plasch Econ Pacific LLC, a Hawai'i-based economic-consulting firm specializing in economic development, land and housing economics, feasibility studies, valuations, market analysis, public policy analysis, and the economic and fiscal impacts of projects.

2. PROJECT OVERVIEW

a. Project Location

The Miki 200 will be centrally located on a 200-acre site in Miki Basin on the island of Lānaʻi, about 1 mile east of the Lānaʻi Airport terminal, 2.7 miles southwest of Lānaʻi City, and 3.7 miles east of Kaumalapau Harbor (see Figures I-1 and I-2). The Tax Map Key (TMK) for the Project area is (2)4-9-002:061(por.).

As shown in Figure I-3, the Project will abut (1) the Hawaiian Electric Company/Maui Electric Co. (**HECO**) power plant, and (2) the "Existing Industrial Condominium" (referred to as **Miki 20** since it is a 20-acre project in the Miki Basin).

b. Project Description

Consistent with the Lānaʻi Community Plan, Miki 200 will include 100 acres designated Light Industrial and 100 acres designated Heavy Industrial. It will be Lānaʻi's first large-scale industrial park. Lot sizes may range from less than a half-acre to 20 acres or more. Also, rental space may be available in industrial buildings if built. Infrastructure may include internal roads, water, power, sewers, drainage, etc.

Miki 200 will provide space for the relocation and/or expansion of existing industrial activities on Lānaʻi, land and warehouses for storing goods and equipment, and land and buildings to accommodate industrial activities new to Lānaʻi. Regarding the last point, it is important to have industrial land readily available and approved for development in order to take immediate advantage of any new economic opportunities which may arise.

c. Development Period

Following approval, most Project development is expected to occur over a period of about 10 years, but development could require more or less time, depending on the pace of future economic and population growth, market conditions and lot leases. About 9% of the land is expected to be developed after 2030 (see Subsection III.3.e).

d. Land Classifications and Required Approvals

Current land classifications of the Project Area and proposed changes are as follows:

- State Districts
  - Current: Agricultural
  - Proposed: Urban
- County Designations
  - Lāna'i Community Plan
    - Current: Light and Heavy Industrial
    - Proposed: No change
  - Maui County Zoning
    - Current: Agricultural
    - Proposed: Light and Heavy Industrial

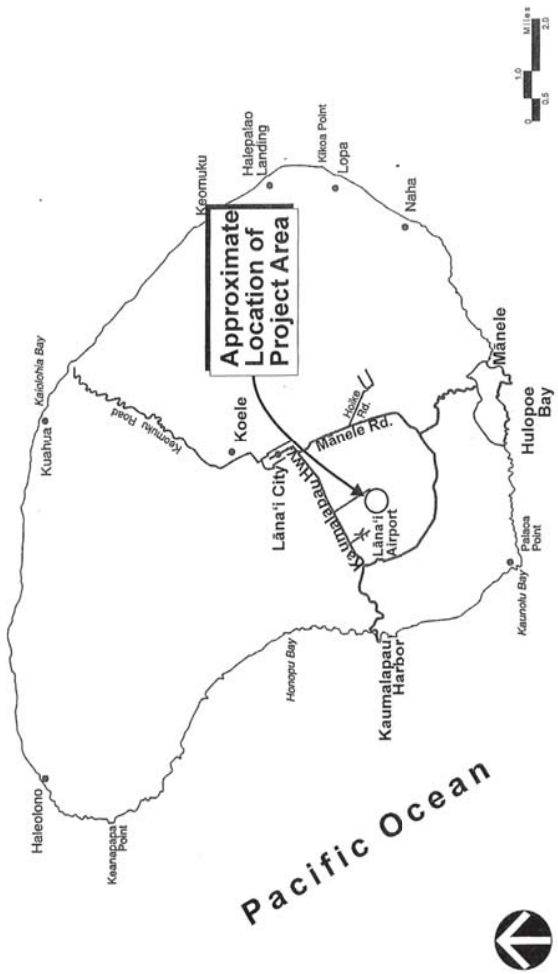


Figure I-1. Project Location, Lāna'i

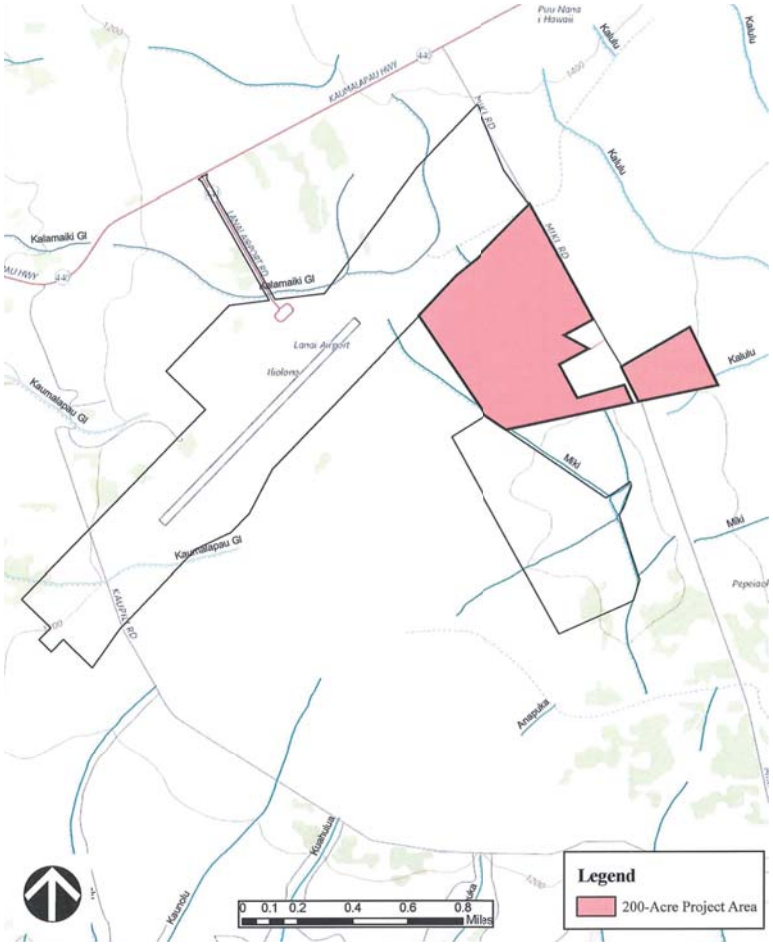


Figure I-2. Project Location, Miki Basin

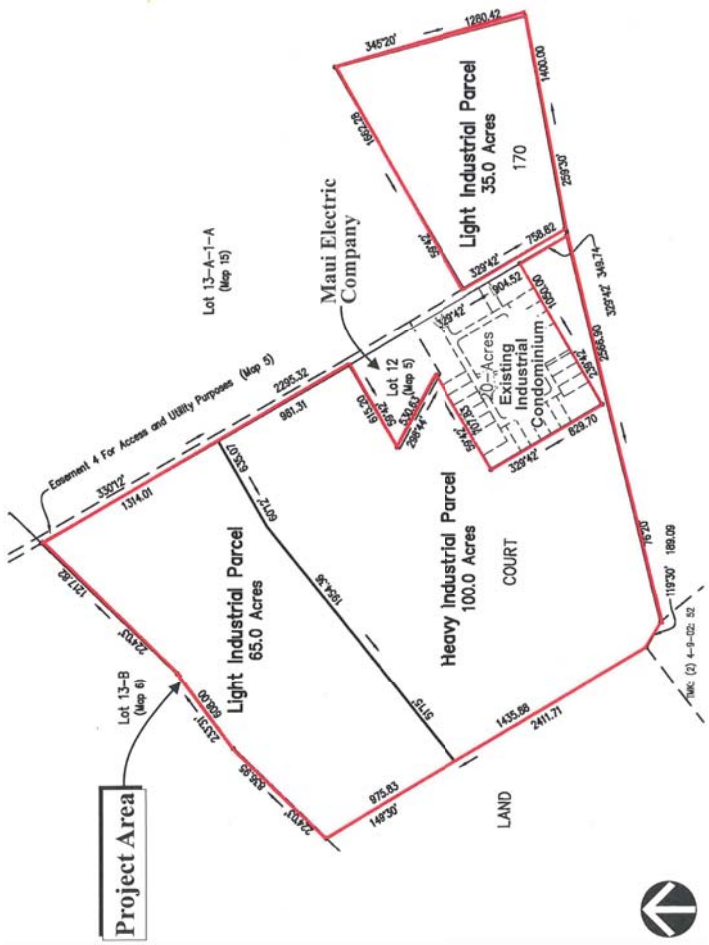


Figure I-3. Site Plan

PART II: LANAI'S ECONOMY AND SOCIO-ECONOMIC CONDITIONS

1. ECONOMIC OVERVIEW

From the 1920s to 1992, the primary economic activity on Lānaʻi was growing pineapple for the mainland canned-pineapple market.

Since the 1990s, the two resorts on Lānaʻi (Manele and Kōʻele) have been the primary driving forces for the economy. Manele and Kōʻele feature 213 and 96 luxury rooms and suites, respectively. In addition, both resorts include single-family homes and multi-family homes for retirees, part-time residents, visitors and managers. The purchase of goods and services by visitors, retirees, part-time residents, the hotel, and hotel employees generate most of the jobs on Lānaʻi.

Other economic driving forces on Lānaʻi's include:

- Sensei Farms, a new hydroponic farm which exports fresh vegetables to markets throughout the Hawaiian Islands, and which employs about 50 workers.
- Government operations (schools, the airport, the harbors, police, fire, post office, etc.)
- Social security and retirement income paid to residents.
- Government income-support payments.
- Occasional construction activity for the building or renovation of hotels, homes, commercial and industrial buildings, government facilities, etc.

Except for the hotel an Manele, most commercial activities on the island are located in Lānaʻi City, including grocery stores, drug stores, restaurants, service stations, beauty salons, building suppliers, etc.

2. SOCIO-ECONOMIC CONDITIONS

Tables II-1 and II-2 summarize socio-economic conditions for County of Maui and Lānaʻi. The County consists of the islands of Maui, Lānaʻi, Molokaʻi, Kahoʻolawe, and Molokini. Except where stated otherwise, the estimates below were reported by the American Community Survey.

a. Population

Between 2015 and 2019, Lānaʻi had a resident population of approximately 2,730, or 1.64% of the County population of 165,979 residents. Residents include those who live full-time or permanently in the County, and exclude visitors and part-time residents (i.e., those who live most of the time in a primary home located elsewhere).

Throughout most of the decade, the U.S. Census Bureau's five-year population estimate for Lānaʻi ranged from approximately 3,100 to 3,500 residents. However, in 2018 and 2019, the five-year estimate dipped below 3,000 residents. As noted above, the 2015-2019 five-year estimate was 2,730 people, which represents a 12.9% decrease from the 2010 population of 3,135 residents. Meanwhile, the population for the County as a whole has increased by 7.2% since 2010 (see Table II-1).

The Lānaʻi Community Plan, which was updated and approved by the Maui County Council in 2016, originally projected that an additional 885 residents will live on the island by the year 2030, for a total population of 4,020 (based on the County's Land Use Forecast produced in December 2012). The Lānaʻi Community Plan did note that increased economic activity and development plans on the island may result in the population growing beyond the original forecast of up to 6,000 residents.

Between 2015 and 2019, Asian residents comprised a higher proportion of the Lānaʻi population compared to the County as a whole: 53.4% of residents were estimated to be Asians compared to 29.3% for the County (Table II-1).

The resident profile of Lānaʻi is older than that of the County as a whole. The median age on Lānaʻi was about 49.0 years old between 2015 and 2019 compared to 41.2 years for the County.

b. Households

The average household size on Lānaʻi is estimated to be 2.31 people per household between 2015 and 2019—a decrease from 2.71 people per household in 2010 (Table II-1). On average, households on Lānaʻi are smaller than households for the County —3.00 people per household.

Approximately 59.8% of the households were estimated to be homeowners. Also, an estimated 63.1% of the households were family households.

c. Housing

Between 2015 and 2019, Lānaʻi had an estimated 1,549 housing units (Table II-1). This figure includes resort/residential units that were used as second homes, or were available for visitors, or were vacant. Approximately 23.8% of housing units were vacant, compared to 25.5% for the County.

Most residents live in Lānaʻi City in single family homes of less than 1,500 square feet on lots of about 6,000 square feet or less (Google Maps). According to the County tax records, many of the homes on Lānaʻi were built before 1940.

d. Income and Education

The mean household income on Lānaʻi between 2015 and 2019 was estimated at $73,484, 39.8% lower than the County as a whole (Table II-2). Correspondingly, Lānaʻi had a lower per-capita income.

A slightly lower proportion of residents on Lānaʻi completed some secondary education compared to the County as a whole. An estimated 50.7% of Lānaʻi residents attended some college or received a higher education degree, compared to 60.8% of the residents for the County. About 67.2% of the households spoke only English at home, while 31.5% spoke Asian and Pacific Island languages.

3. Economic Role of Shipping

Inasmuch as Lānaʻi is a small island with a small population and a small economy, few consumer and business goods are produced on the island. Instead, most goods must be imported by barge or airfreight from Honolulu. Barge service is weekly, but the service is canceled occasionally due to kona storms. Airfreight is available daily, but the capacity is low and the shipping rates are higher than the barge rates.

4. Implications to the Demand for Industrial Land

Economic development is needed on Lānaʻi in order to provide jobs and increase incomes for the residents. As mentioned above, the average household income on Lānaʻi is 39.8% lower than the County-wide average.

For both residents and businesses, Lānaʻi needs more storage space than other communities of similar size because most goods must be imported, and shipping is infrequent and occasionally unreliable. And for most residents, home storage is limited by the relatively small lots and homes.

Part III: Market for Industrial Land

1. Supply of Industrial Land

Currently, Lānaʻi has about 36.2 acres of industrial land of which about 2.7 acres are used for offices and other non-industrial activities, 23.5 acres are used for industrial activities. The supply of industrial land is as follows:

— Pūlama Lānaʻi Central Services: about 7.7 acres, 0 acres available

This project is located in Lānaʻi City at 13110 Fraser Avenue. About 2.7 acres are used for Pūlama Lānaʻi offices and other non-industrial activities, and about 5 acres are used for industrial activities, including a laundry for the hotels, food storage, and a maintenance warehouse. None of the land is available for additional industrial uses.

— Miki 20: about 20 acres, 10 acres available in the future

Maki 20 is an industrial condominium that abuts both the proposed Project and the HECO power plant (see Figure I-3).

This project is anticipated to be subdivided into 31 lots in accordance with County requirements, but the Land Court has yet to approve the subdivision. A petition to the Land Court for approval was submitted in 2018, but which was later amended to include the Hawaiʻi Department of Transportation due to a public road over an easement which runs in part through a portion of the Lānaʻi Airport property. The petition is under review by a Deputy Attorney General.

Currently, about 10 acres are being used for Pūlama Lānaʻi warehouses, Hawaiʻi Gas, Maui Disposal, equipment rentals by Sunbelt, and a concrete/rock crushing plant. The crushing plant involves a temporary use of 1.6 acres that will be relocated to Miki 200.

None of the land is currently available for additional industrial uses. However, about 10 acres will be available in the future, following subdivision approval by the Land Court. Lots encompassing half of Miki 20 will be offered for sale for various industrial activities. This translates to future land sales of about 9 acres , excluding roads and other common areas.

After the subdivision is approved by the Land Court, Miki 20 may evolve to become a small-scale industrial park hosting a variety of industrial tenants.

— HECO Power Plant: about 5 acres, 0 acres available

HECO's generating facilities are located on about 5 acres abutting the proposed Project and Miki 20 (see Figure I-3). None of this land is currently

available for industrial activities other than that used for HECO's generating facilities.

— Kaumalapau Harbor: about 3.5 acres, 0 acres available

About 3.5 acres of industrial land are located at Kaumalapau Harbor. None of this land is currently available for industrial activities other than harbor-related activities.

None of Lānaʻi's industrial land is currently available for additional industrial activities, but 10 additional acres will be available in the future pending subdivision of Miki 20 by the Land Court. Also, no land or building space is available as part of an industrial-park.

Miki 200 will increase the supply of industrial land by 200 acres, resulting in a total island-wide supply of about 233.5 acres of industrial land. This accounting excludes the 2.7 acres used for non-industrial activities at Pūlama Lānaʻi Central Services.

2. MARKET CONDITIONS

a. Annual Absorption of Industrial land

Except for Miki 20, there have been no significant changes in the supply of industrial land on Lānaʻi in decades. Even though subdivision of Miki 20 has yet to be approved by the Land Court, 10 acres of industrial uses were added in the previous decade as indicated above. Since there are no other industrial parks on Lānaʻi, there is no additional history of industrial-park land or building space absorption.

b. Vacancy Rates

All available industrial land on Lānaʻi is being used. Similarly, all available space within existing industrial buildings is used. Thus, the vacancy rates for industrial land and building space is essentially zero.

c. Industrial Land Sales and Values

There have been no recent sales of industrial lots on Lānaʻi, so price data are not available. However, the County assesses land values at market rates. For 2021, Pūlama Lānaʻi Central Services land was assessed at $206,210 per acre. Given its location in Lānaʻi City, this value is higher than that what is expected for Miki 200.

The Miki 20 land is assessed as agricultural land as part of a 16,124-acre parcel. Thus, this project provides no meaningful information on industrial-land values.

For tax purposes, the HECO property is assessed as Agricultural land (not Industrial land) at $94,080 per acre. This high value indicates that the assessment is based on the actual use of the land, and not on a possible agricultural use.

The industrial land at Kaumalapau Harbor is assessed at $863,203 per acre. Since this is harbor-front land, it is not comparable to Miki 200.

For Miki 200, once developed and serviced with utilities, the land is expected to be valued between $100,000 to $200,000 per acre.

d. Industrial Rents

No data are publicly available on market rents for the existing industrial land or space on Lānaʻi.

On Oʻahu, some of the most affordable industrial space can be found at Kenai Industrial Park near the Kalaeloa Barbers Point Harbor. In late 2019, asking rents were about $1.10 per square foot per month. Land values at Kenai Industrial Park are much higher than on Lānaʻi, but building costs on Oʻahu are much lower than on Lānaʻi. Based on Kenai Industrial Park, rents for industrial space at Miki 200 are expected to be less than $1 per square foot per month, assuming that industrial buildings are built and areas within buildings are rented to tenants.

3. DEMAND FOR INDUSTRIAL LAND

a. Current Industrial Uses

As indicated in Section III.2, about 23.5 acres of industrial land are currently being used on Lānaʻi: about 5 acres at Pūlama Lānaʻi Central Services, 10 acres at Miki 20, 5 acres at the HECO site, and 3.5 acres at the harbor.

b. Committed Industrial Uses, Miki 200

For Miki 200, about 174 acres are committed for infrastructure and industrial activities, including:

— Infrastructure: about 20 acres

Internal roads, drainage areas and common areas are expected to require about 20 acres (10%) of the Project area.

— Renewable Energy: about 127 acres

HECO has requested proposals for a 17.5 megawatt (**MW**) photo voltaic system on Lānaʻi plus a 70 MW-hour (**MWh**) battery energy storage system (**PV+BESS**). To help meet the need for renewable energy on Lānaʻi, Pūlama Lānaʻi plans to allocate 127 acres at Miki 200 for renewable energy. The acreage is based on the energy facility being developed at the Pacific Missile Range Facility (**PMRF**) on Kauaʻi (14 MW/70MWh PV+BESS).

— Concrete/Rock Crushing Facility: about 14.5 acres

Pūlama Lānaʻi's concrete recycling and rock- crushing facility uses equipment to crush concrete and rocks into various sizes and types of aggregate to construct roadways, sidewalks, etc., and for backfill throughout the island for construction projects.

The facility and equipment are mobile, and are temporarily located on 1.6 acres at Miki 20. Miki 200 will provide a permanent base for the operation, water for washing equipment and controlling dust, and a central location for serving the island. Most of the acreage for the relocated operation will be used for stockpiling (1) various types of material to be crushed and (2) various grades of aggregate. These stockpiles will provide an ample and ready supply of aggregate when needed.

After the relocation of operations to Miki 200, the 1.6 acres now used at Miki 20 will come available for other industrial activities.

— Asphalt Plant: about 12.5 acres

Pūlama Lānaʻi's asphalt plant is a hot-mix batch plant that services both the community and Pūlama Lānaʻi. The asphaltic concrete produced from this plant supplies material required to pave new roads, and to repair and repave existing ones.

This mobile facility will be relocated from its current temporary site near Kaumalapau Harbor to Miki 200 in order to provide a permanent base of operations in a central location for serving the island. The current location near the harbor will be used for stockpiling supplies.

c. Typical Industrial Activities

"Typical industrial activities" are defined to include those industrial activities typically found in Hawaiʻi (such as manufacturing, warehouses, base yards, etc.), but excluding those activities listed in the previous section (i.e., PV+BESS, concrete/rock-crushing facilities, and asphalt plants).

A pent-up demand for industrial land and industrial space to accommodate "typical industrial activities" is readily apparent on Lānaʻi. Many businesses in Lānaʻi City are operated from homes, partly because there are no industrial parks on Lānaʻi that serve small-scale tenants. Yards and rooms are used for operations and to store equipment and supplies. In some cases, inadequate space may be limiting local companies ability to expand. For some of these businesses, an industrial park may be a more suitable location because of more space, visual impacts, noise, odors, dusts, etc. Many of these home businesses provide a second source of income for workers employed elsewhere on Lānaʻi. If industrial space were available, some business owners might opt to expand their companies into into full-time

operations. In other cases, businesses are operated from vans, and some might benefit from a permeant location in an industrial park. In addition, some industrial activities may fail to develop on Lānaʻi due to a lack of a suitable location.

A partial list of industrial activities that could or are likely to develop at Miki 200 include the following:

— Vehicle rentals (cars, 4-wheel drive vehicles, trucks, etc.)
— Vehicle maintenance and repair (engines, transmissions, tires, body, etc.)
— Car wash
— All-terrain vehicle sales, maintenance, repair, etc.
— Small-boat supplies, maintenance and repair (including fishing gear)
— Commercial laundry services for residents
— Base yards and storage for construction trucks, equipment and supplies (lumber, bricks, cement, pipes, roofing, sheetrock, etc.)
— A base of operations for home maintenance, repairs and services (roofing, electrical, plumbing, appliances, cleaning services, pools, etc.)
— A base of operations for maintaining and repairing office equipment (computers, printers, wifi networks, etc.)
— Self-storage space for household goods, records, business supplies, etc.
— Shops and crafts (metal, woodcrafts, taxidermy, lei hulu, etc.)
— Fruit and vegetable processing, possibly with a shared commercial kitchen
— Veterinarian services and pet supplies at a fixed location
— A gym featuring exercise and therapy equipment
— A fixed location for a slaughtering facility and cold storage for hunted animals (i.e., axis deer and mouflon sheep)
— Laboratories (medical, environmental, etc.)
— Shared office facilities for business at Miki 200

d. Land Required for Typical Industrial Activities

Although the Maui Island economy is much larger than that of Lānaʻi, Maui's supply of industrial land provides information for estimating the potential demand for industrial land on Lānaʻi. The economies of both Maui and Lānaʻi are driven primarily by tourism.

In early 2020, about 1,538 acres on Maui were zoned Light or Heavy Industrial. About 80 acres of industrial land were used for two concrete/rock crushing facilities and two asphalt

plants. No industrial land on Maui was used for utility scale PV+BESS. Thus, 1,458 acres were used for "typical industrial activities" (1,538 acres less 80 acres).

In 2019, the *de facto* population for Maui Island was about 216,990 people. This is based on an estimated *de facto* population of 227,213 for the County of Maui as reported in the *Hawai'i Data Book*, less 9,649 residents living on Lāna'i and Moloka'i, less an estimated 575 visitors on Lāna'i and Moloka'i (479 visitor units × 60% occupancy rate × 2 people per occupied room). The number of visitor units is from the 2020 Visitor Plant Inventory.

Thus, the per-capita land requirement on Maui for "typical industrial activities" was about 6.7 acres per 1,000 people in 2019 (1,458 acres ÷ 216,990 people).

By 2030, the *de facto* population of Lāna'i is expected to reach about 4,510 residents and visitors: about 4,020 residents, 380 visitors staying in hotels, and 110 part-time residents and visitors staying in second homes and vacation homes. As indicated in Section II.2.a, the County's Land Use Forecast for Lāna'i projects 4,020 residents by 2030, while the Lāna'i Community Plan noted that increased economic activity and development plans for the island may result in as many as 6,000 residents. The estimate of 380 visitors staying in hotels is based on 320 rooms at Manele, Kō'ele and Hotel Lāna'i; 60% occupancy; and 2 people per occupied room. The estimate of 110 part-time residents and visitors staying in second homes and vacation homes is based on 137 single-family homes and 121 multi-family homes at Manele and Kō'ele; 75% of the homes used for second homes or vacation homes; 25% occupancy; and 2.5 people per home for single-family homes and 2 people for multi-family homes.

Based on the above, **about 30.3 acres would be required on Lāna'i by 2030 for "typical industrial activities"** (6.7 acres/1,000 people × 4,510 residents and visitors). As mentioned in Section III.4.a, 23.5 acres of industrial land are currently being used on Lāna'i, including about 21.9 acres for "typical industrial activities" and 1.6 acres of temporary concrete/rock crushing operations at Miki 20. Thus, by 2030, there is a **potential demand for an additional 8.4 acres for "typical industrial activities"** (30.3 acres less 21.9 acres), **or about 7.6 acres excluding roads and other common areas** (90% of 8.4 acres). Demand for industrial land could be higher due to increased storage requirements to compensate for infrequent and unreliable shipping.

Regarding self-storage, the SpareFoot Storage Beat reports that commercial storage use amounts to about 5.9 square feet per person in the U.S. For Lāna'i, this translates to about 23,700 square feet of storage by 2030 (5.9 sf/person × 4,020 residents). Assuming a one-story building with a floor area ratio (**FAR**) of 35%, about 1.5 acres would be required for a self-storage facility (23,700 sf × 1 acres/43,560 sf × 1/35% FAR). This acreage would be included in the estimated 7.6 acres for "typical industrial activities."

e. Industrial Activities After 2030

About 18.4 acres at Miki 200 will accommodate the demand for industrial land beyond 2030. More importantly, this acreage will provide industrial land approved for development and may have major infrastructure in order to take immediate advantage of any new economic opportunities which may arise, thereby diversifying Lāna'i's economy. This acreage will also be available to accommodate "typical industrial activities" before 2030 in the event that the pent-up demand is greater than the estimate given in the previous section.

About 10.6 acres at Miki 20 will also be available to accommodate future demand for industrial land (10 acres vacant plus 1.6 acres of temporary use less 1 acre for infrastructure).

f. Summary

The future supply and use of industrial land on Lāna'i is projected to be as follows:

	Acres
— **Miki 200** (proposed)	
• Committed	
+ Infrastructure	20.0
+ Renewable energy	127.0
+ Concrete/rock-crushing facility	14.5
+ Asphalt plant	12.5
• Typical industrial activities	7.6
• Vacant (to be developed after 2030)	18.4
• **Total Miki 200**	**200.0**
— **Existing Industrial Projects**: Pūlama Lāna'i Central Services, Miki 20, HECO, and Kaumalapau Harbor	
• Currently used (includes land for infrastructure, but excludes 1.6 acres in temporary use at Miki 20)	21.9
• Available in the future, pending the Land Court Subdivision Approval of Miki 20	
+ Infrastructure	1.0
+ Lots	10.6
• **Total Existing Industrial Land**	**33.5**
— **Total Industrial Land, Proposed and Existing**	**233.5**

4. CONCLUSIONS

Miki 200 is consistent with the Lāna'i Community Plan, and will provide much needed industrial lots on Lāna'i, and a much needed industrial park. Furthermore, the Project will be

centrally located for serving the island. Lots may range in size from about a half-acre to 20 acres or more, and rental space may be provided in new industrial buildings if built. Rents will be at market rates.

Currently, vacant industrial land is not available on the island. However, about 10.6 gross acres will come available at Miki 20 assuming a favorable subdivision approval by the Land Court and relocation of the temporary concrete/rock crushing facility to Miki 200.

Regarding market feasibility of Miki 200, commitments are in place for 174 acres (87%) of the Project area. An additional 7.6 acres for "typical industrial activities" will increase the projected demand to 181.6 acres (91%) by 2030. The remaining 18.4 acres will provide land to take advantage of unforeseen new economic opportunities which may arise, and to accommodate the demand for industrial land beyond 2030.

REFERENCES

Colliers International. "O'ahu, Hawai'i, Research & Forecast Report, Industrial Market." Fourth Quarter 2019.

County of Maui, Office of Economic Development. Maui County Data Book. 2018.

County of Maui, Real Property Assessment Division. 2021.

Hawai'i Department of Business, Economic Development & Tourism, State of Hawai'i. *The State of Hawai'i Data Book*. Annual.

Hawai'i Energy Projects Directory. 2021.

Hawai'i Public Utilities Commission. Docket No. 2015-0389, Order 37796. May 21, 2021.

Hawai'i Tourism Authority. "2020 Visitor Plant Inventory."

Plasch Econ Pacific LLC. 2021.

Pūlama Lāna'i. 2021.

SpareFoot Storage Beat. "U.S. Self-Storage Industry Statistics.: January 27, 2021.

U.S. Census Bureau. American Community Survey 5 Year Estimate, 2010-2014.

U.S. Census Bureau. American Community Survey 5 Year Estimate, 2015-2019.

PART II TABLES:
SOCIO-ECONOMIC CONDITIONS

Table II-1. Demographic Characteristics, County of Maui and Island of Lana'i: 2010 and 2015–2019 Estimates

Item	County of Maui			Lana 'i		
	2010	2015-2019	Change	2010	2015-2019	Change
Population (residents)	154,834	165,979	7.2%	3,135	2,730	-12.9%
Male	77,587	82,633	6.5%	1,600	1,396	-12.8%
Female	77,247	83,346	7.9%	1,535	1,334	-13.1%
Distribution						
Male	50.1%	49.8%		51.0%	51.1%	
Female	49.9%	50.2%		49.0%	48.9%	
Population by Age						
Pre-school Age, 4 and Under	10,020	9,907	-1.1%	235	124	-47.2%
School Age, 5 to 19	29,117	29,706	2.0%	621	366	-41.1%
Working Age, 20 to 64	95,894	97,271	1.4%	1,805	1,546	-14.3%
Retirement Age, 65 and Over	19,803	29,095	46.9%	474	694	46.4%
Distribution						
Pre-school Age, 4 and Under	6.5%	6.0%		7.5%	4.5%	
School Age, 5 to 17	18.8%	17.9%		19.8%	13.4%	
Working Age, 18 to 64	61.9%	58.6%		57.6%	56.6%	
Retirement Age, 65 and Over	12.8%	17.5%		15.1%	25.4%	
Median Age	39.6	41.20	4.0%	38.6	49.00	26.9%
Ethnicity						
White alone	53,336	58,891	10.4%	460	488	6.1%
Black or African American alone	870	845	-2.9%	5	0	-100.0%
American Indian and Alaska Native alone	603	424	-29.7%	2	0	-100.0%
Asian alone	44,595	48,579	8.9%	1,745	1,459	-16.4%
Native Hawaiian and Other Pacific Islander alone	16,051	18,093	12.7%	205	186	-9.3%
Some Other Race alone	3,051	2,865	-6.1%	5	52	940.0%
Two or More Races	36,328	36,282	-0.1%	713	545	-23.6%
Distribution						
White alone	34.4%	35.5%		14.7%	17.9%	
Black or African American alone	0.6%	0.5%		0.2%	0.0%	
American Indian and Alaska Native alone	0.4%	0.3%		0.1%	0.0%	
Asian alone	28.8%	29.3%		55.7%	53.4%	
Native Hawaiian and Other Pacific Islander alone	10.4%	10.9%		6.5%	6.8%	
Some Other Race alone	2.0%	1.7%		0.2%	1.9%	
Two or More Races	23.5%	21.9%		22.7%	20.0%	

Table II-1. Demographic Characteristics, County of Maui and Island of Lana'i: 2010 and 2015–2019 Estimates
(continued)

Item	County of Maui			Lana 'i		
	2010	2015-2019	Change	2010	2015-2019	Change
Households	53,886	54,479	1.1%	1,158	1,181	2.0%
Average Size	2.82	3.00	6.4%	2.71	2.31	-14.8%
Tenure						
Homeowners	30,055	33,232	10.6%	591	706	19.5%
Renters	23,831	21,247	-10.8%	567	475	-16.2%
Distribution						
Homeowners	55.8%	61.0%		51.0%	59.8%	
Renters	44.2%	39.0%		49.0%	40.2%	
Household Type						
Family Household	35,498	38,249	7.7%	788	745	-5.5%
Non-family Household	18,388	16,230	-11.7%	370	436	17.8%
Distribution						
Family Household	65.9%	70.2%		68.0%	63.1%	
Non-family Household	34.1%	29.8%		32.0%	36.9%	
Housing Units	70,379	73,169	4.0%	1,545	1,549	0.3%
Occupied	53,886	54,479	1.1%	1,158	1,181	2.0%
Vacant	16,493	18,690	13.3%	387	368	-4.9%
For seasonal, recreational, or occasional use	9,956	n/a		108	n/a	
Distribution						
Occupied	76.6%	74.5%		75.0%	76.2%	
Vacant	23.4%	25.5%		25.0%	23.8%	
For seasonal, recreational, or occasional use	14.1%	n/a		7.0%	n/a	

Sources:
U.S. Censusu Bureau. Decennial Census. 2010.
U.S. Census Bureau. American Community Survey 5 Year Estimate, 2015-2019.

Table II-2. Income and Education, County of Maui and Island of Lana'i: 2010–2014 and 2015–2019 Estimates

Item	County of Maui			Lana 'i		
	2010-2014	2015-2019	Change	2010-2014	2015-2019	Change
Income						
Mean Household Income	$84,035	$102,759	22.3%	$67,475	$73,484	8.9%
Per Capita Income	$29,499	$35,241	19.5%	$23,262	$33,052	42.1%
Educational Attainment, 25 Years and Older						
Less than 9th Grade	4,393	4,416	0.5%	146	219	50.0%
Grades 9 to 12, No Diploma	6,007	5,057	-15.8%	158	128	-19.0%
High School Graduate, No College	34,941	36,912	5.6%	896	723	-19.3%
Some College, No Degree	27,200	27,584	1.4%	505	408	-19.2%
Associate Degree	9,854	12,029	22.1%	170	229	34.7%
College, Bachelor's Degree	19,374	21,366	10.3%	367	334	-9.0%
Graduate or Professional Degree	9,000	10,753	19.5%	170	136	-20.0%
Total Population, Age 25 and Older	110,769	118,117	6.6%	2,412	2,177	-9.7%
Distrbution						
Less than 9th Grade	4.0%	3.7%		6.1%	10.1%	
Grades 9 to 12, No Diploma	5.4%	4.3%		6.6%	5.9%	
High School Graduate, No College	31.5%	31.3%		37.1%	33.2%	
Some College, No Degree	24.6%	23.4%		20.9%	18.7%	
Associate Degree	8.9%	10.2%		7.0%	10.5%	
College, Bachelor's Degree	17.5%	18.1%		15.2%	15.3%	
Graduate or Professional Degree	8.1%	9.1%		7.0%	6.2%	
Language Spoken at Home (Household)						
English Only	117,369	120,418	2.6%	2,299	1,751	-23.8%
Spanish	2,768	5,896	113.0%	-	33	0.0%
Other Indo-European	2,483	1,647	-33.7%	1	1	0.0%
Asian and Pacific Island languages	25,882	27,466	6.1%	967	821	-15.1%
Others	234	645	175.6%	-	-	0.0%
Distribution						
English Only	78.9%	77.2%		70.4%	67.2%	
Spanish	1.9%	3.8%		0.0%	1.3%	
Other Indo-European	1.7%	1.1%		0.0%	0.0%	
Asian and Pacific Island languages	17.4%	17.6%		29.6%	31.5%	
Others	0.2%	0.4%		0.0%	0.0%	

Sources:
U.S. Census Bureau. American Community Survey 5 Year Estimate, 2010-2014.

APPENDIX B

IMPACTS ON AGRICULTURE REPORT

PROPOSED MIKI BASIN INDUSTRIAL PARK:
IMPACTS ON AGRICULTURE

PROPOSED MIKI BASIN INDUSTRIAL PARK:
IMPACTS ON AGRICULTURE

PREPARED FOR:

Pūlama Lāna‘i

PREPARED BY:

Plasch Econ Pacific Inc.
and Munekiyo Hiraga

February 2019

CONTENTS

EXECUTIVE SUMMARY **1**
1. INTRODUCTION **1**
2. PROJECT INFORMATION **1**
a. Project Location and TMK 1
b. Project Description 1
c. Land Classifications and Required Approvals 1
3. AGRICULTURAL CONDITIONS **2**
a. Soil Types 2
b. Soil Characteristics 3
c. Soil Ratings 4
d. Slopes 5
e. Climatic Conditions 5
f. Irrigation Water 6
g. Local Advantages and Disadvantages 6
h. Summary of Agricultural Conditions 7
4. PAST AGRICULTURAL USES **7**
5. EXISTING AND FUTURE COMMERCIAL FARMING ON LĀNA‘I **8**
a. Existing Farms 8
b. Agricultural Park 8
c. Hydroponic Farm 8
6. IMPACT ON AGRICULTURAL OPERATIONS IN THE PROJECT AREA **9**
7. IMPACT ON THE GROWTH OF AGRICULTURE **9**
8. OFFSETTING BENEFITS **9**
9. CONSISTENCY WITH STATE AND COUNTY POLICIES **10**
a. Availability of Lands for Agriculture 10
b. Conservation of Agricultural Lands 10
c. State and County of Maui Land Use Plans 11
10. REFERENCES **11**

REFERENCES

TABLES

1. Miki Basin Industrial Park: Soil Types and NRCS Ratings 3

FIGURES

1. Regional Location Map
2. Project Location Map
3. Site Plan
4. State Land Use District Classification Map for Island of Lāna‘i
5. State Land Use District Classification Map for Project Area
6. Lāna‘i Community Plan Map
7. Soil Classification Map
8. ALISH Map
9. Land Study Bureau Map
10. Lāna‘i Water System
11. Acreage in Crop, Hawaii: 1960 to 2017

APPENDIX

State and County Goals, Objectives, Policies, and Guidelines Related to Agricultural Lands

EXECUTIVE SUMMARY

1. PROPOSED DEVELOPMENT

Pūlama Lāna'i proposes to develop the Miki Basin Industrial Park (the Project) on an approximately 200-acre site (the Project Area) in the Miki Basin area on the island of Lānaʻi, Hawaiʻi. The Project will include 100 acres of light industrial and 100 acres of heavy industrial zoned lands.

2. AGRICULTURAL CONDITIONS

The Project Area has agronomic conditions that are unsuitable for field farming to supply crops to Lānaʻi markets, or for export to Oʻahu or the mainland. The problem is a lack of irrigation water.

Except for water, the Project Area has favorable agronomic conditions: soils are good; solar radiation is moderate; and the trucking distances to Lānaʻi City and Mānele Resort are short. However, Lānaʻi farmers are at a competitive disadvantage in supplying the Oʻahu and mainland markets because of shipping costs.

3. PAST AGRICULTURAL USES

The Project Area and surrounding fields were used for a pineapple plantation from the 1920s to 1992. Since then, the Project Area and the surrounding fields have been fallow.

4. EXISTING AND FUTURE COMMERCIAL FARMING ON LĀNAʻI

Only one commercial farmer operates on Lānaʻi.

There is a plan for a 100-acre agricultural park on the island of Lānaʻi. In 1992, the Land Use Commission required Castle & Cooke's Lānaʻi Resort to set aside 100 acres for the development and operation of an agricultural park by the State Department of Agriculture and County of Maui for the residents of Lānaʻi. This was a condition for approving the Manele Golf Course. However, there has not been any progress on developing the park due to a lack of interest.

Sensei Farms Lānaʻi is developing a hydroponic farm to supply fresh produce to local markets, and possibly to off-island markets. Ten (10) greenhouses are planned, which will be powered by an off-grid photovoltaic system. One of the major advantages of hydroponic farming is that it requires relatively little water compared to field farming.

5. IMPACT ON AGRICULTURAL OPERATIONS WITHIN THE PROJECT AREA

The Project will not have any adverse effects on any existing onsite agricultural operations since the land has not been cultivated since the pineapple plantation closed in 1992.

6. IMPACT ON THE GROWTH OF AGRICULTURE

The development of the Project will result in a loss of 200 acres of fallow agricultural lands on Lānaʻi. However, there are approximately 18,000 acres of former plantation lands on Lanai which remain available for agricultural use, and over 200,000 acres statewide. The loss of 200 acres of agriculture land on Lānaʻi, plus the loss of agricultural land due to other projects (i.e., the cumulative impact), is too small to affect the growth of diversified agriculture on Lānaʻi or Statewide.

7. OFFSETTING BENEFITS

The loss of 200 acres of agricultural land will be offset by the benefits of the Project, including: (1) employment generated by construction activity and onsite commercial and industrial activity; (2) offsite economic activity generated by the purchases of goods and services by construction companies and the families of construction workers; (3) tax revenues derived from County property taxes and State taxes (excise, personal income, and corporate income); and (4) goods and services provided by businesses of the Project.

8. CONSISTENCY WITH STATE AND CITY POLICIES

a. Availability of Lands for Agriculture

The Hawaiʻi State Constitution, the Hawaiʻi State Plan, the State Agriculture Functional Plan, the County of Maui 2030 General Plan, and the County's Lānaʻi Community Plan call directly or implicitly for preserving the economic viability of plantation agriculture and promoting the growth of diversified agriculture. To accomplish this, an adequate supply of agriculturally suitable lands and water must be assured.

With regard to plantation agriculture, the Project Area is no longer part of a pineapple plantation. The last pineapple harvest was in 1992.

With regard to diversified agriculture, the Project will not result in the loss of any existing agricultural operation since the Project Area is not currently being cultivated and has not been cultivated since 1992.

Although the Project will reduce the availability of agricultural land by about 200 acres, the Project will not limit the growth of diversified agriculture statewide or on Lānaʻi since ample agricultural land is available due to the loss of nearly all plantations in Hawaiʻi.

b. Conservation of Agricultural Lands

In addition to the above, State and County policies call for conserving and protecting prime agricultural lands, including protecting farmland from urban development.

It should be noted that many of the State agricultural policies were written before the major contraction of plantation agriculture (from 1981 to 2016), and assume implicitly that profitable agricultural activities eventually will be available to utilize all available agricultural lands. This has proven to be a questionable assumption in view of the enormity of the contraction of plantation agriculture, the abundant supply of farmland that came available for diversified agriculture, and the slow growth in the amount of land being utilized for diversified agriculture.

Furthermore, discussions in the State Agriculture Functional Plan recognize that redesignation of lands from Agricultural to Urban and/or Rural should be allowed *"... upon a demonstrated change in economic or social conditions, and where the requested redesignation will provide greater benefits to the general public than its retention in ...agriculture;"* that is, when an *"overriding public interest exists."* The enormous contraction of plantation agriculture, which resulted in the supply of agricultural land far exceeding demand, constitutes a major change in economic conditions. Moreover, the Project will provide community benefits (jobs, tax revenues, etc.) that far exceed the benefits of leaving the land in agriculture. In practice, the Project is expected to have no significant impact on agricultural activity since ample land is available statewide to accommodate the anticipated growth of diversified agriculture.

c. State and County of Maui Land Use Plans

The Lāna'i Community Plan currently designates the Project Area for Light/Heavy Industrial use. However, the entire Project Area is designated "Agricultural" under the State Land Use District and the Maui County Zoning. Because the Project Area is intended for transition to industrial type uses as evidenced by the Lāna'i Community Plan, Pūlama Lāna'i will request an amendment to the State Land Use District and the County zoning for the Project Area to be consistent with the Community Plan.

MIKI BASIN INDUSTRIAL PARK:
IMPACTS ON AGRICULTURE

1. INTRODUCTION

Pūlama Lāna'i proposes to develop the Miki Basin Industrial Park (the Project) on an approximately 200-acre site (the Project Area), located east of the Lāna'i Airport in the Miki Basin area, Lāna'i, Hawai'i.

This report addresses the impacts of the Project on agriculture. The material below gives information about the Project, the agricultural conditions of the Project Area, past agricultural uses of the land, the impact of the Project on existing agricultural operations in and near the Project Area, the impact of the Project on the growth of diversified-crop farming, benefits of the Project that would offset adverse agricultural impacts, and consistency of the Project with State and County agricultural policies. The Appendix provides a summary of State and County goals, objectives, policies, and guidelines related to agricultural lands.

2. PROJECT INFORMATION

a. Project Location and TMK

As shown in Figure 1 (all Figures follow the body of the report), the Project Area is situated approximately 3.2 miles southwest of Lāna'i City. The Project Area is bordered on the west by the Lāna'i Airport and on the north, east, and south by open lands which were historically utilized for pineapple plantation (see Figure 2). The Tax Map Key (TMK) for the Project Area is (2)4-9-002:061(por.).

b. Project Description

Pūlama Lāna'i proposes the Miki Basin Industrial Park which will include 100 acres of light industrial and 100 acres of heavy industrial zoned lands (see Figure 3).

c. Land Classifications and Required Approvals

Current land classifications of the Project Area and proposed changes are as follows:

State Districts

- Current: Agricultural (See Figures 4 and 5)
- Proposed: Urban

County Designations

- Lāna‘i Community Plan
  - Current: Heavy Industrial and Light Industrial Area) (see Figure6)
- Maui County Zoning
  - Current: Agricultural
  - Proposed: M-1, Light Industrial (100 acres)
    M-2, Heavy Industrial (100 acres)

3. AGRICULTURAL CONDITIONS

a. Soil Types

As shown in Figure 7, the Project Area contains six (6) soil types. Their acreages are shown in Table 1 by their quality as rated by the Natural Resources Conservation Service (NRCS), formerly known as the Soil Conservation Service.

For each of the six (6) soil types, the complete name, the range of slopes, and soil descriptions are:

- **MuA: Moloka‘i silty clay loam, 0 to 3 percent slopes.**

  The Moloka‘i series consists of well drained soils on uplands on the islands of Maui, Lāna‘i, Moloka‘i, and O‘ahu. The MuA soils are on smooth slopes and the surface layer is dark reddish-brown silty clay loam about 15 inches think. The subsoil, about 57 inches thick, is dark reddish brown silty clay loam that has prismatic structure. The material at depths between 35 and 64 inches is moderately compact in place. The soils that are used for pineapple are commonly very strongly acid in the surface layer. Runoff is slow and the erosion hazard is slight.

- **MuB: Moloka‘i silty clay loam, 3 to 7 percent slopes.**

  The MuB soils are characterized by 3 to 7 percent slopes. Included in mapping were a few small areas that are eroded to soft, weathered rock. Runoff is slow to medium and the erosion hazard is slight to moderate. This soil is used for sugar cane, pineapple, pasture, wildlife habitat, and homesites.

- **MuC: Molokai silty clay loam, 7 to 15 percent slopes.**

  The MuC soils are characterized by 7 to 15 percent slopes. The soils occur on knolls and sharp slope breaks. Runoff is medium and the erosion hazard is moderate. This soil is used for sugar cane, pineapple, pasture, wildlife habitat, and homesites.

- **UwB: Uwala silty clay loam, 2 to 7 percent slopes.**

  The Uwala Series consists of well drained soils on uplands on the island of Lāna‘i. The UwB soils have smooth slopes and included in mapping were small, severely eroded areas. Runoff is slow to medium, and the erosion hazard is slight to moderate. The soils are strongly acid in the surface layer and medium acid in the subsoil.

- **UwC: Uwala silty clay loam, 7 to 15 percent slopes.**

  The UwC soils are characterized by 7 to 15 percent slopes. Runoff is medium and the erosion hazard is moderate. Workability is slightly difficult because of the slope. This soil is used primarily for pineapple and small areas are used for wildlife habitat.

- **WrA: Waikapu silty clay loam, 0 to 3 percent slopes.**

  The Waikapu series consist of well drained soils in uplands on the islands of Lāna‘i and Moloka‘i. The WrA soils are characterized by 0 to 3 percent slopes and found on uplands in depressions on old alluvial fans. The soil is typically slightly acid to neutral but is strongly acid to very strongly acid in the surface layer in areas where pineapple is grown. There are a few stones on the surface and a few shallow gullies. Runoff is slow and the erosion hazard is slight.

Table 1. Miki Basin Industrial Park:
Soil Types and NRCS Ratings

Soil Types	Acres		NRCS Rating
MuA	44.9	22.5%	I
MuB	88.4	44.2%	IIe
MuC	1.5	0.7%	IIIe
UwB	27.0	13.5%	IIe
UwC	19.5	9.7%	IIIe
WrA	18.7	9.4%	I
Total	**200.0**	**100%**	

b. Soil Characteristics

Land in the Project Area exhibits a number of favorable characteristics for farming, including gentle sloping (and well drained soils. However, due to lack of available irrigation water, the Project Area is not suitable for intensive field farming. The Project Area and the surrounding areas were historically used for pineapple production, which only requires relatively little water. Also, soils in the Project Area are acidic on the surface layer.

c. Soil Ratings

Three (3) classification systems are commonly used to rate Hawai‘i soils: (1) Land Capability Grouping, (2) Agricultural Lands of Importance to the State of Hawai‘i, and (3) Overall Productivity Rating.

Land Capability Grouping (NRCS Rating)

The 1972 Land Capability Grouping by the U.S. Department of Agriculture, NRCS rates soils according to eight (8) levels, ranging from the highest classification level “I” to the lowest “VIII”.

Assuming irrigation, approximately 63.7 acres (31.8%) of the Project Area have soils that are rated in Class I, which have few limitations that restrict their use (see Table 1). Approximately 115.4 acres (57.7%) of the Project Area have soils that are rated in Class IIe. Class II soils have moderate limitations that reduce the choice of plants or require moderate conservation practices. The subclassification “e” indicates that the limitations are due to erosion. The reminder of the Project Area, approximately 21.0 acres (10.5%), is characterized as having soils that are rated Class IIIe. Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

These ratings ignore the lack of irrigation water for the Project Area.

Agricultural Lands of Importance to the State of Hawai‘i (ALISH)

ALISH ratings were developed in 1977 by the NRCS, UH College of Tropical Agriculture and Human Resources, and the State of Hawai‘i, Department of Agriculture. This system classifies land into three (3) broad categories: (a) “Prime” agricultural land which is land that is best suited for the production of crops because of its availability to sustain high yields with relatively little input and with the least damage to the environment; (b) “Unique” agricultural land which is non-Prime agricultural land used for the production of specific high-value crops; and (c) “Other” agricultural land which is non-Prime and non-Unique agricultural land that is important to the production of crops.

The entire Project Area has soils that are rated “Unique” (see Figure 8). This rating reflects the past use of the land for growing pineapple.

Overall Productivity Rating (LSB Rating)

In 1967, the UH Land Study Bureau (LSB) developed the Overall Productivity Rating, which classifies soils according to five (5) levels, with “A” representing the class of highest productivity and “E” the lowest.

The majority of the Project Area has soils rated D, with a small area rated E (see Figure 9). The low rating reflects the lack of irrigation water for the Project Area.

Summary Evaluation of Soil Quality

The Project Area has lands that are considered good farmland based on the soil quality. The land is characterized as “Unique” farmland by ALISH and 89.5 percent of the Project Area is rated I or II by NRCS, indicating that it has few or moderate limitations for farming. The Project Area is relatively flat with well drained soils that are able to sustain high yields, as is evidenced by decades of pineapple cultivation.

However, this evaluation ignores the lack of irrigation water.

d. Slopes

Most of the Project Area has slopes of less than 4%.

e. Climatic Conditions

Like other areas in Hawai‘i, the island of Lāna‘i has a mild semitropical climate that is due primarily to three factors: (1) Hawai‘i’s mid-Pacific location near the Tropic of Cancer, (2) the surrounding warm ocean waters that vary little in temperature between the winter and summer seasons, and (3) the prevailing northeasterly tradewinds that bring air having temperatures which are close to those of the surrounding waters.

Solar Radiation

The Project Area receives a moderate level of sunshine, with average daily insolation of about 420 calories per square centimeter per day.

Rainfall

Average annual rainfall at the Project Area is approximately 20 inches. Most of this rainfall occurs during the winter rainy season (October through April), while the summer months (May through September) are hot and dry.

Temperatures

Average temperatures range from the mid-60s in the winter to the low 70s in the summer.

Winds

The prevailing surface winds are tradewinds that blow between the islands of Maui and Moloka‘i. This wind increases evaporation and soil erosion on the north and east sides of Lāna‘i. Occasional strong winds can cause crop damage if unprotected by windbreaks.

f. Irrigation Water

Lana‘i has five (5) water systems, including two (2) drinking water systems, one (1) brackish water system used for irrigation, and two (2) reclaimed water systems, also used for irrigation. Historically, fields on the island of Lāna‘i were irrigated with a combination of surface water from Maunalei Valley and groundwater from wells once used for pineapple cultivation. Figure 10 presents the existing water system on Lāna‘i. All waterlines near the Project Area convey chlorinated water, or they have been abandoned.

Due to a limited amount of potable water on Lāna‘i, brackish groundwater and treated wastewater are used to irrigate the golf courses and resort landscaping. Water is not available to support extensive diversified crop farming on the Lāna‘i fields.

g. Local Advantages and Disadvantages

Lāna‘i Island Market

The Project Area is well-located for supplying the Lāna‘i Island market because of the relatively short distance from the Project Area to Lāna‘i City (the island’s commercial and population center) and to Manele Resort.

The Lāna‘i Island market is relatively small: according to the U.S. Census American Community Survey (ACS) 5-Year Estimate, the resident population of Lāna‘i between 2013 and 2017 was estimated to be 3,203.

Maui Island Market

Lāna‘i farmers are at a disadvantage when competing against Maui farmers because of inter-island shipping costs, delays, and extra handling. There is no regular barge service between Lāna‘i and Maui Island.

The Maui County market is significant, with about 166,260 residents in 2017.

O‘ahu Market

All neighbor island farmers are at a disadvantage when competing against O‘ahu farmers in supplying the Honolulu market due to inter-island shipping costs, delays, and extra handling. In comparing barge and air-cargo services, shipping by barge is less expensive and larger loads can be shipped, but the shipments are slow and infrequent. Air service is faster and frequent, but it is far more expensive, and capacities are limited.

In 2017, O‘ahu’s population was estimated to be about 988,650 residents.

Mainland Market

Compared to Hawai‘i, the mainland market is enormous: in 2017, the U.S. population waas estimated to be 325.7 million. In supplying this market with products that can be

carried by container ship—i.e., products having long shelf-lives such as coffee, nuts, and canned fruit—most neighbor-island farmers are competitive with farmers on O‘ahu. Even though freight from must first be barged to Honolulu then transferred onto a container ship, Matson’s overseas shipping service includes inter-island barge service at no additional fee: except for some minor port charges, Matson charges a common fare for all islands. However, Matson does not service Lāna‘i, so additional shipping fees are required when exporting to the mainland.

In the case of fresh products that must be shipped by air to the mainland—i.e., products having short shelf-lives such as fresh vegetables, fruits, and flowers—farmers on Lāna‘i are at a disadvantage compared to O‘ahu farmers because most mainland air cargo is shipped via Honolulu International Airport. Compared to farmers on O‘ahu, Lāna‘i farmers encounter additional costs, delays, and handling to cover inter-island air-cargo service and transferring the fresh produce from small inter-island aircraft to large overseas aircraft.

In the U.S. mainland market, Hawai‘i farmers must also compete against farmers on the mainland and in Mexico, Central and South America, Southeast Asia, etc. Most of the competing farm areas have lower production and delivery costs than Hawai‘i does. Competing against Mexico is particularly difficult given existing trade agreements and Mexico’s proximity to major U.S. markets.

Summary of Locational Advantages

In terms of location, farmers on the island are relatively well-situated to supply the small Lāna‘i Island market..

However, compared to farmers on O‘ahu and the other islands, they are at a disadvantage in supplying the Honolulu and mainland markets.

h. Summary of Agricultural Conditions

The Project Area has agronomic conditions that are unsuitable for field farming to supply crops to Lāna‘i markets, or for export to O‘ahu or the mainland. The problem is a lack of irrigation water.

Except for water, the Project Area has favorable agronomic conditions: soils are good; solar radiation is moderate; and the trucking distances to Lāna‘i City and Mānele Resort are short. However, Lāna‘i farmers are at a competitive disadvantage in supplying the O‘ahu and mainland markets because of shipping costs.

4. PAST AGRICULTURAL USES

In 1922, James Dole purchased nearly the entire island of Lāna‘i and began developing a plantation for his Hawaiian Pineapple Company, Ltd. (HAPCo). Pineapple was suitable for

Lāna‘i’s agricultural conditions because Lāna‘i has fertile soils and pineapple requires relatively little water. For almost 70 years, the island of Lāna‘i was the world’s largest pineapple plantation with more than 18,000 acres of cultivated lands.

In 1931, Castle & Cooke purchased 21% of the shares of HAPCo, and by 1961 owned the entire company which by then had been renamed Dole Food Company.

In 1980s and 1990s, stiff competition from plantations in Latin America and the Philippines brought declining profitability to the Hawai‘i pineapple industry.

In 1985, David H. Murdock purchased Castle & Cooke, which owned approximately 98% of the island of Lāna‘i. Pineapple cultivation was slowly phased out, with the final harvest in 1992. By then, the island’s economy was shifting from agriculture to tourism.

Since the end of pineapple cultivation on Lāna‘i, the Project Area and the surrounding former pineapple plantation lands have been fallow.

5. EXISTING AND FUTURE COMMERCIAL FARMING ON LĀNA‘I

a. Existing Farms

Only one commercial farmer operates on Lāna‘i, and he sells fresh produce to local grocery stores and the hotels. In addition, some part-time farmers grow crops for personal consumption, and some sell to the grocery stores.

b. Agricultural Park

There is a plan for a 100-acre agricultural park on the island of Lāna‘i. In 1992, the Land Use Commission required Castle & Cooke’s Lāna‘i Resort to set aside 100 acres for the development and operation of an agricultural park by the State Department of Agriculture and County of Maui for the residents of Lāna‘i. This was a condition for approving the Manele Golf Course. However, there has not been any progress on developing the park due to a lack of interest.

c. Hydroponic Farm

Sensei Farms Lāna‘i is developing a hydroponic farm to supply fresh produce to local markets, and possibly to off-island markets. Ten (10) greenhouses are being planned, each of which will cover nearly a half acre (160 feet by 124 feet). One of the major advantages of hydroponic farming is that it requires relatively little water compared to field farming. The greenhouses will be powered by an off-grid photovoltaic system.

A Head House building is also planned, which will include a lab, conference rooms, a dining room for employees, offices, a locker room, multi-function space, and a kitchen. The kitchen will be used for cooking demonstrations and meal preparation using produce from the hydroponic farm.

6. IMPACT ON AGRICULTURAL OPERATIONS IN THE PROJECT AREA

There are no existing agricultural operations at the Project Area. As such, there will be no adverse impacts to existing agricultural operations.

7. IMPACT ON THE GROWTH OF AGRICULTURE

The development of the Project will result in a loss of 200 acres of fallow agricultural lands on Lāna‘i. However, there are approximately 18,000 acres of former plantation lands on Lanai which remain available for agricultural use.

Statewide, the remaining supply of available farmland released by plantation agriculture exceeds 200,000 acres. This is about 3.7 times the amount of land in crop—about 54,000 acres. About 15,000 acres of the 54,000 acres are used for food crops grown primarily for the Hawai‘i market, while about 39,000 acres are used primarily for export crops (pineapple, macadamia nuts, coffee, seeds, flowers, etc.).

The supply of available farmland is vast because of the statewide contraction and closure of many sugarcane and pineapple plantations during the past four decades, combined with the subsequent slow growth of diversified-crop farming (i.e., all crops other than sugarcane and pineapple)—see Figure 11.

Figure 11 also shows the growth of diversified-crop acreage. Even though Hawai‘i has a long history of strong support for its agriculture industry, little growth in diversified-crop acreage has occurred since 1983, with the single exception being seed crops. However, seed acreage has declined in recent years, and the seed-crop industry faces public opposition over their development of genetically modified organisms (GMO) crops.

The lack of significant growth of diversified crops reflects increased competition from overseas resulting from technology and other advances that have improved the delivery of fresh produce (faster, less spoilage, better coordination of supply to demand), along with trade agreements which increased food exports to the U.S. from low-cost producers in Mexico, Central America, South America, and elsewhere.

Following the plantation closures on O‘ahu, vegetable and melon acreage expanded on the capital island, but this was followed by declines on the Neighbor Islands for the farmers who exported to O‘ahu.

In summary, the loss of 200 acres of agriculture land on Lāna‘i, plus the loss of agricultural land due to other projects (i.e., the cumulative impact), is too small to affect the growth of diversified agriculture on Lāna‘i or Statewide.

8. OFFSETTING BENEFITS

The loss of 200 acres of agricultural land will be offset by the following benefits of the Project:

Construction Activity

- Construction jobs and income associated with Project development.

- Indirect jobs and income generated by purchases of goods and services by construction companies and families of construction workers.
- State tax revenues (excise taxes, personal income taxes, corporate income taxes, etc.) paid by construction companies and workers, and by companies and families that are supported by construction activity.

Operations, Full Development

- Goods and services provided by businesses of the Projects.
- Employment and income generated by onsite industrial activity.
- Tax revenues derived from County property taxes and State taxes (excise, personal income, and cooperate income).

9. CONSISTENCY WITH STATE AND COUNTY POLICIES

a. Availability of Lands for Agriculture

The Hawai‘i State Constitution, the Hawai‘i State Plan, the State Agriculture Functional Plan, the County of Maui 2030 General Plan, and the County’s Lāna‘i Community Plan call directly or implicitly for preserving the economic viability of plantation agriculture and promoting the growth of diversified agriculture. To accomplish this, an adequate supply of agriculturally suitable lands and water must be assured.

With regard to plantation agriculture, the Project Area is no longer part of a pineapple plantation. The last pineapple harvest was in 1992.

With regard to diversified agriculture, the Project will not result in the loss of any existing agricultural operation since the Project Area is not currently being cultivated and has not been cultivated since 1992.

Although the Project will reduce the availability of agricultural land by about 200 acres, the Project will not limit the growth of diversified agriculture statewide or on Lāna‘i since ample agricultural land is available due to the loss of nearly all plantations in Hawai‘i.

b. Conservation of Agricultural Lands

In addition to the above, State and County policies call for conserving and protecting prime agricultural lands, including protecting farmland from urban development.

It should be noted that many of the State agricultural policies were written before the major contraction of plantation agriculture (from 1981 to 2016), and assume implicitly that profitable agricultural activities eventually will be available to utilize all available agricultural lands. This has proven to be a questionable assumption in view of the enormity of the contraction of plantation agriculture, the abundant supply of farmland that came available for diversified agriculture, and the slow growth in the amount of land being utilized for diversified agriculture.

Furthermore, discussions in the State Agriculture Functional Plan recognize that redesignation of lands from Agricultural to Urban and/or Rural should be allowed *“... upon a demonstrated change in economic or social conditions, and where the requested redesignation will provide greater benefits to the general public than its retention in ...agriculture;”* that is, when an *“overriding public interest exists.”* The enormous contraction of plantation agriculture, which resulted in the supply of agricultural land far exceeding demand, constitutes a major change in economic conditions. Moreover, the Project will provide community benefits (jobs, tax revenues, etc.) that far exceed the benefits of leaving the land in agriculture. In practice, the Project is expected to have no significant impact on agricultural activity since ample land is available statewide to accommodate the anticipated growth of diversified agriculture.

c. State and County of Maui Land Use Plans

The Lāna‘i Community Plan currently designates the Project Area for Light/Heavy Industrial use. However, the entire Project Area is designated “Agricultural” under the State Land Use District and the Maui County Zoning. Because the Project Area is intended for transition to industrial type uses as evidenced by the Lāna‘i Community Plan, Pūlama Lāna‘i will request an amendment to the State Land Use District and the County zoning for the Project Area to be consistent with the Community Plan.

10. REFERENCES

Act 25, S.B. No. 1158, April 15, 1993.

County of Maui, Department of Water Supply. *Lanai Water Use & Development Plan, 2011*.

County of Maui, Planning Department. *County of Maui 2030 General Plan Countywide Policy Plan*. 2010.

County of Maui, Planning Department. *Lanai Community Plan*. 2002.

Giambelluca, T.W., Q. Chen, A.G. Frazier, J.P. Price, Y.-L. Chen, P.-S. Chu, J.K. Eischeid, and D.M. Delparte, 2013: *Online Rainfall Atlas of Hawai‘i.* Bull. Amer. Meteor. Soc. 94, 313-316, doi: 10.1175/BAMS-D-11-00228.1.

Giambelluca, T.W., X. Shuai, M.L. Barnes, R.J. Alliss, R.J. Longman, T. Miura, Q. Chen, A.G. Frazier, R.G. Mudd, L. Cuo, and A.D. Businger. 2014. *Evapotranspiration of Hawai‘i. Final report submitted to the U.S. Army Corps of Engineers—Honolulu District, and the Commission on Water Resource Management, State of Hawai‘i.*

Lanai Culture & Heritage Center. *Pineapple of Lāna‘i.* https://www.lanaichc.org/pineapple-history.htm (accessed on November 6, 2018).

Lanai Water Company. *History.* http://lanaiwatercompany.com/about-us/history/ (accessed on November 13, 2018)

Pacific Business News. *100-acre agriculture park on billionaire Larry Ellison's Lanai gaining traction* (April 3, 2017). https://www.bizjournals.com/pacific/news/2017/04/03/100-acre-agriculture-park-on-billionaire-larry.html?ana=RSS%26s%3Darticle_search&utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+bizj_pacific+%28Pacific+Business+News+of+Honolulu%29 (Accessed on November 14, 2018)

R.M. Towill Corporation. *Heavy/Light Industrial Parcels Affecting Lot 13-A-1-A (Map 15) of Land Court Consolidation 170*. 2018.

State Land Use Commission. *State Land Use District Maps*. Effective dated December 20, 1974.

State of Hawai'i, Department of Agriculture. *Agricultural Lands of Importance to the State of Hawai'i*. 1977.

State of Hawai'i, Department of Agriculture. *State Agriculture Functional Plan*. 1991.

State of Hawai'i. *Hawaii State Planning Act, Chapter 226*, Hawai'i Revised Statutes.

The Maui News. *Ellison's hydroponic farm on Lanai is set to open by late '18* (April 1, 2018). http://www.mauinews.com/news/local-news/2018/04/ellisons-hydroponic-farm-on-lanai-is-set-to-open-by-late-18/ (Accessed on November 14, 2018).

U.S. Census Bureau. American Community Survey 5 Year Estimate, 2013-2017.

FIGURES

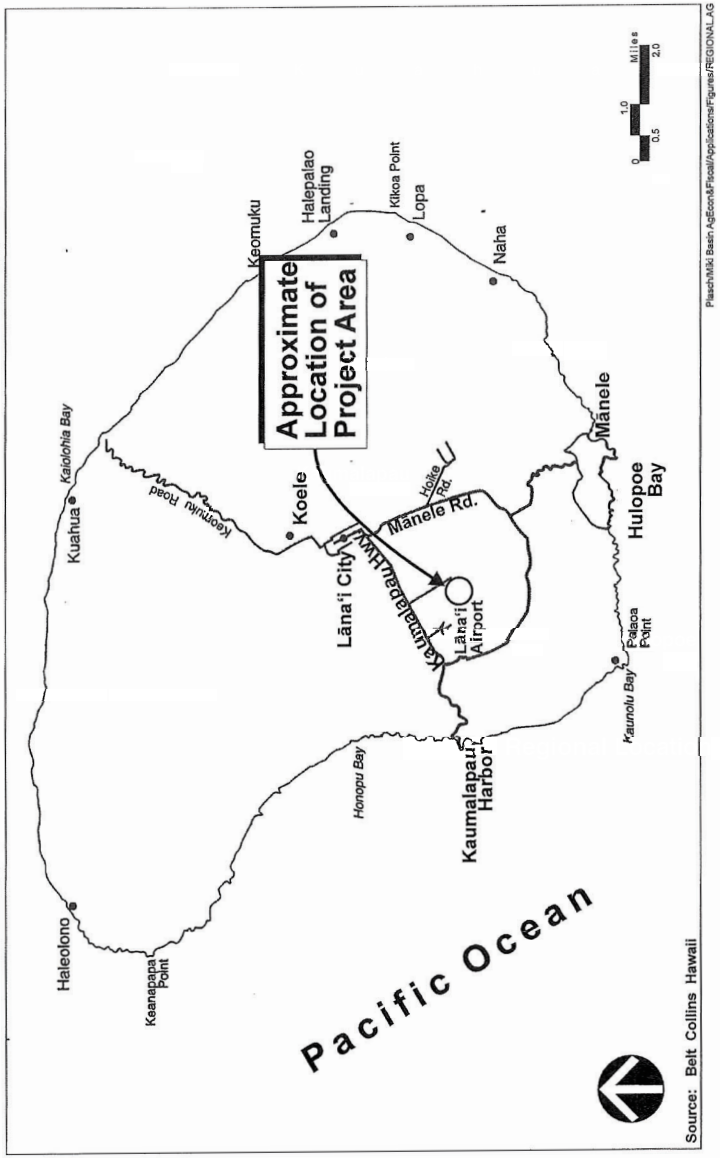


Figure 1. Regional Location Map

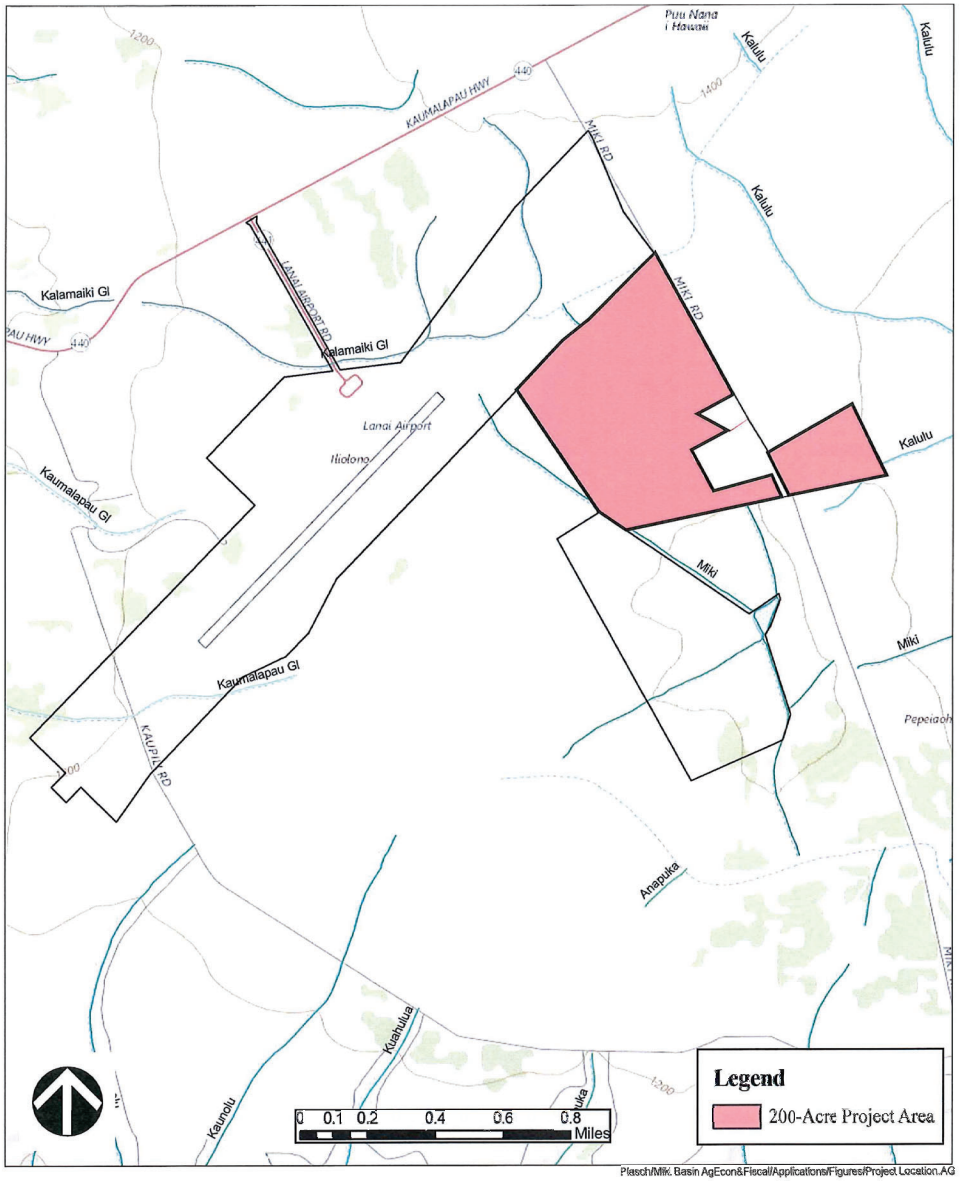
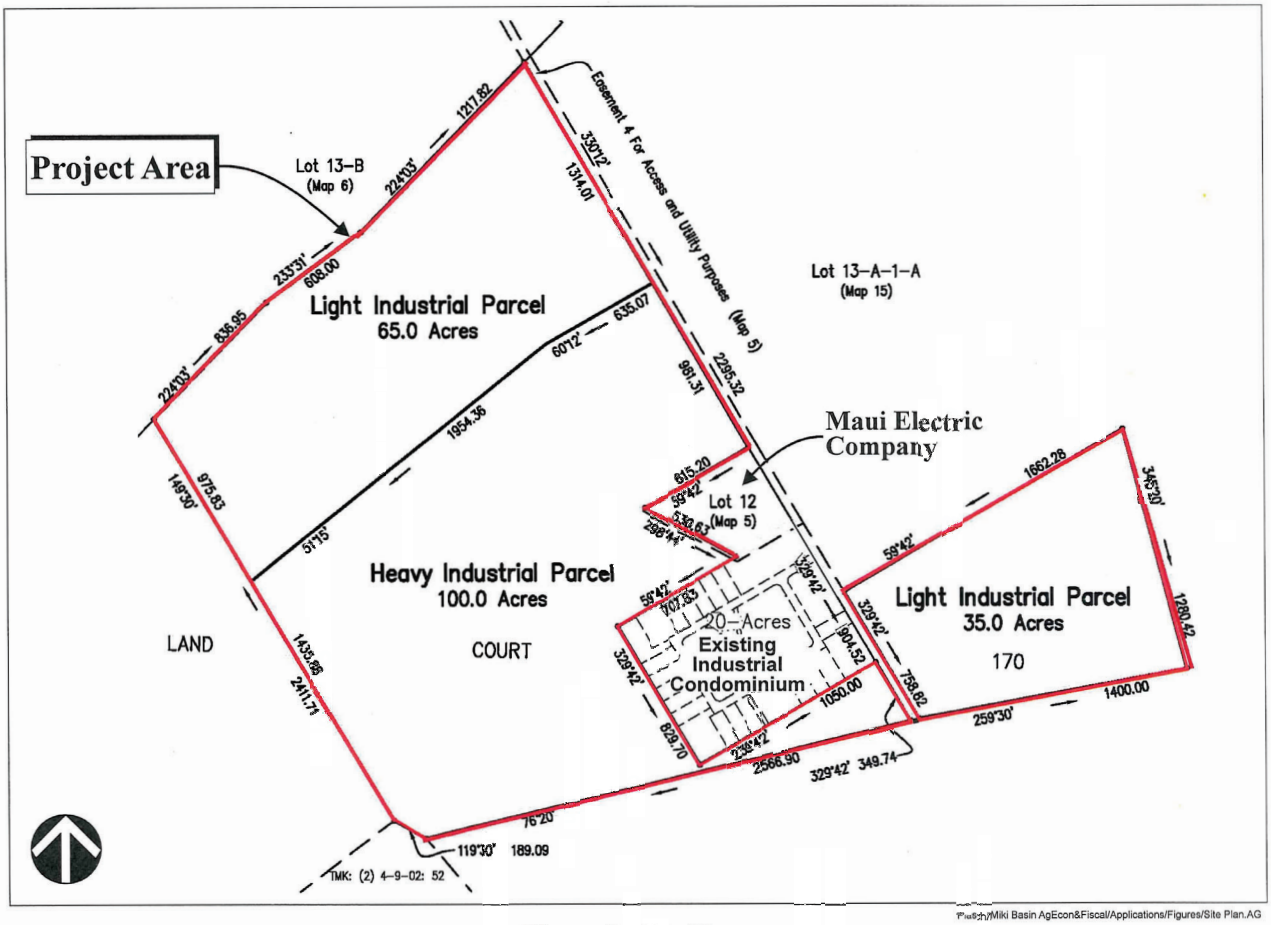
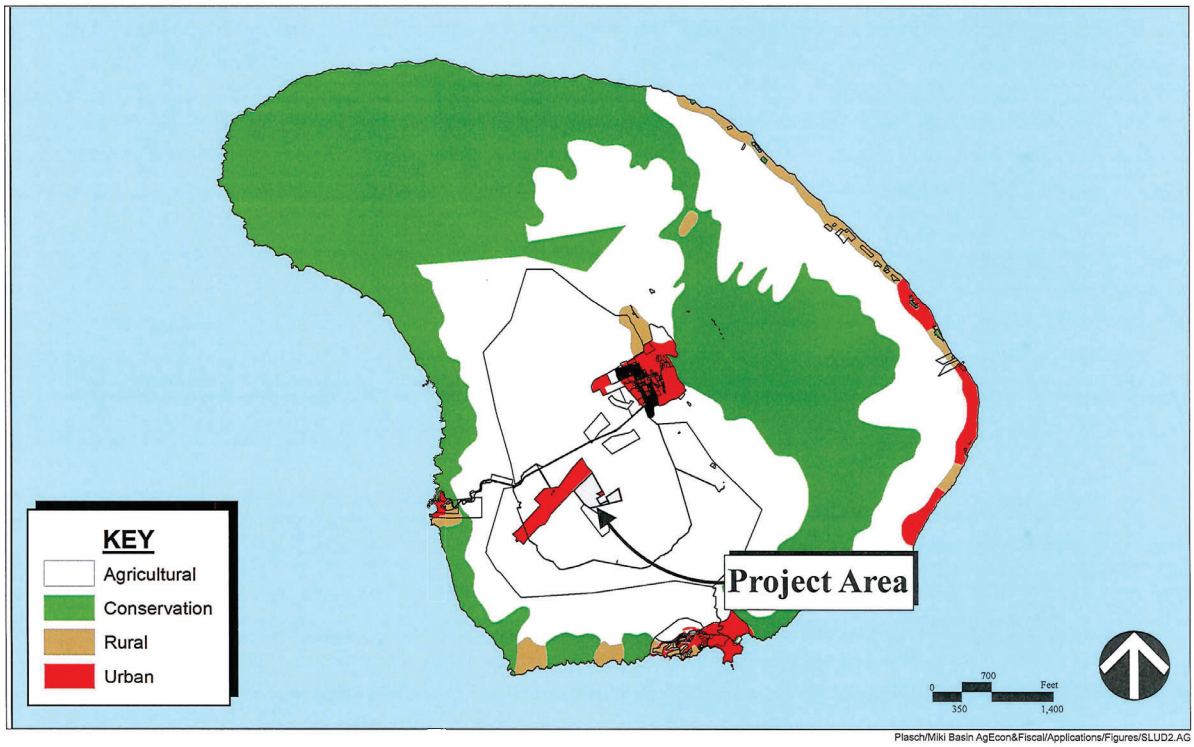


Figure 2. Project Location Map



P:\wp2h\Miki Basin AgEcon&Fiscal\Applications\Figures\Site Plan.AG

Figure 3. Site Plan



Plasch/Miki Basin AgEcon&Fiscal/Applications/Figures/SLUD2.AG

Figure 4. State Land Use District Classification Map for Island of Lāna'i

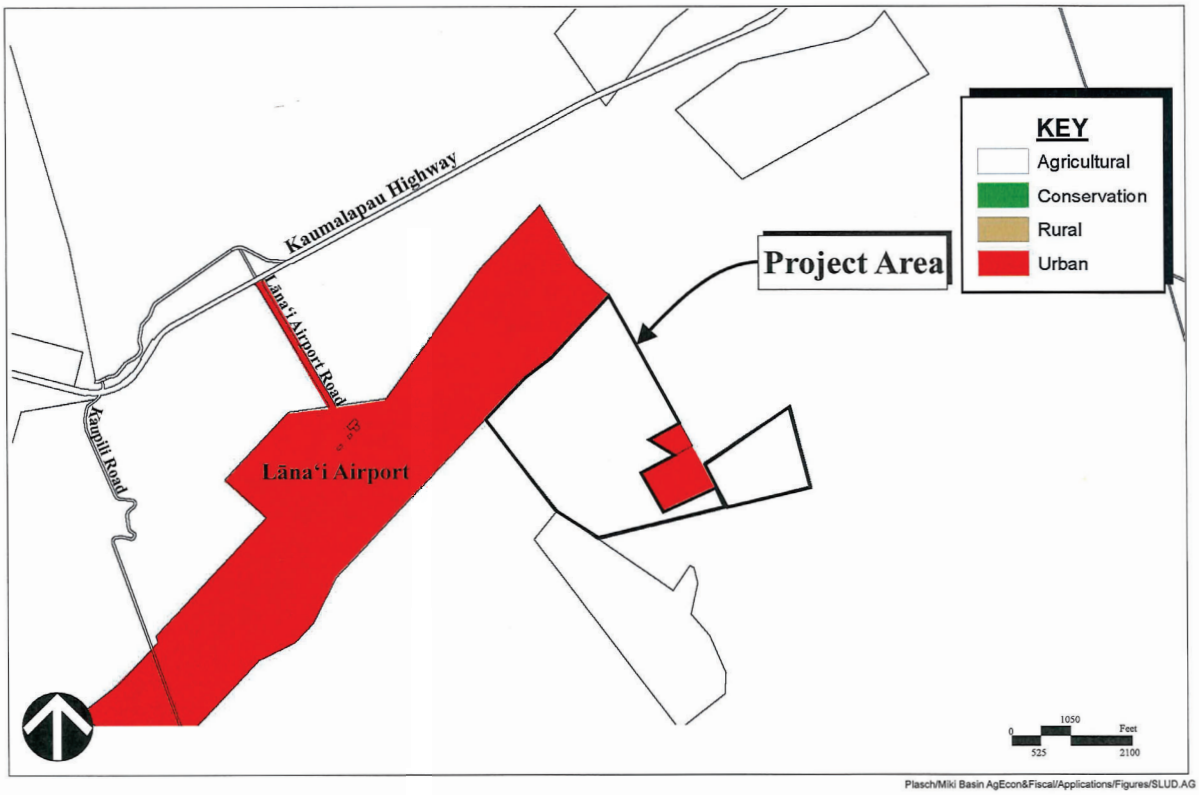


Figure 5. State Land Use District Classification Map for Project Area

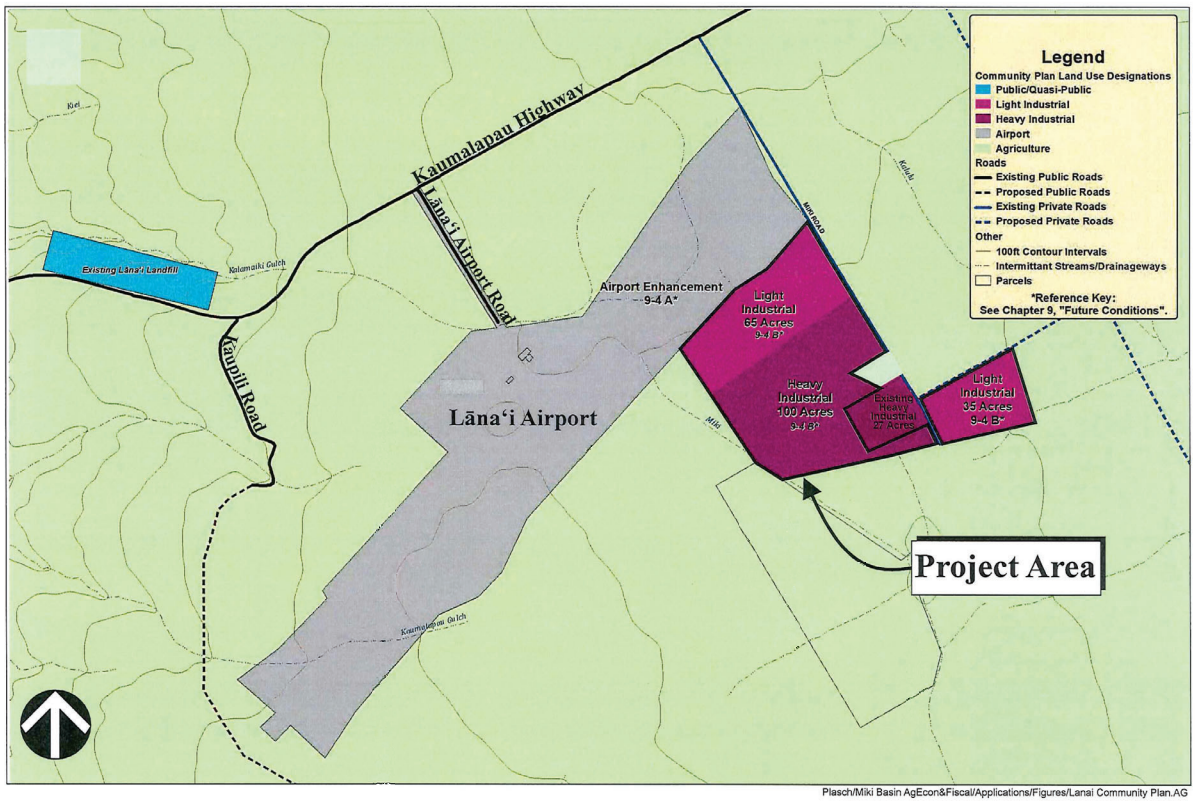


Figure 6. Lāna'i Community Plan Map

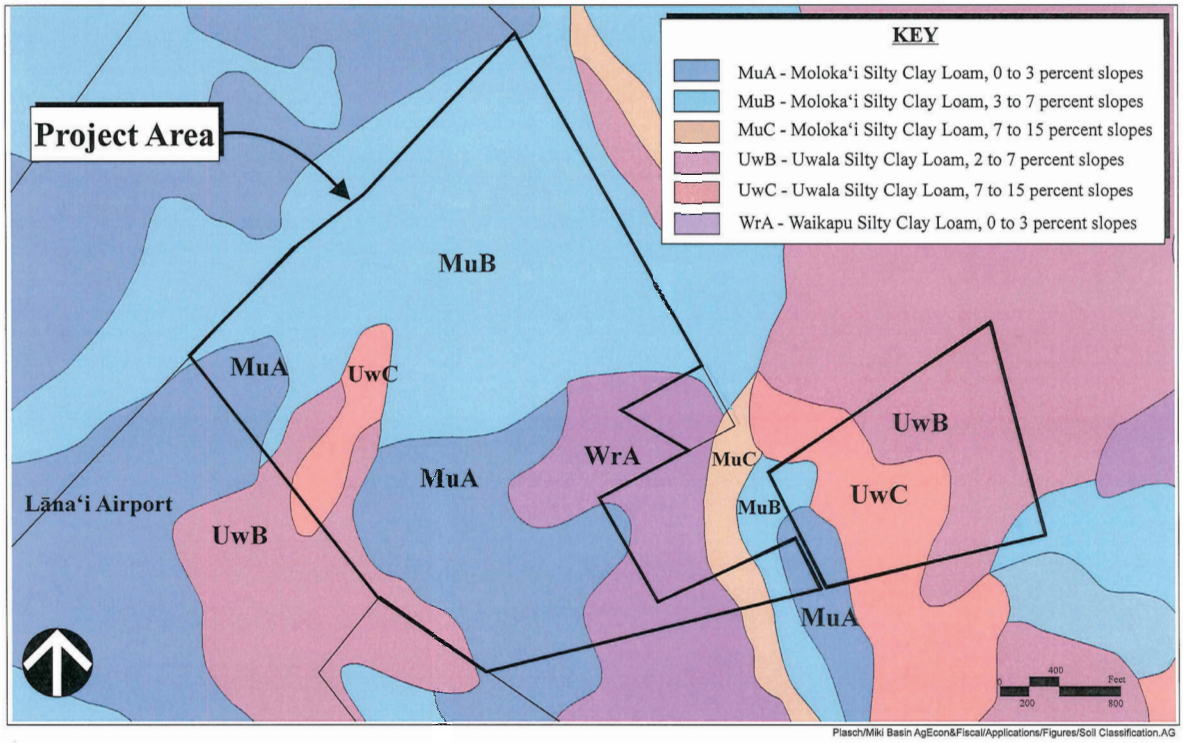


Figure 7. Soil Classification Map

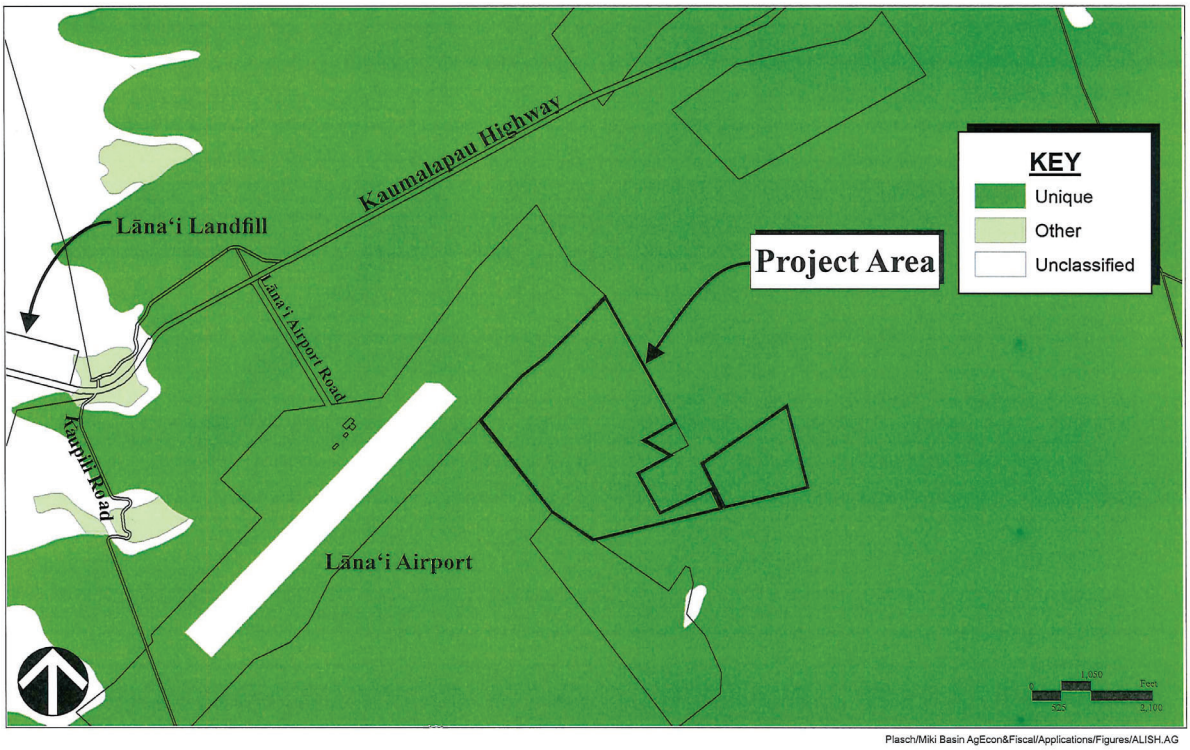


Figure 8. ALISH Map

FEA REF-309

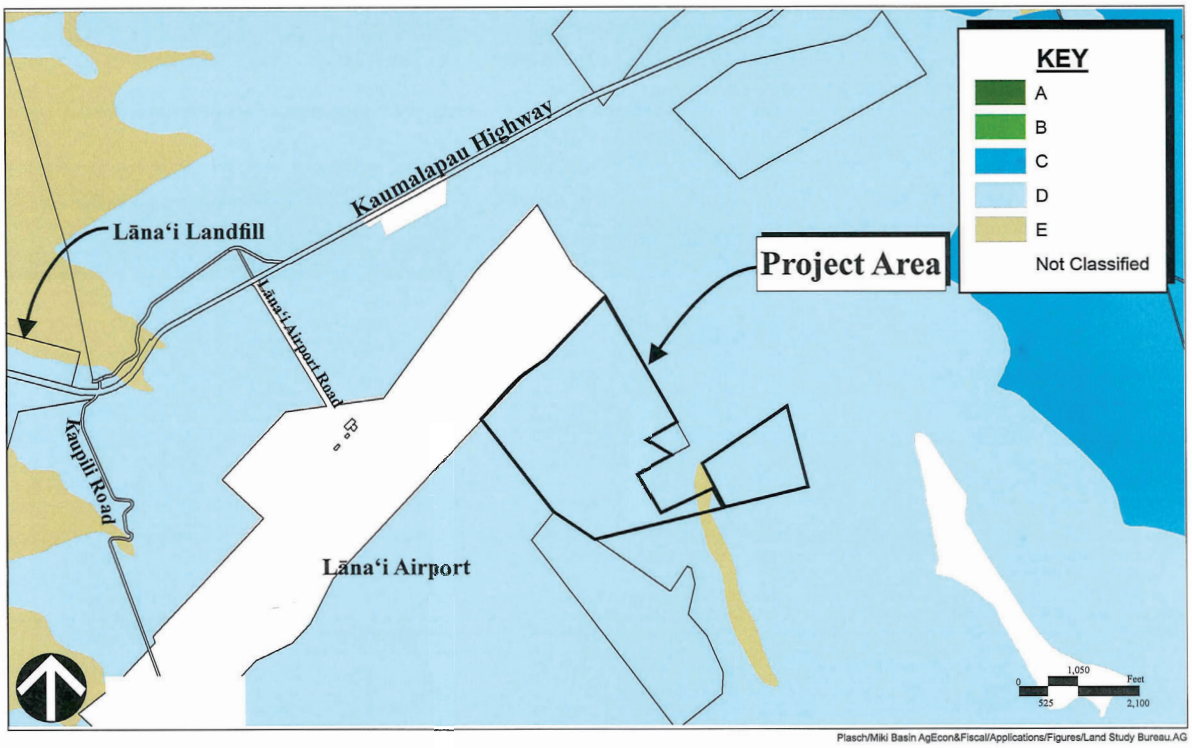


Figure 9. Land Study Bureau Map

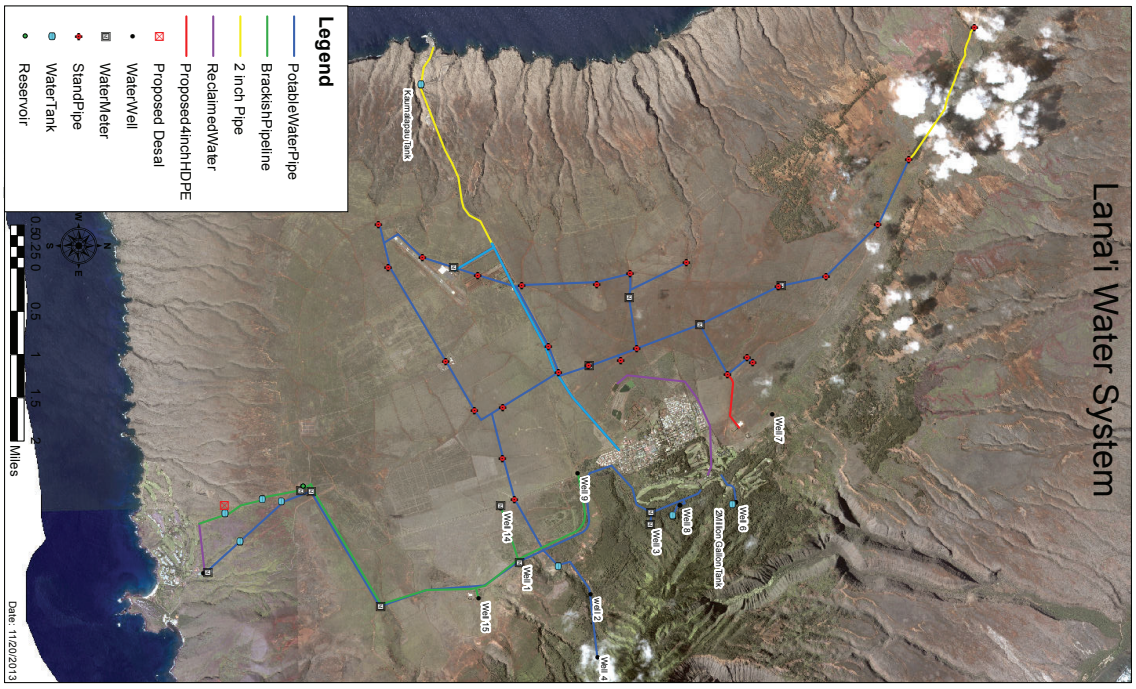


Figure 10. Lāna'i Water System

FEA REF-310

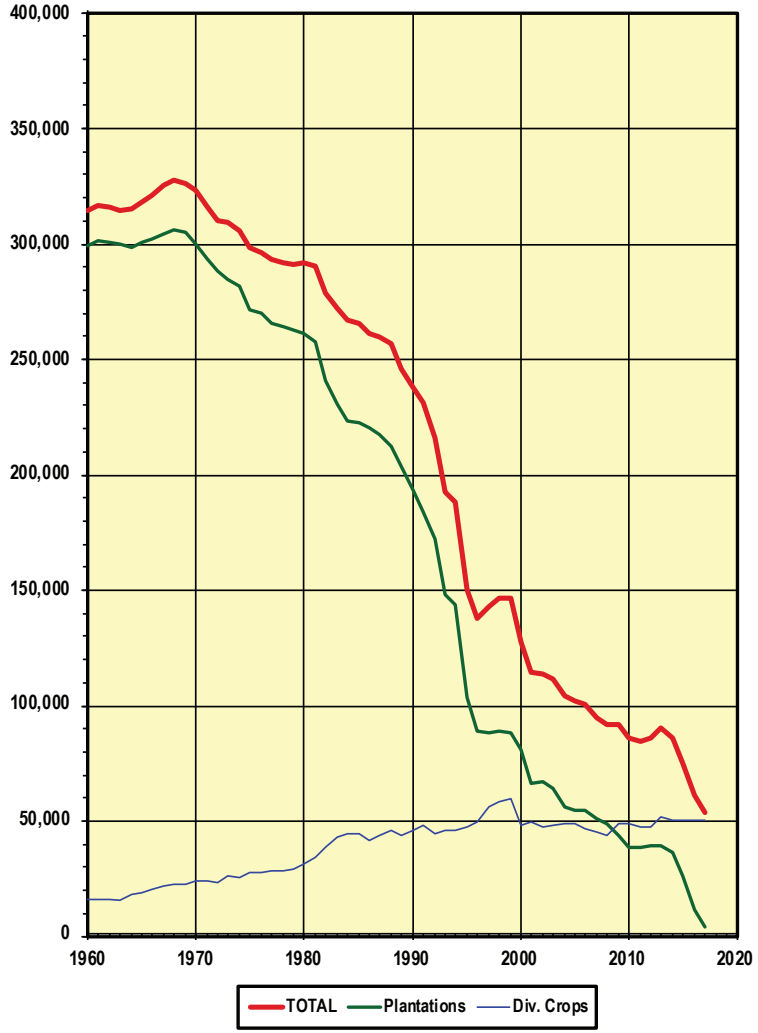


Figure 11. Acreage in Crop, Hawaii: 1960 to 2017

APPENDIX

STATE AND COUNTY GOALS, OBJECTIVES, POLICIES AND GUIDELINES RELATED TO AGRICULTURAL LANDS

1. HAWAI'I STATE CONSTITUTION (Article XI, Section 3):

...to conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands...

2. HAWAI'I STATE PLAN (Chapter 226, Hawaii Revised Statutes, as amended):

Section 226-7 Objectives and policies for the economy--agriculture.

(a) Planning for the State's economy with regard to agriculture shall be directed towards achievement of the following objectives:

(1) Viability in Hawaii's sugar and pineapple industries.

(2) Growth and development of diversified agriculture throughout the State.

(3) An agriculture industry that continues to constitute a dynamic and essential component of Hawaii's strategic, economic, and social well-being.

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

(2) Encourage agriculture by making best use of natural resources.

(10) Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.

(16) Facilitate the transition of agricultural lands in economically nonfeasible agricultural production to economically viable agricultural uses.

Section 226-103 Economic priority guidelines.

(c) Priority guidelines to promote the continued viability of the sugar and pineapple industries:

(1) Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.

(d) Priority guidelines to promote the growth and development of diversified agriculture and aquaculture:

(1) Identify, conserve, and protect agricultural and aquacultural lands of importance and initiate affirmative and comprehensive programs to promote economically productive agricultural and aquacultural uses of such lands.

(10) Support the continuation of land currently in use for diversified agriculture.

Section 226-104 Population growth and land resources priority guidelines.

(b) Priority guidelines for regional growth distribution and land resource utilization:

(2) Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.

3. AGRICULTURAL STATE FUNCTIONAL PLAN (1991)

(Functional plans are guidelines for implementing the State Plan. They are approved by the Governor, but not adopted by the State Legislature.)

Objective H: Achievement of Productive Agricultural Use of Lands Most Suitable and Needed for Agriculture.

Policy H(2): Conserve and protect important agricultural lands in accordance with the Hawaii State Constitution.

Action H(2)(a): Propose enactment of standards and criteria to identify, conserve, and protect important agricultural lands and lands in agricultural use.

Action H(2)(c): Administer land use district boundary amendments, permitted land uses, infrastructure standards, and other planning and regulatory functions on important agricultural lands and lands in agricultural use, so as to ensure the availability of agriculturally suitable lands and promote diversified agriculture.

4. COUNTY OF MAUI 2030 GENERAL PLAN, COUNTYWIDE POLICY PLAN (2010)

Countywide goals, objectives, policies and actions

F. Strengthen the Local Economy

Objective

2. Diversify and expand sustainable forms of agriculture and aquaculture.

Policies

b. Prioritize the use of agricultural land to feed the local population, and promote the use of agriculture lands for sustainable and diversified agricultural activities.

e. Support ordinances, programs, and policies that keep agricultural land and water available and affordable to farmers.

Implementing Actions

c. Create agricultural parks in areas distant from genetically modified crops.

J. Promote Sustainable Land Use and Growth Management

Objective

2. Improve planning for and management of agricultural lands and rural areas.

Policies

a. Protect prime, productive, and potentially productive agricultural lands to maintain the islands' agricultural and rural identities and economies.

c. Discourage developing or subdividing agriculturally designated lands when non-agricultural activities would be primary uses.

Implementing Actions

a. Inventory and protect prime, productive, and potentially productive agricultural lands from competing non-agricultural land uses.

5. COUNTY OF MAUI, LĀNA'I COMMUNITY PLAN (2016)

C. ENVIRONMENT AND NATURAL RESOURCES

3. **Goals, Policies, Actions**

Policies

4. Recognize and support agricultural forestry and game BMPs as key elements to maintain preserve and protect Lana island water and marine resources

6. REFERENCES

Act 25, S.B. No. 1158, April 15, 1993.

County of Maui. *County of Maui 2030 General Plan, Countywide Policy Plan.* Adopted by Ordinance No. 3732, effective on March 24, 2010.

Hawaii Department of Agriculture. *The Hawaii State Plan: Agriculture, State Functional Plan*. 1991.

Maui County Council. *Lāna'i Community Plan (2016).*

State of Hawaii, Office of State Planning, Office of the Governor. *The Hawaii State Plan, 1991.* 1991.