Final Environmental Assessment

HŌKŪAO 201H HOUSING PROJECT
LĀNAʻI CITY, LANAʻI, HAWAIʻI
(TMK NO. (2)4-9-002:061(por.);
(2)4-9-014:001(por.);
(2)4-9-014:009(por.))

Prepared for:
Lanai Resorts, LLC,
a Hawaiʻi limited liability company
doing business as Pūlama Lānaʻi

May 2021
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May 2021
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PROJECT PLANS A
Anticipated subdivision layout
2 Bedroom Home

SITE PLAN
scale: 1/32" = 1'-0"

FRONT ELEVATION
scale: 1/16" = 1'-0"

SIDE ELEVATION
scale: 1/16" = 1'-0"
APPENDIX

AGRICULTURAL IMPACT ASSESSMENT
Dear Mr. Matsumoto:

At your request and authorization, we have completed an Agriculture Impact Assessment regarding the proposed Hokuao 201-H Housing project, a 200-lot single family subdivision to be set on some 50-acres of currently vacant land southwesterly adjacent to and downhill from the existing village core of Lanai City, Lanai Island, Maui County, Hawaii.

The purpose of this assignment is to assess the affect the project will have, if any, on the agriculture land base and industry on the Island of Lanai; complying with State of Hawaii guidelines associated with moving land within the State Land Use Agricultural District into another district.

Our conclusions are summarized in the following report.

In completing our assignment we have reviewed pertinent data, maps, reports and other materials prepared by the United States Department of Agriculture, State of Hawaii Department of Agriculture, Hawaii State Land Use Commission and Maui County agencies, in addition to reports prepared by others, web-based and other information sources, and as provided by Pulama Lanai.

The analyses, opinions and conclusions were developed based on, and this report has been prepared in conformance with, the guidelines and recommendations set forth in the Uniform Standards of Professional Appraisal Practice (USPAP), and the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute.
The intended user of this report is Pulama Lanai. The intended use is for inclusion within reports/document submittals associated with the going-forward entitlement process for the Proposed Hokuao Residential Project.

It has been a pleasure to assist you in this assignment. If you have any questions concerning the analysis, or if CBRE can be of further service, please contact us.

Respectfully submitted,

CBRE - VALUATION & ADVISORY SERVICES

Tom Holliday, CRE, FRICS  Benjamin J. Holliday  
Director  Senior Valuation Associate

Phone: 808.541.5120  Phone: 808.497.1006  Email: Tom.Holliday@cbre.com  Email: Benjamin.Holliday@cbre.com

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Executive Summary

The proposed Hokuao Residential Project will be developed on some 50 acres southwesterly adjacent to the existing village core of Lanai City, providing needed affordable and market-priced housing for Lanai households.

Entitlement sanctioning the development will require re-classification of the site from agricultural to urban and residential uses for State and Maui County land use/planning designations. Our assignment was to assess the impact such re-classification would have on the Lanai agricultural land base and industry; particularly identification and analysis of detrimental outcomes.

Based on our analysis, as summarized herein, we conclude the conversion of the 50-acre proposed Hokuao Project site from historical agricultural use to going-forward residential use will not have a measurable negative impact upon the current or future agricultural land base of Lanai or its agricultural industry.

Among our primary findings:

- A portion of the Hokuao site was cultivated with pineapple as part of the larger Dole Lanai Plantation for decades before production ceased in 1992.
- The site has lain fallow for 27 years with no plans forwarded for replanting with any crop.
- The site soils are primarily Lahaina and Waihuna Clay types which are suitable for pineapple, sugar cane, small scale truck farming or pasture uses, and wildlife habitats.
- Some of the classifications are specifically noted as being suitable for “homesites”.
- The site is classified on Agricultural Lands of Importance to State of Hawaii (ALISH) maps as “unique” which is defined as “land other than Prime Agricultural Land and is used for the production of specific high-value food crops”, a secondary classification to “prime”.
- The Hokuao site represents an infinitesimal portion of the available agricultural lands on Lanai, or about 0.38 percent of the 13,000+ acres of the previously cultivated pineapple plantation.
- The Hokuao site is not a critical or unique agricultural site; its inclusion would not be critical to agricultural development elsewhere on the island or its exclusion would not diminish agricultural use elsewhere.
- There is no demonstrated market demand for agricultural use of the Hokuao site and there is sufficient available supply to meet near to mid-term demand in existing, serviced agricultural subdivisions with some 105 cultivatable acres available for lease.
- The proposed subdivision will create more jobs and greater economic activity on the site than occurred under current agricultural use (0 jobs, $0 economic activity) or historic pineapple use (maximum 5 jobs, $350,000 economic activity). Development of the Hokuao Residential Project will result in $171.9 million in capital investment, nearly 1,000 worker-years of employment with $70 million in wages, and stabilized annual economic activity of $18.5 million and 21 full-time equivalent jobs.
- Agricultural use on the Hokuao site could be in conflict with and/or deleterious to existing abutting residential use.
- There is an evident demand for the site being residentially-developed to house Lanai households.
Introduction

Puana Lanai proposes to develop the Hokuao Residential Project on a 50-acre site which is a natural expansion area for Lanai City (the Project Area). It is located southwest of Lanai City, Lanai, Hawaii. The proposed subdivision will add 200 housing units; comprising of 102 “workforce/affordable” and 98 “market priced” single family homes.

This report assess the impacts of the Hokuao Project on the Lanai agriculture land base and its agricultural industry.

The body of the presentation is divided into five sections:

1. Overview of the Proposed Hokuao Residential Project
2. The Lanai Agricultural Industry
3. Agricultural Conditions of the Hokuao Site
4. Consistency with State and County Policies
5. Analysis of Agricultural and Economic Impacts

Reports and primary source materials are cited in the applicable sections of the report.

Overview of The Proposed Hokuao Residential Project

LOCATION

The Hokuao Project Area is situated southwesterly adjacent to and downhill from the existing Lanai City village core, near the center of Lanai Island and approximately 3.2 miles northeast of Lanai Airport. Vacant agricultural lands previously cultivated with pineapple lie westerly of the site and Lanai City easterly.

The property is identified on State of Hawaii Tax Maps as Second Division, Tax Map Key 4-9-4-Various Parcels and is currently primarily classified for agricultural use by the State and County. Historically the majority of the site was used for pineapple cultivation; however, since closing of plantation operations in 1992 the property has been uncultivated and unused.

The aerial below shows the general location of the Hokuao Residential Project on the island followed by a more specific siting using the State Land Use District Map as a base.
PROJECT DESCRIPTION

The envisaged forwarded master plan contains 102 workforce/"affordable-priced" single-family homes ranging in size from 1,220 square feet to 1,600 square feet, and 98 “market-priced” single-family homes averaging 2,200 square feet. Lots will have a minimum size of 6,000 square feet, with a community pavilion, restrooms, 100-stall surface parking lot, and open/buffer space as shown on the next page.

The inventory will be offered as finished homes to qualifying affordable and market buyers by Pulama Lanai, with the affordable homes priced according to County/HUD pricing criteria. No Transient Vacation Rentals will be permitted, nor Accessory Dwelling (Ohana) units in the near-term.

It is our understanding the new neighborhood would be entitled as a Maui County “201H” project designation requiring that a minimum of 50 percent of the inventory meet affordability guidelines.

The current master plan for the development is shown following.

EXISTING AND PROPOSED LAND CLASSIFICATIONS

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

State Land Use Districts
- Current: Agricultural
- Proposed: Urban

County Designation
- Lanai Community Plan

(Map shown below)
Overview of the Proposed Project

- Current: Mixed uses including park, public, and mixed-use residential. Area is identified as being with “Lanai City Expansion Area”
- Proposed: Same. No change required.

- Maui County Zoning
  (No Map Available)
  - Current: Agriculture
  - Proposed: To appropriate residential designation

The Lanai Agricultural Industry

HISTORICAL SUMMARY OF LANAI AGRICULTURE

Once commonly referred to as the “Pineapple Island” the Dole Lanai Plantation had sustained a cultivated area of some 13,000 acres, reportedly periodically reaching as high as 15,000 to 20,000 from its inception in the early 1920’s until active operations shut down in 1992. It is reputed to have supplied up to 75 percent of the world’s pineapple crop at peak production.

Portions of the Hokuao Project site were incorporated into the fields.

The cultivation of pineapple began in Lanai in 1910 by Charles and Louisa Gay with the first successfully crop. By 1917, the Gay family had a going-concern pineapple business focusing on lands near present-day Lanai City. The crop was harvested and taken to Manele Landing via truck for loading on boats to Maui for canning. The lack of infrastructure made the trip difficult resulting in the loss of much fruit due to bruising.

In 1922 James Dole purchased much of Lanai (which eventually became the Pulama Lanai lands). In 1923 the Dole Hawaiian Pineapple Company began operations of what would be the world’s largest pineapple plantation. In 1961, Castle & Cooke acquired Dole Food’s interests, and began the evolution of company focus from pineapple cultivation to planning for new resort and residential development on Lanai.

The development plans were not manifest and David H. Murdock purchased the company in 1985 which included the Lanai plantation ownership. Murdock’s pursued resort development on the island at Manele Bay and Koele and gradually began phasing out the pineapple business. The plantation was eventually closed down with the final harvest being in 1992.

The following photograph from December 1953 shows the on-going cultivation of the majority of the proposed Hokuao Residential Project site.
There has been no agricultural activity on the Hokuao site since 1992, nor has there been an expressed demand by any party to undertake such.

EXISTING AGRICULTURAL USE

There are several small independent sustainability-oriented farming efforts on private lands on the island comprising just a handful of in-production acres. There is a temporary plant quarantine facility near Lihue Airport to insure plant material imported for the resorts does not introduce invasive pests. (Statewide Agricultural Land Use Baseline 2015, Hawaii Department of Agriculture).

Lanai currently has two active major agricultural subdivisions, both developed by Pulama Lani in circa 2013 and offering land leases to third-party agricultural/farming operations. Although relatively well-received by the market, there remains significant unabsorbed inventory. The subdivisions are summarized in the following chart.

<table>
<thead>
<tr>
<th>Agricultural Subdivision</th>
<th>Year Opened for Lease</th>
<th>Total Leasable Acres</th>
<th>Acres Leased to Date</th>
<th>Remaining Available Acres</th>
<th>Percent of Acreage Absorbed</th>
<th>Average Annual Absorption (in Acres)</th>
</tr>
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<tr>
<td>Airport Industrial Subdivision</td>
<td>2013</td>
<td>50</td>
<td>20</td>
<td>30</td>
<td>40.0%</td>
<td>3.3</td>
</tr>
<tr>
<td>Palawai</td>
<td>2013</td>
<td>100</td>
<td>25</td>
<td>75</td>
<td>25.0%</td>
<td>4.2</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td></td>
<td><strong>150</strong></td>
<td><strong>45</strong></td>
<td><strong>105</strong></td>
<td><strong>30.0%</strong></td>
<td><strong>7.5</strong></td>
</tr>
</tbody>
</table>

Source: Pulama Lani and CBRE

Sensei Farms Lanai, a Larry Ellison project, is an in-development hydroponic farm envisaged to supply fresh produce to Lanai patrons with a goal of achieving sufficient production to service off-island markets.

Ten (10) greenhouses totaling 19,840 square feet are planned, each covering nearly half an acre (160 feet X 124 feet X 13 feet high). Hydroponic farming requires relatively little water compared to field farming and power needs will be met via an off-grid photovoltaic system.

Offices, including a demonstration kitchen, vegetable processing and cold storage facilities are also proposed.

This is a highly-specialized, unique to Lanai use, that does not required the use of cultivatable land.

IMPACT ON EXISTING AGRICULTURAL OPERATIONS ON THE HOKUAO SITE

There are no existing, in-place agricultural operations utilizing the proposed Hokuao Project site, and we are aware of any plans for such being forwarded at this time.

We conclude there will be no adverse impacts to existing or proposed agricultural use of the property.

IMPACT ON THE FUTURE OF LANAI AGRICULTURE

Hokuao will result in a loss of some 50 acres of fallow agricultural land.

This is an infinitesimal amount (0.38 percent) relative to the historic Dole Plantation sustained cultivation of 13,000, and an even lesser fraction (0.25 percent) of the up to 20,000 potentially cultivatable acres on the island.

The amount of useable agricultural acreage on Lanai far exceeds any forwarded plan to date, and the area is now a component of the some 200,000 acres of fallow agricultural lands statewide vacated by the now-defunct sugar and pineapple industries.
We conclude that the loss of 50 acres of agriculture land on Lanai is too small to affect the growth of diversified agriculture on Lanai or statewide.

Agricultural Conditions of the Hokuao Site

SOIL TYPES

The Project Area contains four (4) soil types. Three of the soil types are part of the Lahaina series while the other is part of the Waihuna series. The United States Department of Agriculture (USDA): Natural Resources Conservation Service describes the soil series as:

- "The Lahaina series consists of very deep, well drained soils that formed in residuum weathered from basic igneous rock. Lahaina soils are on low elevation, mountain hillslopes and have slopes of 0 to 40 percent. Mean annual rainfall is about 762 millimeters (30 inches) and mean annual temperature is about 23 degrees C. (73 degrees F.)"

- "The Waihuna series consists of deep, well drained soils that formed in fine textured alluvium from basic rock. Waihuna soils are in basins and on fans and have slopes of 0 to 25 percent. Mean annual rainfall is about 30 inches and mean annual air temperature is about 69 degrees F."

The following map displays the Hokuao project area and underlying soil types.

The summary descriptions for each of the four (4) soil types are presented following as excerpted from the "Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii" which was conducted by the USDA Soil Conservation Service in cooperation with the University of Hawaii Agricultural Experiment Station.
The soil types are all judged to be suitable for pineapple production, with the Lahaina silty clay types also suitable for sugarcane, and in some cases truck crops, pasture and wildlife habitat. One is specifically cited as appropriate for homesites.

LaA: Lahaina silty clay, 0 to 3 percent slopes
On this soil runoff is slow and the erosion hazard is no more than slight. This soil is used for sugarcane and pineapple.

LaB: Lahaina silty clay, 3 to 7 percent slopes
This soil is on smooth uplands. Including in mapping were small areas that are underlain by consolidated sand at a depth below 30 inches. Cobblestones are common on the surface in a few places. In some places, near the coastal plains, the profile contains fragments of coral, stones, gravel, or sand.

In a representative profile the surface layer is a dark reddish-brown, silty clay about 15 inches thick. The sub-soil, about 45 inches thick, is dusky-red and dark reddish-brown subangular blocky silty clay and silty clay loam. The substratum is soft, weathered basic igneous rock. These soils are medium acid in the surface layer and slight acid to medium acid in the subsoil.

Permeability is moderate. Runoff is slow, and the erosion hazard is slight. The available water capacity is about 1.3 inches per foot of soil. In places roots penetrate to a depth of 5 feet or more. This soil is used for sugarcane and pineapple. Small acreages are used for truck crops, pasture, and homesites.

LaC: Lahaina silty clay, 7 to 15 percent slopes
On this soil, runoff is medium and the erosion hazard is moderate. Included in mapping were small, steep areas and areas where a few cobblestones and stones are on the surface.

This soil is used for sugarcane and pineapple. Small acreages are used for truck crops, pasture, and wildlife habitat.

WoA: Waihuna clay, 0 to 3 percent slopes
This is the most extensive soil in the Waihuna series. It occurs on Lanai, mainly as two large areas. Included in mapping were small areas that are subject to ponding. These areas are in the central part of the Palawai basin and in other depressions. In some years water remains in these depressions long enough to damage crops or interfere with farming operations.

In a representative profile the surface layer, about 18 inches thick, is dark brown, very sticky and very plastic clay. The next layer, 40 to more than 50 inches thick, is dark-brown, very sticky and very plastic clay and silty clay that has subangular blocky structure. This is underlain by relatively soft, weathered pebbles and stones. The soil is strongly acid in the surface layer as a result of pineapple culture, but it is neutral to medium acid in the rest of the profile. Cracks, ½ inch to 1 inch wide, form when the soil dries. Permeability is moderately slow. Runoff is slow, and the erosion hazard is no more than slight. The available water capacity is about 1.3 inches per foot of soil. In places roots penetrate to a depth of 5 feet or more. This soil is difficult to work because it is very sticky and very plastic when wet.

In some areas weathered gravel and cobblestone are scattered throughout the profile. A strong granular surface mulch, ½ inch to 2 inches thick, develops upon drying. Cracks ½ inch to 1-inch are present to a depth of more than 20 inches when the soil dries. The A horizon range from 10YR to 7.5YR in hue and from 2 to 3 in chroma. In most places the soil color is yellowest near the source of alluvium and is somewhat redder as distance from the source increases. Texture of the lower part of the C horizon ranges from silty clay to clay. In places few to common mottles occur in the lower part of the profile.

This soil is used for pineapple.

AGRICULTURAL LANDS OF IMPORTANCE TO HAWAII (ALISH) CLASSIFICATION
Developed in 1977 as joint effort of the Natural Resources Conservation Service (NRCS), University of Hawaii and Hawaii Department of Agriculture, this system classifies agricultural lands in the islands lands into one of three broad categories:

1. Prime – Land which is best suited for the production of crops with an ability to sustain high yields with relatively little input or damage to the environment.
2. Unique – Non-Prime land also used in the of specific high-value crops.
3. Other – Non-Prime, non-Unique land that is important to the production of crops.

As shown on the following map the Hokuao site, along with virtually all of the Important Agricultural Lands on Lanai, are classified as “Unique”
LAND STUDY BUREAU CLASSIFICATION

The University of Hawaii Land Study Bureau (LSB) “Overall Productivity Rating” classifies soils according to five levels “A” through “E”, with the former representing the class of highest productivity and the latter the lowest.

As shown on the following map the proposed Hokuao Project site is primarily classified as “C” or having relatively average productivity for agricultural lands, with a portion classified as “D” or having less than average productivity potential.

SLOPES

The proposed Hokuao Residential Project site has slopes ranging from 0 percent to above 10 percent, with most of the area in the mid to lower part of the overall range.

CLIMATIC CONDITIONS

Like other areas in Hawaii, the island of Lanai has a mild semitropical climate that is due primarily to three factors:

(1) Hawaii’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.

The Hokuao project site is located in central Lanai and receives a moderate amount of rainfall each year. Average annual rainfall is approximately 34 inches with January being the wettest month with an average monthly rainfall of approximately 5 inches, and the driest month being August with an average total of 1.5 inches. The annual average temperature is approximately 69 degrees Fahrenheit.

IRRIGATION WATER

Lanai 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 Lanai were irrigated with a combination of surface water from Maunalei Valley and groundwater from wells once used for pineapple cultivation. Lanai City waterlines in the vicinity of the Hokuao site convey chlorinated water or have been abandoned. Due to a limited amount of potable water on Lanai, 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 Lanai agricultural lands.

CONCLUSIONS

The proposed Hokuao Residential Project site was well-suited for pineapple cultivation as a nominal, inconsequential component within the context of a massive island-wide plantation. However, we conclude it is not a significant free-standing agricultural holding which is critical to the Lanai agricultural land base or agricultural industry due to:

- It’s soil types are not generally suitable for crops other than pineapple or sugar, and those areas which could sustain other crops would require irrigation for truck farming or diversified agricultural uses.
- The quality/productivity of the soil is at best average according to State surveys.
- There is limited irrigation water available to support any field crop use of the property.
There is no evident critical element within the agricultural conditions of the Hokuao site which makes its inclusion in the agricultural land base and industry of Lanai vital to going-forward success or its exclusion a detriment to such.

The site is well-located for supplying the Island of Lanai market due to its proximity to Lanai City. However, high production costs make it difficult to create a sustainable agricultural operation.

Consistency with State and County Policies

Numerous important State and County documents and plans call for preserving the economic viability of the Hawaii agricultural industry and promote its long-term growth and diversification; which requires an adequate, and sustainable foundation of land and water resources. Among the defining documents are: The Hawaii State Constitution, the Hawaii State Plan, the State Agriculture Functional Plan, the County of Maui 2030 General Plan, and the County’s Lanai Community Plan.

The goal to preserve plantation agriculture is currently obsolete with the near-total demise of the sugar and pineapple industries in the islands. The Hokuao site has not been part of a pineapple plantation since the final harvest in 1992.

As the Hokuao property has not been cultivated in the 27 years since the demise of the pineapple plantation there will be no net loss of any existing agricultural operation with the development of the residential subdivision.

Hokuao will only reduce the availability of agricultural land by about 50 acres, a nominal amount relative to the Lanai agricultural land base and will not limit the growth of diversified agriculture on the island or statewide.

State and County policies also call for conserving and protecting prime agricultural lands, including protecting farmland from urban development.

However, the State Agriculture Functional Plan recognizes that re-designation 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 re-designation will provide greater benefits to the general public than its retention in …agriculture,” that is, when an “overriding public interest exists.”

As indicated in the subsequent section of the report, the proposed Hokuao Residential Project will provide community benefits (capital investment, jobs, wages, tax revenues, etc.) that far exceed the benefits of any reasonable agricultural use of the site. And, it will have no significant impact on agricultural activity since ample land is alternatively available elsewhere on Lanai and statewide to accommodate agricultural growth.
Analysis of Economic and Market Impacts

Extrapolation of statistics taken from the Hawaii Department of Business, Economic Development and Tourism annual State Data Book editions for late 1980’s indicate that on a statewide basis pineapple production created full-time employment of about one worker for every ten acres in cultivation and total gross direct economic activity of some $7,350 per acre (1990 dollars). These outcomes are generally consistent with the available Lanai employment and Dole plantation figures from the era for the 13,000 acre plantation, with plantation employment at 1,200 to 1,300 workers (0.100 to 0.108 per acre) and total revenues of $90 million to $100 million ($6,923 to $7,518 per acre).

Thus the Hokuao site were it fully cultivated with pineapple (which it was not) would have generated on an allocated basis full-time employment for some ten persons and economic activity of some $250,000 to $375,000, rounded.

Even if cultivation had continued to the present, the job count would have remained static and the economic activity would only be approaching $1 million annually for the entire site.

In our Market Study, Economic Impact Analysis and Public Cost Benefit Assessment of the Proposed Hokuao 201-H Housing Project (April 2019) we estimated the capital investment, construction and permanent jobs and associated wages, household income and spending, tax revenues and other factors/benefits flowing to Lanai, Maui and the State from the project. The primary outcomes from our model are summarized on the following table.

<table>
<thead>
<tr>
<th>Summary of Major Economic Impacts and Public Fiscal Benefits</th>
<th>Analysis Item</th>
<th>During Build-Out (Annually)</th>
<th>Stabilized Annually Thereafter</th>
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</thead>
<tbody>
<tr>
<td>Direct Capital Investment</td>
<td>$171,947,833</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local Supplier’s Profit</td>
<td>$6,877,913</td>
<td></td>
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<tr>
<td>Worker Years of Jobs</td>
<td>1,028</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Employee Wages</td>
<td>$70,526,468</td>
<td>$1,082,143</td>
<td></td>
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<tr>
<td>De Facto Population</td>
<td>488</td>
<td></td>
<td></td>
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<tr>
<td>Full-Time Resident Household Income</td>
<td>$195,910,293</td>
<td>$99,019,346</td>
<td></td>
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<tr>
<td>De Facto Population Expenditures</td>
<td>$186,093,602</td>
<td>$186,475,982</td>
<td></td>
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<tr>
<td>Total Lanai Island ‘Base’ Economic Impact</td>
<td>$300,024,970</td>
<td>$205,025</td>
<td></td>
</tr>
</tbody>
</table>

A secondary concern is new agricultural use on the Hokuao site could be deleterious to abutting residential use.

Incompatibility of agricultural and residential uses is an increasing concern in maintaining community/neighborhood harmony and achieving sustainable planning due to concerns over fertilizer/pesticide intrusion, species migration, dust, noise and irregular activity.

Typically, the agricultural use is there “first” and trumps complaints from later residential development. In the case of the Hokuao site, re-introducing cultivation to the property could be met with strenuous objections from the existing proximate neighborhoods of Lanai City. Given the vast amount of available vacant agricultural acreage on the island, the potential clashes with existing neighbors, and the need for buffers diminishing the usability of the Hokuao site, it is a less desirable location for agriculture.

The investment, economic and fiscal impacts generated by the proposed Hokuao Project exceeds by many-fold plantation, diversified or other agricultural use of the site.

Further, while there is no evident demand for agricultural use of the Hokuao site and ample supply of serviced, available agricultural sites in existing subdivisions elsewhere on the island, our above-referenced Market Study concluded there would be sufficient demand to absorb and built-out the 200 homes in the project ten-years from the commencement of vertical construction, as summarized in the following table.
PROFESSIONAL QUALIFICATIONS OF THOMAS W. HOLLIDAY, CRE, FRICS

**Business Affiliation**

<table>
<thead>
<tr>
<th>Role</th>
<th>Company</th>
<th>Location and Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director</td>
<td>The Hallstrom Team (CBRE, Inc.)</td>
<td>Honolulu, Hawaii (2015 – Present)</td>
</tr>
<tr>
<td>Former Staff Appraiser</td>
<td>Davis-Baker Appraisal Co.</td>
<td>Avalon, Santa Catalina Island, California (1977 -1979)</td>
</tr>
</tbody>
</table>

**International Designation and Membership**

- CRE Designation (2015) - The Counselors of Real Estate
- FRICS Designation (2016) - Fellow of the Royal Institution of Chartered Surveyors

**Education/Qualifications**

- California State University, Fullerton (Communications/Journalism)
- More than 600 Hawaii Hotel/Hospitality Valuation and Consulting Assignments
- More than 150 Market Studies, Economic Impact Analyses and Public Fiscal Assessments for Proposed Projects and Entitlement Purposes
- Qualified expert witness testimony before State of Hawaii Land Use Commission, County Planning Commissions, County Councils and various state and county boards and agencies since 1983.
- Only certified real estate economist by County of Kauai for workforce housing assessments.
- Numerous SREA, Appraisal Institute and RICS Courses
- Numerous professional seminars and clinics.

On January 1, 1991, the American Institute of Real Estate Appraisers (AIREA) and the Society of Real Estate Appraisers (SREA) consolidated, forming the Appraisal Institute (AI).

**Recent Assignments**

- Market Study, Economic Impact Analyses and Public Costs/Benefits (Fiscal Impact) Assessments
  - Oahu
    - OHA Kakaako Makai (Mixed-Use Project)
    - Howard Hughes/Ward Kewalo Basin (Retail Project)
    - Marriott Waikiki Parking Lot (Hotel/Timeshare Project)
    - Residence Inn Kapolei (Hotel)
    - Turtle Bay Resort (Destination Resort Community)
    - Waikapu Country Town (Mixed-Use Community)
    - Oahu Community Correctional Center Relocation
    - Oahu Tourism Spending/Tax Impact Analysis
    - Waikapu Country Town (Mixed-Use Community)
**Professional Qualifications of Thomas W. Holliday (continued)**

**Maui County**
- Waikapu Country Town (Mixed-Use Community)
- Lanai City Expansion (Mixed-Use/201H Community)
- Polanui Garden (201H Residential Community)
- Molokai Ranch Holdings (Mixed-Use)
- Makaha Rural Subdivision (201H Residential Community)
- Makaha Kai (201H Residential Community)
- Maui Research & Tech Park (Mixed-Use Community)
- Maui Lani (Mixed-Use Community)
- Honuaula (Mixed-Use Community)
- Makena Beach Resort
- Maui Business Park, Phase II (Industrial/Commercial)
- Kapalua Mauka (Master Planned Community)
- Haliimaile (Mixed-Use Master Planned Community)
- Pulelehua (Master Planned Community)
- Westin Kauanapali Ocean Villas Expansion (Resort/Timeshare)

**Big Island**
- Parker Ranch Waimea Town Center (Mixed-Use)
- West Hawaii/Gold Coast Tourism & Hotel Analysis
- Puako Farms/Kamakoa (Residential Subdivision)
- Kau Tea Farm (Agricultural/Mixed-Use Project)
- Kamakana Villages (Mixed-Use Residential Development)
- W.H. Shipman Ltd, Master Plan (Various Urban Uses)
- Nani Kahuku Aina (Mixed-Use Resort Community)
- Kona Kai Ola (Mixed-Use Resort Community)
- Waikoloa Highlands (Residential)
- Waikoloa Waimea (Mixed-Use Residential Development)

**Kauai**
- Princeville Lodge (Hotel)
- Princeville Phases I & II (Destination Resort Community)
- Hanalei Plantation Workforce Housing (Resort)
- Lima Ola (Residential Community)
- Coco Palms (Hotel)
- Sheraton Kauai Workforce Housing (Resort)
- Coconut Coast Tourism and Hotel Analysis
- Hanalei Plantation Resort (Resort/Residential)
- Kukuiula (Resort/Residential)
- Waipoulu (Mixed-Use Planned Development)
- Elele Commercial Expansion (Commercial)
- Village at Poipu (Resort/Residential)
- Ocean Bay Plantation (Resort/Residential)

**Major Neighbor Island Valuation Assignments**
- Mauna Lani Bay Hotel
- Courtyard Kahului Airport Hotel
- Maui Oceanfront Days Inn
- Holiday Inn Express - Kona Hotel (proposed)
- Keauhou Beach Hotel
- Courtyard King Kamehameha Kona Beach Hotel
- Aloha Beach Resort
- Coco Palms Resort
- Grand Hyatt Kauai
- Islander on the Beach
- Waimea Plantation Cottages
- Coconut Beach Resort
- Sheraton Maui Hotel
- Outrigger Wailea Resort Hotel
- Maui Lu Hotel
- Coconut Grove Condominiums
- Palaea Bay Holdings
- Waikea Ranch
- Maui Coast Hotel
- Westin Maui Hotel
- Maui Marriott Hotel
- Waihee Beach
- Kapalua Bay Hotel and The Shops at Kapalua

**Email Address**
Tom.Holliday@cbre.com
APPENDIX C

TERRESTRIAL VEGETATION AND WILDLIFE SURVEYS
FINAL REPORT

Terrestrial Vegetation and Wildlife Surveys for Hōkūao 201 H Affordable Housing Development, Lāna‘i City, Hawai‘i

Prepared for:
Lāna‘i Resorts, LLC, dba Pūlama Lāna‘i
735 Bishop Street, Suite 2000
Honolulu, Hawai‘i 96813

Prepared by:
Cardno
737 Bishop Street, Suite 3050
Honolulu, Hawai‘i 96813

April 2019

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1 Introduction

The purpose of this report is to provide information regarding the occurrence of terrestrial plants and wildlife resources in the area encompassing the proposed construction of affordable housing in Lānaʻi City, Hawai‘i. Cardno was tasked with conducting biological surveys and preparing a report of findings to address the results from this and previous surveys. This report will be integrated with environmental compliance documentation submitted to state and county regulatory agencies for review and support issuance of appropriate environmental entitlements.

The proposed Lānaʻi City expansion comprises approximately 50 acres of land in the Kamoku Ahupua’a of Lānaʻi. The irregularly shaped project area is located immediately west of and downslope from Lānaʻi City center. The site is bounded on the east by Fraser Avenue and two church parcels and bounded on the north by 9th Avenue and a dirt road following tax map key (TMK) boundaries. Most of the western boundary is marked by the chain-link fence boundary of the wastewater treatment plant, while the southern boundary follows 12th Avenue and Awalua Avenue. Photos of the area appear in Appendix A.

The proposed project has been titled “Hōkūiao 201 H Affordable Housing Development” identified on tax maps as TMK: (2) 4–9–002:001 por., TMK: (2) 4–9–014:001 por., and TMK: (2) 4–9–014:009 por. (Figure 1).

TMK: (2) 4–9–002:001 is a large parcel of approximately 86,036 acres covering most of Lānaʻi, and includes both the island’s undeveloped lands and most of the abandoned pineapple fields.
TMK: (2) 4–9–014:001 is an approximately 84 acres parcel that is used today for storage, the Pūlama Lānaʻi Nursery, and community gardens for Lānaʻi residents.
TMK: (2) 4–9–014:009 comprises approximately 25.65 acres and is the location of the island’s original, now abandoned, power plant and the graded yard used to store shipping containers.

The three parcels that comprise the proposed project area are owned by Lānaʻi Resorts, LLC.

The proposed project would be located close to Dole Park to take advantage of its walkable proximity to shops, groceries, and educational and entertainment venues. The project visually and physically connects to the town via 9th Avenue and 12th Avenue road extensions, continuing the existing street grid pattern into the new development. A wide concrete bike/walk path will be located on 9th Avenue to connect the community to Fraser Avenue.

Along the east edge, bordering the school fields, the project provides a one-acre park, a 1,500-square foot community pavilion, comfort stations, and 100 parking stalls for use by residents of Hōkūiao.

Soils and vegetation adjacent to the roadway have been disturbed by previous flooding, grading, and side-casting of asphalt and construction debris. The soils here consist predominantly of silty clay and all are well drained (USDA 2014a). None of these soils series meet the definition of a hydric soil on the current Hydric Soil List (USDA 2014b). The area is underlain by Pleistocene lava flows from the Lānaʻi shield volcano (Sherrod et al. 2007). Soils at the site are predominantly “Waihuna Clay” (NRCS 2013). The area surrounding Fraser Avenue is underlain by Quaternary alluvial surficial deposits (Sherrod et al. 2007).
2 Methods of Study

Terrestrial wildlife and vegetation surveys were conducted by biologists John Ford and Maya LeGrande. Prior to conducting field work, the biologists reviewed existing scientific literature, previously prepared environmental compliance documents, biological survey reports, topographic maps and images, and engineering drawings relevant to the proposed project. Previous surveys conducted in the same area by Bruner (2000), Char (2000), Guinther (2008), Hobdy (2008), ICF International (2013, 2014, and 2015), and Nagata (1986, 1990, and 1991) were also reviewed. There have been no additional terrestrial biological surveys within the project area over the past two years (Donoho 2018).

The U.S. Fish and Wildlife Service (USFWS) website was viewed to determine if any listed threatened or endangered species are known to reside within or adjacent to the project area (USFWS 2018a).

Field observations within the project area were conducted on June 30, 2016 between 10:00 a.m. and 6:15 p.m. and on July 1, 2016 between 5:30 a.m. and 10:30 a.m. Figure 2 illustrates the areal extent of the terrestrial biological studies and the relative locations of point count stations. The weather at the times of data collection was partly cloudy to overcast with light winds. All observed plant species were documented. Plant associations and distribution, disturbances, topography, substrate types, exposure, drainage, and related factors were noted. Rocky outcrops, shaded areas, and depressions that are more likely to support native plant species were intensively surveyed.

Birds were identified visually with Nikon 8 x 42 6.3-degree binoculars as well as by their vocalizations. Four 8-minute point count stations with a radius of 300 feet (Scott et al. 1986) were established at representative locations within the project area (see Table 1 and Figure 2). Additional observations were also collected as noted above. Observations of mammals, amphibians, reptiles, and insects were made incidental to the avian surveys and related surveys of vegetation.
3 Results

3.1 Vegetation

Native plant habitats within the proposed project area have been highly modified by human activities, including commercial agricultural, road building, grading, residential construction, and the intentional and accidental introduction of alien species. The overwhelming abundance of non-native plant species throughout the project area is directly correlated to disturbances over the last several hundred years. The project area consists largely of undeveloped lands and lies adjacent to a commercial plant nursery and community gardens. A total of 156 plant species were observed within the proposed project area. Of the observed species, 153 species are alien (introduced) and three are native (two indigenous and one endemic). An inventory of all plant species observed within the project area is presented in Appendix B at the end of this report.

The undeveloped land to the west of the community gardens and to the north of the existing sewage treatment ponds (Photo 1 in Appendix A) is dominated by a mix of sourgrass (Digitaria insularis) and golden crown-beard (Verbesina encelioides) along with trees including Christmas berry (Schnirius terebinthinifolius), Formosa koa (Acacia koa), and koa haole (Leucaena leucocephala). Other weedy species observed scattered throughout the area included lantana (Lantana camara), apple of Sodom (Solanium linnaeanum), jimson weed (Datura stramonium), tree tobacco (Nicotiana glauca), balloon plant (Asclepias phytoscapa), spiny amaranth (Amaranthus spinosus), and Guine grass (Megaezysurus maximus).

Two native plant species commonly found within the undeveloped lands included the indigenous 'ula'ula (Waihena indica), which was scattered along existing dirt roadways, and a single endemic koa (Acacia koa) tree that was observed near the center of the project area. Sections near the southern boundary of the project area were colonized by a nearly impenetrable forest of Formosa koa and Christmas berry with Guinea grass understory.

The eastern section of the undeveloped lands lies just off Fraser Avenue. Ironwood (Casuarina equisetifolia) is the dominant tree species in the area with a thick understory of matted ironwood needles where little else grows. Species observed along the edges of the forest include Guinea grass, balloon plant, lantana, spiny amaranth, prickly lettuce (Lactuca serriola), popolo (Solanum americanum), and Jamaican vervain (Stachytarpheta jamaicensis). Other tree species include African tulip (Spathodea campanulata), Chinese banyan (Ficus microcarpa), Formosa koa, and Christmas berry.

The plant nursery is located at the center of the overall project area and is dominated by ornamental species (Photo 2 in Appendix A). These species are not included in the overall species list so as not to skew the naturalized species data for the overall project area. Weedy and/or naturalized species noted along the periphery of the nursery were included in the species list. These included laue le' (Phymatosorus grossus), Chinese banyan, African tulip, pigweed (Portulaca oleracea), and Guinea grass. Many large ornamental trees are located within the nursery and have either become established by growing into the ground from their containers or appear to have been intentionally planted. Established tree species include Cook Island pines (Araucaria columnaris), orchid tree (Bauhinia sp.), kukui (Aleurites moluccana), coconut (Cocos nucifera), variegated hau (Hibiscus tiliaceus), magnolia (Magnolia grandiflora), mango (Mangifera indica), jacaranda (Jacaranda mimosifolia), pua kenikeni (Frangipani berterana), and Moreton fig (Ficus macrophylla).

A community garden lies to the southeast of the plant nursery (Photo 3 in Appendix A). It is composed of numerous small lots subdivided by makeshift fences and corrugated metal sheets and contains various structures that house farm animals, such as goats and chickens. Many of the parcels have fruits and vegetables planted including papaya (Carica papaya), banana (Musa sp.), avocado (Persea americana), malunggay (Moringa oleifera), citrus species (Citrus spp.), and Indian mulberry (Morus cynthia). The majority of the area is bare dirt with few weedy plants species growing within the parcels. The periphery of this area is dominated by Guinea grass, African tulip trees, and indigo (Indigofera suffruticosa).

3.2 Wildlife

During the surveys, 13 species of birds were observed and/or heard during four 8-minute point counts at representative locations within the proposed project area (Table 1). Four additional species of birds were observed incidentally within the proposed project area, including the rock pigeon (Columba livia), cattle egret (Bubulcus ibis), wild turkey (Meleagris gallopavo), and gray francoin (Francolinus pondicerianus).

The most conspicuous species observed and/or heard throughout the project area during this survey was the common mynah (Acidotheres tristis) (Table 1). Species commonly observed/heard in densely vegetated areas include common mynah, Japanese white-eye (Zosterops japonicus), Japanese white-eye (Zosterops japonicus), Japanese white-eye (Zosterops japonicus), northern cardinal (Cardinalis cardinalis). The most conspicuous species of birds observed/heard in open and edge habitats included common mynah, zebra dove (Geopelia striata), and house sparrow (Passer domesticus). Wild turkeys were occasionally seen around edge habitats.

Previous studies cited above that were conducted within the same general vicinity during fall and winter months reported finding some migratory winter resident species not seen including the Pacific golden plover (Pluvialis fulva), wandering tattler (Tringa incana), ruddy turnstone (Arenaria interpres), sandpiper (Calidris alba). Other species reported from the vicinity of Lāna'i City in previous surveys include the red-crested cardinal (Paroaria coronata), barn owl (Tyto alba), Hawaiian short-eared owl (Asio flammeus), white-rumped shama (Copsychus malabaricus), northern mockingbird (Mimus polyglottos), and Java sparrow (Passer oryzivora), and nutmeg manikin (Lonchura punctulata).

All but three of the avian species observed within the project area were naturalized alien species. These findings are consistent with previous biological surveys in the vicinity of Lāna'i City. Appendix C lists all bird species observed during surveys and previously reported as being within the proposed project area.

Table 1 Results of 8-minute Point Counts Within the Proposed Project Area

| Common Name* | Species Name | Status | Number of Point Count Stations | RA** | Location and Number of Point Counts
|--------------|--------------|--------|---------------------------------|------|-----------------------------------
| Yellow-rumped warbler | Steptotelia variolosa | A | 4 | 3 | 3 | 1 | 2 |
| Japanese white-eye | Zosterops japonicus | IR | 3 | 3 | 2 | 2 | 1 |
| White-throated robin | Turdus albicollis | A | 3 | 1 | 2 | 2 | 1 |
| Red-legged falcon | Falco rusticolus | A | 2 | 2 | 1 | 1 | 2 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
| White-tailed kite | Elanus leucurus | A | 2 | 1 | 1 | 1 | 1 |
None of the project area is encumbered by critical habitat for endangered species (USFWS 2016). No listed threatened or endangered species of birds were found within the boundaries of the proposed project; however, six listed endangered Hawaiian black-necked stilt (*Himantopus mexicanus knudseni*) and four listed endangered Hawaiian coot (*Fulica ala*) were observed foraging in the sewage treatment ponds at dawn approximately 600 feet beyond the southwestern boundary of the proposed project area. At the same time, at least 50 indigenous resident black-crowned night herons (*Nycticorax nycticorax hoactli*) were observed foraging in the northernmost wastewater treatment pond outside the boundary of the proposed project area. These three species are also protected under the Migratory Bird Treaty Act.

Axis deer (*Axis axis*) were frequently seen during this survey, particularly in scrub forest habitat on the northern portion of the project area along the boundary road. The entire project area is crisscrossed with deer trails, tracks, and scat. Deer were also reported within the project area during previous studies (ICF 2015, 2013a, 2013b). Cats (*Felis catus*) and dogs (*Canis familiaris*) were observed at residences within Lāna‘i City along the northeastern margin of the project area.

Numerous metallic skinks (*Lampropholis delicata*) were observed in leaf litter and exposed bedrock along the edges of house lots and drainage ways. The Bishop Museum’s Hawaiian herpetology checklist (Bishop Museum Hawaii Biological Survey 2018) recognizes only two species of gekkos on Lāna‘i: the common house gecko (*Hemidactylus frenatus*) and mourning gecko (*Lepidodactylus lugubris*). Although no geckos were observed within the project area, their calls were occasionally heard.

4 Discussion

The results represent a one-time snapshot of the wildlife and plants inhabiting the project area. As such, these data cannot be considered a definitive list of all species that utilize habitats within the project area. Many species are diminutive and cryptic in nature making observation difficult. Other species are nocturnal and may not be observed in the area infrequently depending upon season, weather, interaction with other species, and dynamic changes in their populations. Other species may be itinerant or accidental visitors to the site. However, when considered together with the results of historical records, a reasonably accurate description of the environment and biota of the project area can be compiled.

The nature of the land and its present and historical disturbances very much limit the natural botanical resources anticipated to occur here. The results of the surveys substantiate this prediction. The rare frequency of native plant species is an indication that because of constant disturbances (i.e., habitat modification, invasive plant species, feral ungulates), only species adapted to such conditions can survive, with few exceptions. Only two widespread indigenous plant species were observed during the survey, *popolo* and *'uhaloa*. The single endemic species, *koa*, was most likely planted at the existing location. None of the plant species observed are listed as threatened or endangered.

The native avifauna of Lāna‘i has changed radically since the early 1900s. Hirai (1978) described the native birds of Lāna‘i, none of which were observed during the surveys. Hobdy (1993) chronicled the decline in indigenous birds and other species of endemic wildlife and plants on Lāna‘i due to interactions with alien species, habitat loss, and disease. Lepage (2018) lists a total of 106 species of birds reported from Lāna‘i, of which 3 are endemic, 14 are globally threatened, 4 are extinct, and 28 are introduced aliens. Many sightings are considered as rare or accidental visitors.

No listed endangered endemic land snails (*Partula variabilis* or *P. semicarinata*) were observed during the surveys. Populations of these two species have been decimated through a long history of predation by non-native animals, loss of native host plants due to grazing and trampling by Axis deer, mouflon sheep, cattle, goats, and pigs (USFWS 2013). They have also suffered from habitat loss by clearing for agriculture and urban development. Their native habitats included wet lowland, mesic, and cliff forests, and their distribution was usually limited to endemic and indigenous plants; although, they have been found on introduced guava (*Psidium guajava*) and New Zealand tea (*Coryline australis*) plants in relatively undisturbed forests.

Although none were observed during the surveys, the native pua or Hawaiian short-eared owl is common on Lāna‘i and forages in open grassy areas. It is reasonable to assume that the proposed project area represents potential foraging habitat for them.

Axis deer are found throughout the project areas. Their grazing limits the native plant species that might otherwise be expected to occur on Lāna‘i. Feral cats are found on Lāna‘i and constitute a serious threat to nesting seabirds on Lanaihale. Norway rats (*Rattus norvegicus*), Polynesian rats (*Rattus exulans hawaiiensis*) and European house mice (*Mus domesticus*) are present on Lāna‘i (*Tomich 1986*) and are likely to occur within the proposed project area, although none were observed. These introduced predators are known to have detrimental impacts upon populations of native wildlife and also serve as a means of passive transport for propagules of invasive and noxious plants.

No listed endangered Hawaiian hoary bats, or *'ua‘u* (*Lasiurus semotus*) were observed. Their populations on Lāna‘i are believed to be very low (*Tetra Tech 2008*), and scientists have speculated that bats found on Lāna‘i are most likely itinerants from neighboring islands with higher elevations.

Although endangered Hawaiian petrels or *'ua‘u* (*Pterodroma sandwichensis*) do not nest within or near the project area, a breeding colony was found in 2006 (*Tetra Tech 2008*) at Lanaihale approximately three miles to the east southeast of the center of the proposed development. *'Ua‘u* attend the colony at night and nest in burrows in the ground, under dense uhū (*Dicranopteris linearis*) ferns. Fledging petrels are known to be confused by bright lights and have collided with man-made structures (*Division of Forestry and Wildlife [DOFAW] 2005*). In studies conducted in 2007, *Hawai‘i DOFAW* biologists found that petrels fledged from the Lanaihale...
colony between early November and December. Collisions with lights by seabirds have been reported on Lāna‘i in the past (Costales 2013); therefore, the use of shaded lighting to minimize detrimental impacts to seabirds is warranted.

The USFWS listed five species of endemic Hawaiian yellow-faced bees as endangered: *Hylaenus anthracinus*, *H. assimulans*, *H. facilis*, *H. hilaris*, and *H. longiceps* (USFWS 2016). Historically, 15 species were known from Lāna‘i (Daly and Magnacca 2003); however, none of these have been reported recently from the project area in Lāna‘i City. Eight of these species have been reported on Lāna‘i between dry shrublands at sea level to mesic and wet forest habitats up to the summit area of the island at 3,000 feet elevation (Magnacca 2007). Seven of the eight species recently recorded are known from coastal, dry forest and shrubland habitats (Magnacca 2007). Magnacca (2007) stated that solitary native bees are known to utilize many different plants as food sources at any given time. Recent molecular studies by Wilson, et al. (2010) suggested a high degree of fidelity in pollen foraging behavior on native plant species by these native bees. No native Hawaiian yellow-faced bees were observed during surveys of the project area.

5 Recommendations

Care should be taken during site clearing and construction to reduce the risk of introducing noxious weeds or other invasive alien species to the island of Lāna‘i. At this time, no equipment is planned to be brought from off island. However, if construction equipment is planned to be brought from off island, it should be cleaned of mud, soil, seeds, insects, and amphibians and their eggs prior to their use at the project sites.

All materials imported to the project site, including gravel, soil, rock, and sand, should be free of invasive plants. All materials should be stokpiled at a designated staging area to prevent their contamination.

Graded sites should be re-vegetated as soon as practicable with plants from Lāna‘i. Imported plants used in landscaping should first be quarantined in an enclosed location away from the project site. All imported plants should be inspected to ensure that they are free from invasive species that could arrive inadvertently, such as coqui frogs (*Eleutherodactylus coqui*), little fire ants (*Wasmannia auropunctata*), and *Miconia calviscens* seedlings. A list of invasive plant and animal species of particular concern in Hawai‘i may be found on the Hawai‘i Invasive Species Council website: http://dlnr.hawaii.gov/hisc/info/invasive-species-profiles/.

If seed mixtures are to be applied by hydro-seeding and hydro-mulching, they should be free of non-native weeds. Any species of plants other than those intended to be in the hydro-seed/hydro-mulch should be removed. In particular, plant species that are not known to occur on Lāna‘i and those that are actively being controlled on Lāna‘i should be removed.

To the maximum extent possible, landscaping should be done with indigenous and endemic flora which is known from elevations and climate regimes on Lāna‘i and/or elsewhere in Hawai‘i similar to that of the proposed project area. It would be beneficial to retain as many of these large mature trees within the project area as possible during the construction of the housing.

Industry standard best management practices (BMPs) should be employed when working within drainage ways to minimize the risk of soil erosion into adjacent drainage ways. These may include but not be limited to the use of silt curtains, coir logs and/or blankets, sediment traps, slope and inlet protection, temporary stabilization, and dust control.

Maintenance of a 600-foot buffer from the existing sewage treatment ponds should be sufficient to prevent disturbance to listed endangered Hawaiian black-necked stilt and coot, and should not interfere with seasonal foraging by migratory shorebirds and waterfowl at the ponds. Additional fencing associated with the proposed project will help deter disturbance of the waterbirds at the sewage ponds by humans and house pets.

All lighting associated with the construction of new homes for the proposed project will need to be designed with accepted federal, state, and county mitigation measures to help prevent the fallout of fledgling seabirds, which can be confused by stray lighting, from their burrows on nearby Lanahale (Telfer et al., 1987). Relevant information is available in the Maui County Code of Ordinances Title 20 Chapter 35. Additional guidance is provided by the International Dark Sky Association that can assist in finding acceptable lighting fixtures for virtually all applications: http://darksky.org/lsa/lsa-products/. Appendix D provides additional information provided by the USFWS for use in selecting lighting for the proposed housing project.

In accordance with current USFWS guidance for mitigation of impacts to Hawaiian hoary bats, the project should avoid or minimize the removal of trees over 15 feet in height and prohibit clearing of these trees from June 1 to September 15 to help ensure that non-volant Hawaiian hoary bat pups are not harmed.
6 Glossary

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Alien</td>
<td>Introduced by humans</td>
</tr>
<tr>
<td>BMP</td>
<td>Best Management Practice</td>
</tr>
<tr>
<td>DOFAW</td>
<td>Department of Land and Natural Resources Division of Forestry and Wildlife</td>
</tr>
<tr>
<td>EA</td>
<td>Environmental Assessment</td>
</tr>
<tr>
<td>Endangered</td>
<td>Formally protected by applicable Federal and/or State laws</td>
</tr>
<tr>
<td>Endemic</td>
<td>Native species occurring only in the Hawaiian Islands</td>
</tr>
<tr>
<td>Feral</td>
<td>Domesticated, non-native species established in the wild</td>
</tr>
<tr>
<td>GAP</td>
<td>National Gap Analysis Program</td>
</tr>
<tr>
<td>Incidental</td>
<td>Observations of species made outside formal point counts</td>
</tr>
<tr>
<td>Indigenous</td>
<td>Hawaiian native species naturally occurring elsewhere</td>
</tr>
<tr>
<td>Itinerant</td>
<td>Species native to other regions that make occasional visits to Hawai‘i</td>
</tr>
<tr>
<td>Invasive</td>
<td>Species not native to Hawai‘i that are harmful to the environment, economy,</td>
</tr>
<tr>
<td></td>
<td>and/or public health</td>
</tr>
<tr>
<td>Nocturnal</td>
<td>Referring to night time</td>
</tr>
<tr>
<td>Non-volant</td>
<td>Young birds or birds not yet able to fly and escape harm</td>
</tr>
<tr>
<td>TMK</td>
<td>Tax Map Key</td>
</tr>
<tr>
<td>U.S.</td>
<td>United States</td>
</tr>
<tr>
<td>USFWS</td>
<td>U.S. Fish and Wildlife Services</td>
</tr>
</tbody>
</table>

7 Literature Cited


Donoho, M. 2018. Former Senior Vice President of Natural Resources for Pūlama Lāna‘i. Personal communication with John Ford via email, October 3, 2018.


Appendix A  Site Photographs

Photo 1. Undeveloped lands to the west of the community gardens and nursery consist of fallow pineapple fields crisscrossed with shallow swales and bounded by jeep trails.

Photo 2. The company nursery occupies an area of approximately 10 acres near the center of the proposed housing development.

Photo 3. This open corridor of disturbed habitat lies between the tall trees that line the boundaries of the community gardens on the left and tall Guinea grass and mixed scrub forest on the right.
Appendix B Plant Species List

The following checklist is an inventory of all the plant species observed within the Hālau 201 H Affordable Housing Development area. The plant names are arranged alphabetically by family and then by species into each of four groups: Pteridophytes, Gymnosperms, Monocots, and Dicots. The taxonomy and nomenclature of the flowering plants (Monocots and Dicots) are in accordance with Wagner et al. (1990), Wagner and Herbst (1999), and Staples and Herbst (2005). Recent name changes are those recorded in the Hawaiʻi Biological Survey series (Evenhuis and Eldredge, eds., 1999-2002). For each species, the following name is provided:

1. Scientific name with author citation.
2. Common English and/or Hawaiian name(s), when known.
3. Biogeographic status. The following symbols are used:
   - E = endemic = native only to the Hawaiian Islands.
   - I = indigenous = native to the Hawaiian Islands and elsewhere.
   - X = introduced or alien = plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after western contact (i.e., Cook’s arrival in the islands in 1778).

<table>
<thead>
<tr>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PTERIDOPHYTES</strong></td>
<td></td>
<td></td>
</tr>
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<td>POLYPODIACEAE</td>
<td>Phymatosorus grossus (Langsd.&amp;Fisch.) Brownlie</td>
<td>laua'e</td>
</tr>
<tr>
<td><strong>GYMNOSPERMS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARAUCARIACEAE</td>
<td>Araucaria columnaris (G.Forst) D.Hooker</td>
<td>Cook Island pine</td>
</tr>
<tr>
<td><strong>MONOCOTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AGAVACEAE</td>
<td>Cordyline fruticosa (L.) A.Chev.</td>
<td>ti, ki</td>
</tr>
<tr>
<td>ALOACEAE</td>
<td>Aloe vera (L.) N.L.Burm.</td>
<td>aloe</td>
</tr>
<tr>
<td>Arecaceae</td>
<td>Cocos nucifera (L.) Pers.</td>
<td>coconut</td>
</tr>
<tr>
<td></td>
<td>Phoenix dactylifera L.</td>
<td>date palm</td>
</tr>
<tr>
<td></td>
<td>Veitchia merrillii (Beccari) H.E.Moore</td>
<td>Manila palm</td>
</tr>
<tr>
<td>COMELINACEAE</td>
<td>Commelina benghalensis L.</td>
<td>hairy dayflower</td>
</tr>
<tr>
<td></td>
<td>Commelina diffusa N.L. Burm.</td>
<td>dayflower</td>
</tr>
<tr>
<td>CYPERACEAE</td>
<td>Cyperus rotundus L.</td>
<td>kilil o'opu</td>
</tr>
<tr>
<td>POACEAE</td>
<td>Brachiaria mutica (Forsk.,) Stapf</td>
<td>California grass</td>
</tr>
<tr>
<td></td>
<td>Cenchrus ciliaris L.</td>
<td>common sandbur</td>
</tr>
<tr>
<td><strong>DICOTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACANTHACEAE</td>
<td>Asystasia gangetica (L.) T. Anderson</td>
<td>Chinese violet</td>
</tr>
<tr>
<td></td>
<td>Justicia betonica</td>
<td>white shrimp plant</td>
</tr>
<tr>
<td></td>
<td>Thunbergia alata (Jacc.) B.K. Simon &amp; S.W.L. Jacobs</td>
<td>Black-eyed susan</td>
</tr>
<tr>
<td></td>
<td>Thunbergia fragrans Roeb.</td>
<td>White thunbergia</td>
</tr>
<tr>
<td>AIZOACEAE</td>
<td>Tetragonia tetragonoides (Pall.) Kuntze</td>
<td>New Zealand spinach</td>
</tr>
<tr>
<td>AMARANTHACEAE</td>
<td>Ageratum conyzoides L.</td>
<td>Ageratum</td>
</tr>
<tr>
<td></td>
<td>Bidens alba (L.) DC. var. radiata</td>
<td>beggar tick</td>
</tr>
<tr>
<td></td>
<td>Bidens pilosa L.</td>
<td>Spanish needle</td>
</tr>
<tr>
<td></td>
<td>Commelina benghalensis</td>
<td>balloon tree</td>
</tr>
<tr>
<td>ASCLEPIADACEAE</td>
<td>Asclepias physocarpa (E.Mey.) Schltr.</td>
<td>balloon tree</td>
</tr>
<tr>
<td><strong>ASTERACEAE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>APIACEAE</strong></td>
<td>Ciclospermum leptophyllum (Endl.) Sprague</td>
<td>fir-leaved celery</td>
</tr>
<tr>
<td><strong>APOCYNACEAE</strong></td>
<td>Thevetia peruviana (Pers.) K.Schum.</td>
<td>be-still tree</td>
</tr>
<tr>
<td><strong>ARALIACEAE</strong></td>
<td>Schefflera actinophylla (Endl.) Harms</td>
<td>octopus tree</td>
</tr>
<tr>
<td><strong>ASCLEPIADACEAE</strong></td>
<td>Asclepias physocarpa (E.Mey.) Schltr.</td>
<td>balloon tree</td>
</tr>
<tr>
<td><strong>ASTERACEAE</strong></td>
<td>Ageratum conyzoides</td>
<td>Ageratum</td>
</tr>
<tr>
<td></td>
<td>Bidens alba (L.) DC.</td>
<td>beggar tick</td>
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<tr>
<td></td>
<td>Bidens pilosa L.</td>
<td>Spanish needle</td>
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<td></td>
<td>Commelina benghalensis</td>
<td>balloon tree</td>
</tr>
<tr>
<td>SCIENTIFIC NAME</td>
<td>COMMON NAME</td>
<td>STATUS</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>Crassocephalum crepidioides (Benth.) S.Moore</td>
<td>crassocephalum</td>
<td>X</td>
</tr>
<tr>
<td>Emilia fosbergii Nicolson</td>
<td>red paulele</td>
<td>X</td>
</tr>
<tr>
<td>Lactuca serriola L.</td>
<td>prickly lettuce</td>
<td>X</td>
</tr>
<tr>
<td>Pluchea indicata (L.) Less.</td>
<td>Indian fleabane</td>
<td>X</td>
</tr>
<tr>
<td>Senecio madagascariensis Poir.</td>
<td>fireweed</td>
<td>X</td>
</tr>
<tr>
<td>Sonchus oleraceus L.</td>
<td>prickly lettuce</td>
<td>X</td>
</tr>
<tr>
<td>Pluchea indica (L.) Less.</td>
<td>Indian fleabane</td>
<td>X</td>
</tr>
<tr>
<td>Verbesina encelioides (Cav.) Benth. &amp; Hook</td>
<td>golden crown-beard</td>
<td>X</td>
</tr>
<tr>
<td>Xanthium strumarium var. canadense Mill.</td>
<td>cocklebur</td>
<td>X</td>
</tr>
<tr>
<td>BASELLACEAE</td>
<td>Madeira vine</td>
<td>X</td>
</tr>
<tr>
<td>Merremia aegyptia (L.) Urb.</td>
<td>hairy merremia</td>
<td>X</td>
</tr>
<tr>
<td>Merremia tuberosa (L.) Rendle</td>
<td>wood rose</td>
<td>X</td>
</tr>
<tr>
<td>CUCURBITACEAE</td>
<td>ivy gourd</td>
<td>X</td>
</tr>
<tr>
<td>Cucurbita maxima</td>
<td>balsam pear</td>
<td>X</td>
</tr>
<tr>
<td>CHENOPODIACEAE</td>
<td>Madeira vine</td>
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</tr>
<tr>
<td>Carica papaya L.</td>
<td>papaya</td>
<td>X</td>
</tr>
<tr>
<td>CASAUINACEAE</td>
<td>ironwood</td>
<td>X</td>
</tr>
<tr>
<td>Chamaecrista nictitans (L.) Moench</td>
<td>partridge pea</td>
<td>X</td>
</tr>
<tr>
<td>Chamaecrista prostrata (Aiton) Small</td>
<td>prostrate spurge</td>
<td>X</td>
</tr>
<tr>
<td>Indigofera heterophylla L.</td>
<td>creeping indigo</td>
<td>X</td>
</tr>
<tr>
<td>Indigofera suffrutcosa Mill.</td>
<td>minor</td>
<td>X</td>
</tr>
<tr>
<td>Leucaena leucocephala (Lam.) de Wit</td>
<td>koa haole</td>
<td>X</td>
</tr>
<tr>
<td>Macroptilium lathyroides (L.) Urb.</td>
<td>wild bean</td>
<td>X</td>
</tr>
<tr>
<td>Macroptilium lathyroides (L.) Urb.</td>
<td>wild bean</td>
<td>X</td>
</tr>
<tr>
<td>Medicago polymorpha L.</td>
<td>bur clover</td>
<td>X</td>
</tr>
<tr>
<td>Mimosa pudica var. unjuga Duches.</td>
<td>敏感植物</td>
<td>X</td>
</tr>
<tr>
<td>Neonotonia whigtii (Whigt&amp;Arnott) Lackey</td>
<td>smooth rattlesnake</td>
<td>X</td>
</tr>
<tr>
<td>Pithecellobium dulce (Roxb.) Benth.</td>
<td>opiuma</td>
<td>X</td>
</tr>
<tr>
<td>Prosopis pallida (Humb. &amp; Bonpl. Ex Willd.) Kunth</td>
<td>algaroba</td>
<td>X</td>
</tr>
<tr>
<td>Samanea saman (Jacq.) Merr.</td>
<td>monkeypod</td>
<td>X</td>
</tr>
<tr>
<td>Senna suaveolens (Burm.f.)</td>
<td>kolomona</td>
<td>X</td>
</tr>
<tr>
<td>Tamarindus indica L.</td>
<td>tamarind</td>
<td>X</td>
</tr>
<tr>
<td>LAMIACEAE</td>
<td>comb hyptis</td>
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</tr>
<tr>
<td>Leonotis nepetifolia (L.) R.Br.</td>
<td>lion’s ear</td>
<td>X</td>
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<tr>
<td>Ocimum gratissumum L.</td>
<td>wild basil</td>
<td>X</td>
</tr>
<tr>
<td>LAURACEAE</td>
<td>Padang cassia</td>
<td>X</td>
</tr>
<tr>
<td>Persea americana Mill.</td>
<td>avocado</td>
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### MALVACEAE

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Status</th>
</tr>
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<tbody>
<tr>
<td>Abutilon grandifolium (Willd.) Sweet</td>
<td>hairy abutilon</td>
<td>X</td>
</tr>
<tr>
<td>Hibiscus sp.</td>
<td>hibiscus</td>
<td>X</td>
</tr>
<tr>
<td>Malva parviflora L.</td>
<td>cheese weed</td>
<td>X</td>
</tr>
<tr>
<td>Malvastrum coromandelianum (L.) Garcke</td>
<td>false mallow</td>
<td>X</td>
</tr>
<tr>
<td>Sida acuta subsp. carpinifolia (L.f.) Boreas.Walk.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Sida cortisiana L.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Sida rhombifolia L.</td>
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<td>X</td>
</tr>
<tr>
<td>Sida spinosa L.</td>
<td>prickly sida</td>
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</tr>
<tr>
<td>Sidastrum micranthum (St.Hil.) Fryx.</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Thepesia populnea (L.) Sol. Ex Correa</td>
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### MELIACEAE

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khaya sengalensis L.</td>
<td>mahogany</td>
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</tr>
<tr>
<td>Mella azedarach L.</td>
<td>chinaberry</td>
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### MORACEAE

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<th>Common Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Artocarpus altilis (Z) Fosberg</td>
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<tr>
<td>Ficus benghalensis L.</td>
<td>Indian banyan</td>
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</tr>
<tr>
<td>Ficus macrophylla L.</td>
<td>Moreton Bay fig</td>
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</tr>
<tr>
<td>Ficus microcarpa L.f.</td>
<td>Chinese banyan</td>
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<tr>
<td>Ficus religiosa</td>
<td>Bo tree</td>
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### MYRTACEAE

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<th>Scientific Name</th>
<th>Common Name</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Eucalyptus citriodora Hook.</td>
<td>lemon gum</td>
<td>X</td>
</tr>
<tr>
<td>Eucalyptus crebra F.v. Muell.</td>
<td>narrow-leaved ironbark</td>
<td>X</td>
</tr>
<tr>
<td>Psidium guajava L.</td>
<td>guava</td>
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</tr>
<tr>
<td>Syzygium cumini (L.) Skeels</td>
<td>Java plum</td>
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</table>

### NYCTAGINACEAE

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<tr>
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<th>Common Name</th>
<th>Status</th>
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</thead>
<tbody>
<tr>
<td>Rorippa sinica L.</td>
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<td>X</td>
</tr>
<tr>
<td>Bougainvillea sp. A.L. Jussieu</td>
<td>bougainvillea</td>
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### OXALIDACEAE

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<th>Common Name</th>
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</thead>
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<td>Oxalis corniculata L.</td>
<td>yellow wood sorrel</td>
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### PASSIFLORACEAE

<table>
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<th>Scientific Name</th>
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<th>Status</th>
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</thead>
<tbody>
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<td>Passiflora caerulea</td>
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<tr>
<td>Passiflora edulis</td>
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### POLYGUIACEAE

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<th>Common Name</th>
<th>Status</th>
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<td>Antigonon leptopus Hook.&amp;Arnott</td>
<td>Mexican creeper</td>
<td>X</td>
</tr>
<tr>
<td>Cucumis sativus</td>
<td>sea grape</td>
<td>X</td>
</tr>
<tr>
<td>Portulaca oleracea L.</td>
<td>pigweed</td>
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</tr>
</tbody>
</table>
Appendix C Avian Species List

The following checklist is an inventory of all the bird species observed June 30 through July 1, 2016 within the area proposed for the Hālāwai 201 H Affordable Housing Development. It also includes the results of previous studies in areas immediately adjacent to, and sometimes overlapping, the current project area. Nomenclature follows Chesser, et al (2018) at http://checklist.aou.org/taxa; last accessed October 3, 2018. The following symbols are used to describe biogeographic status of each species (based upon Pyle and Pyle 2009, http://hbs.bishopmuseum.org/birds/rp-monograph/PrimaryChecklist.htm):

- **R** - Resident (Endemic or Indigenous)
- **N** - Naturalized (non-native) resident (established and breeding)
- **n** - Naturalized (non-native) visitor from other islands
- **B** - Breeding Visitor
- **W** - Winter Resident (some may migrate through the islands)
- ***** - Species protected under the Migratory Bird Treaty Act

<table>
<thead>
<tr>
<th>SCIENTIFIC NAME</th>
<th>COMMON NAME</th>
<th>CARDNO SURVEY</th>
<th>PREVIOUS SURVEYS</th>
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</thead>
<tbody>
<tr>
<td>STRIGIDAE</td>
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</tr>
<tr>
<td>Asio flammeus sandwichensis</td>
<td>Hawaiian short-eared owl (R)*</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>PASSERIFORMES</td>
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<td></td>
</tr>
<tr>
<td>Cettiidae</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horornis diphone</td>
<td>Japanese bush warbler (N)</td>
<td>X ✓</td>
<td></td>
</tr>
<tr>
<td>Zosteropidae</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zosterops japonicus</td>
<td>Japanese white-eye (N)</td>
<td>X ✓</td>
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**SCIENTIFIC NAME**

**COMMON NAME**

**CARDNO SURVEY**

**PREVIOUS SURVEYS**

---

**GALLIFORMES**

**PHASANIDAE**

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**COLUMBIFORMES**

**COLUMBIDAE**

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**STRIIFORMES**

**TYTONIDAE**

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Appendix D  Seabird-friendly Lighting Solutions

UNACCEPTABLE / DISCOURAGED
Fixtures that produce glare and light trespass

UNACCEPTABLE Fixtures that produce glare and light trespass
- Unshielded Floodlights or Poorly-shielded Floodlights
- Unshielded Wallpacks & Unshielded or Poorly-shielded Wall Mount Fixtures
- Drop-Lens & Sag-Lens Fixtures w/ exposed bulb / reflector lens
- Unshielded Streetlight
- Unshielded Security Light
- Unshielded PAR Floodlights
- Unshielded floodlight that is angled incorrectly

ACCEPTABLE Fixtures that shield the light source to minimize glare and light trespass and to facilitate better vision at night
- Fully Shielded Fixtures
- Full Cutoff Fixtures
- Fully Shielded Walkway Bollards
- Fully Shielded Wallpack & Wall Mount Fixtures
- Fully Shielded Security Light
- Fully Shielded PAR Floodlights
- Fully Shielded Streetlight
- Fully Shielded ’Period’ Style Fixtures
- Shielded / Properly-aimed PAR Floodlights
- Shielded floodlight that is angled correctly

Illustrations from www.darksky.org and www.darkskysociety.org
ARCHAEOLOGICAL INVENTORY SURVEY INCLUDING END OF FIELD WORK REPORT
Abstract

At the request of Pulama Lāna‘i, T. S. Dye & Colleagues, Archaeologists has completed an archaeological inventory survey for the proposed Hōkū-ao 201-H Residential Project, located at Kamoku, Lāhaina District, Lāna‘i Island. A review of the historical background indicates the entire 105 ac. project area was modified by heavy equipment during the establishment of Lāna‘i City and commercial pineapple fields in the 1920s. The archaeological inventory survey included surface survey and test excavations with a backhoe. Three potentially significant historic properties were identified, all of which are historic-era artifacts that were transported into the project area for preservation. Two wood-frame buildings from the Kōʻele School complex, in poor condition a decade ago, have now been overgrown by vegetation and lack the integrity of condition to be listed on the Hawai‘i Register of Historic Places. A pineapple harvester, “Machine 1,” in the possession of the Lāna‘i Culture & Heritage Center, possesses sufficient integrity to be significant under Criterion “a” due to its association with the commercial pineapple fields that for seven decades were the primary economic pursuit on the island. It is recommended that “Machine 1” be moved to a sheltered location away from the proposed Hōkū-ao 201-H Residential Project and that funds for its restoration and interpretive display be pursued.

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1 Introduction

At the request of Pūlama Lānā‘i, T. S. Dye & Colleagues, Archaeologists has completed an archaeological inventory survey of the proposed Hōkū-ao 201-H Residential Project. The proposed Hōkū-ao 201-H Residential Project comprises approximately 50 acres (ac.) in the land of Kamoku, Lāhaina District, Lānā‘i Island (fig. 1). The irregularly shaped project area is located immediately west of and downslope from Lānā‘i City. The project area is bounded on the east by Fraser Avenue and two church parcels; on the north by 9th Avenue, which is an unimproved dirt road west of Fraser Avenue, and by a dirt road that follows tax map boundaries. Most of the western boundary is marked by the chain-link fence boundary of the wastewater treatment plant, while the southern boundary follows 12th Avenue and Awalua Avenue.

The proposed Hōkū-ao 201-H Residential Project is identified on tax maps as TMK: (2) 4-9-002-061 por., TMK: (2) 4-9-014-001 por., TMK: (2) 4-9-014-009 por., and TMK: (2) 4-9-014-011 por. (fig. 2).
The four parcels that contribute to the proposed Hōkū-ao 201-H Residential Project are owned by Lāna‘i Resorts, LLC.

The Hōkū-ao 201-H Residential Project proposes construction of 200 single family homes, comprising 133 affordable homes exclusively for purchase by buyers falling within the HUD 2018 low-income guidelines, and 67 market-rate homes. All lots will typically be 6,000 ft² minimum, with a few 6,100 ft² lots on irregularly shaped corners (fig. 3).

Most of the project area topography consists of flat to gently sloping open, patchy forest and scrub lands. An existing drainage swale on the western boundary of the site carries storm water away from the existing town and community center.

The archaeological inventory survey included a pedestrian survey that yielded abundant evidence that the area of the proposed Hōkū-ao 201-H Residential Project was used in the past for commercial agriculture and industry, and also extensive test excavation with a backhoe to determine the presence or absence of potentially significant buried cultural deposits.

2 Background

Lāna‘i is sixth in size of the major Hawaiian Islands (fig. 4), and like all islands in the group, it was formed through volcanic eruptions and is constantly being reshaped by erosional activity. The primary caldera was in the area now known as the Pālawai Basin, and it is estimated that Lāna‘i first rose above sea level approximately 1.5 million years ago. It is approximately 13.25 mi. long by 13 mi. wide, and at its highest point, Lāna‘i Hale, stands 3,370 ft. above sea level. The island of Moloka‘i lies to the north of Lāna‘i, across the Ka-lohi Channel, and Maui lies to the east, across the ‘Au‘au and Naeheehe Channels; the channel of Ke-ala-i-Kahiki and the island of Kaho‘olawe lie to the southeast.

The southern and western sides of Lāna‘i face the open ocean and are fringed by imposing cliff sides, while the windward side slopes gently to the sea. Thus, Lāna‘i sits in the lee of its sister islands. Its history, like that of Moloka‘i and Kaho‘olawe, has almost always been overshadowed by its larger neighbor, Maui.

The name of the island may be literally translated as “day of conquest”—Lā meaning “day” and Na‘i meaning “conquest.” Through the tradition of the chief Kaululā‘au, Lāna‘i was named on the day the young chief vanquished evil ghosts from the island. An early missionary dictionary translates the island’s name as “hump,” but this translation does not fit with traditional knowledge of the meaning or pronunciation of the name [47]. In addition to political and social contexts, Lāna‘i’s relationship to Maui and Moloka‘i includes a significant environmental one as well, sitting as it does in the rain shadow of the larger and higher islands. Lāna‘i’s ecosystem evolved in the absence of man and most other mammals, giving rise to cloud forest zones, which gave life to the land, and made the island hospitable to people when they settled Lāna‘i perhaps as long as 1,000 years ago. There were two primary forest-watershed zones, the major watershed of Lāna‘i Hale at the highest peak of Pālawai and Kealia Aupuni Ahupua‘a; and what has historically been called the Kānepū‘u forest zone of Kā‘a Ahupua‘a. Untouched for countless centuries, the forest systems of Lāna‘i evolved the unique ability to capture droplets of water, which in turn percolated through the ground to create water sources that were spread from mountain to shore across the island. While these precious forest regions have been radically altered by man’s activities and feral animals, evidence of the region’s water-producing capabilities are still visible on the landscape and in traditional accounts and historic literature.
2.1 Physical Environment

The proposed Hōkū-ao 201-H Residential Project lies between 1,500 and 1,600 ft. above sea level, about midway in elevation between the 3,370 ft. peak of the island at Lāna‘ihale to the east and the sea (fig. 5). About a kilometer south is the Pālawai Basin, the partially filled primary caldera of the island’s volcano. Topographically, the Hōkū-ao 201-H Residential Project is located at the southeastern end of the island’s northwest rift zone, which has been described as “rising gradually from the Pālawai Basin for about 6 miles is a smooth flat area 1½ to 3 miles wide bounded on the northeast side by a fault scarp which dies out northwestward” [53:11]. Together, the flat part of the northwest rift zone and the Pālawai Basin supported most of the island’s pineapple fields. Most of the proposed Hōkū-ao 201-H Residential Project is located on former pineapple fields.

Perennial streams on Lāna‘i are concentrated on the windward side of the island’s main
ridge and are less common elsewhere (fig. 6). The flat area of the northwest rift zone and the Pālāwai Basin are not dissected; most of the streams in these areas are intermittent or ephemeral. Two intermittent or ephemeral streams are shown in the proposed Hōkū-ao 201-H Residential Project; these are drainage ditches associated with the wastewater treatment plant. Rainfall on Lānaʻi varies with elevation. The project area receives about 750 mm of rainfall annually (fig. 6).

Soils in the proposed Hōkū-ao 201-H Residential Project belong to the Waihuna and Lahaina Series (fig. 7). The Waihuna clay in the proposed Hōkū-ao 201-H Residential Project consists of well-drained and moderately well-drained soils on alluvial fans and in depressions . . . These soils formed in old, fine-textured alluvium . . . In a representative profile the surface layer, about 18 inches thick, is dark-brown, very sticky and very plastic clay . . . This is underlain by relatively soft, weathered pebbles and stones. The soil is strongly acid in the surface layer as a result of pineapple culture, but it is neutral to medium acid in the rest of the profile. [14:129]

The Lahaina Series silty clay in the project area consists of well-drained soils on uplands . . . These soils developed in material weathered from basic igneous rocks . . . In a representative profile the surface layer is dark reddish-brown silty clay about 15 inches thick. The subsoil, about 45 inches thick, is dusky-red and dark reddish-brown subangular blocky silty clay and silty clay loam. [14:78]

Lānaʻi City is widely recognized as unique among Hawaiʻi’s rural communities. Built as a plantation town, it follows a grid plan focused around a rectangular central park, Dole Park. The city also exhibits well-established landscaping, including Cook Pine trees planted along the streets. Most structures date to the decade between 1927 and 1938, and the development standards and styles are typical of American towns in the first half of the twentieth century. Buildings are limited to two stories or 30 ft. above grade, and commercial buildings in the downtown area are all one-story and generally small in scale. Most commercial buildings have setbacks of at least 15–20 ft. from the edge of the street, and are separated from adjacent buildings by an average of 15 ft. of open yard space.1

2.2 Historical Background

This section presents a general historic background for the island of Lānaʻi that was compiled by Kepā Maly. It is based on firsthand observation of cultural practices in the 1970s, interviews with older kamaʻaina at that time, and an exhaustive review of pertinent documentary sources, including records held by Kumu Pono Associates and the Lānaʻi Culture & Heritage Center.

The historical narratives cited on the following pages provide readers with access to some of the most detailed and earliest accounts recorded from Lānaʻi. The narratives offer a glimpse into the history recorded from the experience and memory of native residents and eyewitness accounts of those who participated in the events which now make Lānaʻi’s history. Some of these historical narratives have been translated from Hawaiian-language accounts for the first time, and other accounts rarely seen since their original date of composition. They are compiled here to provide a more detailed history of the land than has been previously available.

1Lānaʻi City Community Design Guidelines, April 1997, prepared by the Maui County Planning Department.
2.2.1 He Wahi Mo'olelo No Lāna'i a Kaulūlā'au: Some Traditions from Lāna'i of Kaulūlā'au

The earliest traditional lore of Lāna'i describes the arrival of the gods Kāne, Kanaloa, and their younger god-siblings and companions to the southern shores of the island. Later accounts describe the visit of the goddess Pele and members of her family to the windward region of Lāna'i. Subsequent narratives describe the settlement of Lāna'i by evil spirits, and the difficulties that the early human settlers encountered in attempts to safely colonize the island. Another tradition relates that in the early 1400s, a young Maui chief by the name of Kaulūlā'au traveled around Lāna'i vanquishing the evil ghosts/spirits of the island, making it safe for people to live on Lāna'i, and is the source of the island's name (Lāna'i) a Kaulūlā'au.

By the early 1600s, all the islands of the Hawaiian group were settled sufficiently to develop an organized way to manage scarce resources. Each island was divided into political and subsistence subdivisions called ahupua'a, which generally ran from the ocean fishery fronting the land area to the mountains. Under the rule of Pālani, Lāna'i was divided into 13 ahupua'a. Native tradition describes ahupua'a divisions as being marked by stone cairns (ahu) with a carved pig (pua'a) image placed upon them, and these ancient divisions remain the primary land unit in the Hawaiian system of land management on Lāna'i today.

The culture, beliefs, and practices of the Hawaiians mirrored the natural environment around them. They learned to live within the wealth and limitations of their surroundings. There is significant archaeological evidence on the island indicating that in the period before western Contact, more people lived on the land sustainably—growing and catching all they needed—than currently live upon the island. Several important traditions pertaining to the settlement of Lāna'i and the beliefs and practices of the ancient residents are commemorated at such places as Kaulūlā'au, Kalaehi, Ke-ahi-a-Kavelo, Hālu, Pu'upehe, Pōhaku ʻō, Kāne'pū'u, Ka'ena ʻīki, Nānāhoa, Ha'alelepa'akai, and Puhí-o-Ka'ala.

Ancient Hawaiian villages, ceremonial features, dryland agricultural fields, fishponds, and a wide range of cultural sites dot the shoreline of Lāna'i at places like Keone, Kau, Mālmāla, Kealakekua, Waikoloa, Kealakekua, Hulopoe, Mānoa, Kealakekua, Lehua, and Lapa'i. In the uplands, localities at Ho'opulupulaamoa and Malulani, Kōele and Kihāmanānā, Kaluulu uka, Kaunolū uka, Keālā Kapu, Keālā Aupuni, and Pālawai were also locations of significant traditional settlements and agricultural endeavors. We also know that over the generations, families with permanent residences in the Lāhaina District of Maui frequented Lāna'i to take advantage of its rich fisheries.

In the period leading up to 1800, there was a decline in the native population, and in the capacity of Lāna'i to produce agricultural resources. This was, in part, due to disputes between the rulers of Maui and Hawai'i which overflowed onto Lāna'i in the mid to late eighteenth century. In the late eighteenth century and early nineteenth century, foreign diseases and influences spread across the islands, leading to a further decline in the population. By the 1840s, there were approximately 600 inhabitants residing on Lāna'i. By the 1870s, the population hovered around 300 residents, and by the early 1890s, there were just 175 native residents.

Native Lore and Historical Accounts: The Gods Walked the Land—Early Settlement of Lāna'i

Several traditions pertaining to the gods and people of ancient Lāna'i were found in a review of Hawaiian-language newspapers. These accounts describe the island condition and the life and practices of Lāna'i's ancient people. The narratives establish the bond between Lāna'i and neighboring islands of the Hawaiian group and more distant Kāhīkī—the ancestral homeland of the gods—as Kāne, Kanaloa, Pele, and others of the god-family shaped the natural environment and lives of the people of the land. Coming into the historic period, readers find significant changes on the land and in the lives of the people of Lāna'i. Selected accounts are related here that transition readers through the history of Lāna'i and a native landscape to one of change under western settlement.

A Famine on Lāna'i—an Ancient Prayer Offered by Pakeaulani to the God Kāne'pū'ina

This tradition tells of two ancient residents of Lāna'i, a period of famine across the islands, and the death of the population. We learn the name of a god of one of the heiau on Lāna'i, Kāne'pū'ina. The word anela (Hawaiianized angel) is used by the writer in place of the traditional words ‘auamakua or akua. Also cited within this account is a pule uttered by ancient residents of Lāna'i.

No na Akua o ka Wa Kahiko …

Eia mai he wahi moolelo no ka malama ana o kekahi anela paha, a mau anela paha, oia hoi he mau Kane paha. Penei ua wahi moolelo la. Aia ma Laniai ka noho ana o Kaumumahanahana, a me kana keiki o Pakeaulani, a me Pakeaulani, a he nui loa no na kanaka ma Lāna'i ia manawā; a hiki mai ke kau wi, pau aku la na kanaka i ka make a a ka ai, a koe ehu o Kaumumahanahana, a me Pakeaulani, kokoke make nae ka makuakane. O ka Pakeaulani hana; oia keia. Hele wale aku la no keia e eli wale aku no i kulina uala, a loaa ka uala liihi, (he au ia uala) kalua a moa, lavae aku la keia a he wahi heiau a lani i hanu'i, kaumahua aku la, alaiula, pule aku la, penei kahi hapa o ka pule.

Kini o ke akua

Fifty thousand gods
Pau ka pule, hoi keia i ami hoi i au no ke aiahi, a moa ia ai lavae aku, i lavae aku ka hana, ua pau kela ai, kai keia ai, pule no hoi e like me manaumu. I kekahi imu lili'i ana a ianei, honi mai la kona makuakane i ka aia o ka uala! I mai la kela, "Ahe'e hoi kau uala e kuu keki e aia mai nei?" Pane mai la kela, "He ai ia na kuu aku." Pane hou mai kona makuakane, "Ahe'o o'ou aku, a he akua ka hoi kou?" A hala ae la na la elima o kana hanana pana pela, alaila, i ka po kamaiilo mai la kekahi anela o Kanepaina. I mai la, "Ea, a keia po e panipani aku oe i na puka puka lili'i o ko olua hele, a e noho malie mai kamaiilo pu me kou makuakane a pau ae la ka lana kamaiilo pu ana, a hele aku la ia anela. Ninamu mai la kona makuakane iia i, "Owai kou hoa i kamaia mai la." I ala la, "Ea, don't have a god, but you do?" Five days had passed in his (Pakeaulani) doing this same thing, then on the fifth night, an angel, Kane'apu'a, spoke. He said, "Heed me, this night go and close the very littlest of the holes in the house of you two, and stay calm, do not speak with your father." When they two were finished speaking, the angel departed. His father asked him, "Who was the companion with whom you were speaking?" He answered, "My god whom I have been worshipping." Not long afterwards, a great rain fell. It rained night and day, and through several nights and days until there was calm, then the rains fell lightly. Looking outside to see what had transpired, there was seen ripe Mai'a (bananas), Kō (sugar cane) lying upon the ground, 'Uala (sweet potatoes) spread all about, Ape (mountain taro) with long stalks leaning to the side; Kalo (taro) which filled the gardens, banana stalks were used as the channels (to irrigate) for the taro. He then cooked the food, and made an offering to his God. When finished, they two ate the sweet potatoes, taro, and bananas until filled. This is how Hawaiians came to once again be spread across Hawaii, only from Lāna'i. So this is one tradition of how one of the Kāne (gods), was worshipped by these men...

Owau no me ka mahalo. John Puniwai.1 I am with appreciation. John Puniwai.2

He Mo'olelo no Kaululā'au: A Tradition of Kaululā'au One of the best known traditional accounts of Lāna'i dates from the early fifteenth century and associates the island with the ruling chiefs of Maui. In these narratives, a young chief, Kaululā'au, was born to Kaka'alaneo and Kanikani'ula. Kaka'alaneo's elder brother was Kāke'a, and Fornander reported that these royal brothers jointly ruled Maui and Lāna'i [17:II-82, 83]. During Kāke'a and Kaka'alaneo's rule, and for many generations preceding it, anyone who attempted to live on Lāna'i experienced great difficulties, as the island was inhabited by evil ghosts/spirits ruled by their king, Pahulu.

While there are numerous narratives that describe how Kaululā'au came to free Lāna'i from the rule of Pahulu, thus making it safe for people to inhabit the island [1;13], there are two major versions of this tradition with variations on the events. The best known is the version published by King David Kalākaua in 1888, but the most detailed version was published in the Hawaiian language in 1863 in association with another tradition from Maui. "Ka Moolelo o Eleio" (p. 19). King Kalākaua's version provides a significant description of Lāna'i and the ability of its people to sustain themselves by working the land and fishing the sea around the island. Through the encouragement of his friend and advisor Walter Murray Gibson,2 the king compiled the traditions found within The Legends and Myths of Hawaii [15] and described Lāna'i as being richly supplied with food crops, natural resources, and fisheries that, but for the presence of the evil beings, made it a desirable place to live.

Excerpts of Kalākaua's version follow, entitled "The Sacred Spear-Point" and "Kelea, the Surf Rider of Maui." These excerpts are followed on page 19 by an excerpt of the Hawaiian-language version of Kaululā'au's legend entitled "Ka Moolelo o Eleio."

"The Sacred Spear-Point" and "Kelea, the Surf Rider of Maui"

Kauhulaau was one of the sons of Kaka'alaneo, brother of, and joint ruler with, Kāke'a in the government of Maui... The court of the brothers was at

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1 Translated by Maly.

2 Walter Murray Gibson settled on Lāna'i By early 1862, and came to control most of the land on the island through fire-simple and leasehold title. A friend of many chiefs, some of whom had been on Lāna'i with Kamehameha I, Gibson recorded a number of traditions from the island, and is generally attributed with the Lāna'i narratives cited by King Kalākaua.
Lele (now Lahaina), and was one of the most distinguished in the [island] group.

The mother of Kaululaau was Kanikaniula, of the family of Kamaunu, king of Molokai, through his son Hali, who was the brother or half-brother of Keoloewa and Kapeepee . . .

Kaululaau was probably born somewhere between the years 1390 and 1400. He had a half-sister, whose name was Wao, and a half-brother, Kahivalua . . .

[Kaululaau] had a congenial following of companions and retainers, who assisted him in his schemes of mischief . . . He would send canoes adrift, open the gates of fish-ponds, remove the supports of houses, and paint swine black to deceive the sacrificial priests. He devised an instrument to imitate the death-warning notes of the aia, and frightened people by sounding it near their doors; and to others he caused information to be conveyed that they were being prayed to death.

Notwithstanding these misdemeanors, Kaululaau was popular with the people, since the chiefs or members of the royal household were usually the victims of his mischievous freaks. He was encouraged in his disposition to qualify himself for the priesthood, under the instruction of the eminent high-priest and prophet, Waolani, and had made substantial advances in the calling when he was banished to the island of Lanai by his royal father for an offence which could neither be overlooked nor forgiven.

At that time Lanai was infested with a number of gnomes, monsters and evil spirits, among them the gigantic moo, Mosoleo. They ravaged fields, uprooted cocoanut-trees, destroyed the walls of fish-ponds, and otherwise frightened and discomfited the inhabitants of the island. That his residence there might be made endurable, Kaululaau was instructed by the kualu and sorcerers of the court in many charms, spells, prayers and incantations with which to resist the powers of the supernatural monsters. When informed of these exorcising agencies by Kaululaau, his friend, the venerable Waolani, told him that they would avail him nothing against the more powerful and malignant demons of Lanai.

Disheartened at the declaration, Kaululaau was about to leave the heiau to embark for Lanai, when Waolani, after some hesitation, stayed his departure, and, entering the inner temple, soon returned with a small roll of kapua in his hand. Slowly uncording and removing many folds of cloth, an ivory spear-point a span in length was finally brought to view. Holding it before the prince, he said:

Take this. It will serve you in any way you may require. Its powers are greater than those of any god inhabiting the earth. It has been dipped in the waters of Po, and many generations ago was left by Lono upon one of his altars for the protection of a temple menaced by a mighty fish-god who found a retreat beneath it in a great cavern connected with the sea. Draw a line with it and nothing can pass the mark. Affix it to a spear and throw it, and it will reach the object, no matter how far distant. Much more it will do, but let what I have said suffice.

The prince eagerly reached to possess the treasure, but the priest withdrew it and continued:

I give it to you on condition that it pass from you to no other hands than mine, and that if I am no longer living when you return to Maui—as you some day will—you will secretly deposit it with my bones. Swear to this in the name of Lono.

Kaululaau solemnly pronounced the required oath. The priest then handed him the talisman, wrapped in the kapua from which it had been taken, and he left the temple, and immediately embarked with a number of his attendants for Lanai.

Reaching Lanai, he established his household on the south side of the island. Learning his name and rank, the people treated him with great respect—for Lanai was then a dependency of Maui—assisted in the construction of the houses necessary for his accommodation, and provided him with fish, poi, fruits and potatoes in great abundance. In return for this devotion he set about ridding the island of the supernatural pests with which it had been for years afflicted.

In the legend of “Kelea, the Surf-rider of Maui,” will be found some references to the battles of Kaululaau with the evil spirits and monsters of Lanai. His most stubborn conflict was with the gnome god Mosoleo. He imprisoned the demon within the earth by drawing a line around him with the sacred spear-point, and subsequently released and drove him into the sea.

More than a year was spent by Kaululaau in quieting and expelling from the island the malicious monsters that troubled it, but he succeeded in the end in completely relieving the people from their vexatious visitations. This added immeasurably to his popularity, and the choicest of the products of land and sea were laid at his feet.

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His triumph over the demons of Lanai was soon known on the other islands of the group, and when it reached the ears of Kakaalaneo he dispatched a messenger to his son, offering his forgiveness and recalling him from exile. The service he had rendered was important, and his royal father was anxious to recognize it by restoring him to favor.

But Kaululaau showed no haste in availing himself of his father’s magnanimity. Ever since the restraints of the court, he had become attached to the independent life he had found in exile, and could think of no comforts or enjoyments unattainable on Lanai. The women there were as handsome as elsewhere, the bananas were as sweet, the cocoanuts were as large, the awa was as stimulating, and the fisheries were as varied and abundant in product. He had congenial companionship, and bands of musicians and dancers at
his call. The best of the earth and the love of the people were his, and the *apapani* ['apapane] sang in the grove that shaded his door. What more could he ask, what more expect should he return to Maui? His exile had ceased to be a punishment, and his father’s message of recall was scarcely deemed a favor.

However, Kaululua returned a respectful answer by his father’s messenger, thanking Kakaalaneo for his clemency, and announcing that he would return to Maui sometime in the near future, after having visited some of the other islands of the group; and three months later he began to prepare for a trip to Hawaii. He procured a large double canoe, which he painted a royal yellow, and had fabricated a number of cloaks and capes of the feathers of the *oo* and *mamo*. At the prow of his canoe he mounted a carved image of Lono, and at the top of one of the masts a place was reserved for the proud *ahu* standard of an *ahu ali‘i*. This done, with a proper retinue he set sail for Hawaii. [35:209–213]

The tradition continues by describing events in which Kaulul‘a‘au participated in battles with various demons similar to those on Lāna‘i. His journey took him to the islands of Hawai‘i, Moloka‘i, and O‘ahu prior to his return to Maui. Upon returning to Maui, Kaulul‘a‘au was welcomed home by his father, and learned that Waolani, his priestly instructor and friend, had died. Recalling the promise made to Waolani, Kaulul‘a‘au secretly hid the sacred spear-point of Lono with the bones of Waolani. Kaulul‘a‘au married Lēa‘a-Ewa, a high chieftess of O‘ahu, and together they lived out their lives, residing at Kau‘a‘ula in Lāhaina and parented six children [35:225].

In the tradition of “Kelea, the Surf-Rider of Maui” [35:229–246], mention is made again of Kaulul‘a‘au and his adventures on Lāna‘i. The account is centered on Kelea, the daughter of Keka‘ala, a cousin of Kaulul‘a‘au. It is reported that when Keka‘ala ascended to the throne (ca. 1415), he “became king of Maui and Lanai; for during that period the latter island was under the protection of the *moi* of Maui, while Molokai still maintained its independence” [35:229].

King Kalākaua described the introduction of *ula* to Lele, now known as Lāhaina, and Kaulul‘a‘au’s banishment to Lāna‘i:

It was Kakaalaneo who introduced the bread-fruit there from Hawaii … For some disrespect shown to his royal brother [Kakae], whose mental weakness doubtless subjected him to unkind remarks, he banished his son Kaululua to Lanai, which island, traditions aver, was at that time infested by powerful and malignant spirits. They killed pigs and fowls, uprooted cocoanut-trees and blighted *taro* patches, and a gigantic and mischievous gnome amused himself by gliding like a huge mole under the huts of his victims and almost upsetting them.

The priests tried in vain to quiet these malicious spirits. No sooner were they exorcised away from one locality that they appeared in another, and if they gave the *taro* patches a rest it was only to tear the unripe bananas from their stems, or rend the walls and embankments of artificial ponds, that their stores of fishes might escape to the sea. Aware of these grievances, Kaululua took with him to Lanai a talisman of rare powers. It was the gift of his friend, the high-priest of his father, and consisted of a spear-point that had been dipped in the waters of Po, the land of death, and many generations before left by Lono on one of his altars.

Crowning a long spear with this sacred point, Kaululua attacked the disturbing spirits, and in a short time succeeded either in bringing them to submission or driving them from the island. The gnome Mosealeo was the most difficult to vanquish. It avoided the prince, and for some time managed to keep beyond the influence of the charmed spear-point; but the monster was finally caught within the boundaries of a circular line scratched with the talisman upon the surface of the earth beneath which it was burrowing, and thereby brought to terms. It could not pass the line no matter how far below the surface it essayed to do so. Heaving the earth in its strength and wrath, it chafed against the charmed restraint that held it captive, and finally plunged downward within the vertical walls of its prison. But there was no path of escape in that direction. It soon encountered a lake of fire, and was compelled to return to the surface, where it humbled itself before the prince, and promised, if liberated, to quit the island for ever. Kaululua obliterated sixty paces of the line of imprisonment, to enable Mosealeo to pass to the sea, into which the hideous being plunged and disappeared, never to be seen again on Lanai. [35:229–230]

**Ka Moolelo o Eleio (The Tradition of Eleio)** The tradition of Eleio is set in the time of Kaka‘alanoe’s rule over Maui, Lāna‘i, Molokai, and Kaho‘olawe (ca. 1400), and was published by W. N. Puakea, in the Hawaiian-language newspaper *Kuokoa* in 1863. The account tells us that Eleio was a famous *ki`akini* associated with the court of the king. He was noted for his ability to travel the circuit of the island, to fetch a choice fish from one district and bring it to the court in another district, keeping it alive. When it was learned that Keleleleiaoka‘ula, Kaka‘alanoe’s wife, was expecting, the king granted Eleio the privilege of naming the child. Eleio stated his desire, that if it was a boy, he should be named Kaululua (The-forest-grove). When the child was born, it was indeed a boy, and he was named Kaululua. As the child grew, his mysterious manner and mischievous nature created many problems for his parents and the people of Maui. Eventually, the youth was banished from Maui and sent to Lāna‘i to fend for himself. At that time in history, Lāna‘i was reportedly inhabited by hordes of *akau* under the rule of Puhulu. While on Lāna‘i, Kaululua was accompanied by his own personal god, Lono. Together, the two traveled about Lāna‘i, tricking the ghosts, killing them, and setting the lands free from their dominion.³

³Nupepa Kuokoa, October 24 & 31, 1863.
Ka Moolelo o Eleio

A mamuli o keia olele ana a Pahulu; alaila, ua nee i aku no lakou a noho ma Honopu, aia ia wahi ma kahi e ane kokoke aku ana i ka pali o Kaholo, aka, o Kaumalapau nae kahi e pili pu ana me Kaholo.

Kahi lokei nei ma Honopu, a noho malaila i kekahi mau po, aole nae he akua oia wahia, no ka mea, ua kaapuni hoole o Pahulu ia mau la a me ia ma po ma ia apana mai o a o, mai ka auka, aole ona halavai iki me ke akua, nolaila, aole o lakou kueneia e noho hou ai malaila.

Nolaila, ua nee hou aku la lakou a noho ma Kaunolu, a malaila a noho loihou hou lakou ma ia wahi, no ka mea, ua ike o Pahulu he wahi akouko au o ke akua.

Nolaila, oele aku la o Pahulu ia Kaaulualua, "E aho i noho nakei la, no ka mea, ua ike mai nei au, aia iluna pono o Kahilikilikani ke akua i kea kahi i nohoai. Eia nae ka mea hai aku ia oe e Kaaulualua, e like me ka mea, ua ike mai nei au, aia iluna pono o Kahilikilikani ke akua i kea kahi i nohoai. Eia nae ka mea hai aku ia oe e Kaaulualua, e like me ka mea, ua ike mai nei au, aia iluna pono o Kahilikilikani ke akua i kea kahi i nohoai.

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Alaila, ua maikai ia mea i ko Kaaulualua manao. A noho lakou malaila, me ka hana aku i kana oihana mau o ka kepehi aku i ke akua oia wahia, la malaila ho o Kaaulualua i ao ai i ka paareea ana i ke akua, e like me ka hana ana o na kanaka o Molokai i pae mai ai ma Kaulelehau, a no o ka kekelelehu o na hana malaleia i loau iai Kaaulualua manaila o ke ao ao ana mai a kona akua a Lono, nolaila, ua pau na akua i ka make o Kaunolu.

Kaulualua, me Kaaulualua manao. A noho lakou manao. A noho malaila i kekahi mau po, aole nae he akua oia wahia, no ka mea, ua kaapuni hoole o Pahulu ia mau la a me ia ma po ma ia apana mai o a o, mai ka auka, aole ona halavai iki me ke akua, nolaila, aole o lakou kueneia e noho hou ai malaila.

Nolaila, ua nee hou aku la lakou a noho ma Kaunolu, a malaila a noho loihou hou lakou ma ia wahi, no ka mea, ua ike o Pahulu he wahi akouko au o ke akua.

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Nolaila, oele aku la o Pahulu ia Kaaulualua, "E aho i noho nakei la, no ka mea, ua ike mai nei au, aia iluna pono o Kahilikilikani ke akua i kea kahi i nohoai. Eia nae ka mea hai aku ia oe e Kaaulualua, e like me ka mea, ua ike mai nei au, aia iluna pono o Kahilikilikani ke akua i kea kahi i nohoai. Eia nae ka mea hai aku ia oe e Kaaulualua, e like me ka mea, ua ike mai nei au, aia iluna pono o Kahilikilikani ke akua i kea kahi i nohoai.

The Tradition of Eleio

Pahulu then flew on ahead, and they went on to stay at Honopu. This place is situated not too far away from the cliffs of Kaholo, though Kaumalapau is there, adjoining Ka-holo.

They arrived at Honopu, and stayed there several nights. Pahulu had traveled all about the place, from one side to the other of the land, and into the uplands, but he could find no akua in the district. Therefore, they had no reason to stay there for long.

Then they traveled once again, and stayed at Kaunolu. They remained at this place for quite a long time, because Pahulu knew that this was a place where the akua gathered.

Therefore Pahulu said to Kaaulualua, "Let us stay here a while, for I see there atop Kahilikalani, is the place where the akua reside. But this is what I have to tell you. Kaaulualua, that you shall indeed destroy all the akua; but you should not kill the god called Kānemakua, for he has an important job here. His work, is that he is the native of this place, it is he who cares for the fish of the sea. He is the god, and if he should be killed, there shall be no other god who can watch over this godly point. So be careful, that you do not destroy the akua of this land as you do your work. From what I have seen, he is perhaps like you in what he does. So let him remain free, that he may be worshipped. Kānemakua will become the god of the fishermen of this place."

Kaulualua's thought was this a good idea. So they dwelt there, and he did his work, killing all the akua of this place. Kaulualua then instructed them in praying to the gods, as he had done with the men of Moloka'i, who had washed ashore at Kahalelehale. So it was that the multitudes do this, as Kaulualua'au had been instructed by his god, Lono. Thus vanished, were the akua of Kaunolu.

So when their work at Kaunolu was completed, they thought of leaving the place, and they went on a short distance and stayed at Māmaki. And there also destroyed them...

Thus the remaining akua of Kaunolu were destroyed, and there was also killed a god with a protruding belly. The name of this god was Kaualua. When this god was killed by Kaulualua'au, they then continued their journey and stayed at Mānele.

They resided there for some time—a number of days and nights—and as was Pahulu's usual practice he went about looking here and there for the ghosts. Not encountering any, he went to tell Kaulualua at Lono and Lono that they should ascend to the uplands, while Pahulu would travel along the coast to Naha, and from there he would seek out Kaulualua'au and his companion.

Kaulualua'au foliage went from Mānele, ascending up to Kanauau [Kaneu'u (also written Kana'u'ul), and from there up the mountain of Ka'ohai. From there they went to Kaha'alelepa'akai, and that peak they went to O'lu'ulalo. And from there they went to the mountain summit of Lāna'i Hale, at the place where Kaulualua'au glued closed the eyes of the ghosts with the glue.1

Translated by Maly.

Keaikaikahiki: "Cameo Man's Path to Kahiki"

The island of Lāna'i plays a role in some traditions describing the arrival of the gods and people in Hawai'i. The famed Keaikaikahiki,
“canoe man’s path to Kahikí,” reportedly starts at Kaunolū on Lāna‘i.3 The residency of the god-navigator Kāne‘āpua is commemorated in a place name to this day, as is the place called Miki (Puuomiki), as a source of water, at Kaunolū. Below is one of the traditions of this god and his place in the life of the families of Lāna‘i.

He Moolelo no Wahanui me Kaneapua ma Lāna‘i
O Wahanui ke kahali ali, o Kilohi ke kālo, o Moopo- uaiki ke kahuna a me na hookele moana. I ko lakou holoa ana a pae ma Hāleolono ma Molokai. I ka wana’o holuo aku la lakou ma ka pa‘i o Kaholo ma Lāna‘i, i ke ao ana, kaalo ae la lakou ma ka lae o Kaunolū, a ma ka hikina hema i kī aku o laila, o ka Lae o Apua, ka inoa oia wahi a hiki i kea la. E noho ana kekahi kanaka o Kaneapua ka inoa. Kaheia mai la ua kanaka nei, penei, “Ko ke waa, no wai he waa?” “No Wahanui.”

“O Wahanui ke ali, o wai ke kahunā?” “O Moopoauiki.” “O Moopoauiki ke kahuna, o wai ke kālo?” “O Kilohi.” “He waa e holoa ana i hea?” “He waa e holoa ana i Kahikī, i Kahikīmoe, i Kahiki kapakapakaua a Kane, he waa e holoa ana e keekeeki i ka houpo o ‘Kane.” “O ko houpo la hoi o ko ke kanaka, ka houpo la hoi o ke akua kehea lai hoi, a pau ola, a koe make. Pehela la hoa’o o ka maluna o ka waa?”

Oleo mai o Kilohi ke kālo. “Ua piha loa ka waa, aole oe e hiki.” I ka hololua ana ma kekahi ma ka-lae mai, loa a ia ino, me ka makanā, a me ka puahiohio, o ka hulī waa, hoolana aku la, a komo i ka lulu o Kaunolū, a pae i Kaunolāpau.

A Tradition of Wahanui and Kāne‘āpua on Lāna‘i
Wahanui was a chief of O‘ahu who went to Kahiki. Wahanui was the chief, Kilohi was the astronomer, and Mo‘opuaiki was the navigator. They sailed and landed at Hāleolono, Molokai.1 In the early morning, they sailed along the cliffs of Kaholo, on Lāna‘i, at daylight, they passed by the point of Kaunolū. Just a little to the southeast of there, is the Point of ‘Apua. That is the name of this place to the present day. There was dwelling there a man by the name of Kāne‘āpua. The man called out, thus, “The canoe, whose canoe is it?” “It is for Wahanui.”

“So Wahanui is the chief, who is the priest?” “It is Mo‘opuaiki.” “So Mo‘opuaiki is the priest, who is the astronomer?” “It is Kilohi.” “Where is the canoe sailing to?” “The canoe, is sailing to Kahikī and Kahikīmoe, Kahiki of the rain drops of Kahilo, to tread upon the bosom of Kahn.” “Your chest is that of a man, and to tread upon the bosom of Kahn, is the end of life, only death will remain. How about if I become one of them upon the canoe?”

Kilohi, the astronomer said, “The canoe is completely loaded, you cannot come.” As they sailed on by, passing a certain point, a storm arose, along with a wind and water spouts. Let the canoe be overturned, they sheltered the canoe at Kaunolū, and then landed at Kaunolāpau. In the story of this man, Kāne‘āpua, it is said that he came here from Kahiki. He came with his elder brothers, and because there was no water, they sent him to the uplands at Miki, to get some water. It is there in the uplands of Lāna‘i. But because the older brothers coveted the rich lands of Kāne‘āpua, that is the land of Kahalāpiko, they abandoned Kāne‘āpua on Lāna‘i. He mated with a woman of that place, and became an elder of some of the people there.

Wahanui folks continued trying [to sail], and frequently came close to dying, as storms came upon the canoe at Kealakahiki, Kahū‘ulawe, where one sails to Kahiki. It is said in the tradition of Wahanui’s sailing to Kahiki, that there was much trouble that came upon them in the sea. When Kāne‘āpua became the steersman, they reached the lands of Kahiki. He was foremost of the navigators, and knew all of the stars of the sky and heavens…2

1 Nāpua Kaikoa, January 5, 1867, p. 1.
2 Translated by Maly.

Chiefly Lineages of Lāna‘i
It was after the events in which Kaululā‘au participated that we see references to chiefly lineages associated with Lāna‘i, and the island fell under the dominion of Maui rulers. The role and fate of Maui’s chiefs in warfare with the chiefs of other islands also spilled over to Lāna‘i in the centuries following Kaululā‘au, and lasted through the time of Kamehameha I. In fact, a review of Lāna‘i’s history since the time of western Contact reveals that the island and its people have been subjected to Maui’s political policies throughout modern times. Between the time of Kaululā‘au and his immediate peers until the middle 1700s, there are only a few notable references to chiefly associations on Lāna‘i and several passing references—generally one or two liners—to some event in which a chief visited or was associated with Lāna‘i. Samuel M. Kamakau made an interesting reference to Lāna‘i in his discussion of the Hawaiian nation in 1869:

Ka Moolelo o Hawaii—Helu 108
He aupuni kahiko ali, o Kahikí kea la aina, ake, he aupuni liili i a maka-au.
Forty-five years after Kalani'ōpu'u's raid on Lāna'i, his granddaughter, Ke'ōpouolani, destroyed all the skeletons and one of several large storehouses on Lāna'i as her personal treasures. Kauhi, a mischievous Lanai expedition is remembered by the name of Kamokuhi. [18:156–157]

Haloalena had the skeletons of the birds cleaned, prepared, and posed for safe keeping in his personal treasures. Kauhi, a mischievous Lanai expedition is remembered by the name of Kamokuhi. [18:156–157]

Kalani'ōpu'u failed in an attempt to take control of Maui in ca. 1778, and took the battle to Hana and the eastern district of Maui. This was the cause of the hostilities between the king of Lanai and the king of Maui. This period of Lāna'i's history has a direct impact on the lands of the Ka'a region, and several prominent native and foreign historians described this time in Lāna'i's history. Samuel M. Kamakau's series on Kamehameha I—which includes background information on the chiefs in historical events predating and during the youth of Kamehameha—names several chiefs from Lāna'i:

Ka Moolelo o Kamehameha I—Helu 5

This is the history of Kamehameha—No. 5

In the year 1769, that is when Kalaniʻōpuʻu took Hāna and the eastern district of Maui. Kalaniʻōpuʻu then returned to Hawaii, after which time, Kamehamehanui went to make war on Puna, whom Kalaniʻōpuʻu had left in charge of the eastern district of Maui. This was a famous battle for both sides. On the side of Kamehameha Nui, the King of Maui, there were joined the chiefs of Moloka'i, being Kaohoku, Kaohokaha a Keawe, Avili, Kumukoa, and Kaspooloku; and the chiefs for Lāna'i, being Namakeha, Kalaimanaui, Keliia, and the other chiefs of Maui. [2]

Kalaniʻōpuʻu failed in an attempt to take control of Maui in ca. 1778, and took the battle directly to Lāna'i. For the first time, Maui was defeated by a different chief for Lanai, under the authority of Kamakaulualii and Kauhi-a-kama. Fornerand [16] reported that

Haloalena, the chief of Lanai was considered a very good ruler. His great favorite pastime was the collection of the skeletons of birds. When the chief's bird tax was about due it was the usual custom of the agents to go out and proclaim the chief's wishes. [16:IV-422]

Haloalena was a leading chief of Lanai, and was one of the leaders of the kingdom. He was a sacred chief, feared by all, and famed for his strength. In ca. 1600, Haloalena was the king of Lanai, though he ruled under the authority of Kamakaulualii and Kauhi-a-kama. Fornerand [16] reported that

Haloalena, the chief of Lanai was considered a very good ruler. His great favorite pastime was the collection of the skeletons of birds. When the chief's bird tax was about due it was the usual custom of the agents to go out and proclaim the chief's wishes. [16:IV-422]
been an early and influential convert to the Protestant mission, and her passing was documented in the *Missionary Herald*.

Keopuolani was greatly beloved by her people … Her native disposition was remarkably amiable and conciliatory, and her treatment of her subjects was ever humane.

We are informed by her biographer, who is a missionary at the Sandwich Island, that she was born on the island of Mowee [Maui], in the year 1773; that her father's family had governed the island of Owhyhee [Hawaii] for many generations; and that her mother's family belonged to the islands of Mowee, Wuihoo [Oahu], Ranai [Lanai] and Morokai [Molokai]. Her grandfather was the king of Owhyhee when it was visited by Capt. Cook, in 1777 [1778].

**Kamoku Ahupua'a**

Throughout the large majority of Hawaiian- and English-language accounts, the name Kamoku is given for the *ahupua'a* (fig. 8). In one narrative recorded by Martha Beckwith [1], Beckwith cites the place name "Kumoku" on Lāna'i, and associates it with the god Kū's first encounter with Lāna'i:

According to Kupihea the great gods came at different times to Hawai'i. Kū and Hina, male and female, were the earliest gods of his people. Kane and Kanaloa came to Hawai'i about the time of Maui. Lono seems to have come last and his role to have been principally confined to the celebration of games. At one time he was driven out, according to Kupihea, but he returned later. Kane, although still thought of as the great god of the Hawaiian people, is no longer worshiped, but Kū and Hina are still prayed to by fishermen, and perhaps Kanaloa—Kupihea repeating to me softly the prayer with which he himself invoked the god of fishes.

Of the coming of the gods he had explicit evidence to offer: "Kū and Hina were the first gods of our people. They were the gods who ruled the ancient people before Kane. On [the island of] Lanai was the gods' landing, at the place called Ku-moku. That is the tradition of our people. Kane and Kanaloa [arrived there], but not Lono. Some claim that Lono came to Maui. It is said that at the time Kamehameha36 quartered his men at Kaunakakai on Molokai before the invasion of Oahu, he went to Lanai to celebrate the Makahiki [New Year] festival and on that occasion he said, "We come to commemorate the spot where our ancestors first set foot on Hawaiian soil." So it seems as if it must be true that the first gods who ruled our people came to Lanai." [1:11]

An earlier version of this tradition has not yet been found in the volumes of research in native-language history or earlier foreign accounts for Lāna'i. In a few of the English-language narratives published by Walter Murray Gibson—an article and land application letters—he writes "Kumoku." Gibson's account of Puhi o Ka'ala, published in the *Nahou* April 1, 1873, page 4, Gibson described the journey of Opunui and Ka'ala, referencing the forest of Kalulu and Kumoku (Kamoku). Opunui and Ka'ala passed "through the groves of Kalulu and Kumoku (Kamoku)," and he then forced her down the trail towards the shore at Kaumalapa'u. To date, specific locational reference to the place name “kumoku” has been found.

**Place Names of Kamoku**

In addition to the *ahupua'a* name, several place names survived the passing of time in Kamoku. The site numbers listed are from Emory's 1924 archaeological inventory survey on Lāna'i [13].

- **Anapuka Arch** (Site 175). A rocky point with an arch.
- **Hōkūao** Morning Star (Site 84). A level land below Lāna'i City.
- **Hulupu'uniu** Translation uncertain (Site 78). A level land area below Hōkūao.
- **Iwi'ole** No bones, or no boundary wall (Site 87). Named for a native tenant who lived on the land below Kō'ele, in the early to mid-1800s.

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86Keopuolani, Queen of the Sandwich Islands Died on September 16th, 1823, while in residence at Lahaina," *Missionary Herald*, July 1825:234-235.
2.2.2 Historical Events: Transitions in Land Use and Population on Lānaʻi

In the 1770s, around the time of western Contact with Hawaiians, Kalaniʻopuʻu, sovereign of Hawaiʻi Island, attempted to take the Maui group of islands by force. Repelled from Maui, the invading force settled on Lānaʻi for a time and reportedly killed many of the native residents and laid the land to waste [18;36]. Apparently, Lānaʻi’s native population never recovered from this event. In 1804, the first major epidemic brought to the islands from Niʻihau to Hawaiʻi died.7 On Lānaʻi the decline didn’t end. One estimate of the native population on Lānaʻi in ca. 1793 is 6,000 [4]. By 1823, Mission Station Journals estimate the population on Lānaʻi to be between 2,000 and 3,000 people, and by the early 1890s the population was around 200. By 1902, the native population dropped to 80 residents, most of whom were descendants of Lānaʻi’s long-term native families. One can only guess how much traditional knowledge of place, practices, and traditions was lost as the population fell from 6,000 to 80 in a little more than a century.

With the exception of the periods from 1854 to 1864 and 1899 to 1901, there were no increases in the population on Lānaʻi. The two periods of increase were tied to western initiatives, the first being an experiment by members of the Mormon Church to establish a station on Lānaʻi between 1854 and 1864. This period led to an increase of more than 300 Hawaiians and a few foreigners, with the majority living in the ahupua’a of Pālalai, and regular travel between the upland settlement and the Mānele landing. The experiment was in decline by 1858, and though there was a revival between late 1861 and 1864, the Pālalai experiment was terminated, and the native population continued its historic decline. The second period of growth, between 1899 and 1901, occurred when the Maunalei Sugar Company brought in some 600 non-Hawaiian laborers to operate a sugar plantation along the windward section of Pālalai Ahupua’a.

One significant contribution to the decline in Lānaʻi’s ability to support the resident population was the introduction of grazing herbivores—goats, sheep, and cattle—which were raised to provide foreign vessels with a meat source. These animals, along with the Scandinavian roof rat, produced a rapid and devastating impact on the ability of Lānaʻi’s forest to draw moisture from the wind-borne clouds and develop groundwater resources. In addition to the introduction of herbivores, the western demand for staple crops such as potatoes, along with the demand for ʻiʻihi as a trade item, and the hunger for firewood

\[\text{Pākāpā}'a} Enclosed point (Site 82). Overlooking Kapano Gulch.

\[\text{Naupaka} \text{Literally, Cliff of Mano. A gulch that forms a boundary between Kamoku and Kamoku.}

\[\text{Pueo} \text{Owl. An 'ili of land in Kamoku Ahupua’a, near the boundary with Kalulu.}

\[\text{Pūlehu-loa} \text{To broil (cook) for a long time (Site 80). Hill and bank that forms a north-ern wall of Pālalai Crater, near the Kalulu-Kamoku boundary. Not far from Keli-iha manu’s house (Boundary Commission records).}

\[\text{Puʻu kaulia} \text{Kaulia tree hill (Site 74). A boundary point between Kalulu and Kamoku Ahupua’a.}

\[\text{Puʻukoa} \text{Koa tree hill (Site 76). A low hill on the flat lands below Hulupu’uni.}

\[\text{Puʻunāhāwai} \text{Hill from which to look to Hawaiʻi (Site 77), a high prominence in Kamoku Ahupua’a close to the boundary with Kalulu (Boundary Commission records).}

\[\text{Puʻunēnē} \text{Goose hill.}

\[\text{illus} \text{as potatoes, along with the demand for ʻiʻihi as a trade item, and the hunger for firewood.}
Lāna'i in 1823

William Ellis, an English missionary who worked with the early Protestant missionaries in the Hawaiian islands, described Lāna'i, the nature of its resources, and the estimated population in the early 1820s:

RANAI, a compact island, seventeen miles in length and nine in breadth, lies north-west of Tahaurawe, and west of Lahaina, in Maui, from which it is separated by a channel, not more than nine or ten miles across. Though the centre of the island is much more elevated than Tahaurawe, it is neither so high nor broken as any of the other islands: a great part of it is barren, and the island in general suffers much from the long droughts which frequently prevail; the ravines and glens, not-withstanding, are filled with thickets of small trees, and to these many of the inhabitants of Maui repair for the purpose of cutting posts and rafters for their small houses.

The island is volcanic; the soil shallow, and by no means fertile; the shores, however, abound with shell-fish, and some species of medusae and cuttle-fish. The inhabitants are but few, probably not exceeding two thousand. Native teachers are endeavouring to instruct them in useful knowledge and religious truth, but no foreign missionary has yet laboured on this or the neighboring island of Morokai, which is separated from the northern side of Ranai, and the eastern end of Maui, by a channel, which, though narrow, is sufficiently wide for the purposes of navigation. [12:6–7]

A Protestant mission station was established in Lāhaina in 1823, and was responsible for West Maui, Lāna'i, Moloka'i, and Kaho'olawe. Mission station leaders were tasked with overseeing the spiritual, educational, and health needs of island residents. In addition to the Protestant missionaries, Lāna'i experienced a period of development as a Mormon mission station from late 1853 to early 1864. As noted above, the “experiment” brought an increase in Lāna'i's Hawaiian population, with Hawaiians from other islands moving to Lāna'i, and also fostered some significant changes on the island, notably in the area of land tenure. The work of the various missionaries and their associates resulted in the creation of an important record of history on the island. Excerpts of reports, personal journals, and articles published in Hawaiian and missionary papers—documenting Lāna'i's population statistics, land use, health, and development of churches and schools—provide important records from Lāna'i.

The islands of Ranai and Morokai have, till within a few weeks, been entirely without teachers. To the former [Lānai], I last week sent a man, who is to act as superintendent of four schools, which are to embrace all the people of the island. There are a few people there, who have frequently visited Lahaina, and when here, have always been in our schools. From among this number, the superintendent is to select four assistants; and thus I hope all the people will have it in their power to learn to read and write, and to acquire, by means of our books, many of the first principles of Christianity. Of the number of pupils which will be embraced in these schools, I can form no estimate, as I have yet received no report, and the island has never been explored by any of our number…

The communications between the two last mentioned islands and Lahaina, are frequent, and even constant. There is scarcely a day, but canoes pass and repass. Almost the only communication is by canoes, though small vessels occasionally visit Morokai. The inhabitants of those islands have very little communication with any other place except Lahaina. If therefore they are illuminated at all, they must derive their light from this station. Tawawa [kahoolawe], too communicates with no other island except Maui, though there are few inhabitants there, and those mostly fishermen, who are not permanent residents.9

A Visit to Lānai in July 1828

The earliest eyewitness description of travel on Lānai was penned in 1828, when William Richards, in the company of Kamehameha I’s sacred daughter, Princess Nahinena’ena’, made a visit to the island. The journal notes were forwarded to the secretary of the American Board of Commissioners of Foreign Missions (A.B.C.F.M.)10 through a communication on December 25, 1834, and the excerpts from the journal cited below describe conditions on Lānai at the time. It is notable that there is a discussion on the practice of people living near the shore, where there is easy access to fisheries and brackish water sources; the occurrence of an upland plantation moistened by the cloud and fog drip—the bench lands above the Pālāwai Basin; and the practice of people living near the shore, who are not permanent residents.

The communications between the two last mentioned islands and Lahaina, are frequent, and even constant. There is scarcely a day, but canoes pass and repass. Almost the only communication is by canoes, though small vessels occasionally visit Morokai. The inhabitants of those islands have very little communication with any other place except Lahaina. If therefore they are illuminated at all, they must derive their light from this station. Tawawa [kahoolawe], too communicates with no other island except Maui, though there are few inhabitants there, and those mostly fishermen, who are not permanent residents.9

As it is especially desirable that you have correct information respecting all our fields of labor, I prepare in this letter to give you some account of Lanai, the little island which lies directly opposite Lahaina & about seven miles, distant. You will perceive by the accompanying map,11 that its greatest length

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10Kep‘a and Oona Maly researched the American Board of Commissioners of Foreign Missions (A.B.C.F.M.) collection at Harvard in 2004, and subsequently digitized it for return to Hawai‘i. This journal, along with thousands of other records of importance to Hawaiian history, have been lost to Hawai‘i for 177 years and are seen here in print for the first time.
11The map referred to by Richards was not found in files with this letter and cannot now be identified.
Wm. Richards to Rev. Rufus Anderson, Secretary of the A.B.C.F.M., Recounting Trips to Lanai in 1828 and
with Chiefess Nahi'ena'ena and the near loss of Kapeleaumoku while traveling from Lahaina to Lanai.

At this point Richards inserts lengthy narratives from his personal journal of 1828, and his visit to Lanai.

Owing to the scarcity of water on Lanai, the island is barren almost beyond conception. I have recently been quite round the island, and visited every principal village on the island except one, and during my whole tour, I saw but one good well of water; and no spring or brook, and I saw nothing growing which was suitable for food, either for man or beast, and nothing grows except sea weeds and sea grass. I should except a few coconut trees and two or three or four have trees.

Most of the people live near the shore for the purpose of taking fish in which the shores of Lanai abound, and a considerable portion of their vegetable food

is about 17 ½ miles and its greatest breadth is about 12 miles. The land rises from the shore to the interior, and terminates in lofty points. The sides of the mountains are cut up by innumerable ravines or alternate ridges and hollows. But these valleys are not like the valleys on the windward side of the other islands, furnished with openings & rivulets.

There is but one permanent brook on the island, and that is so small that it is all lost in a few small talo ponds, and their fare does not reach the shore except in the wet seasons of the year. There is not a well of good water on the island, except such as are prepared after the manner of the Hebrews. These wells, though few on Lanai, are common at many parts of the Sandwich Islands. They are either natural or artificial pits, sometimes only a few feet in diameter, and at other times many yards. They are so prepared as that when it rains the water for a distance may flow into them. There are steps to go down into them, but they are not often very deep. In places where they are exposed to direct light & from the wind, they are uniformly covered and even where they are not thus exposed they are often covered, to prevent the water from drying up as soon as it would otherwise. Some of these wells are never exhausted even though they are not replenished for eight or nine months. Others which are small, depend entirely on the almost nightly rains which fall on most of the high mountains of the Sandwich Islands, though in many places these rains are little more than heavy dews.

There are many people who make no use of water for washing either themselves or their clothes, except the dew or water on the grass and some times, there is so little of this that they resort to the juice of the succulent plant which they collect. Most of these people however, have two places of residence, and only spend a part of the year on the mountain where there is also a great scarcity of water. In the sea shore, both at Lanai and throughout the islands, with few exceptions, there is a full supply of brackish water, but such as none can drink except those who are accustomed to it. I know not a single well on the Sandwich Islands, supplied with water from the bottom, except such as are on the sea shore on a level with the sea.

Owing to the scarcity of water on Lanai, the island is barren almost beyond conception. I have recently been quite round the island, and visited every principal village on the island except one, and during my whole tour, I saw but one good well of water; and no spring or brook, and I saw nothing growing which was suitable for food, either for man or beast, and nothing grows except sea weeds and sea grass. I should except a few coconut trees and two or three or four have trees.

Most of the people live near the shore for the purpose of taking fish in which the shores of Lanai abound, and a considerable portion of their vegetable food

they receive from Lahaina, in barter for fish. There is however one inland plantation of some extent, which furnishes considerable food. It is watered by the mist or light rain which falls during the night, in sufficient quantities for the growth of potatoes and in wet seasons some upland - taro is raised. There are few people that reside at that place constantly, but considerable number who reside generally on the shore, go up & spend a month or two at a time so as to keep their land under cultivation, and then return again to the sea side where they can have abundance of fish, and water too, such as it is for there is a plenty of that which is brackish.

The numbers of inhabitants on the island, has been estimated at about 1600; but at the present time I think there are not so many though there has been no regular census of the island taken & it is impossible to make such an estimate as can be relied upon.

The island is always under the same governance as the island of Maui, but the direct care of it has for years been given to Kapeleaumoku, an elderly man, who is a member of our church, and a man of established reputation. . .

In a letter of mine written Oct. 15th, 1828 I alluded to a tour around the island of Lanai, made by myself in company with the Princess, and promised a full account of it. The following is from my journal kept at that time, but which was never sent.

July 24, 1828 – Thursday.

A few missionaries located at the principal places on each of the islands exert an important influence not only over those inhabitants who receive their constant instruction, but also over all the inhabitants of the several islands. This they do, in part, through the chiefs in part, through native teachers, but principally, in consequence of the roving habits of the people which induce them often to visit the principal places by which means they are brought under the occasional sound of the gospel and for a season under the direct influence of missionary instruction.

The chiefs too are after calling the people to the places where they reside to do work for them. In the winter & spring of 1832, all the able bodied men of Maui, Molokai & Lanai were called to Lahaina, and most of them spent several weeks there. It is probable that scarcely a year passes in which most of the people are not thus called to the residence of the chiefs.

The following are extracts from the Lahaina Report dated October 15, 1828. It mentions the people of Lanai assembling for prayer and instruction, as well as population and school enrollment statistics.

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Here Richards is referring to kalo, or taro.

Page 2 - Reel 797:763.

Page 1 - Reel 797:762.

Page 3 - Reel 797:764.

Page 3 - Reel 797:765.
You are already aware that this place is the centre of missionary operations for Maui, Molokai, Lanai, and Kahoolawe. Lahaina is the only place where there is regular preaching. It is, however, by no means the only place where people assemble for religious worship on the Sabbath. There are not less than twenty places on this island, and several on Molokai and Lanai, where people assemble for prayer and instruction. The native teachers take the direction of the meetings, occupying the time in reading and teaching the various Scripture tracts and other books, and conclude with prayer. By this course the people are inspired with a reverence for the Sabbath; and though the teachers are themselves extremely ignorant, yet they are able, in this manner, to communicate some instruction, and the people are thereby kept from assembling for vicious purposes, and worse than idle conversation.

Examination of the Schools

During the summer and early part of the fall of 1828, subsequently to the arrival of the late reinforcements, owing to an increase of their numbers, the missionaries at Lahaina were enabled to make tours over Maui and the small island adjacent, for the purpose of preaching the Gospel, examining the schools, and giving the people such counsel and encouragement as their circumstances required...

<table>
<thead>
<tr>
<th>Island</th>
<th>Sch'ls.</th>
<th>Mal.</th>
<th>Fem.</th>
<th>Writers</th>
<th>Readers</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Ranai</td>
<td></td>
<td>11</td>
<td>236</td>
<td>249</td>
<td>31</td>
<td>201</td>
</tr>
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</table>

...A great proportion of the pupils are persons of middle age, and still they have learnt to read the Scriptures. According to the estimate we made, only one fifth of the scholars are under fourteen years of age.

The people of every district which we visited were addressed particularly on this subject, both by ourselves and the princess [Nahienaena]. We have received the fullest evidence that our exertions have not been in vain. Since our return from the tour of the island, about 5,000 spelling books have been called for, principally to establish schools among children. This increases the whole number enrolled in the schools to about 18,000; viz. 15,500 to this island [Maui]; 1,000 to Molokai; and 700 to Ranai. It is not probable that, with the present population, so large a number as this can ever appear at an examination. But 18,000, we think less than the full number of those who are now enrolled in the schools under the direction of this station...

The population of Maui has been heretofore estimated at 20,000, that of Molokai at 3,000 or 4,000, and that of Ranai at 2,000 or 3,000, making the whole population on these three islands not more than 27,000. The present estimate represents the population as probably amounting to 37,000. Upon comparing with this the number of learners in the schools on these islands, as just given, it will be seen that almost half the whole population, of both sexes, and all ages, are in the schools; a larger portion of the people, probably, than are enjoying the advantages of instruction in any other country on the globe.18

2.2.3 Land Tenure

The Māhele ʻĀina of 1848 set the foundation for fee-simple property rights in the Hawaiian Islands. As a part of major ethnographic work conducted by Kepā and Onaona Maly for the development of the Lānaʻi Culture & Heritage Center, a full history of land tenure on Lānaʻi in the period between 1848 and 1960 has been conducted and made available to the public.19

The narratives below summarize the Māhele ʻĀina on Lānaʻi, drawn from a review of all records compiled as a part of the Māhele ʻĀina of 1848, with subsequent actions of the Land Commission and government through issuance of Royal Patents on the Awards.

Māhele ʻĀina Statistics on Lānaʻi

A total of 110 claims which could be verified for Lānaʻi were recorded. These include both chiefly and commoner/native tenant claims.

- 105 claim records were located in the volumes of the Native Register.
- 88 claim records were located in the volumes of the Native Testimony.
- 2 claim records were located in the volumes of the Foreign Register.
- 21 claim records were located in the volumes of the Foreign Testimony.
- 64 of the claims were surveyed and recorded in the Māhele Award Survey Books.
- 51 claim records were recorded in the volumes of the Royal Patent Books.

The combined claims from Lānaʻi represent 331 separate documents (some overlapping in records of the Native and Foreign Books):

- 56 claims were awarded. Of those awarded, five claimants were chiefly awardees, who received entire ahupua’a.
- 51 awards made to native tenants and individuals of lower chiefly lineage, totaled a little over 600 acres of the approximately 89,000 acres of land on Lānaʻi.

Place Names Referenced in Claims by Applicants

A total of 86 place names for the island of Lānaʻi is in the records provided to the Land Commissioners. The names from Kamoku are Aumoku 1 & 2, Iwiolé, Kaumalapau, Kulelelua (Kalelelua), Makaliilii, and Mooloa.

Disposition of Ahupua’a and Konohiki Claims on Lānaʻi

As a part of the Māhele, the king and chiefs were required to file their claims for personal lands, determine how to pay for their lands—usually by giving up certain lands, in lieu of cash payment—and to claim the kapu fish and wood of their land. The latter items were the konohiki rights to

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18Missionary Herald, July 1829:208–211.
resources with which the konohiki would sustain themselves and generate revenues for their support. In eliciting claims and documentation of rights, the chiefs began submitting letters for the record to the Minister of the Interior. There were only limited letters submitted for Lāna‘i. Of particular interest is a letter dated August 26, 1852 from Noa Pali to Keoni Ana, Minister of the Interior, documenting the kapu or konohiki fish and trees for 11 of Lāna‘i’s 13 ahupua‘a (table 1).

Table 1: Forbidden fish of the konohiki and the prohibited woods

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Buke Māhele (Land Division Book), 1848  In preparation for the final division of lands between the king, konohiki, and government, a Buke Māhele was kept as a log of the agreed upon division. This book is the basis of the Crown and Government land inventory now known as the Ceded Lands. There are 13 ahupua‘a on Lāna‘i. Disposition of 10 ahupua‘a was recorded in the Buke Māhele (1848) and before the Land Commissioners. Three ahupua‘a were apparently dropped through an oversight on the part of the king, Commissioners, and staff. Titles confirmed at the close of the Land Commission are presented in table 2.

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Aloha to you Commissioners who Quiet Land Claims of the Hawaiian Kingdom. We hereby petition to enter our claims on the Island of Lanai. Here are our claims — moo (planting parcel) lands; kula (open plains and planting) lands; the mountains; the wood, woods to be taken under the konohiki; fishes, fishes to be taken under the konohiki; the length is from the moana (open ocean) to the fishery of Kaholo; from one fishery to the other

Table 2: Disposition of ahupua‘a

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*Helu 100041 (Recorded with Helu 10024), Kanekeleia (and Iono et al.), Palawai, Native Register 6:510–511, Lāna‘i, February 12, 1848, translated by Maly.

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Ali'i and Native Tenant Claims from Kamoku Ahupua'a

Kamoku means literally "the district or cut-off portion," [47:82]. Emory explains that the *ahupua'a* "was once cut off from a number of *ahupua'a* for the use of the whole district, hence its name" [13:31]. Kamoku is located on the leeward side of the island and includes 8,291 acres. It is bounded by the ocean on the southwest and the mountains on the northeast. On the north, it is bounded by the *ahupua'a* of Kaʻai, and on the south, by Kalulu *ahupua'a*. Kamoku was noted for its upland forest and springs, with areas the Hawaiians developed into an extensive forested dryland agricultural system. Temporary and long-term residences, from which the rich fisheries facing the *ahupua'a* were accessed, sported the sheltered coves along the shore. Pali was the *konohiki* of Kamoku under the Kamehamehas, and at the time of the Māhele, Kamehameha III retained the *ahupua'a* as a Crown Land.

Uhu was the *kapu* fish, and koko (*Euphorbia* spp.) was the *kapu* wood. Oleloa, a woman of chiefly lineage, claimed the important spring-watered bay of Kaumālapau, an 'ili of Kamoku, but relinquished it to the government during the Māhele.

Table 3 lists Land Commission Awards of native tenants who filed claims for *kuleana* (fee-simple property rights) in 1847–1855 to land in Kamoku. The claims reveal some of the activities that occurred in the lands of Kamoku. Registered Map 2227 (fig. 9) shows the claims in Kamoku. None of the claims registered or awarded fall within the Hōkūao 201-H Residential Project.

### Table 3: Native tenants of Kamoku Ahupua'a

<table>
<thead>
<tr>
<th>LCA Helu</th>
<th>Claimant</th>
<th>Land</th>
<th>Claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>2686</td>
<td>Oleloa</td>
<td>Kaumālapau at Kamoku</td>
<td>—</td>
</tr>
<tr>
<td>4145</td>
<td>Kauhiou</td>
<td>Palawai &amp; Kamoku</td>
<td>1 house lot, cultivated land</td>
</tr>
<tr>
<td>6813</td>
<td>Kaai</td>
<td>Kalulu &amp; Kamoku</td>
<td>1 house lot</td>
</tr>
<tr>
<td>8236</td>
<td>Kaunuiwaiaina</td>
<td>Pua at Kamoku</td>
<td>1 paiku</td>
</tr>
<tr>
<td>10630</td>
<td>Pali</td>
<td>Kamoku</td>
<td>Several moku mauna, sweet potato and gourd fields</td>
</tr>
</tbody>
</table>

At the time that fee-simple property rights were established in the Hawaiian Kingdom, Kamoku Ahupua'a was identified as 'Āina Leʻi Aliʻi (Crown Lands) having been retained by Kamehameha III in the Māhele 'Āina of 1848. In 1906, Territorial Governor George R. Carter entered into an exchange agreement which conveyed Kamoku, along with seven other *ahupua'a* on Lānaʻi, to Charles Gay. Thus, with the exception of kuleana 'Āina and Royal Patent Grant lands, all of the *ahupua'a* of Kamoku became private property, eventually transferring to the Hawaiian Pineapple Company, Limited (HAPCo) and subsequently to the present ownership. It is within the uplands of Kamoku Ahupua'a, at Kōʻele and Khamāniania, that the earliest western residences were established, and in 1923, James Dole selected Kamoku as the site for building Lānaʻi City.

There are several resources on the cultural landscape and in the archival records which help us understand some of the history of Kamoku. Among these are place names, the occurrence of the ancient *ahupua'a* trail *ala p'i'i uka*, the traditional boundary alignment
markers between Kalulu and Kamoku Ahupua‘a, and parcels of land which were at one
time held by native tenants.

The following are translations done by Kepā Maly of documents associated with Māhele
claims in Kamoku Ahupua‘a. The kinds of documents included are Land Commission
Award (LCA) claims documented in the Native Register, Native Testimony, Foreign Testi-
mony, Māhele Award Book, and Royal Patents. Reproductions of the original documents
which are in Hawaiian are included in accompanying figures. The descriptions of the
claims included in the Māhele documents offer a glimpse into the kinds of activities that
occurred in Kamoku.

Helu 2686: The Claim of Oleloa

| Helu 2686 (see also Helu 367) |
| Claimant Oleloa (w.) |
| Location Kaumalapau at Kamoku |
| Date January 8, 1848 |

Native Register  Greetings to you John II and Kaauwai, and the Commissioners who
quiet claims.
I hereby tell you of my several land claims from the King. Here are the names of my
lands: Puunau in Lahaina; Kalama II [Kona]; Kaumalapau [Lanai]; and Kanoni [Kau]. I
have five lands, and my residency is from the King. Therefore, I provide before you, my
document to you, that you, the Commissioners who quiet claims may see. Here also is
my lot at Puunau, and I give to you my document, Kolopapela Kaau [wai] and Richards to
quiet by your hands. Aloha to you with peace.
Done by me, Oleloa, Widow. (fig. 10)

Helu 4145: The Claim of Kauihou

| Helu 4145 |
| Claimant Kauihou |
| Location Palawai & Kamoku |

Native Testimony Kawaaiki, Sworn. I know his Parcels of land at Kalulu, Lanai. 3 Parcels of
land in the ili below.
Parcel 1. 1 moku mauu in the ili of “Ahupua.”
Parcel 2. 1 moku mauu in the ili of “Elialii.”
He received this Parcel from Hua in the time of Kamehameha II, and has dwelt there
peaceably to this time. No one has objected.
Naoopu, Sworn. The words above are all true. My knowledge is the same. (fig. 11)
Parcel 2. The boundaries are thus. Mauka, land of Maawe. Kamaiki, land of Konohiki.
Makai, the same. Kaena, Il of Kapano.
Parcel 3. The boundaries are thus. Mauka and all about, land of Konohiki.
He received these Parcels of land from his parents in the year 1840, and his parents
received them from Daniela II. He has resided there peaceably to this time. No one has
objected.
Kawaaiki, Sworn. All the words above are true. My knowledge is the same. (fig. 12)

Māhele Award Book  There in the Ahupuaa of Kalulu, Island of Lanai. Three Parcels.
Parcel 1. There in the Il of Ahupau... [metes and bounds] ... 6 Acres. 3 Roods, 10
Rods...
Parcel 2. There in the Il of Elialii... [metes and bounds] ... 7 Acres, 3 Roods, 17.8 Rods...
Parcel 3. There in the Il of Kamoku... [metes and bounds] ... 5 Acres, 3 Roods, 2 Rods...
(fig. 13)

Helu 8556: The Claim of Kaauwaeaina

Helu 8556
Claimant Kaauwaeaina
Location Maunalei, Kalulu, and Kamoku
Recorded at Lanai
Date February 7, 1848
Royal Patent 5137 (figs. 17, 18)
Parcel 3. 1 Pauku land in the ili of Pueo, Kamoku Ahupuaa.

Par. 1. The boundaries are thus. Mauka, my land. Kaena and all about, land of Konohiki.
Par. 2. The boundaries are thus. Mauka and all about, land of Konohiki.
Par. 3. The boundaries are thus. Mauka and all about, land of Konohiki.

He received Parcel 1 from Kawaaiki in the year 1844. Par. 2 from his parents in the time of Kamehameha II. Par. 3 from his parents in the time of Kamehameha I. He has resided there peaceably to this time. No one has objected.

I. Kaliliaumoku, Sworn. All the statements above are correct. My understanding is exactly like that as spoken by Kawaaiki. (fig. 15)
Parcel 2. There in the ili of Kapanouka... [metes and bounds] ... 1 Acre, 0 Roods, 35 Rods.

Parcel 3. There in the ili of Pueo... [metes and bounds] ... 38 Acres, 2 Roods, 12 Rods.

( fig. 16)

Figure 16: Helu 8556 of Kauuwaena. Source: Māhele Award Book 7:212.

Helu 10630: The Claim of Pali

Helu 10630
Claimant Pali

Location Kamoku
Recorded at Lanai
Date February 5, 1848
Royal Patent 4800 (figs. 23, 24)

Native Register Aloha to you Kaauwai, J. Ii and Armstrong, Commissioners who Quiet Land Claims. Here are my thoughts to you, that you will look upon my land claim. Here are the lands which the King gave me on Lanai. Auhea gave them to me. I am a Konohiki of the King, the lord of the land. That is what he said to me.
Here is this claim of mine. We spoke with Auhea, about my being the tax collector, that when the reign of the King in the Government was finished, then my position would end. That is was what we spoke of. But the Government would not consider my claim if my work should be at fault.
Here is this responsibility of mine, a responsibility of prayer [as an overseer of the Lanai Church] from Ricord and Hoapili. Richards is my overseer. I have attended this work for 13 years. That is what I took care of. Now Baldwin tends to the work, and I am under Baldwin.
School overseer is another responsibility of mine, gotten from those people who had it. That is it. The decision to approve or deny it, is now up to you as you decide. (fig. 19)

Native Testimony Lanai. July 10, 1851.
Poupou, Sworn. I know his parcels of land in the Ahupuau of Makaliilii, Kulelelua, Iwiole and the 2 Aumoku on Lanai. They are combined into one, being several moku mauu, sweet potato and gourd fields.
The boundaries are thus. Mauka, land of Konohiki. Kamaiki, land of Kaauwai. Makai, land of Konohiki, Kaena, Alanui (Road).
He received his land from M. Kekauluohi in the year 1839, and has resided there peaceably to this time. No one has objected, and he is the Overseer of these lands.
Keawe, Sworn. All the words above are true. My knowledge is the same.
Pali, Sworn. The reason for my thinking of joining them together as one, is because there are many places of mine which are cultivated here and there, and where are built houses. I go from one place to another to cultivate, as announced in the Elele [newspaper]. Therefore I've joined my places together. It is as the witnesses have stated above. My claims for the other places are ended. (fig. 20)

Foreign Testimony Jany. 17th, 1853.
Resolved, that the Land Commission be and is hereby authorized to award fee simple titles to Pali (Claim No. 10,630), Kalaihoa (No. 3719 B) and Malulu (No. 6846) as surveyed by Asa, containing respectively 1121\(\frac{1}{4}\), 75 \(\frac{1}{10}\) & 90 Acres.
By order of Privy Council (Sig.) Lorrin Andrews,
Secretary. (fig. 21)
Figure 19: Helu 10630 of Pali. Source: Native Register 6:526.

Figure 20: Helu 10630 of Pali. Source: Native Testimony 13:259.

Māhele Award Book  
There in the ili of Kaumalapau, Mooloa, Makalii, Kalelehua and 2 Aumoku, in the Ahupua'a of Kamoku, Island of Lanai. One Parcel.

Beginning at the Western corner and running… [metes and bounds]… 112 Acres, 1 Rood, 23 Rods. (fig. 22)

Palapala Sila Nui, 1855–1867: Royal Patent Grant Lands on Lāna'i  
At the same time the Māhele 'Āina was being undertaken, it was realized that many native tenants were not receiving lands claimed, or in the case of environmentally stressed areas, they were not able to claim adequate land areas to support their families. As a result, the king signed into law an act giving applicants the right to apply for larger tracts of land from the inventory of government lands set aside for the support of government operations. All Royal Patent Grants issued on Lāna'i are listed in table 4.

One Royal Patent Grant was awarded in Kamoku Ahupua'a, with a parcel also situated in the adjoining Kalulu Ahupua'a. This land is approximately two miles below the study area. The application and records follow. The original records were written in Hawai'ian.
Figure 21: Helu 10630 of Pali. Source: Foreign Testimony 15:40.

Figure 22: Helu 10630 of Pali. Source: Māhele Award Book 7:222.

Table 4: Royal Patent Grants on Lāna’i

<table>
<thead>
<tr>
<th>Grant No.</th>
<th>Grantee</th>
<th>Location</th>
<th>Acreage</th>
<th>Book</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1928</td>
<td>Koiku Pawili</td>
<td></td>
<td>34.93</td>
<td>10</td>
<td>1855</td>
</tr>
<tr>
<td>1929</td>
<td>Kekua Pawili</td>
<td></td>
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Nahuina & Keliihue, he aina kuai ka laua me ke Aupuni, Kalulu i Lanai, 236.68 Eka, hookahia dala o ka Eka 1.

No ka aina 236.75
No ka Sila 5.00
No ke Ana ana 20.00 261.75
Kaa mua ia Ioane Richardson 158.00
Kaa hope ia P. Nahaolelua 103.75

Ua kaa loa kea aina, ua hooiliia ke dala i ke Kuhina Kalaiaina. E nana ma ka Buke 2 aoao 31. Ua looa mai ka P. Sila Nui, Helu 3029, ua haawiia ia Nahuina & Keliihue.21

A translation by Kepā Maly of the preceding document follows.

Nahuina & Keliihue have purchased land of the government in Kalulu, Lanai. 236.68, at $1.00 per Acre.

Price of the Land 236.75
Price of the Patent 5.00
Price of the Survey 20.00 261.75

The land has been paid for in full, with the money collected by the Minister of the Interior. Look in Book 2, page 31. The R. Patent, Number 3029 has been received by Nahuina and Keliihue.

The Royal Patent documents are included as figures 25 and 26.

21Hawai‘i State Archives, DLNR 2 Vol. 37:38.
Figure 25: Page 1 of 2. Royal Patent 3029 of Nahuina and Keliʻihue. Source: Volume 14, p. 113-114.

Figure 26: Page 2 of 2. Royal Patent 3029 of Nahuina and Keliʻihue. Source: Volume 14, p. 113-114.
The following is from the Notes of Survey for Royal Patent 3029 to Nahuina & Keliihue, at Kalulu and Kamoku. The original document was written in Hawaiian. The sketch map accompanying the Notes of Survey is included as figure 27.

Apana 1. Ma ke Ahupuaa o Kalulu, Mokupuni o Lanai.
E hoomaka ana ma ke kīhi Komohana Hema o keia apana a holo aku i ka:
He. 52 ½º Hi. 2532 pauku pili me Aupuni;
Ak. 52º Hi. 2653 pauku pili me Aupuni;
Ak. 43 ¾º Ko. 2030 pauku pili me Aupuni;
He. 30 ¼º Ko. 514 pauku pili me Ahupuaa o Kamoku;
He. 53 ¾º Ko. 718 pauku pili me Ahupuaa o Kamoku;
He. 68 ½º Ko. 2930 pauku pili me Ahupuaa o Kamoku;
He. 45 ½º Ko. 2080 pauku pili me Ahupuaa o Kamoku;
Hiki i ke kīhi mua. O kona ili 133 3/10 Eka.

Apana 2. Ma ka ili o Kaumalapau i loko o ke Ahupuaa o Kamoku.
E hoomaka ana ma ke kīhi Hikina Akau o keia apana a holo aku i ka:
Ak. 52 ¾º Ko. 415 pauku pili me Aupuni;
Ak. 44º Ko. 2144 pauku pili me Malulu;
He. 32 ½º Ko. 4664 pauku pili me Malulu;
He. 43º Hi. 2320 pauku pili me Aupuni;
Ak. 29º Hi. 2540 pauku pili me Ili o Pueo;
Ak. 43º Hi. 2200 pauku pili me Ili o Pueo;
Hiki ke kīhi i hoomaka ai.
O kona ili, 103. 58/100 Eka.

[John Richardson]
Waikapu.
Nov. 1855.

Below is a translation of the Royal Patent 3029 Notes of Survey document by Kepā Maly.

Parcel 1. In the Ahupuaa of Kalulu, Island of Lanai.
Beginning at the Southwestern corner of this parcel and running to the:
South 52 ½º East 2532 links along Government;
North 52º East 2653 links along Government;
North 43 ¾º West 2030 links along Government;
South 30 ¼º West 514 links along the Ahupuaa of Kamoku;
South 53 ¾º West 718 links along the Ahupuaa of Kamoku;
South 68 ½º West 2930 links along the Ahupuaa of Kamoku;
South 45 ½º West 2080 links along the Ahupuaa of Kamoku;
To the first corner.

Parcel 2. In the ili of Kaumalapau, in the Ahupuaa of Kamoku.
Beginning at the Northeastern corner of this parcel and running to the:
North 52 ¾º West 415 links along Government;
North 44º West 2144 links along Malulu;
South 32 ½º West 4664 links along Malulu;
South 43º East 2320 links along Government;
North 29º East 2540 links along the Ili of Pueo;

Figure 27: Sketch map accompanying the Notes of Survey for Royal Patent 3029 of Nahuina and Keliihue. Source: Hawai‘i State Archives.
North 43° East 2200 links along the Il of Pueo;
To the corner of commencement.
Containing 103 30/100 Acres.
[John Richardson]
Waikapu,
Nov. 1855.

Boundary Commission Surveys and Testimonies

Following the Māhele Āina, there was a growing movement to fence off land areas and control access to resources which native tenants had traditionally been allowed to use. By the 1860s, foreign land owners and business interests petitioned the Crown to have the boundaries of their respective lands—which were the foundation of plantation and ranching interests—settled. In 1862, the king appointed a Commission of Boundaries, a.k.a. the Boundary Commission, whose task was to collect traditional knowledge of place, pertaining to land boundaries and customary practices, and determine the most equitable boundaries of each ahupua‘a that had been awarded to ali‘i, konohiki, and foreigners during the Māhele. The commission proceedings were conducted under the courts and as formal actions under the law. As the commissioners on the various islands undertook their work, the kingdom hired or contracted surveyors to begin the surveys, and in 1874, the Commissioners of Boundaries were authorized to certify the boundaries for lands brought before them.23

In the period of 1876–1877, William D. Alexander, Surveyor General; M. D. Monsarrat, Assistant Surveyor; J. F. Brown; and party surveyed the entire island of Lāna‘i, traveling with elder native tenants. Alexander’s field book,24 covering late March and early April 1876, contains his notes, compiled through interviews and fieldwork. The book provides readers of the present day with glimpses into the cultural and natural landscape of Lāna‘i, and identifies several elder informants on Lāna‘i. Of particular importance is documentation of traditional sites such as heiau, areas of residence, burial sites, shrines, former ‘ua‘u nesting grounds, and trails. In the record are also found a number of place names and descriptions of features not mentioned in other documentary sources.

Unfortunately, few of the narratives recorded in Register Book No. 153 made it into the formal proceedings and documents of certification authorized by the Boundary Commission. The court proceedings focused on metes and bounds, relying on the authenticity and accuracy of the documentation provided by the surveyors. Thus, the notes copied verbatim from Register Book No. 153 provide us with the background as to how the boundaries were determined, and identify significant cultural resources of Lāna‘i.

The following from Register Book No. 153 are notes on Lāna‘i boundaries at Halepalaao. It is dated March 28, 1876. Note that Alexander uses macron accents—kahakō—in certain place and people names as indicated.

Kaumalapau & Kalama are both Ilis of Kamoku. Three lands run across from sea to sea, viz., Palawai, Kalalu, & Kaunolu...

April 1.
Appr. Elevation of the water shed near the road from Maunalei to Kamoku = 1750 ft.
Appr. Elevation of the Koele station 1550 ft...
April 3rd. 76. Monday.
Keliihue widow of Nahuiwa, was born on Kalulu, & testifies that the boundary between Kalulu and Kamoku comes down from a hill known as Puunene down the North bank of the Kapano valley to the Govt. road, passing near Kawaananhele’s house, keeping straight on across a side ravine coming in from the north, called Keaakō, to the top of the north wall of the Palawai crater at a place called Pulehulua, near Keliinanamu‘i’s house.

Kamoku

Thence itskirts to thenorthwestern slope of the crater till it meets the old road to the sea, which it follows down to Kaumalapau Harbor.

Papalua another old resident agrees with the above in the main, but declares that from Pulehulua the boundary runs to a rocky eminence called Pau Nanahawi, where he says that Makalena set up his compass.

From thence he says it runs to the site of an old heiau called Ka Ili o Lono, near which Papalua’s house formerly stood, near the present road. Kaaiai, an old kamaaina, insane however, points out a pile of rocks nearly on a line between these two points called Kuainanpu, to which he says he guided Makalena.

From the Ili o Lono the line follows the old road to the neighborhood of Kaumalapau Harbor. The whole of the harbor belongs to Kamoku. Starting from the edge of the pali on the south side of the harbor, the line follows the ridge on the south side of Kaumalapau ravine till it meets the old road.25

Primary records in the Boundary Commission collection from Lāna‘i were recorded from 1876 to 1891. The records include testimonies of elder kama‘aina who were either recipients of kuleana in the Māhele, holders of Royal Patent Land Grants on the island, or who were the direct descendants of the original fee-simple title holders, as recorded by the surveyors/commissioners. The resulting documentation covers descriptions of the land, extending from ocean fisheries to the mountain peaks, and also describe traditional practices; land use; changes in the landscape witnessed over the informants’ lifetime; and various cultural features across the land.

The native witnesses usually spoke in Hawaiian, and in some instances, their testimony was translated into English and transcribed as the proceedings occurred. Other testimonies from Lāna‘i have remained in Hawaiian, untranslated, until development of a manuscript for the Lāna‘i Culture & Heritage Center.26 Translations of the Hawaiian-language texts below were prepared by Kepā Maly. The descriptions and certificates of boundaries

24Register Book No. 153, copied from the collection of the State Survey Division.
for the ahuapua’a of Lāna‘i are from the notes of W. D. Alexander, who worked for the Boundary Commission. The notes, dated 1875–76, give boundary information collected from kama‘aina. The following are excerpts from Alexander’s notes.

At Halepalaoa March 28th, ’76.

Hoa, an old Kamaaina states that the boundary between Kaohai and Paawili begins at the inlet of the sea a little south of the Church, & thence follows the bottom of the kahawai to the top of the mountain.

Kaumalapau & Kalama are both Ilis of Kamoku. Three lands run across from sea to sea, viz., Palawai, Kalalu, & Kaunolu,…

April 3rd. 76. Monday.

Keliihue widow of Nahuina, was born on Kalulu, & testifies that the boundary between Kalulu and Kamoku comes down from a hill known as Puunene down the North bank of the Kapano valley to the Govt. road, passing near Kawasnehele’s house, keeping straight on across a side ravine coming in from the north, called Keaakik, to the top of the north wall of the Palawai crater at a place called Pulehulua, near Keliihananui’s house.

Kamoku

Thence it skirts to the northwestern slope of the crater till it meets the old road to the sea, which it follows down to Kaumalapau Harbor.

Papalaus another old resident agrees with the above in the main, but declares that from Pulehulua the boundary runs to a rocky eminence called Puu Nanaia-hawaii, where he says that Makalena set up his compass.

From thence he says it runs to the site of an old heiau called Ka Ili o Lono, near which Papalaus’s house formerly stood, near the present road. Kaaiai, an old kama‘aina, insane however, points out a pile of rocks nearly on a line between these two points called Kuanaiupu, to which he says he guided Makalena.

From the Ili o Lono the line follows the old road to the neighborhood of Kaumalapau Harbor. The whole of the harbor belongs to Kamoku. Starting from the edge of the pali on the south side of the harbor, the line follows the ridge on the south side of Kaumalapau ravine till it meets the old road.27

Below is a letter from M. D. Monsarrat, a surveyor, to W. D. Alexander dated 1877. There is some description of Monsarrat’s process, as well as the areas of Lāna‘i which he has already surveyed.

Palawai, Lāna‘i

Since writing my last letter I have found an old Kamaaina by the name of Pali who has been absent for some time. He gives his age at ninety nine and is pretty helpless as I had to lift him off and on his horse. I could not get him to come for less than two dollars a day but I think that he is worth it as he seems to be very honest. He puts Kamoku boundary the same as Keliihue and not wrongly as Papalaus did.

I have surveyed Kaunolu boundary on this side of the mountain, also both sides of Palawai from the top of the mountain to the South wall of Palawai crater from there to the sea, I will leave until I return from the other side of the mountain, where I intend starting early Monday morning. Don’t you think that I had better survey the boundary between the government land of Kamao and Kaohai which is very short and will survey with Paawili on the upper side of the island to Palawai form a survey of Kaohai. I have started to carry a set of triangles around from Puu Manu to Halepalaoa and find that it can be done with little effort and few triangles. When I was in Lahaina Mr. Gibson spoke of having me stop here and complete the survey of the island as he is very anxious for a map.

It is beginning to get very dry here and water scarce. Potatoes are also very scarce and expensive. Pai ai are a dollar apiece in Lahaina now having jumped from seventy five cents since I came over…

As soon as I finish Kaunolu I will send you the notes of survey as the minister of interior is very anxious to get them. Mr. Gibson is going to start his men shearing at Palawai in a few days. Hoping to hear from you soon. I remain yours, 28

The following Boundary Commission document gives testimonies of the surveyor Monsarrat, as well as Kamau’s Pali on the boundaries of lands on Lāna‘i. Pali states that he was the konohiki of Kamoku.

Hooponopono Palena Aina a ke Komisina


Decision of Boundaries by the Commission

On the 14th day of June, A.D. 1877, Prof. W.D. Alexander, set before the Boundary Commissioner of Maui, an application to Certify the boundaries of several lands which have all been surveyed on the Island of Lāna‘i. They being, “Palawai” of W.M. Gibson Esq. “Kaohai” of Her Highness R. Keelikolani; “Kalulu” and “Kamoku,” Crown Lands; “Kamao,” “Kealia,” “Paawili,” & “Kaunolu,” Government Lands.

Notes:

28M. D. Monsarrat (Surveyor) to W. D. Alexander (Surveyor General), June 2, 1877, Hawai‘i State Archives, DAGS 6 Box 1 - Survey.
Ma ka la 17 o Septemabua, A.D. 1877, ua noho ka Aha ke Komisina e hooleho no ke noo maluanae. O M.D. Monsarrat (Hope Ana Aina Aupuni) ka mea i hiki mai ma ka aoao o ka mea noa. A no ka mea ho i ana no i Ana ia mau aina apau. A ua hoomana pu ia mai no ho i oia i Jno. O. Dominis e lavelave imua o ke Komisina ma na mea e pili ana i na Aina Lei Alii ma Lanai. Hoohikiia o alelo mai:

Nau no i Ana keia mau aina a pau; ua hele pu au me na Kamaona ma na palena apau o keia mau Aina. A ua lokahi lako au apau, ua pono, a ua poolei ka'au ana ana. O Rev. N. Pali ko'u alakai nui nana i kuhikahi, a ua make iho nei kekahai. No ka hiki ole ana mai o Pali i keia la, ua hoopono ka Aha a hiki mai oia noho hou.

Ma ka la 30 o Septemabua 1877, ua hiki mai o Pali, a ua noho hou ka Aha. Hoohikiia o Pali a olelo mai:

Pali au, he kamaaina au no na Lanai, na ko'u mau makau i kuhikuhu mai ia'u. A no ko'u noho konohiki ana hoi malalo o Kauikeaouli maopopo loa ia'u na palena. Noho Konohiki au no "Kalulu," " Kamoku." He mau aina Aupuni o Kamao, Kealia, Pawili, a me Kaunolu. Maopopo loa ia'u.1

1 Palawai Ahupua'a, Island of Lanai, Boundary Commission Volume No. 1, p. 108-110, No. 34, Keena Kainaina o Maui, Lahaina, September 17, 1877.

On the 17th day of September, A.D. 1877, the Commission convened to hear the above applications. M.D. Monsarrat (Asistant Government Surveyor) was present on behalf of the applicant. Also as the one who Surveyed all of the lands. Jno, O Dominis was authorized to bring the mater to the Commission by those adjoining the Crown Lands on Lanai. Sworn and stated:

I surveyed all these lands; I went along all the boundaries of the lands with natives. They were all in agreement. My surveys are correct and true. Rev. N. Pali was my primary guide, he pointed out things, others have since passed away.

Because Pali did not arrive this day, the Commission moved Await his arrival before reconvening. On the 30th day of September, 1877, Pali arrived, and The Commission reconvened. Pali Sworn and stated:

I am Pali. I am a native of Lanai, my parents pointed them (the boundaries) out to me. And as a result of my having been Land overseer under Kauikeaouli, the boundaries are known to me. I was the Konohiki of "Kalulu," and "Kamoku." Kamao, Kealia, Pawili, and Kaunolu are Government lands. I know them well.2

2 Commissioner of Land Boundaries.

The following is from the Boundary Commission. It certifies the boundaries determined through the survey of Monsarrat.

Olelo Hooholo

Ke hooholo nei au. O na palena o na aina apau ma Lanai i anaia e M.D. Monsarrat, oia hoi o "Palawai" no W.M. Gibson, " Kaohai" no ka Mea Kekie R. Keeliolani, "Kalulu" a me "Kamoku" he mau aina Lei Alii a nea.

Decision

I hereby move. The boundaries of all the lands on Lanai, surveyed by M.D. Monsarrat, they being, "Palawai" of W.M. Gibson, "Kaohai" of Her Highness, R. Kekiolani, "Kalulu," and "Kamoku." Crown Lands, and "Kamao," "Kealia" [Aupuni], "Pawili" & "Kaunolu," being Government lands, as uniformly surveyed and given within, are right and correct.

Signed at Lahaina, this 30th day of Sept. 1877.

Komisina P. A. Apana Elua, ko H. P. A.1 2 Commissioner L.R.2 Second District, of the H.I.3

1 Boundary Commission Volume No. 1, Palawai Ahupua'a, Island of Lanai, p. 113.
2 Commissioner of Land Boundaries.
3 Translated by Maly.

The following are the metes and bounds surveyed by Monsarrat of Kamoku Ahupua'a.

Commencing at a pile of stones over a cross cut in a large stone on South side of Kaumalapau Harbor on edge of gulch. The boundary runs:

1. N 86° 27' E true 3254 feet along Kalulu up South edge of gulch to a stone marked with a cross on edge of gulch a little above a branch that comes into the main gulch from the South. Thence:

2. N 88° 46' E true 5225.9 feet along Kalulu, up South edge of gulch to a cross cut in a stone on South edge of same. Thence:

3. N 84° 40’ E true 2594 feet along Kalulu to head of gulch. Thence:

4. N 47° 34’ E true 2080 feet along Kalulu to a cross cut in a stone amongst a lot of stones at the former site of an old Heiau called "Ili o Lono." Thence:

5. N 46° 19’ E true 10144.4 feet along Kalulu up South edge of gulch to a point a little North of a cactus clump marked by two triangular pits.

6. N 65° 44’ E true 4039 feet along Kalulu along North edge of crater to a red wood post on the North wall of the crater at a place called Puleluola near Kiliarahanauu's house.

7. Thence along Kalulu down across a small ravine (coming in from the North called Kekauku) to Government Road and up the N.W. edge of the Kapano valley, passing near Kawaanoanehele's house to a point on ridge marked with four triangular pits and ditch thus; said point being a little east of Pua Nene and bearing N 44° 53’ E true 8052 feet from above mentioned red wood post.

8. N 45° 49’ E true 1067.9 feet along Kalulu across valley passing to the S. E. of a water hole called Kailohena to a red wood post on ridge that comes down from the central mountain range.

9. N 62° 37’ W true 6742.5 feet along Paomai down above mentioned ridge and across valley into a small ridge and down said ridge to a red wood post at end of same.

10. N 84° 37’ W true 1316.8 feet along Paomai to a cross cut in a stone.

11. S 74° 8’ W true 6258 feet along Paomai passing to the North of a couple of Hala clumps to two Triangular pits at an old house site.
12. S 74° 07' W true 3045 feet along Paomai to a cross cut on a stone at head of gulch.
13. N 86° 6' W true 1368 feet along Paomai down South side of gulch.
14. S 83° 45' W true 1455 feet along Paomai to a cross cut in a stone.
15. S 74° 9' W true 920 feet along Paomai.
16. N 55° 12' W true 898 feet Paomai across gulch to a red wood post a little West of a cactus clump; here ends the Crown land of Paomai. Thence:
17. S 65° 58' W true 1617 feet along Kaa down North side of gulch to a cross on a stone.
18. S 64° 57' W true 2040 feet along Kaa down North side of gulch to a cross on a stone. Thence:
19. S 70° 33' W true 3590 feet along Kaa to a point 10 East of a large rock with cross cut on it. Thence:
20. S 68° 53' W true 1664 feet along Kaa to Sea Shore. Thence:
21. S 1° 55' W true 13460 feet along sea shore to point of Commencement.

Area 8291.09 Acres.

Surveyed by M.D. Monsarrat, Assistant
Hawaiian Government Survey
Lanai, June 1877.29

An Interior Department letter from 1878 gives a list of the lands and length of coastline of Lāna'i. It states that Kamoku, a crown land, has 1.54 mi. of coastline.30

The following is a series of correspondence regarding Walter M. Gibson’s desire to lease government lands on Lāna'i. The first is a letter written by Gibson in which he first expresses his desire to lease Lāna'i land.

On March 23, 1866, Walter M. Gibson applied to the Minister of the Interior, F. W. Hutchinson, for a lease on the government lands on Lāna'i, including lands in Kamoku. With his application, Gibson submitted a sketch map, included here as figure 28.

In compliance with your request I have the honor to lay before the Department, a statement respecting Government lands on Lāna'i.

There are six ahupua'a of land belonging to Government on the island, named: Kamao, Paawili, Kealia, Kalulu, Kaunolu, and Kamoku; comprising about 24,000 acres, with a population of 80 persons. About one eight of this surface is good arable “dry” land; perhaps one half is more or less adapted for grazing; and the remaining three eights, the portion bordering on the beach, an utter barren waste.

I made application to the Department in October 1862 to lease all of these lands. My application was favorably entertained by the Department, but owing to want of proper surveys, a lease was not made out at the time, as I was

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Six months later, on September 18, 1866, Gibson applied again to the Minister of the Interior. I beg to be informed if the Government lands in this island have been rented or leased. A certain number of natives whom I opposed in their destruction of the little shrubbery of the island, in order to make charcoal, assert that the land is in their possession, and have attempted to subject me to a great deal of annoyance. I cannot believe in the truth of their assertion that such a lease has been made, in view of the pledge given to me by your predecessor in office, His Majesty. I am not at all anxious to lease all the Government lands on Lanai. The bulk of these lands, comprised in the districts named Kaunolu, Kalulu and Kamoku, can be better utilized by the native residents at present, and I should waive any pretensions I may have in respect to them; but the smaller lands of Kamao, Paavili, and Kealia, which comprise about one fourth of the Government lands, I desire to lease, as they adjoin my own lands.

Your Excellency will observe in the rough draft map I left at the Interior Office, that the lands of Pavili and Kealia are enclosed between my lands of Palawai and Kealia. These lands Palawai, and the leased land Kaohai, are not more than half a dozen families residing on these small lands, and little or no stock upon them, and they may be properly detached from the bulk of the Government lands on the Western half of the island, where the chief part of the population resides. I trust that some equitable adjustment of these lands will shortly be made, and I beg to be notified respecting any contemplated disposal of them by lease or otherwise...

P.S. It is proper to mention that I have made improvements on Kamao, Pavili, and Kealia, and it would be an act of gross injustice were I to be dispossessed of these lands, by the Department, to another party. I had expended much labor on Kamao, which was thus rendered fruitless. However, I would still propose to the Government to lease the five lands, Kamao, Paavili, Kealia, Kalulu, and Kaunolu. They are now mere commons, upon which roam many thousand head of sheep and goats that do not yield one cent of revenue to the Government...

Accompanying this, a rough draft map of Lanai.

The following correspondences detail the matter of leasing government lands on Lānaʻi to Gibson. The first is from Chas. T. Gulick, Interior Department clerk, to P. Nahaolehua, the governor of Maui and regards the receipt of Gibson’s application. The attached sketch mentioned is included here as figure 29.

There was received at this Office, an application from Walter Murray Gibson (Kipekona), desiring to lease some of the Government Lands on Lānaʻi. Here are their names: Kamao, Pavili, Kealia Aupuni, Kaunolu and Kalulu. At the time that L. Kanehehameha was the Minister of the Interior, he agreed to lease the lands to him, should he build the walls at appropriate places on the land. When he became king, Gibson was deprived of the right. Gibson has sent the application to Stephen Spencer, secretary of the Interior Department, who confirms that the King agreed to it when he was in the office. Will you please look into this and tell me what you think about this request. There is attached, a sketch that shows the location of the lands. It is not an accurate sketch but gives a general rendering.

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2 Translated by Maly.

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Governor Nahaolehua replies to Gulick with the following, dated May 28, 1873, which essentially asks that the lease request by Gibson be denied so as not to deprive the natives of access to the lands. Nahaolehua plainly expresses that Gibson is an untrustworthy individual. Gibson had claimed no more than a half-dozen families resided on the lands; however, Nahaolehua says that "quite a number of natives" live on the lands, who would thus be dispossessed should Gibson acquire the lease.

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P.S. It is proper to mention that I have made improvements on Kamao, Pavili, and Kealia, and it would be an act of gross injustice were I to be dispossessed of the advantages to be derived from them, without being allowed a proper opportunity to enter into competition for leasing the lands upon which the improvements are situated, especially in view of the solemn pledge given me by the Interior Department.

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2 Translated by Maly.

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I received your letter of the 26th day of this month, relative to the application of...
W. Gibson “e hoolimalima kekahi mau aina ma Lanai” eia ko lakou mau inoa, Kamao, Pawili, Kealia, Kaunolu, ame Kalulu.

A ke ololo mai nei i ka wa ia L. Kamehameha ke Kalaiaina, ua ae mai oia ia aina ka Hoolimalima i ua mau aina nei, ua poloioi keia mau ololo, maanei au e hoakaka ai ina kumu i nele ai o Gibson i ua mau aina nei i i ka wa i noho M0i iho nei of Kamehameha V.

Ul lohe ka moii ina hana a W. Gibson, ma ia hope mai. Eia ka mua, Puhi ae la o Gibson i ke ahi a pau loa aku ka maau o ka aina i ka a ia e ka ahi. A ololo iho la o Gibson i kanaka o Lanai he mea waiai ole ka Hanai holoholona, o ka mahiai oia ia mea waiai o ka aina a he mea hooliaka no hoi ia i i ke kino o ke kanaka a he mea no hoi ia e nei ai na hanau ana a na keiki. Ul lohe ania o kanaka ia mau ololo lave aku la lakou ina hipa e kuai me Gibson he mahina hooikahi a oia ae pau loa na Hipa a Gibson, aole, ai mahiai ua waihi nei i pau i ke ahi, ul lohe M0i i keia hana Gibson.

Eia ekahi ua ololo o Gibson i na Hoa-hana o ka Hoomana Molemona e lave mai i ko Kauai, ko Oahu, Molokai, Maui, Hawaii i ko Dala no ke kai a aina ma Lanai ia Palawai, no ka Ekaesia ka ololo ana a Gibson no lakou ua aina nei, ake i ko hanana, o ka Palapala Kuai o ua aina nei o Palawai, o ka inoa wale no o Gibson kai kakauia ma ka Palapala Kuai ame kona Hoolina. Nele iho la ka Ekaesia Molemona, ma keia mau han a akamai a Gibson i haule mailo o ka Lahui Hawaii.

Ul komo ka manao kanalua iloko o ka M0i no ko haule ania iho o keia mau piliiku maluna o ekahi o kona mau makaainana, oia ke kumu i nele ai o Gibson i ka aina ole.

Eia ekahi hanai akamai a Gibson i hanai mai e ka poe o Lanai. Kuai iho nei o Gibson i ka aina ia Kaa a lilo ia ia kukulu aku nei i W. Gibson, “to lease some lands on Lanai,” these being their names, Kamao, Pawili, Kealia, Kaunolu and Kalulu.

And that during the time that L. Kamehameha had the Interior, he had consented that he was to get the lease of said lands. That statement is true. Here I will explain the reasons why Gibson was refused said lands during the time that Kamehameha V was King.

The King had heard after that what Gibson had done. This is the first: Gibson set fire to the grass on the land and was all burnt up by the fire, then Gibson said to the natives of Lanai, that there was no benefit from raising animals, that farming is what will enrich the land, and will make the body of the person strong, and would be the means of having a lot of children born. When the natives heard these words, they took their sheep to sell to Gibson, and in one month and a little over, Gibson had plenty of sheep, but the place which had been burnt was not cultivated, the King heard of these doings of Gibson.

Here is another, Gibson told the members of the Mormon Religion on Kauai, Oahu, Molokai, Maui, and Hawaii, to secure money to buy land on Lanai, that is Palawai. Gibson said it was to belong to the Religion and to be their land, but when the deed of said land of Palawai was made out, only Gibson’s name was written on the deed, and to his heirs. The Mormon Religion had nothing. Because of these smart doings of Gibson, and which fell upon the Hawaiian Nation, doubt was entered into the King’s mind of this distress having fallen on some of his subjects, that is the reason why Gibson was without any land.

Here is another smart doing of Gibson which was reported by the people of Lanai. Gibson bought the land of Kaa, and it be-
ka Pa i ua aina nei o Ka. Lave aku nei ka Hipana anikai Kaa mai Palawai aku pau pu aku nei me ka hapa a Kana'aka, a komo iloko o ka Pa o Ka a noho ilaila. Elua paha pule, lave hou nei Kaa mai a haii i Palawai, hui hou me ka Hipana a kanaka a komo hou iloko o kela pa, ike aku nei kanaka ai i ka laku aia iloko o ka Pa me ko laku Hoialaula, kii aku nei e ho’olu mai, olelo maikai mai la no o Gibson, pela iho. Pili’kia wai i keia manawa e holo ana wau i Lahaina a hiki keia i Lahaina nei, a hala kekahi mau la holu aku la kela i Honolulu a hala kekahi mau la malaila a hoi maia kii aku la ka mea hipaa a hookuu a mai‘a mai‘a ale no ka mea i hoialonaia a o na keiki paa aku iloko ka Pa, aka aia no i Lanai ka poe i ike ia Gibson i ka hana peine.

Nolaila he hai wale aku no keia i ko'eu manai, aole kupono keia Hooialimalima ke aeia mai nae keia olelo a ka mea iaia ka mana o keia hana oia o ke Kuhina Kalaaizina “E.O. Hall.” A he nui no ko pe kanaka o Lanai e noho ana maluna o keia mau aina, ake he mahalo au ia Gibson i ka hana akama;i1 Hawai‘i State Archives, Interior Department Lands.

Governor Nahaolelua writes again to Gulick on June 5, 1873. Nolaila, ua hooialimalima no kakou i ua mau aina nei me ke Aupuni mamuli no nae o ke Kauoha a ke Kuhiina Kuhina ia'a e like no me keia manawa. A no ka'u mau wahi holo aloha o wau no kekahi u ike ia Hooialimalima ana.

Iloko oia hooialimalima ana, ua hookaa pono no kanaka ina makahiki Eha, a i ka lima o ka makahiki, ua koe nae $265. i ka aole mai, a o ka nui o o Dala i kaa mai $1735.00. Oia iho la ka loa ake ke keona.

Ina no e lilo o Kalulu a me Kaunolu i Gibekona a kahi no ia i lehulehu ai ona kanaka, aole no he nui loa o no kanaka ma Lanai, oia wale no ka'u mea hai aku.1 Hawai‘i State Archives, Interior Department Lands.

Gibson doing this.2 Translated by Maly.

Governor Nahaolelua writes the following to the Minister of the Interior, E.O. Hall, on June 13, 1873. I received your letter, and noted what is said therein.

I have better give you a list of all the lands on Lanai: Pawili, Kamao, four Kealia, Kaunolu, Kalulu, Kamoku & Poamai. These are all the Government lands, and Gibson has acquired six lands, and three lands remain.

But it is all right according to what have been decided by you people. And the proper rent for these six lands, according to my belief, is Two Hundred Dollars per annum, and for the remaining lands for the first lease Two Hundred. That is what I think.2 Translated by Maly.

E.O. Hall responds to Governor Nahaolelua on June 16, 1873 with the following letter, which proposes a rental rate to be paid by Gibson for government lands on Lanai.

Your letter of the 13th of June, has been received. This is the opinion of the King and the Ministers, regarding lands of Lanai.

Your letter of the 2nd day of June was received, and I note what is said. If this report, however, is acceptable to the one in authority over the lands on Lanai, Pawili kekahi mau mea, a o Kamao, and there are some on Pawili, think.2

Nolaila, ua hooialimalima no kakou i ua mau aina nei me ke Aupuni mamuli no nae o ke Kauoha a ke Kuhiina Kuhina ia’a e like no me keia manawa. A no ka’u mau wahi holo aloha o wau no kekahi u ike ia Hooialimalima ana.

The natives saw that theirs were inside the pen, having their marks. They went after them to bring them back. Gibson said very nicely to them, wait a while, I am busy now, I am going to Lahaina. And when he got to Lahaina, and some days passed, then he went to Honolulu. And after some days were passed there, he came back. The owner of the sheep went to get his, and only the parent sheep which had the mark was released, and the ewes were kept in the pen. But, they are still on Lanai who saw Gibson doing this.

Therefore, I only let you know what I think, that the lease to this fellow is unsatisfactory. If this report, however, is acceptable to the one in authority over such matters, that is, the Minister of the Interior, “E.O. Hall.” And there are quite a number of natives living on these lands. But I do admire Gibson for being so smart.2

Governor Nahaolelua writes to Gulick on June 5, 1873.

Governor Nahaolelua writes again to Gulick on June 6, 1873. Your letter of the 2nd day of June was received, and I note what is said. It is true that there are quite a number of persons living on some of these lands of Kalulu and Kaunolu, and there are some on Pawili, and I am not quite familiar with Kamao and Kealia, because their living together is mixed up.

Ina no e lilo o Kalulu a me Kaunolu i Gibekona a kahi no ia i lehulehu ai ona kanaka, aole no he nui loa o no kanaka ma Lanai, oia wale no ka'u mea hai aku.1

Pilikia wai i keia manawa e holo ana wau i Lahaina a hiki keia i Lahaina nei, a hala kekahi mau la holu aku la kela i Honolulu a hala kekahi mau la malaila a hoi maia kii aku la ka mea hipaa a hookuu a mai‘a mai‘a ale no ka mea i hoialonaia a o na keiki paa aku iloko ka Pa, aka aia no i Lanai ka poe i ike ia Gibson i ka hana peine.

Nolaila he hai wale aku no keia i ko'eu manai, aole kupono keia Hooialimalima ke aeia mai nae keia olelo a ka mea iaia ka mana o keia hana oia o ke Kuhina Kalaaizina “E.O. Hall.” A he nui no ko pe kanaka o Lanai e noho ana maluna o keia mau aina, ake he mahalo au ia Gibson i ka hana akama;i1 Hawai‘i State Archives, Interior Department Lands.

Governor Nahaolelua writes again to Gulick on June 5, 1873.

Ina no e lilo o Kalulu a me Kaunolu i Gibekona a kahi no ia i lehulehu ai ona kanaka, aole no he nui loa o no kanaka ma Lanai, oia wale no ka'u mea hai aku.1 Hawai‘i State Archives, Interior Department Lands.

Gibson doing this.2 Translated by Maly.

Governor Nahaolelua writes the following to the Minister of the Interior, E.O. Hall, on June 13, 1873. If Kalulu and Kaunolu are given to Gibson, those are the places where there are a number of natives. There are not very many natives on Lanai. That is all I wish to tell you.2

1 Hawai‘i State Archives, Interior Department Lands.
2 Translated by Maly.

Your letter of the 2nd day of June was received, and I note what is said. It is true that there are quite a number of persons living on some of these lands of Kalulu and Kaunolu, and there are some on Pawili, and I am not quite familiar with Kamao and Kealia, because their living together is mixed up.

As to inquiry about their awards or occupancy under lease. Some of them have awards, but they are small ones. Therefore, they leased these lands from the Government but under the instructions of the Minister of the Interior to me, the same as now. And about my animals, I too have paid towards said lease.

During that lease, the natives paid properly for four years, and during the fifth year, there was a balance of $265, which remained unpaid. The amount of money that was paid was $1735.00 that is the receipts and the balance.

If Kalulu and Kaunolu are given to Gibson, those are the places where there are a number of natives. There are not very many natives on Lanai. That is all I wish to tell you.2

1 Hawai‘i State Archives, Interior Department Lands.
2 Translated by Maly.
O na aina o Kaunolu a me Kalulu, no na makaainana ia mau aina, a nau no e ohi i na dala, e like ma na makahiki i hala.

O na aina o Kealia, Pawili 2, a me Kamao, e hoolimalia ia Gibeson no na dala $100.00 i ka makahiki. Pehea ia?

O ka aina o Kamoku, ua lilo i ka Pake; pela kau liohe. Pehea? Ehia mak. ka lilo ana, a ehihiana i ka mak.

O ka aina o Mahana, he aina aupuni ia. Ia wai ia ka lilo ana i keia manawa? Ua manoia ia C. Kanaina. Aole ka.

O Paomai, ua ninau no wau ia oe no keia aina. E pene mai, ke oholu oe . . .2

1 In the context of the land description it appears that Pawili 2 is the section of Pawili that runs into the basin, between Paìawai and Kealia Aupuni. Based on surveys and testimony, this section of Pawili crosses from windward to leeward Lāna‘i, but on the leeward side is cut off from the coast near the ‘Eho‘ehonui boundary marker.


3 Translated by Malihah.

Then, in 1889, after the death of Gibson, Gibson’s estate trustee Cecil Brown wrote to J. F. Brown, the Commissioner of Public Lands, to extend the lease of government lands of Lāna‘i.

Cecil Brown Administrator and Trustee of the Estate of W.M. Gibson, deceased, with the Will annexed. Hereby makes tender the surrender to the Hawaiian Land Commission, leases held by the Estate of W.M. Gibson of Government lands as follows on condition hereafter stated.

1. Lease No. 168 of the lands of Pawili, Kamao and Kealia Aupuni Rental $150.00 per Annum. Expires June 23rd, 1908.
2. Lease No. 220 Lands of Mahana, Rental $100.00 per Annum. Expires November 1st, 1908.
3. Lease No. 279 Land of Kaunolu, Rental $250.00 per Annum. Expires February 9th, 1907.
4. Lease the land of Kalulu as tenant at will, Rental $200.00 per annum.

The Estate paying for the four leases $700.00 per annum.

It is hereby proposed to surrender the said leases provided a new lease will be granted for the whole area of lands in said four leases be granted to the Administrator of said Estate of W.M. Gibson at an annual rental of Twenty Five Hundred ($2500.00) Dollars for a term of lease of Twenty One years from date hereof.

To be granted without Competition.

J. F. Brown writes to Sanford B. Dole, proposing that grazing and sugarcane cultivation might be possible on the lands leased to the W. M. Gibson Estate in the following letter, dated March 9, 1899.

Enclosed please find copy of an application on behalf of W.M. Gibson Estate for surrender and for releasing of certain Public Lands held by Gibson Estate on the Island of Lāna‘i.

The total area concerned in this application is about 29,341 acres.

The larger part of this is grazing and mountain land but a portion on a rough estimate not less than 2000 acres might be adapted to cane growing if supplied with water. This area of 2000 acres, say below 600 feet level, would be found on the lands of Mahana, Kaunolu and Kalulu named above, these being on N.E. side where plantation site is proposed. The lands of Pawili, Kamao and Kealia may or may not be included in proposed plantation site. If so included, the possible cane area would be largely increased. I do not understand that any authority exists under the law for the lease without competition asked for by applicants, but for the satisfaction of applicants who desire the matter to be brought before the Executive, I would respectfully refer the same to their opinion at a convenient early date.33

The document below conveys lands (fee-simple and leasehold), livestock, and personal property on the island of Lāna‘i from the Gibson Estate to Charles Gay, as ordered by court decision.

This Indenture made this 28th day of August A.D. 1902, between Albert Barnes, Commissioner, of Honolulu, Island of Oahu, Territory of Hawaii of the first part, and Charles Gay of Makaweli, Island of Kauai, in said Territory, of the second part.

Whereas, in proceedings duly taken in the Circuit Court of the First Judicial Circuit of said Territory at Chambers in Equity, by and between Gustave Kunst, designs of S.M. Damon, J.H. Fisher, and H.E. Waity, copartners under the firm name of Bishop & Company, Plaintiffs and H.N. Pain and Elise S. U. Neumann, sale devisees and Executive under the last Will and testament of Paul Neumann, deceased, and Henry Holmes, Trustee of Elise S.V. Neumann, and S.M. Damon, S.E. Damon and H.E. Waity, copartners doing business under the firm name and style of Bishop & Company defendants to enforce the Decree of Foreclosure and Sale theretofore made and filed in the suit of S.M. Damon et al vs. Cecil Brown, Administrator with the Will annexed of Walter Murray Gibson and Trustees of the Estate of said Walter Murray Gibson, deceased, under said Will et al., it was ordered adjudged and decreed by an order made on the 24th day of June A.D. 1902 by the Honorable George D. Gear, Second Judge of the said Circuit Court that the said Decree of Foreclosure and Sale be enforced by a sale of all and singular the real and personal property and assets of the estate.

33FO & Ex. 1899 Pub Lands Comm.
of the said Walter Murray Gibson, deceased, hereinafter set forth, and that the same be sold at public auction in said Honolulu at the front door of the Court House (Aliiolani Hale), by and under the direction of the said Albert Barnes, who was by said Decree appointed a Commissioner to sell the said property and was duly authorized to give public notice of, make arrangements for and conduct the sale as set forth in said order.

And whereas, the said Commissioner, pursuant to the said order and direction, after giving public notice of the time and place of sale as in said order required did, on the sixteenth day of August A.D. 1902, at the front door of the Court House (Aliiolani Hale) in said Honolulu to expose to sale at public auction all and singular the said premises and property with the appurtenances at whose sale the said premises and property hereinafter described were sold to the said Charles Gay for the sum of One Hundred and Eight Thousand Dollars ($180,000.00) that being the highest sum bid for the same, and Whereas the proceedings of said Commissioner in the premises were duly reported to the said court, and the said premises and property were sold accordingly at public auction as above set forth.

Schedule "A"

Fees Simple.

First. All that tract or parcel of land situate on the Island of Lanai, containing Five Thousand Eight Hundred and Ninety-Seven and 1-10 (5897.1-10) acres, and known as the Ahupuaa of Palawai, and comprised in Royal Patent No. 1093. . . .

Fourteenth. All that land described in Royal Patent 4767, L.C.A. 10041 conveyed by John S. Gibson to W.M. Gibson by deed dated July 17, 1876 of record in liber 47 fol. 49. . . .

Leases

First. All leases of land on the Island of Lanai held by said Walter Murray Gibson on August 31st, 1887, so far as he had the right to assign the same without incurring any forfeiture. . . .

Personal Property

First. All those flocks of sheep on the 20th day of June A.D. 1902 or thereabouts of mixed ages and sexes, on said day depasturing, running or being upon the said Island of Lanai and also all that herd of cattle and all horses on said 20th day of June, 1902, also depasturing and running upon the said Island of Lanai on said day, all formerly belonging to the Estate of Walter M. Gibson, deceased, together with all the natural increase of the said flocks and herds, and also all the wool, then upon the said sheep and which has since that time been produced and shorn from said sheep, and their said increase save and except such sheep, cattle and wool as have been sold with the consent of the said plaintiff.

Second. All wool presses, wagons, carts, harnesses, tools implements, chattels and effects belonging to said Walter Murray Gibson on said August 31st, 1887, situated on the Island of Lanai, at said time and now in and upon said lands or any of them.

The flocks of sheep and their increase are now estimated at about 18,000 head.

The herd of cattle with their increase are now estimated at about 210 head.

In witness whereof the said Albert Barnes has hereunto set his hand and seal the day and year first above written.34

2.2.4 Ranching Operations on Lānaʻi, 1854–1951

Goats, sheep, cattle, the European boar, and horses were introduced to the islands between 1778 and 1810. During those early years, Kamehameha I and his chiefs placed kapu over the newly introduced animals to ensure that their populations would grow. In the fifty-year period from 1780 to the 1830s, populations of these non-native animals—like the hipu (sheep) and pu'a (goat) (wild steer or cattle), and kao (goat)—grew to become a great nuisance to the Hawaiian population, and had devastating effects on the Hawaiian environment.

Records indicate that the first of these introduced ungulates were brought to Lānaʻi around the 1830s, where a few native tenants, living under landed chiefs, managed the populations. In 1848, a new system of land management was instituted in the Hawaiian Kingdom, and individuals of means were granted large tracts of land. When fee-simple title to land was granted to native Hawaiians and foreign residents who had sworn oaths of allegiance to the king, formal efforts at controlling the hipu, pipi, kao, and other grazers were initiated.

Ranching was a part of Lānaʻi’s history for close to 100 years, in the period from ca. 1854 until closure of the ranch in 1951. Initially, Mormon elders brought livestock to Lānaʻi as a part of their effort to establish a mission in the uplands at Pālawai. In 1862, Walter Murray Gibson took over the Mormon settlement, and focused the livestock efforts on the Island of Lānaʻi, at said time and now in and upon said lands or any of them.

From 1910 to 1951, Lānaʻi ranch operations focused on cattle and a steady decline in the population of other livestock. The steady transition to cattle grazing led to the
eradication of tens of thousands of goats, sheep, and pigs—many driven over the cliffs of Kaʻapahu in Kaʻa—in an effort to reduce impacts on the steadily decreasing pasturage. In 1914, the Maui News reported on a visit by rancher-investor J. T. McCrosson to Lānaʻi under the heading “Big Improvements on Lānaʻi.” McCrosson makes specific reference to the leeward pastures on the island, extending from the 150 ft. to 1,000 ft. elevation.

I spent a week on Lanai inspecting the ranch. The lee side of the island is greener that it has been for years. The finest Pili grass pastures in the Territory extend in a broad belt the whole length of the island, from 150 feet above sea level to about 1000 feet elevation. The belt varies from a quarter to two miles wide. Up in the shallow crater that occupies the center of Lanai a good many hundred acres have been plowed and planted in Rhodes grass and Paspalum. It formerly took twenty acres of the wild pasture land to support a bullock. The Paspalum pastures now fatten fifty head of stock on every hundred acres.35

In 1929, L. A. Henke published A Survey of Livestock in Hawaii [32], which included the following description of the Lānaʻi Ranch operations. Henke notes that a water line system and extensive fences were made on the island. Describing the basic ranching operations on Lānaʻi, Henke reported

The Island of Lānaʻi, while primarily given over to the growing of pineapples since 1924, still has an area of 55,000 acres of fairly well grassed but rocky and rather arid country extending in a belt around the 55 miles of coast line of Lānaʻi, that are utilized as ranch lands and carry about 2,000 Herefords and 180 horses. This belt is from two to four miles wide and extends from the sea to about 1,000 feet in elevation.

The total area of the Island is about 140 square miles and it ranges in height from sea level to about 3,376 feet elevation, with an average annual rainfall on a great part of the uplands of about 34 inches.

In 1922 before the upper lands were given over to the more profitable pineapples an area of some 2,000 acres had been planted to Pigeon peas (Cajanus indicus) and Paspalum dilatatum. On the lower, rather rocky, present ranch lands the algaroba tree (Prosopis juliflora) is valuable because of its bean crop, and Koʻa haole (Leucaena glauca) and Australian salt bush (Atriplex semibaccata) are considered desirable forage crops. It is planned to further improve the lower pastures by additional planting of the above crops and by light stocking and resting present pastures.

In the future the ranch will not do much more than raise beef and saddle horses for the pineapple plantation needs. The ranch, though a part of the Hawaiian Pineapple Company’s property, still operates as the Lanai Company, Ltd.


The Hawaiians formerly herded goats, probably for their skins on the uplands of Lanai, and some agricultural work was done by Walter Murray Gibson, who arrived in 1861, in connection with the Mormon Church. Gibson acquired considerable land and when he died in 1888 his daughter, Talula Lucy Hayselden, became the owner. Gibson and the Hayseldens developed a sheep ranch on the island, much of which was then owned by the Government and by W.G. Irwin.

Irwin later acquired the Government lands and the Hayseldens about 1902 sold out to Charles Gay and nearly the whole island of 89,600 acres was combined under the ownership of Charles Gay, which passed to Irwin in 1910 and from him to John D. McCrosson and associates in the same year, when the Lanai Company, Ltd., was formed. Their interests were sold in 1917 to H.A. and F.E. Baldwin, who in turn sold the property to the Hawaiian Pineapple Co., Ltd., in December 1922, who are the present owners.

Mr. Gay continued with the sheep ranch started by Gibson and Hayselden, probably carrying as high as 30,000 at times, but when the Lanai Company, Ltd., was started in 1910 they changed to cattle and put in extensive provisions for water and fences, and a count in April 1911, gave 20,588 sheep and 799 head of cattle. At the end of 1920 there were only 860 sheep and early in 1923 a count showed that the number of cattle had increased to 5,536 and besides 4,462 had been sold during the previous five years. Reduction of the herd to a much more manageable number was started on a large scale in 1924, and from the end of 1922 to October 1928, 6,764 head of cattle were sold.

Mr. Moorhead was manager for the Hayseldens, Mr. Gay managed his own property for a time, Lt. Barnard was manager for the Lanai Company in 1910, and G.C. Muaro, the present manager, took charge in 1911. [32:51–52]

The ranch ended operations in 1951 when the Hawaiian Pineapple Company decided to focus all its efforts on the pineapple plantation.

2.2.5 Hawaiian Pineapple Company

James Dole, owner of the Hawaiian Pineapple Company, purchased the island of Lānaʻi on December 5, 1922. The purchase price of the island was $1.1 million. Nearly $2 million was spent on improvements to the island, for the development of macadamized roads and the town of Lānaʻi City. In 1926, Dole hosted a tour of the plantation and developing city. The 150-person tour of politicians, businessmen, and friends were impressed with the progress that had been made in the short time on Lānaʻi [48].

Lānaʻi had been often overlooked because the appearance of the island from offshore was dry and desolate, but Dole saw that island are some arable lands. There were 20,000 acres of land suited to pineapple on the island of Lānaʻi–Hawaiian Pineapple Company considered it as the last of the desirable acreage left in Hawaiʻi. The soil and conditions were desirable, but many improvements had to be made. Many miles of cactus had to be dragged out and removed from the landscape. The Hawaiian Pineapple Company
built a harbor at Kaumalapau with a breakwater made of a solid rock cliff that they had busted and transferred. Roads from the fields to the harbor were paved. One of Hawaiian Pineapple Company’s old photos shows neat rows of pineapple, with Lāna’i City in the background. Lāna’i City was developed for the workers that were brought over [31:17–23].

2.2.6 Kihamāniania and the Kōʻele Vicinity

Situated on the edge of Lāna’i City, on the site of Iwiʻole and the old Cavendish golf course, are found the ruins of the oldest historic structure in Lāna’i City. Under the growth of ironwood and Christmas berry trees are the walls, made of stone and coral mortar, of an old church and schoolhouse, on which construction began in 1840. On the makai side of the ruins is an historic cemetery, marked only by some simple stone alignments and depressions in the ground (fig. 30).

Figure 30: Kihamāniania ruins as they appeared in 2008. Photo courtesy of Kumu Pono Associates.

While the Kihamāniania vicinity was the main upland settlement on Lāna’i in the early to mid-nineteenth century, by the late 1860s the population was dispersed. In the 1870s, business interests, in the form of ranching, became established in the Kōʻele vicinity, and the Kihamāniania Church and schoolhouse fell into disuse. Based on the recollections of elder kamaʻaina, we know that the cemetery continued to be used by native families in the area through the early 1900s. To date, we have found only limited documentation pertaining to the construction and uses of this site, but we anticipate that, upon completion of the research project being undertaken as a part of the work leading to the development of the Lāna’i Culture & Heritage Center, we will uncover more interesting historical facts.

At present, we rely upon a few historical accounts of the Kihamāniania area, dating from 1840 to 1917, and the memory of elder kamaʻaina of Lāna’i, who learned about the location from their kūpuna, to tell some of this story.

For individuals who may be interested in the Hawaiian language, we also include native texts as published in their original sources, with translations of the same prepared by Kepā Maly.

Kalili’aumoku, the resident teacher at Kihamāniania in the 1840s, wrote the following article to readers of the Hawaiian newspaper Ka Nonanona in which he described the difficulty in getting the stone house for the church and school constructed:

Auhea oukou e ka poe kukulu luakini o keia pae aina, e nana mai oukou i ka makou hana ana i keia luakini; o ka ha keia o ka makahiki o ka hana ana o keia hale, aole i paa, ua hiolo kekahi aoao, ke hana hou nei nae makou, ke halihali nei makou i ke one; ua moa ka puna; o ka uahu hou koe.

I koʻu nana ana ma keia hana, nui ka hemahema: eia ka lohi o kahi o ka wai i waiho ai, hookahi nāule a me ka hapa ka lohi o ka wai.

Eia ka lohi o ka puna a me ke one, eha mile a me ka hapa ka lohi ma ka aoao ko-mohana, pela no hoi ke kii aku i ke one ma ka aoao hikina.

Eia ka lohi o ka pohaku, elua mile ka lohi.

Eia ka pohaku kokohe he kohi ilalo e like me ka ai, pela e loaari o ka pohaku, nui ka hemahema o ka makou hana.

Ke ake nei ko makou manao e paa ko makou luakini, kahi e hai ia ai ka oele a ke Akua. Aole no hoi e pono loa ka hale maoli ma keia wahi, no ka mai o ke anu, aole e pono na malihini ke hele mai me kahi kiheli wale no: eia ka pono me ke kapa mahuahua ka pono.

Nolaila o keia hale pohaku ka pono loa no keia wahi. Eia no keia herahema, o ka laau olu, he kakaikahi ka laau loloa loa: aia eha kaloa, a me ka iwilei aliaka hiki.
Nui ko makou maka mano e paa ko makou luakini i keia makahiki. Aka, aole i ike ka manawa. O kekahai poe o makou i hana i keia hale, ua hele aku kekahai poe.

Us make kekahai mau hoohanau ekolu a i i ke kino o ka Haku. O kekahai luakini o makou, aia ma ka aoao hikina o keia aina, aole hemahema loa e like me keia hale; ua kokoke no ka puna a me ke one, a me ka pohaku, a me ka wai, hoakahui wale no mea hemahema, o ka wahie, oia wale no ka mea kii aku i kahi kahi.

Eia kahi olelo ninau, ina i mana o okou i kuu hoike ana i ka hemahema o keia hale, he pono paha, he hewa paha keia hoike ana a'u?

Na'u na Kaliliaumoku, Kumu ao Kihamaniania.1

We greatly desire to complete our church this year.

But it shall not be seen at this time. The people who are making this house, some of them have gone away.

Three of the brethren have died, and are in the body of the lord.

One church of ours is there on the eastern side of this island, it is not in difficulty like this house. It is close to the coral, the sand, the stones, and the water. The only difficulty is the fire wood, that is the only thing which is gotten from some distance away.

So here is a question, if you who think of my testimony about the difficulties of this house, is it right, or is it wrong what I have explained?

Done by me, Kaliliaumoku. Teacher at Kihamaniania.2

When we reached the high land we found the air much more cool & invigorating and after we had crossed the ridge the soil became better and vegetation more lovely. There is an extensive piece of tableland there, perhaps 10 miles one way & 3 or 4 the other, on which are very few stones. There we spent the night & met with the people, near 200 in all who had come together to hear & see the strangers. Pali the Lunalauhau [tax collector] for the whole island resides at this place called Kihamaniania. His influence is manifestly good. We found several pious people around him & himself a good man. He told us that his little children only 6 & eight years old had read the Bible through. He also gave us a list of all the men-the women & children on the island, the whole numbering 584 inhabitants. Most of the chiln. are in school and very few of them who are 12 years old that cannot read.

The atmosphere was cool & invigorating at Kihamaniania. We spent the night there and early in the morning held another meeting with them, after which we left amid many greetings for the seaside at Kaohai, Pia's place.

We travelled constantly only stopping once to hold meetings at the place of Kamalu [presumably in Pālawai], who teaches a school and is Lunakanawai [Magistrate] for the whole island. He showed us his prison, after meeting. It was a large hole in the side of the hill, some 10 feet in diameter and about 20 feet deep. He said he put prisoners in there when they became rebellious and required punishment. Sometimes he had two in at once but rarely more than one.

He had a turkey baked for us and a fowl roasted which he set before us with sweet potatoes sufficient & two watermelons. After dinner we pursued our course over a rolling country of hill & valley and just as the sun reached the top of the hills which then fell behind us we began to descend to the sea, and by dark reached Kaohai, where Pia had the people of all that neighborhood assembled under some kou trees at his door, and though our feet & limbs ached with the journey we must first sit down and hold a meeting with them which we did & I trust good was done altho' we were all so tired that it was with difficulty we got about & got up when we once had sat a few minutes. Pia then had a decent supper set for us on a table with dishes, plates, knives & forks, & some of Sam & Mow's bread. After supper he had water poured into his bathing tub (a half hogshead or butt) from the sea where each of us bathed, which much refreshed us. We then retired for the night and enjoyed a refreshing sleep.

This morning again I talked to the people and after breakfast Pia got his whaleboat rigged and we started for Lahaina, having a gentle sea breeze. But the surf rolls in so heavily at Kaohai that it was with difficulty we got out. I was expecting two or three times to be swamped, but the boat rode through every surf safely so that by the goodness of God we got safely to sea and reached Lahaina safely before 12 o'clock, where we found our families all well after an absence of 4½ days. [15:168-169]
In a short article submitted to the native newspaper Ka Hae Hawaii in 1856, we learn about the lesson work, and the names of the teachers at both Kihāmaniania and Maunalei schools. At Kihāmaniania, Solomon Kaho’oalahala, who later became the island magistrate, was the resident teacher. The Kaho’oalahala family still maintains its generational attachment and residency on Lāna‘i.

E ka Hae Hawai‘i e: Aloha oe,—I ka Poaha, oia ia la 25 o Dekemaba, he hoike kula ma Lanai nei. I ka hora eiva o ke kakahiaka, o ke kula o Maunalei ka mua.

O S. Halekai ke kumu, 19 haumana: ma ka A 5; ma ka Heluhelu 14; ma ka Helunaau 14; ma ka Hoikehonua 7; ma ka Huinahehu 7; ma ka Palapalaaina 7.

Hora 10 1/2, hoike ke kula o Kihāmaniania, S. Kahoolalahala ke kumu, 34 haumana: ma ka A 22; ma ka Heluhelu 12; ma ka Palapalaaina 12; ma ka Huinahehu 12; ma ka Hoialohalohula 5; ma ka Pa ko li 9.

Nau na, R. Koiku.

Kahalepalaoa. Dek. 31, M.H. 1856.

1 Ka Hae Hawai‘i, March 4, 1857.
2 Translated by Malay.

In the following two short articles, penned by native residents, associates of church in the Lahaina District, we learn that the Kihāmaniania Church and School, as well as that at Maunalei, had fallen into disuse, disrepair, and had become home to goats, sheep, and dogs. The first article is called “Luakini ile ma Lanai” which means “There is no church on Lāna‘i.”

Ma ka mokupuni a o Lānai i loko o na la mua o Sepatembabu ma ka la Sapati ua hele au i ka pule ma Maunalei, aia malaila kahi e hoomoana ai na Ekaesia me kau manao he Luakini malaila, i ko‘u ike ana he lanai wale no a punu, he hakakahaka a nahaha ma kau wahi, he opula a he lepo kahi e noho ai, a he nui na ilo i komo pu, a noho pu me na Ekaesia a e nui ana na Kao a e na hipa ke hiki i ka wa ua, a pela no mauka o Kihāmaniania, he haile polahoku a paa loa i ka wa e ola ana o Kalilauumoku, a me Mahulu a i keia wa ua lilo i hale holoholona...

To the Ha Hawaiian:

Aloha to you,—On Thursday, that is the 25th day of December, there was a school exhibition on Lāna‘i. It was at nine o’clock in the morning, and Maunalei school was the first.

S. Halekai is the teacher, there are 19 students: 5 in Science; 14 in Reading; 14 in Mental Arithmetic; 7 in Geography; 7 in General Arithmetic; and 7 in Mapping.

At 10:30 o’clock, the School at Kihāmaniania did its exhibition. S. Kahoolalahala is the teacher, and there are 34 students: 22 in Science; 12 in Reading; 12 in Mapping; 12 in General Arithmetic; 5 in Written Arithmetic; and 9 in music.

Done by me, R. Koiku.


1 Translated by Maly.

Ma na ka Hoailonahelu 5; ma ka Pa ko li 9 in Mental Arithmetic; 7 in Geography; 7 in General Arithmetic.

I was on the island of Lāna‘i in the first days of September. On the Sabbath day I went to the service at Maunalei, for there is a place established there in the Church, and I thought that there was a Church there. But when I saw it, there was only a shelter, for it is broken apart and scattered about. There is rubbish and dirt where one sits, and there are many dogs which enter as well, and reside in the Church. There are also many goats and sheep that enter in when it rains. It is the same at Kihamiania, where there is a stone house made in the time when Kalilauumoku and Malulu were living. But in this time, it has become a house for animals...

S. W. Naiilili.

Puehuehu, Lahaina.1

1 Nupepa Kuokoa, November 20, 1866, p. 4.
2 Translated by Maly.

The second article is entitled “Ka holo ana e Kaapuni ia Hawai‘i...” which translates as “A Journey around Hawai‘i...”

Okatopa 21. Ua loa na waapa e holo ana i lanai, a piolele e holo ai o Mrs. Kapuuhonua a me Luku, ua kauoha mai o Lota Kuaihelani ia‘u e malama ia loua ma Lanai. Aole no he lalau o lau ma keia hele ana, a aumoe kai ai ma Manele, a malama ia e ke kaikaina o Mr. Puaelewa.

Okatopa 23. Ma ke avakea, ua lawe ia mai na lio eko lu no makou, a pi atu makou i uka o Kihāmaniania, ua mahalo au ia uka o Lanai, he aina maikai he lepo o uka, aole he a nui, he maikai wale no. O Lanai ka o i o na mokupuni uku o ka maikai loa.

Okatopa 24. Ua hele nui mai na kanaka e lohe i na mea hou, a pau ka‘u hai ana, ua haawi mai lakou i na dala $4.00. Eia completed, they gave $4.00. Here is what I wrote.

I am the teacher, and there are 34 students: 5 in Science; 14 in Reading; 14 in Map-

October 21. A boat was gotten to travel to Lāna‘i. It was dark when Mrs. Kapu-

uhonua, Luku (and I), sailed. Lot Kuai-

helani instructed me to care for them on Lāna‘i. That they should not wander about.

Around midnight we landed at Mānele, and were cared for by the younger brother of Mr. Puaelewa.

October 23. At noon, we took three horses for ourselves, and we ascended to Kihāmaniania. I admire the uplands of Lāna‘i, it is a good land. There is dirt in the uplands, not lots of stones, it is very good. Lāna‘i is foremost of the good, small islands.

October 24. Many people came together to hear the news, and my speaking was completed, they gave $4.00. Here is what astonished me. There is not a clean church on Lāna‘i. Kihāmaniania is broken apart, and the goats sleep in it when it rains. Aloha nui to Rev. N. Pali and S. Kaho’oalahala...

(na Rev. Kaukau)1

1 Nupepa Kuokoa, November 16, 1867, p. 4.
2 Translated by Maly.

In 1917, members of the Congregational Churches visited Lāna‘i. One of the visitors was the part-Hawaiian Reverend Steven Desha, who had also visited Lāna‘i in his youth. In an article published in the Hawaiian-language newspaper Ka Hoku o Hawaii, Desha described the Kihāmaniania-Kōʻele vicinity, and the relationship of the Kihāmaniania facility to others on the island of Lāna‘i. An excerpt from Desha’s Hawaiian texts and the translation follow below. The article is entitled “Ka Huakai i na Hono a Piilani.”
He mau makahiki i ke ola ana o ka mea e kakau nei keia huakai i hoohala ai ma life of the writer of this journey to the Is-

keia Mokupuni o Kaulul¯a’au i na la opio, aland of Kaulul¯a’au, a time when there were

six school houses on this island. There

mokupuni, oia hoi he hookahi hale kula mawas one at Awalua; one at Paoma'i, the

Awalua, he hookahi ma Paomai, he Home Place where my family resided; one at Mau-

o ko‘u Ohana i noho ai, a he hookahi no hoi i Maunalei, the

Mau-oke ko‘u Ohana i noho ai, a he hookahi no hoi i kahi

kokoke i Kahalepalaoa, a he hookahi i uka o

P¯al¯awai. And on the days of the annual

Kihamaninia, a he hookahi no hoi i Palawai. exhibition (of skills), the schools would

A ina la hoike nui o ka makahiki, e hui ana all gather together at the Church of Ka-

malaila e hoike ia ai na kula like ole, a i

kekahi makahiki hoi ma ka Luakini iuka o

Kihamaninia e hoike ai, a i maluna o ka

250 mau haumana o keia mau kula e hoike

ia ai, a he la laukanaka maoli no ia o ua

Mokupuni nei o Kauluahaa. I keia ike hou the exhibitions. Indeed, those were days

ana aku nei hou ua nele na wahi i noho ia e

na kanaka i ke kanaka ole, a he mehameha

wale ka aina ma na wahi lehulehu…1

1 Ka Hoku o Hawai‘i, October 11, 1917, p. 3.

Translated by Maly.

In 1921, Kenneth Emory conducted his survey of cultural resources on L¯ana‘i. During

the course of his fieldwork, he visited Kihamaninia and took a photograph of the site

(fig. 31). His photograph shows us a very different setting than the one we see today. More

of the walls were standing, and the ground about the area was completely open, clear of

trees, with only low grass surrounding the region. This was a result of years of sheep

and cattle grazing, for these lands made up some of the important pasturage of the Lanai

Ranch. Of the Kihamaninia ruins, Emory reported

Two Protestant stone meeting houses were begun on Lanai in 1842. One of

them was finished in 1851 and represents the ruins at Kihamaninia, near

Koele. The other church, at Maunalei, seems not to have been finished in 1858.

[13:9]

2.2.7 Kama‘aina Knowledge

Over the years, members of elder Hawaiian families of L¯ana‘i have passed down their

reollections that, at one time, the lands around Kihamaninia (the K¯o‘ele vicinity) were

an important area of residence for the people of L¯ana‘i. In traditional times, the lands in

the Kihamaninia, K¯o‘ele, Ka‘holena, and Nininiwai area were noted for their agricultural

resources which supported the life of the people. This was in part a result of the

environmental conditions of the region, and the traditional place names, themselves, tell

us something about the environment.

K¯o‘ele Pronounced with a long ō, and a break between the ō and e. Elder kama‘aina

of L¯ana‘i say that K¯o‘ele was named because of the cool, moisture-laden breeze and

clouds which blow off of L¯ana‘i Hale, darkening the land. In this case, k¯o means

windborne, the ‘ele means darkness(K¯o‘ele — Darkness-borne upon the wind). These

dark mists carried with them. The life-giving waters which settled upon the land,

and made it an area capable of sustaining the people of the land.

Kihamaninia Also written Kiham-máníanie, is said to describe someone sneezing in fits.

Ka‘iholena Named for a native type of banana (The-iholena), which was a choice crop of

the area.

Nininiwai Describes the dripping (pouring) water, resulting from the moist clouds and

mist which came down the mountain slopes, and enabled the cultivation of crops.36

36 In the early 1970s, Abraham Pi‘ian¯ai’a—an elder Hawaiian descendant of the chief Pi‘ian¯ai’a that resided on L¯ana‘i during the occupation by Kamehameha I—said that in his ‘ohana, there was a tradition about Kihamaninia in times before the making of the church and school. Abraham’s father and sister were both born on L¯ana‘i in the late nineteenth century, and are descended from the Chinese resident who at one time held the government lease on Kamoku Ahupua‘a.

Figure 31: Kihamaninia Church and School ruins in 1921. Source: Kenneth Emory Collection. Copy work courtesy of Robin Kaye, 1975.
2.2.8 Lāna’i City

The story of Lāna’i City begins when James Dole purchased nearly the entire island of Lāna’i in November 1922, as a part of the holdings of the Hawaiian Pineapple Company, Ltd. Prior to 1922, the lands on which the city would be built had been grazed as part of the old Lāna’i Ranch operations, and a large horse paddock at Kaumaikahōki dominated the pre-city landscape. Plans for building Lāna’i City were drawn up in early 1923, as Dole and his partners set out to make Lāna’i the world’s largest pineapple plantation. Coming from Connecticut, Dole was familiar with the design of the “town square” and grid system of laying out streets in such a way that everything was connected to the “green” or park in the middle of town. Under Dole’s tenure, the Lāna’i plantation and city grew, and at one time the island supported nearly 20,000 acres of cultivated pineapple, making it the world’s largest plantation. For seventy years, from 1922 to 1992 when the last harvest took place, the name “Lāna’i” was synonymous with pineapple.

Between 1924 and 1929, Lāna’i City blossomed upon the landscape; most of the buildings and streets which we still see today were constructed during this short period (fig. 32). By March 1924, the general layout of Lāna’i City was established and some 40 buildings—many of which remain in the present-day Lāna’i City—were built or were under construction.

In the early years of the plantation, the largest group of immigrant laborers was made up of skilled Japanese carpenters and stone masons. Their initial work was undertaken on an almost barren landscape, overgrazed by years of sheep, goat, and cattle pasturing.

Following a brief and successful experiment in planting pineapple on Lāna’i by Charles Gay, James Dole, president of the Hawaiian Pineapple Company, purchased the island of Lāna’i for $1.1 million dollars in 1922. In 1923, he sent engineers to begin the design of Lāna’i City, the Kaumālapa’u Harbor, fields, and facilities which would support the envisioned pineapple plantation. Between 1923 and 1925, the city was laid out. It included houses for individual families and group homes for single men; a hospital dispensary; a theater; stores; churches; a hotel; offices; and labor yards. Outlying plantation camps, overlooking Pālāwai, at Miki, Quarry Camp and Kaumālapa’u, were also built. The Kaumālapa’u Harbor was also built during this time. As this work was going on, and housing became available, tracts of land in Pālāwai were being cleared of stones and boulders both by hand and with livestock, and then planted in pineapple.

In 1926, James Dole and a large group of island politicians and business backers visited Lāna’i. They were greeted by the new residents of the island, who were mostly of Japanese origin. By 1930, the population of plantation employees and their families included 965 Japanese, 867 Filipinos, 102 Koreans, 78 Chinese, 46 Caucasians, and 43 Portuguese. There was also a population of 173 Hawaiians, mostly representative of the old native families, but few were working directly for the plantation (fig. 33) (cf. 54).

A series of articles published in the Maui News between 1926 and 1939 provide us with eyewitness accounts of the growth and development of the Lāna’i pineapple plantation operations and city. Several of these articles are cited below. The first, published in the Maui News on February 3, 1926, told readers of the visit by James Dole and his associates, as he unveiled the plantation and city to all Hawai’i. The account, describing development which had occurred on Lāna’i between 1923 and January 1926, reads

Sunday was show day at Lanai, the Hawaiian Pineapple Company having chartered the Inter-Island steamer Kilauea to take almost 150 prominent Honoluluians to see what it has done with the property it purchased from Baldwin interests in the way of pineapple developments. The Governor and other territorial officials as well as some of the city and county officials were in the party.
Figure 33: Early families of Lāna'i City on Lāna'i Avenue, fronting Dole Park. Courtesy of Castle & Cooke, Inc.

The Kilauea sailed from Honolulu at 10 o'clock Saturday night and discharged her passengers at Kaumalapau at 6 Sunday morning. Awaiting them were some 40 automobiles and they were taken about in cars for their sightseeing trip, most of which were brought with them from Honolulu. James D. Dole, president of the company personally conducted the party. The motorcade started at 7:50 headed by H. Bloomfield Brown in charge of affairs for the company on the island.

Dinner was served at noon and there was speech making, among the speakers being the Governor. A heavy rainfall cut short the sightseeing trip and the Kilauea sailed on her return trip at 3:30. The Hawaiian Pineapple Company has spent for purchase of the property and its development more than $3,000,000 and the visitors were much impressed with what has been done on the property.

Statistics Furnished

The following facts and figures as to Lanai are taken from a folder which was prepared for the excursionists:

- Island of Lanai, 140 square miles, 90,000 acres; located 65 miles southeast of Honolulu; estimated pineapple land, 15,000 to 20,000 acres; option on Lanai taken September 5, 1922; option exercised December 5, 1922; population at that time about 150; present population, 1000; elevation of Lanai City, 1650 feet; building of Lanai City commenced August 1923; number of schools, two; attendance, 150; seven miles of asphalt macadam road to Lanai City, eight to 12 inches thick, and 200 feet wide, widened at turns; maximum grade of road to Lanai City, about 6 per cent; water supply lifted 750 feet by electric pump from tunnels in bottom of Maunalei gulch; water brought in six inch redwood pipe through three riders by three tunnels, aggregating 5300 feet in length; capacity of old Kahiholena reservoir, 500,000 gallons; capacity new Kahiholena reservoir, 3,900,000 gallons; electric power generated by 100 KW oil engine generator set, generated at 440 volts, transmitted at 2300 volts; capacity moving picture theater, 450; Kaumalapau harbor development work commenced September 1923; length of break water 100 feet; tonnage of rock in breakwater, 116,000; minimum depth of Kaumalapau harbor, 27 feet; depth of Kaumalapau harbor entrance, 65 feet; length of wharf, 400 feet; number of cattle on ranch at present time, 4000.

By 1930, the population on Lāna'i totaled 2,356 residents. In the mid-1930s, efforts in expanding the amount of acreage were made, and new laborers, primarily of Filipino and Japanese background, settled on Lāna'i. All planting, picking, weeding, and most field clearing was done by hand. There were no pineapple picking machines. The pickers picked by hand, loaded bags, walked to the end of the rows and then loaded the pineapples in boxes. The boxes were then hand loaded onto trucks and driven down to Kaumalapau, where cranes would load the truck bins onto the barges for shipping to the cannery at Iwilei in Honolulu.

Later, Maui News articles document the following descriptions of Lāna'i City, the island community, and plantation operations, noting that 16 years after Dole's acquisition of Lāna'i, the island had become the world's largest pineapple plantation. The following reports on the success of the Lāna'i venture were published in 1938 and 1939:

Ten years ago, Lanai was just another unimportant island on the map of the Hawaiian group; today the Hawaiian Pineapple Co. operates on it the largest pineapple plantation in the world, to supply fruit for its cannery in Honolulu, also the largest in the world.

Ten years ago, Lanai's population was approximately 600, and about 4,000 acres were under cultivation. Today the land under cultivation, has increased five-fold to 20,000 acres, and the island's population has grown to an estimated 3,500.

The five year period from 1925 to 1930 was one of great building activity on Lanai as the pineapple company conducted an extensive building program to provide housing for the hundreds of workers who were arriving almost on every boat to make their homes on the island.

Homes for married couples were erected by blocks, in numerical order. There were model two bedroom homes, with large airy living rooms and spotless kitchens, running water, electricity and spacious grassed yards.

Single men's houses were divided in two by a partition with three furnished rooms in each section. All these houses were supplied with running water and electricity. They were laid out to provide ample space around each house.

Attractive as these homes were eight years ago, they are now being remodeled and made better, finer homes. More spacious rooms are being added and sanitary toilets and baths installed.

These new homes are painted cream white inside and out, with doors stained walnut. Each contains six rooms, four of which are 10 by 12 foot bedrooms with built in drawers and closets. The living room has a floor space of 12 by 16 feet, and the kitchen is 14 by 16 feet. All have built in cabinet cases and pantries. All are supplied with running water.

Sanitary toilets, baths and wash basins are installed in all of the homes.34

A story elsewhere in this issue of the Maui News describes some of the progress which is being made on all sides on Lanai Island. It is a story of the building of a happy community and reflects credit on all who are having a hand in the Pineapple Isle's development.

The cooperation which has been forthcoming from everyone is a splendid example of the Lanai spirit and in the years to come, this little Island will be as famous for its spirit as any other place in the Territory.

More power to Dexter Fraser and the hundreds of Lanai residents who are supporting him in his efforts to make Lanai City the finest in all the land.35

The following Maui News article is from August of 1938. In the article, many of the developments occurring on Lanai are described. The article is entitled "Lanai Sees Big Things Ahead Under Leadership of Dexter 'Blue' Fraser."

County recognition of Lanai, signaled by last weekend's visit of the board of supervisors to look over the site for a $30,000 road to Keomuku is only an incident in the development of a community that has made rapid strides during the past few years under the leadership of Dexter "Blue" Fraser, Hawaiian Pineapple Co. superintendent on the Pine Island.

The Lanai of today is a community of happy people, working in harmony for the better island. Moral of Hawaiian Pineapple Co. employees is high. Everyone is pulling together, and this unanimity of purpose has resulted in a way of life for the people of the island that stands as a model for other communities in the Territory.

Painting the City.

The physical aspect of Lanai City has been improved recently by a program of renovation and modernization. When the board of supervisors arrived on Lanai last Saturday for an inspection trip, members of the party saw a neat city, freshly painted in green and white, shaded by cool evergreens.

The painting program is not quite complete, but even now there is an appearance for freshness and cleanliness. The city is, as it always has been, spotless. Crowds of men are assigned to keep the community clean from fallen leaves, weeds, and refuse and to trim the lawns which surround each of the comfortable homes in which the pineapple workers live.

Aside from the County's projected road to Keomuku, the plantation is doing a bit of road work itself. About a month ago, work was started on a project to eliminate some of the dangerous hair pin curves on the Lanai City-Kaumalapau road and widen it to provide ample room for the large pineapple trucks which haul fruit to the port for shipment to the cannery in Honolulu.

Have Safety Program.

Safety has become almost a fetish on Lanai. There is a safety committee composed of community leaders. Workers are invited to submit suggestions and as result of the committee's activities, guards have been placed on machinery, instruction has been given in first aid, and safety first signs have been conspicuously posted.

In the fields mechanical loading machines have relieved some of the back breaking toil which heretofore has been the bane of the field worker. These machines are by no means perfected as Hawaiian Pine freely admits, but progress is being made and experiment is constantly in progress.

In order to correct one deficiency discovered in the fields, the company is now spending about $500 on each loading machine, an outlay of $10,000 for the twenty loaders now in operation. With the pineapple marked as uncertain as it is, Hawaiian Pine is proceeding carefully. There is a definite trend toward improvement in quality. Marginal fields have been abandoned for the time being. Small pineapples, lacking in quality, are left in the fields.

Carrying out the quality idea, Hawaiian Pineapple Co. is now replanting after the first crop rather than after the third as has been the practice in the past.

Athletic Program.

Community life is becoming more pleasant as the years go by. An extensive program of athletics has been developed. This reached its peak during the summer picking months when Maui and Hawaii send young men to Lanai to work in the fields. Most of these are high school students, and many of them are athletes who have found that work in the fields is an ideal conditioner for football and other strenuous sports.

At present, two Maui high school football teams are on Lanai preparing for the forthcoming season under the direction of their coaches...

The Lanai City golf course has recently been remodeled and is becoming increasingly popular. The course is laid out on the slope above the city, which offers a number of good natural hazards, not the least of which is the road

34 1938: "Hawaiian Pine Improves Conditions on Lanai Isle. The past ten years have brought phenomenal development to the island of Lanai under the guidance of the Hawaiian Pineapple Co., which is creating ideal working conditions for its employees," Maui News Editorial, January 22, 1938, p. 1, c. 2.
35 Maui News Editorial, January 22, 1938, p. 8, c. 2.
to Koele, which cuts through the course. This is no course for the exclusive use of the "big shots." Anyone on the island may use it if he chooses, and the result has been a growing interest in golf...

**Lions Active.**

Lanai also is finding that the Lions club is filling a definite community need. This organization has been particularly active and only recently sponsored an eye clinic in which more than 100 individuals had their eyes examined...

The fine spirit that has developed on Lanai is due in no small part to the fine leadership of Mr. Fraser. He is universally beloved. He joins enthusiastically in the life of the community. His wise, just dealing with his employees has made him a respected friend of everyone on the island.

The board of supervisors found last weekend how persistent Blue Fraser can be despite his constant joviality and penchant for playing schoolboy pranks. If someone started to a joke about two Scotchmen, Mr. Fraser somehow or other swung the conversation about so that he could get in another, “Now about the Keomuku road.”

Mr. Fraser, the board found, is determined that Lanai shall have full and complete recognition as an integral part of Maui County, and that extends to the budget meetings when the money is being passed out.

**Voters Total 507.**

Lanai is becoming a political factor not to be overlooked. Mr. Fraser pointed out on a number of occasion; There are 507 voters on the island at present, nearly twice as many as there were in the 1966 election. One of the reasons for the increase is that Lanai youngsters are reaching voting age. This portion of the electorate, Mr. Fraser points out, is keenly interested in government affairs and exercises its voting privilege with discretion.

Mr. Fraser and other Lanai leaders recognize that the $30,000 available for Lanai roads “is only a fly speck,” to use Mr. Fraser’s expression. “But it is a start,” he went on to say.

Jim Munro readily agreed with County officials that it would be desirable to spend $5,000 or more of the amount for a complete survey, even if it does mean less road to start with. Lanai is confident that the board, having once recognized Lanai’s needs will augment the $30,000 as time goes by and that eventually the county will do more for the Pineapple Island than replace a S67 cesspool cover.

Uncertainty of the pineapple market on the mainland, Lanai regards as “one of those things.” But it is not allowed to interfere with the community’s peace of mind, solidarity and intense joy of living in a land where every factor is favorable and better days loom just ahead.40

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40*Maui News* Editorial, August 17, 1938, p. 1, c. 4; and p. 6, c. 1–3.
was focused toward the relocation of previously identified sites, and the consolidation of that information into the new State Inventory of Historic Places system. It was during this effort that Emory’s sites were assigned their State Inventory of Historic Places numbers (see sec. 2.3.1).

In general, the statewide inventory left the identification of new archaeological sites as a task to be completed for future surveys. Due to this, no new archaeological sites were recorded in the vicinity of the current project.

Following his work on the statewide inventory of historic places, Robert Hommon produced a paper that outlined his general impression of the archaeology of Lāna‘i Island. He noted that Lāna‘i Island contained the greatest degree of relatively untouched archaeology in the Hawaiian archipelago. He states,

Through a happy set of circumstances, the archaeology of Lana'i is almost entirely intact. Despite the fact that nearly 20% of the area of the island is under cultivation for pineapple, less than 2% of the archaeological features recorded by Emory in the early 1920's have been destroyed in the process.

He then argued, given the completeness of the archaeological record, that an island-wide research design should be developed in order to direct future investigations. This recommendation also appears to respond to a development plan that was proposed by Castle and Cooke that would have substantially altered the interior and northeast shore of the island. It appears that this broad-scale development of Lānai has not occurred, and no comprehensive island-wide research design is known to have been written.

2.3.3 Cultural Resources Management Studies

From the late 1980s to the present day, the primary impetus for archaeological research near the proposed Hōkū-ao 201-H Residential Project has been for cultural resources management studies in support of construction and development. The majority of these investigations have been within the general vicinity of Lāna‘i City; however, some have extended to the areas of Hī Flats and Waipā’a Flats.

No pre-contact sites have been recorded in the vicinity of the proposed Hōkū-ao 201-H Residential Project. This is due in part to construction disturbances associated with the founding of Lāna‘i City and the use of the surrounding area for pineapple cultivation and industrial pursuits, which likely destroyed any intact surface architecture and/or deposits.

A few early settlement and ranch-era historic properties have been identified near the proposed Hōkū-ao 201-H Residential Project and include the Kihamaniania Church, site 50-40-98-1946, and its associated historic burial complex at Nininiwai Hill, site 50-40-98-1947 (fig. 34). Also located in Kamoku Ahupua‘a is the Kō‘ele District, site 50-40-98-01004, which is a group of preserved historic ranch-era buildings in and around the Four Seasons Lodge at Kō‘ele.

No significant historic properties were documented within the project area during the island-wide survey by Kenneth Emory in 1924 and the statewide survey of 1974 [13; 34].

Previous archaeological investigations in the vicinity of the current project are shown in figure 35. The following discussion presents the results of the research in chronological order.

In October of 1986, Cultural Surveys Hawai‘i conducted an archaeological reconnais-sance survey with subsurface testing for the Koele Hotel (fig. 35, k). A total of 20 auger tests were excavated during the project. The survey and subsurface testing of the area concluded that “[i]t appears very unlikely that any prehistoric cultural deposits could remain intact within the immediate Koele area” [37:23]. However, the area was recognized for its historic significance as a center for livestock and ranching activity on the island. No artifacts were collected and no historic properties were documented during the project.

An archaeological reconnaissance was conducted of 24.6 acres for the proposed Lalakoa III Subdivision in 1987 (fig. 35, m) [22]. The subdivision has been built since that time. The following observations were made:

The present condition of the property shows clear evidence of long term use as a pineapple field. [A]lthough presently overgrown with weeds, small pineapple plants are still the dominant vegetation. The cultivation service roads, field boundaries and plastic mulch are still visible. [22]

Because of the history of cultivation in the area, the archaeologists concluded that the subdivision would have no impact on archaeological or historic resources.

In 1988, a subsequent archaeological investigation was conducted for the Lalakoa III Subdivision (fig. 35, m) [23]. Surface sweeps yielded “almost exclusively basaltic flakes of both coarse- and fine-grained raw material with a few retouched pieces and adz fragments” [23:3]. In addition, four volcanic glass specimens were collected.
Data recovery was performed on Kå'o for the Four Seasons Lodge at Kå'o (fig. 35, k). It was concluded that no intact historic-era layer was present.

Also in 1988, inventory survey and data recovery were conducted on a 20 acre parcel excavated at site 50–40–98–1595, which contained a surface scatter of historic debris and clearance has been given for the Subdivision to proceed” [23:24]. The archaeologists concluded that “no archaeological materials remain on the property

Subsurface testing was conducted and the stratigraphy indicated that there had been repeated plowing, which would have shifted any cultural materials out of primary context. The archaeologists concluded that “no archaeological materials remain on the property and clearance has been given for the Subdivision to proceed” [23:19].

Also in 1988, inventory survey and data recovery were conducted on a 20 acre parcel for the Kå'o Golf Course, which is the easternmost portion of Låna'i City, including the Kå'o Golf Course, the Kå'o single-family housing, the Queen's multi-family housing, and the Olopu Woods subdivision (fig. 35, l, e, m). Three historic ranching features and a secondarily deposited lithic scatter were recorded during the survey of the golf course. A small amount of secondarily deposited lithic material was observed at the other project locations and was attributed to an off-site source. No historic properties were recorded.

In 1992, Borthwick and Hammatt [3] conducted an archaeological survey for the proposed Kå'o Reservoir (fig. 35, o). No archaeological surface sites were identified. No historic activities were recorded for the survey area. The area was probably unused because of the steepness of the slope in the area. Monitoring was recommended for only the initial construction activity as subsurface deposits were not expected.

Cultural Surveys Hawai'i conducted an investigation with archaeological monitoring in 1992 for a short length of sewer line located within the Waialua Annex Subdivision (fig. 35, o) [29]. The plow zone was observed in the trench to a depth of 70 cm below ground surface. No historic properties, intact deposits, or cultural materials were collected during the project.

In 1993, Cultural Surveys Hawai'i completed an archaeological inventory survey of a 13,000 ft. long, 100-150 ft. wide waste water pipeline corridor connecting the Låna'i sewage treatment plant with the Kå'o Golf Course irrigation system (fig. 35, o) [27]. The route of the waste water pipeline corridor ran north-south through the proposed Håkå'a 201-H Residential Project.

In the entire project area visibility was excellent because of low vegetation consisting of secondary growth in now abandoned pineapple fields. Emphasis was placed in examining the ground surface along the proposed pipeline route for scatters of basalt flakes . . . None of these were observed during the fieldwork. [27:5]

The survey yielded no historic properties and no intact cultural remains. Also in 1993, Hammatt and Borthwick [26] conducted data recovery and monitoring at a 300 acre parcel for the Kå'o Golf Course, which is the easternmost portion of Låna'i in figure 35. The southern extent of the large project area runs along a portion of Kapano Gulch. Five sites were studied. Four were in the northern portion of the project area, and one, site 50-40-98–1595, was in the southern portion (see fig. 34). Backhoe trenches were excavated at site 50-40-98-1595, which contained a surface scatter of historic debris associated with the Charles Gay homestead at Lålåkoa. No cultural feature was observed and it was concluded that no intact historic-era layer was present.

Figure 35: Location of previous archaeological investigations in the vicinity of the proposed Håkå'a 201-H Residential Project: a, Hill et al. [33], Dagan et al. [10]; b, Fredericksen [19]; c, Lee-Greig and Hammatt [41], Dagan et al. [19]; d, Lee-Greig and Hammatt [40]; e, Hammatt and Borthwick [24], Hammatt and Borthwick [26]; f, Creed et al. [7]; g, Conley-Kapoi and Hammatt [5]; h, Borthwick and Hammatt [2]; i, Hammatt and Chiogioji [29]; j, Lee-Greig and Hammatt [38]; k, Kaschko [37], Hammatt et al. [28]; l, Hammatt and Borthwick [24], Hammatt and Borthwick [26]; m, Hammatt [22], Hammatt and Borthwick [23]; n, Hammatt and Borthwick [24], Hammatt and Borthwick [26]; o, Hammatt and Borthwick [27]; p, Hammatt and Shidelcer [30]; q, DiVito and Dye [11]; r, Madeus et al. [42]; s, Borthwick and Hammatt [3]; t, Hammatt and Borthwick [25]; u, Dagan and Hammatt [8]; v, Lee-Greig and Hammatt [39]; w, Pfennig et al. [46]; x, Cordova et al. [6].

The number, size and quality (fine-grained basalt) of the artifacts collected suggest that they were present within the project area prior to commercial pineapple activity. The type of quality material present is the same as that found from the quarry at Ko'i in the Palawai Basin. [23:19]

Subsurface testing was conducted and the stratigraphy indicated that there had been repeated plowing, which would have shifted any cultural materials out of primary context. The archaeologists concluded that “no archaeological materials remain on the property and clearance has been given for the Subdivision to proceed” [23:19].

Also in 1988, inventory survey and data recovery were conducted on a 20 acre parcel for the Four Seasons Lodge at Kå'o (fig. 35, k) [28]. Data recovery was performed on two historic ranch-era trash pits. The artifacts recovered contributed to the knowledge of ranch life on Låna'i.

In 1989, Borthwick and Hammatt [2] conducted a reconnaissance survey of the Waialua Multi-Family Housing Project area now known as the Iwiole Dormitories (fig. 35, h). A single lithic scatter was documented during the project and was determined to have been disturbed during cultivation activities in the area. No historic properties or intact subsurface remains were recorded.

Also in 1989, Hammatt and Borthwick [24] conducted reconnaissance surveys of four localities in Låna'i City, including the Kå'o single-family housing, the Queen's multi-family housing, and the Olopu Woods subdivision (fig. 35, l, e, m). Three historic ranching features and a secondarily deposited lithic scatter were recorded during the survey of the golf course. A small amount of secondarily deposited lithic material was observed at the other project locations and was attributed to an off-site source. No historic properties were recorded.

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Cultural Surveys Hawai‘i conducted an archaeological inventory survey of a 50 acre Hawaiian Homelands parcel located at the northwest corner of Lāna‘i City in 2000 (fig. 35, f) [7]. No cultural materials were observed and no historic properties were recorded due to the use of the area for pineapple cultivation.

In 2002, an archaeological inventory survey of the Lāna‘i Police Station was conducted by Xamanek Researches (fig. 35, b) [19]. No historic properties or cultural remains were documented during the project.

In 2004, an archaeological inventory survey of the lower west slope of Ninivai Hill, east of Lāna‘i City, was conducted by Hammatt and Shideler (fig. 35, p) [30]. The fieldwork focused on documentation of the ruins of the Khiamaniania Church, site 50–40–98–1946, and the associated cemetery, site 50–40–98–1947 (see fig. 34). At the cemetery, 18 discrete burials were identified, which were marked by stone alignments or pavements. Also identified was an “altitude breaker,” which serves to dissipate the force of water coming down through a pipeline from the upper slopes of Ninivai Hill” [10:39]. It was assigned SHP 50–40–98–1600, although the archaeologists thought it was less than 50 years old. Finally, a trail feature was assigned site 50–40–98–1601 (see fig. 34). Characteristics such as cement on a path margin stone indicated that the trail is twentieth century. The church is significant for Criteria A, C, D, and E because

The church ruin is associated with the initial Christianization of the Hawaiian people of Lāna‘i, is suggested to have a distinctive method of construction (mortar from burned coral carried up from the coast), to have the potential to yield further information and as having important value to the native Hawaiian people. [30:45]

The cemetery is significant under Criteria D and E. Preservation is recommended for the church and cemetery. For the altitude breaker and trail, the archaeologists assign a significance of Criterion D and recommend “consultation in writing with SHPD prior to any substantial alteration” since they feel the young ages of the sites do not warrant preservation.

In 2005, Cultural Surveys Hawai‘i conducted a field inspection of the Court Family housing project area and a 7.673 acre parcel in the northwestern portion of Lāna‘i City (fig. 35, p) [5]. No cultural materials were collected and no historic properties were identified during either of the projects.

In 2006, Cultural Surveys Hawai‘i conducted archaeological monitoring for the installation of a sewer line on the lower west slope of Ninivai Hill (fig. 35, v) [39]. No cultural materials were identified during the trenching for the sewer line.

Cultural Surveys Hawai‘i conducted a cultural impact assessment and an archaeological inventory survey of a 73 acre parcel for the Lāna‘i Affordable Housing project in 2009 (fig. 35, e) [9, 41]. The archaeological inventory survey overlapped the northern end of the proposed Hōkū-ao 201-H Residential Project. A pedestrian survey and subsurface testing were conducted. Only one historic property was assigned a State Inventory of Historic Places site number during the project, site 50–40–98–6649, an historic-era culvert head wall located just outside the northern boundary of the proposed Hōkū-ao 201-H Residential Project. The culvert was determined eligible for listing on the Hawai‘i Register of Historic Places under Criterion d “because of the potential to yield information important for understanding the history of the region” [41:57]. However, no further historic preservation work for the site was recommended [41:58]. Lee-Gregg and Hammatt [41:36-41] also document two historic wood-frame buildings in poor condition: CSH-2, a structure identified as associated with the Kō‘ele School complex; and CSH-3, the original Kō‘ele single-room schoolhouse. These buildings were moved to their current locations in the mid-1980s through the efforts of several community groups and were intended to be preserved, restored, and incorporated “into the landscape of Kō‘ele as part of a heritage program through an agreement with Castle & Cooke Resorts, LLC” [41:56]. However, the survey found the two buildings “in an extensive state of disrepair” [41:56]. Nevertheless, the buildings were both evaluated as significant for their information content, Criterion d [41:32].

Constructed around the mid-1920’s, CSH-2 . . . . . is a double-room building with a covered deck or lanai fronting the entry ways and an add-on room on the west end of the building and off of the lanai. Overall assembly is of single wall construction consisting of timbers and wood boards with horizontal sliding windows. Roof construction is of conventional wood framing and asphalt shingles with cross ventilation facilitated by shuttered vents below the roof line . . . The interior lighting of both rooms consisted of suspended fluorescent lighting, hanging from a drop ceiling and the floors appear to be of plywood construction.

Room one is an open room with built-in cabinetry and counter space constructed from the floor to the window sill . . . Room two is also an open room floor plan with a green board mounted to a shared wall between rooms one and two . . .

The floor boards of the lanai and a portion of the roof that once sheltered the lanai have collapsed. Additionally, the majority of the window glass from the surrounding windows is missing from the framework and the cabinetry and walls have been subject to extensive wood rot. While prominent elements of the building construction are still discernible, on the whole . . . CSH-2 is in extremely poor condition. [41:36]

CSH-3 is the original Kō‘ele single room school house that was refurnished in the mid-1920s in the Richardson residence . . . Currently, the structure is a multi-roomed building of conventional wood frame construction and wood board siding . . . single hung windows . . . and a lanai that extends off of the apparent front entryway. The roof of this structure consists of corrugated sheet metal while the floors are entirely constructed of plywood.

Like CSH-2, this structure is in extremely poor condition as 3/4 of the roof is no longer intact, the floor of the lanai and south-facing wall has completely collapsed . . . and the window glass has been completely removed. [41:39]

Lee-Gregg and Hammatt [41] also excavated five test trenches, two of which—BT-2 and BT-3—were within the proposed Hōkū-ao 201-H Residential Project. The stratigraphic...
The archaeological inventory survey of the proposed Hökü-ao 201-H Residential Project was designed to determine whether or not the proposed Hökü-ao 201-H Residential Project included places where potentially significant cultural deposits might be buried. A backhoe with a blade fitted to the bucket, rather than teeth (see fig. 77, p. 129), excavated 25 test trenches typically 2 m (meters) long, 0.8 m wide, and more than 1 m deep. In each case, excavation ended within the natural subsoil. These excavations were carried out over a period of two and a half days on July 19-21.

Each trench was photographed and described. A sample was taken of each sediment layer exposed in the excavations and returned to the laboratory for standard description using a Munsell soil color chart [21] and a flowchart to determine texture by feel [55]. Test excavation locations were determined with a handheld Global Positioning System (GPS) rover with post-processing for differential correction. Differentially corrected GPS points typically achieved horizontal precision less than 2 m. They were plotted on publicly available base maps using geographic information system software. Because no sites were found, a method to determine site boundaries was not employed.

The report contains an extensive background section prepared by Kepa Maly, who grew up on Lāna‘i and has been conducting ethnographic interviews with knowledgeable individuals and compiling historical information for many decades. No additional consultations were undertaken as part of this archaeological inventory survey.

The collections made during the archaeological inventory survey were limited to soil sediment samples, which were analyzed and discarded.
4 Field Results

This section presents the results of the surface survey and test excavations carried out in the proposed Hōkū-ao 201-H Residential Project.

4.1 Surface Survey

Archaeological surface survey revealed the presence of three potentially significant historic properties within the proposed Hōkū-ao 201-H Residential Project, including Dole Harvester “Machine 1,” the original Kōʻele one-room schoolhouse, and a two-room school building also associated with the former Kōʻele school complex.

The Dole Harvester “Machine 1” was moved to its current location adjacent to the Recycle Center from the Miki area of southwestern Lānaʻi in March 2010 [44]. In practice, the harvester used a conveyor belt on long boom to transport the handpicked fruit to a bin on a flatted truck (fig. 36).

“Machine 1” is now in the possession of the Lānaʻi Culture & Heritage Center, which assessed the condition of “Machine 1” around the time it was moved to its current location (fig. 37). The assessment found the main frame to be sound and the diesel engine repairable, but other components, such as the electrical system, elevator, boom, conveyors, counterweight, crown blower system, walkways, rails, ladders, platforms, operator station, and bin were in various states of disrepair. Several pieces were noted as missing, and rust, which was widespread, threatened the structural integrity of several components.

Four treatment options were considered during the assessment, including full restoration, stabilization, storage, and disposal. To date, the storage option has been followed, with the machine now enclosed with a chain-link fence but otherwise unprotected from the elements.

The two school buildings, CSH-2 and CSH-3 (p. 100), both of which were in extremely poor condition when they were described in 2009, have not been kept up since then. The photographs in Lee-Greig and Hammatt [41:37–41] show dilapidated buildings in a field of short grass; today the buildings have been overgrown by vegetation and are in worse condition than they were in 2009. No detailed observations of building condition were made during the archaeological inventory survey, but preservation of these two buildings appears to be a lost cause today, some 30 years after they were moved from their original Kōʻele locations.

No other historic properties were identified during the surface survey.

4.2 Test Excavations

Twenty-six test excavations with backhoe, Test Pits 1–26, were excavated throughout the proposed Hōkū-ao 201-H Residential Project (fig. 38). The test pits were placed to cover the entire proposed Hōkū-ao 201-H Residential Project; however, no test pits were excavated within the Pūlama Lānaʻi nursery operation or within the Community Garden area due to the ongoing use of these facilities. Instead, Test Pits 6–11 were placed around the perimeter of these two facilities for the purpose of determining whether or not they were established on typical soil profiles. Also, a reduced level of test excavation was carried out at the northern end of the proposed Hōkū-ao 201-H Residential Project. This is an area that is used today for processing green waste and for storing large tanks of propane, and in the past housed industrial activities related to the pineapple plantation. Sparse vegetation growth and numerous push piles indicate that this area has recently experienced quite a bit of grading and earth moving. Test Pits 24 and 25 indicate the degree to which these modern activities have affected the landscape.

One of the main divisions of the proposed Hōkū-ao 201-H Residential Project, from a historical point of view, is between the former pineapple fields on the west and the uncultivated area on the east between the former fields and Lānaʻi City. The test pits were placed to investigate both of these areas. Test Pits 1–4 were excavated east of the former pineapple fields and Test Pits 5–26 were excavated within the former pineapple fields. These excavations augment the two long trenches, BT-2 and BT-3, excavated within the proposed Hōkū-ao 201-H Residential Project some years ago [41]. BT-2 was excavated within the former pineapple fields and BT-3 was excavated east of them.
Finally, somewhat greater effort was expended at the southern end of the proposed Hōkū-ao 201-H Residential Project, where Test Pits 15–18 were placed relatively close to one another. Vegetation here is better developed than in other parts of the former pineapple fields. The increased level of effort was designed to investigate whether this was related to a less intensive use of this area for pineapple cultivation in the hope that evidence of earlier uses might be preserved.

4.2.1 Test Pit 1

Test Pit 1 was located immediately south of 9th Street near the base of the slope down from Fraser Avenue (fig. 38). Vegetation is dominated by tall grasses and young trees (fig. 39). The underlying soil is Waihuna clay (see fig. 7), which was a favored soil for pineapple cultivation. According to data held in the State of Hawai‘i geographical information system [GIS] (see fig. 5), the test pit was located a short distance east of the former pineapple fields.

Excavation to a depth of 130 cm below surface exposed two natural stratigraphic layers and no cultural deposits (fig. 40). The upper layer, Context 1, a dark reddish brown silt loam, was typically 70 cm thick (fig. 41, table 5). The second layer, Context 2, a dark reddish brown silty clay, extended to the base of excavation, which was determined by the increasing presence of soft weathered pebbles that mark the basal layer of Waihuna clay soils. Aside from the loamy texture of Context 1, the stratigraphic profile exposed in Test Pit 1 closely resembles the representative profile for Waihuna clay [14:129].

The stratigraphic profile in Test Pit 1 can be compared to the profile description of BT-3, which was excavated in Waihuna clay about 75 m north of Test Pit 1 [41:46]. That excavation revealed a dusky red A horizon from the surface to 28 cm below surface, followed by a dusky red B horizon that extended to the base of excavation at 106 cm below surface. No cultural materials were found.

4.2.2 Test Pit 2

Test Pit 2 was located close to the southeastern end of the proposed Hōkū-ao 201-H Residential Project and adjacent to Awalua Avenue, a dirt road that runs generally north-south and parallel to Fraser Avenue (fig. 38). Vegetation is tall grasses and young ironwood trees (fig. 42), and the underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit was located a short distance east of
Figure 41: Schematic stratigraphic sections, Test Pits 1–8. See table 5 for sediment descriptions.

The former pineapple fields.

Table 5: Sediment descriptions for Test Pits 1–8

<table>
<thead>
<tr>
<th>Context</th>
<th>Depth</th>
<th>Description</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Pit 1</td>
<td>1</td>
<td>0–70 Dark reddish brown (5YR 2.5/2) terrestrial silt loam</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>70–130+ Dark reddish brown (5YR 2.5/2) terrestrial silt loam; base of excavation</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td>Test Pit 2</td>
<td>3</td>
<td>0–35 Dark reddish brown (2.5YR 2.5/4) terrestrial loam</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>35–70 Dark reddish brown (2.5YR 2.5/4) terrestrial silt loam</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>70–140+ Dark reddish brown (5YR 3/4) terrestrial silt loam; base of excavation</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td>Test Pit 3</td>
<td>6</td>
<td>0–55 Dark reddish brown (5YR 3/3) terrestrial sandy clay</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>55–150+ Dark reddish brown (2.5YR 2.5/2) terrestrial sandy loam; base of excavation</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td>Test Pit 4</td>
<td>8</td>
<td>0–25 Dark reddish brown (2.5YR 3/4) terrestrial sandy clay</td>
<td>Fill material deposition process</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>25–62 Dark reddish brown (2.5YR 3/4) terrestrial loam</td>
<td>Fill material deposition process</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>62–80 Very dusky red (2.5YR 2.5/2) terrestrial silt loam</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>80–123+ Dark red (2.5YR 3/6) terrestrial silty clay; base of excavation</td>
<td>Natural deposition process</td>
</tr>
</tbody>
</table>

*Centimeters below surface.*

Figure 42: Excavation of Test Pit 2, looking east. Archaeological technician Taz Del Rosario monitors the excavation.

Excavation to a depth of 140 cm below surface exposed three natural stratigraphic layers and no cultural deposits (fig. 43). The upper layer, Context 3, a dark reddish brown A horizon, was typically 35 cm thick (fig. 41, table 5). The second layer, Context 4, a dark reddish brown B horizon, typically extended to a depth of 70 cm below surface. The basal layer exposed in the excavation was Context 5, a dark reddish brown C horizon. The stratigraphic profile exposed in Test Pit 2 resembles the representative profile for Lahaina silty clay [14:78].
4.2.3 Test Pit 3

Test Pit 3 was located near the southeastern corner of the proposed Hōkū-ao 201-H Residential Project, immediately downslope from Fraser Avenue (see fig. 38). Vegetation in the vicinity of the test pit is tall grasses and Christmas berry trees (fig. 44), and the underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit was located well east of the former pineapple fields.

Excavation to a depth of 150 cm below surface exposed two natural stratigraphic layers and no cultural deposits (fig. 45). The upper layer, Context 6, a dark reddish brown A horizon, was typically 55 cm thick (fig. 41, table 5). It was underlain by Context 7, a very dusky red B horizon that extended to the base of excavation. The stratigraphic profile exposed in Test Pit 3 resembles the representative profile for Lahaina silty clay [14:78].

4.2.4 Test Pit 4

Test Pit 4 was located near the northeast corner of the proposed Hōkū-ao 201-H Residential Project, immediately adjacent to the grounds of the Kingdom Hall of Jehovah’s Witnesses (see fig. 38). This is an open area used to stockpile construction and other materials (fig. 46). The underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit was located well east of the former pineapple fields.

Excavation to a depth of 123 cm below surface exposed four stratigraphic layers, including a modern application of fill material that has begun to support vegetation and two natural deposits that represent a paleosol (fig. 47). Test Pit 4 yielded abundant evidence of modern human activity. In addition to the application of fill material, pieces of plastic, glass, and other modern materials were exposed on the surface of the paleosol. No potentially significant cultural deposits were observed. The upper layer, Context 8, is a dark reddish brown A horizon typically 25 cm thick that is developing on the dark reddish brown fill material identified as Context 9 that extends to a depth of 62 cm below surface.
The very dusky red Context 10, which extends to a depth of 80 cm below surface, represents the A horizon of the paleosol. The modern artifacts noted above were found on its surface. It is underlain by Context 11, a dark red B horizon that extends to the base of excavation.

**Figure 47:** Completed excavation of Test Pit 4, looking southeast. Note the modern paleosol at the middle of the stratigraphic section. The scale is marked in 10 cm increments. See fig. 41 and table 5 for description and interpretation of the stratigraphic profile.

### 4.2.5 Test Pit 5

Test Pit 5 was located near the intersection of 9th Street and Awahua Avenue near the northern end of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). Vegetation is tall grasses and ironwood trees (fig. 48), and the underlying soil is Waihuna clay (see fig. 7). According to data held in the State of Hawai'i GIS (see fig. 5), the test pit is located in a former pineapple field.

**Figure 48:** Excavation of Test Pit 5, looking northeast. Awahua Avenue is the dirt road in the foreground. The white truck is heading toward Lāna‘i City on 9th Street.

Excavation to a depth of 100 cm below surface exposed three layers (fig. 49). The upper layer, Context 12, a dark reddish brown silt loam with pieces of black plastic mulch, which extends to a depth of 25 cm below surface, represents the plow zone of the pineapple field. The second layer, Context 13, is a dark reddish brown B horizon that extends to 44 cm below surface. The basal layer, Context 14, is a dark reddish brown C horizon that is found to the base of excavation. Context 12 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. Contexts 13 and 14 are natural deposits. No potentially significant cultural materials were found in the Test Pit 5 excavation.

**Figure 49:** Completed excavation of Test Pit 5, looking east. The scale is marked in 10 cm increments. See fig. 41 and table 5 for description and interpretation of the stratigraphic profile.

The stratigraphic profile exposed in the Test Pit 5 excavation is similar to the profile description for BT-2, which was located about 50 m east and still within the old pineapple fields [41:49–51].

### 4.2.6 Test Pit 6

Test Pit 6 was located immediately east of the Pūlama Lāna‘i Nursery (see fig. 38). This is a grassy area next to a dirt road (fig. 48). The underlying soil is Waihuna clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 130 cm below surface exposed two layers (fig. 51). The upper layer, Context 15, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 47 cm below surface. Context 15 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 16, is a natural dark reddish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 6 excavation.

### 4.2.7 Test Pit 7

Test Pit 7 was located immediately east of the Community Garden, near its northern end (see fig. 38). This location near the middle of the proposed Hōkū-ao 201-H Residential...
4.2.8 Test Pit 8

Test Pit 8 was located near the southeastern end of the proposed Hōkū-ao 201-H Residential Project, immediately east of the Community Garden (see fig. 38). This location is a grassy area next to a dirt road (fig. 54). The underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawaiʻi GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 110 cm below surface exposed two layers (fig. 55). The upper layer, Context 19, is a dark reddish brown plow zone with pieces of black plastic mulch. It extends to a depth of 40 cm below surface. Context 19 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lānaʻi. The lower layer, Context 18, is a natural dark reddish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 7 excavation.
Context 20, is a natural dark reddish brown B horizon that is found at the base of excavation. No potentially significant cultural materials were found in the Test Pit 8 excavation.

**Figure 55:** Completed excavation of Test Pit 8, looking west. Note the black plastic pieces in the upper stratum. The scale is marked in 10 cm increments. See fig. 41 and table 5 for description and interpretation of the stratigraphic profile.

### 4.2.9 Test Pit 9

Test Pit 9 was located immediately west of the Community Garden, near its middle (see fig. 38). The vegetation here is high grasses (fig. 56). The underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

**Figure 56:** Excavation of Test Pit 9, looking west. Note the black plastic pieces exposed at the surface in the foreground.

Excavation to a depth of 100 cm below surface exposed two layers (fig. 57). The upper layer, Context 21, is a dark reddish brown plow zone with pieces of black plastic mulch. It extends to a depth of 44 cm below surface. Context 21 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 22 is a natural dark red B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 9 excavation.

**Figure 57:** Completed excavation of Test Pit 9, looking east. Note the black plastic pieces in the upper stratum. The scale is marked in 10 cm increments. See fig. 58 and table 6 for description and interpretation of the stratigraphic profile.

**Figure 58:** Schematic stratigraphic sections, Test Pits 9–16. See table 6 for sediment descriptions.

### Table 6: Sediment descriptions for Test Pits 9–16

<table>
<thead>
<tr>
<th>Context</th>
<th>Depth</th>
<th>Description</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Pit 9</td>
<td>21</td>
<td>0–44</td>
<td>Dark reddish brown (2.5YR 3/4) terrestrial loam</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>44–100+</td>
<td>Dark red (2.5YR 3/6) terrestrial clay loam; base of excavation</td>
</tr>
<tr>
<td>Test Pit 10</td>
<td>23</td>
<td>0–40</td>
<td>Dark reddish brown (2.5YR 3/3) terrestrial silt loam</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>40–110+</td>
<td>Dark reddish brown (2.5YR 2.5/4) terrestrial loam; base of excavation</td>
</tr>
<tr>
<td>Test Pit 11</td>
<td>25</td>
<td>0–43</td>
<td>Dark red (10R 3/6) terrestrial sandy loam</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>43–115+</td>
<td>Dark red (2.5YR 3/6) terrestrial sandy loam; base of excavation</td>
</tr>
</tbody>
</table>

*Centimeters below surface.

Continued on next page
4.2.10 Test Pit 10

Test Pit 10 was located at the southwestern corner of the Pūlama Lānaʻi Nursery near the middle of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). This is a grassy area just outside the nursery fence. The underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 110 cm exposed two layers (fig. 59). The upper layer, Context 23, is a dark reddish brown plow zone with pieces of black plastic mulch that extends to a depth of 40 cm below surface. Context 23 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lānaʻi. The lower layer, Context 24, is a natural dark reddish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 10 excavation.

4.2.11 Test Pit 11

Test Pit 11 was located outside the western end of the Pūlama Lānaʻi Nursery near the middle of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). This is a grassy area just outside the nursery fence (fig. 60). The underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 115 cm below surface exposed two layers (fig. 61). The upper layer, Context 25, is a dark red plow zone with pieces of black plastic mulch that extends to a depth of 43 cm below surface. Context 25 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lānaʻi. The lower layer, Context 26, is a natural dark red B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 11 excavation.
4.2.12 Test Pit 12

Test Pit 12 was located near the western end of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). The vegetation here is dominated by lantana (fig. 62) and the underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 100 cm below surface exposed two layers (fig. 63). The upper layer, Context 27, a very dusky red plow zone with pieces of black plastic mulch, extends to a depth of 40 cm below surface. Context 27 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 28, is a natural dark red $B$ horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 12 excavation.

4.2.13 Test Pit 13

Test Pit 13 was located near the southwestern end of the proposed Hōkū-ao 201-H Residential Project, about 75 m east of Test Pit 12 (see fig. 38). The vegetation here is dominated by lantana (fig. 64) and the underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 110 cm below surface exposed two layers (fig. 63). The upper layer, Context 29, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 50 cm below surface. Context 29 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 30, is a natural dark red $B$ horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 13 excavation.

4.2.14 Test Pit 14

Test Pit 14 was located near the southwestern end of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). The vegetation here is dominated by lantana (fig. 66) and
the underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 110 cm below surface exposed two layers (fig. 67). The upper layer, Context 31, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 45 cm below surface. Context 31 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 32, is a natural dark reddish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 12 excavation.

4.2.15 Test Pit 15

Test Pit 15 was located near the southwestern corner of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). The vegetation here is dominated by tall grasses (fig. 68) and the underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 120 cm below surface exposed two layers (fig. 69). The upper layer, Context 33, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 45 cm below surface. Context 33 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 34, is a natural dark reddish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 15 excavation.

4.2.16 Test Pit 16

Test Pit 16 was located near the southwestern corner of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). The vegetation here is dominated by tall grasses (fig. 70) and the underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 120 cm below surface exposed two layers (fig. 71). The upper layer, Context 35, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 35 cm below surface. Context 35 is a twentieth-century cultural
4.2.17 Test Pit 17

Test Pit 17 is an extant trash pit located near the southern end of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). The vegetation here is dominated by tall grasses and the underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai'i GIS (see fig. 3), the trash pit is located in a former pineapple field.

Two layers were exposed in the trash pit, which had been excavated to a depth of 190 cm below surface (fig. 72). The upper layer, Context 37, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 45 cm below surface. Context 37 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 38, is a natural red B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 17 excavation.

Figure 72: Test Pit 17, an extant trash pit, looking west. Note the black plastic pieces in the upper stratum and the modern trash at the base of the pit. The scale is marked in 10 cm increments. See fig. 73 and table 7 for description and interpretation of the stratigraphic section.
### Table 7: Sediment descriptions for Test Pits 17–24

<table>
<thead>
<tr>
<th>Context</th>
<th>Depth*</th>
<th>Description</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Pit 17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>0–45</td>
<td>Dark reddish brown (2.5YR 2.5/4) terrestrial sandy loam; base of excavation</td>
<td>Cultural deposition process</td>
</tr>
<tr>
<td>38</td>
<td>45–190+</td>
<td>Red (2.5YR 4/8) terrestrial clay loam; base of excavation</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td>Test Pit 18</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>0–54</td>
<td>Dark reddish brown (3YR 3/4) terrestrial sandy loam</td>
<td>Cultural deposition process</td>
</tr>
<tr>
<td>40</td>
<td>54–125+</td>
<td>Dark red (2.5YR 3/6) terrestrial loam; base of excavation</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td>Test Pit 19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>0–80</td>
<td>Dark brown (7YR 3/3) terrestrial sandy loam</td>
<td>Cultural deposition process</td>
</tr>
<tr>
<td>42</td>
<td>80–105+</td>
<td>Dark yellowish brown (10YR 3/4) terrestrial silt loam; base of excavation</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td>Test Pit 20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>0–50</td>
<td>Dark reddish brown (3YR 3/2) terrestrial silty clay</td>
<td>Cultural deposition process</td>
</tr>
<tr>
<td>44</td>
<td>50–115+</td>
<td>Dark reddish brown (3YR 3/3) terrestrial silty clay loam; base of excavation</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td>Test Pit 21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>0–60</td>
<td>Dark reddish brown (3YR 3/2) terrestrial loam</td>
<td>Cultural deposition process</td>
</tr>
<tr>
<td>46</td>
<td>60–105+</td>
<td>Dark reddish brown (3YR 3/3) terrestrial sandy loam; base of excavation</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td>Test Pit 22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>0–55</td>
<td>Dark reddish brown (3YR 2.5/2) terrestrial sandy loam</td>
<td>Cultural deposition process</td>
</tr>
<tr>
<td>48</td>
<td>55–108+</td>
<td>Dark reddish brown (3YR 2.5/2) terrestrial silty clay; base of excavation</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td>Test Pit 23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>0–45</td>
<td>Dark reddish brown (3YR 2.5/2) terrestrial sandy clay loam</td>
<td>Cultural deposition process</td>
</tr>
<tr>
<td>50</td>
<td>45–110+</td>
<td>Dark reddish brown (3YR 2.5/2) terrestrial silty clay; base of excavation</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td>Test Pit 24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>5–40</td>
<td>Dark reddish brown (3YR 3/2) terrestrial sandy loam</td>
<td>Cultural deposition process</td>
</tr>
<tr>
<td>53</td>
<td>40–110+</td>
<td>Dark reddish brown (2.5YR 2.5/4) terrestrial silty clay; base of excavation</td>
<td>Natural deposition process</td>
</tr>
</tbody>
</table>

*Centimeters below surface.

4.2.18 Test Pit 18

Test Pit 18 was located near the southern end of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). The vegetation here is dominated by grasses and the underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 125 cm below surface exposed two layers (fig. 74). The upper layer, Context 39, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 54 cm below surface. Context 39 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 40, is a natural dark red B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 18 excavation.

### Figure 74: Completed excavation of Test Pit 18, looking east. Note the black plastic pieces in the upper stratum. The scale is marked in 10 cm increments. See fig. 73 and table 7 for description and interpretation of the stratigraphic profile.

4.2.19 Test Pit 19

Test Pit 19 was located near the western end of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). The vegetation here is dominated by grasses and the underlying soil is Lahaina silty clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 105 cm below surface exposed two layers (fig. 75). The upper layer, Context 41, a dark brown plow zone with pieces of black plastic mulch, extends to a depth of 80 cm below surface. Context 41 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 42, is a natural dark yellowish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 19 excavation.

4.2.20 Test Pit 20

Test Pit 20 was located near the western end of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). The vegetation here is dominated by grasses and Christmas berry trees and the underlying soil is Waihuna clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.
Figure 75: Completed excavation of Test Pit 19, looking northwest. Note the black plastic pieces in the upper stratum. The scale is marked in 10 cm increments. See fig. 73 and table 7 for description and interpretation of the stratigraphic profile.

Excavation to a depth of 115 cm below surface exposed two layers (fig. 76). The upper layer, Context 43, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 50 cm below surface. Context 43 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 44, is a natural dark reddish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 20 excavation.

Figure 76: Completed excavation of Test Pit 20, looking east. Note the black plastic pieces in the upper stratum. The scale is marked in 10 cm increments. See fig. 73 and table 7 for description and interpretation of the stratigraphic profile.

4.2.21 Test Pit 21

Test Pit 21 was located near the northwest corner of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). The vegetation here is dominated by grasses and Christmas berry trees (fig. 77) and the underlying soil is Waihuna clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Figure 77: Excavation of Test Pit 21, looking southeast. The backhoe operator is Terrence Sarme.

Excavation to a depth of 105 cm below surface exposed two layers (fig. 78). The upper layer, Context 45, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 60 cm below surface. Context 45 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 46, is a natural dark reddish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 21 excavation.

Figure 78: Completed excavation of Test Pit 21, looking east. Note the black plastic pieces in the upper stratum. The scale is marked in 10 cm increments. See fig. 73 and table 6 for description and interpretation of the stratigraphic profile.
4.2.22 Test Pit 22

Test Pit 22 was located near the northwestern corner of the proposed Hōkū-ao 201-H Residential Project about 60 m east of Test Pit 21 (see fig. 38). The vegetation here is dominated by grasses and Christmas berry trees (fig. 79) and the underlying soil is Waihuna clay (see fig. 7). According to data held in the State of Hawai'i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 108 cm below surface exposed two layers (fig. 80). The upper layer, Context 47, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 55 cm below surface. Context 47 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 48, is a natural dark reddish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 22 excavation.

Figure 79: Excavation of Test Pit 22, looking southeast.

Figure 80: Completed excavation of Test Pit 22, looking east. Note the black plastic pieces in the upper stratum. The scale is marked in 10 cm increments. See fig. 73 and table 7 for description and interpretation of the stratigraphic profile.

4.2.23 Test Pit 23

Test Pit 23 was located near the northern end of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). The vegetation here is dominated by grasses and Christmas berry trees (fig. 81) and the underlying soil is Waihuna clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 110 cm below surface exposed two layers (fig. 82). The upper layer, Context 49, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 45 cm below surface. Context 49 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 50, is a natural dark reddish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 23 excavation.

Figure 81: Excavation of Test Pit 23, looking south.

Figure 82: Completed excavation of Test Pit 23, looking east. Note the black plastic pieces in the upper stratum. The scale is marked in 10 cm increments. See fig. 73 and table 7 for description and interpretation of the stratigraphic profile.
4.2.24 Test Pit 24

Test Pit 24 was located near the northern end of the proposed Hōkū-ao 201-H Residential Project in an area that was used recently for industrial purposes (see fig. 38). The vegetation here is dominated by grasses and herbs (fig. 83) and the underlying soil is Waihuna clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 110 cm below surface exposed two sediment layers capped at the surface by Context 51, a 5 cm thick pad of asphalt (fig. 84). The upper sediment layer, Context 52, a dark reddish brown plow zone with pieces of black plastic mulch, extends to a depth of 40 cm below surface. Context 52 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna‘i. The lower layer, Context 53, is a natural dark reddish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 24 excavation.

Figure 83: Excavation of Test Pit 24, looking south. Note the asphalt under the backhoe bucket. The backhoe operator is Terrence Sarme.

4.2.25 Test Pit 25

Test Pit 25 was located near the northeastern end of the proposed Hōkū-ao 201-H Residential Project (see fig. 38). The vegetation here is dominated by grasses and herbs (fig. 85) and the underlying soil is Waihuna clay (see fig. 7). According to data held in the State of Hawai‘i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 107 cm below surface exposed three layers (fig. 86). The upper layer, Context 54, an application of very dusky red fill material that includes pieces of black plastic mulch, extends to a depth of 15 cm below surface. The black plastic mulch indicates that this fill material was deposited sometime after pineapple cultivation was established on the island in the twentieth century. The middle layer, Context 55, represents multiple applications of fill material, including a reddish gray sand that appears to be imported from outside the proposed Hōkū-ao 201-H Residential Project. It extends to 65 cm below surface. The lowest layer, Context 56, is a natural dark reddish brown B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 25 excavation.

Figure 84: Completed excavation of Test Pit 24, looking east. Note the asphalt at the surface and the black plastic pieces in the stratum beneath it. The scale is marked in 10 cm increments. See fig. 73 and table 7 for description and interpretation of the stratigraphic profile.

Figure 85: Excavation of Test Pit 25, looking southwest. Note the propane gas tanks in left background.

Figure 86: Completed excavation of Test Pit 25, looking southwest. Note the banded fill material near the middle of the stratigraphic section. The scale is marked in 10 cm increments. See fig. 87 and table 8 for description and interpretation of the stratigraphic profile.
Figure 87: Schematic stratigraphic sections, Test Pits 25 and 26. See table 8 for sediment descriptions.

Table 8: Sediment descriptions for Test Pits 25 and 26

<table>
<thead>
<tr>
<th>Context</th>
<th>Depth</th>
<th>Description</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Pit 25</td>
<td>54</td>
<td>0–15 Very dusky red (2.5YR 2.5/2) terrestrial clay loam</td>
<td>Fill material deposition process</td>
</tr>
<tr>
<td></td>
<td>55</td>
<td>15–65 Reddish gray (5YR 5/2) terrestrial sand</td>
<td>Fill material deposition event</td>
</tr>
<tr>
<td></td>
<td>56</td>
<td>65–107+ Dark reddish brown (2.5YR 2.5/4) terrestrial silty clay loam; base of excavation</td>
<td>Natural deposition process</td>
</tr>
<tr>
<td>Test Pit 26</td>
<td>57</td>
<td>0–45 Dusky red (10R 3/4) terrestrial silty clay loam</td>
<td>Cultural deposition process</td>
</tr>
<tr>
<td></td>
<td>58</td>
<td>45–115+ Dusky red (10R 3/4) terrestrial silty clay loam; base of excavation</td>
<td>Natural deposition process</td>
</tr>
</tbody>
</table>

*Depth in cm below surface.

4.2.26 Test Pit 26

Test Pit 26 was located near the middle of the proposed Hōkū-ao 201-H Residential Project, west of the Pālama Lāna'i Nursery (see fig. 38). The vegetation here is dominated by grasses (fig. 88) and the underlying soil is Waihuna clay (see fig. 7). According to data held in the State of Hawai'i GIS (see fig. 5), the test pit is located in a former pineapple field.

Excavation to a depth of 115 cm below surface exposed two layers (fig. 89). The upper layer, Context 57, a dusky red plow zone with pieces of black plastic mulch, extends to a depth of 45 cm below surface. Context 57 is a twentieth-century cultural deposit formed in the 70 years that pineapple was cultivated on Lāna'i. The lower layer, Context 58, is a natural dusky red B horizon that is found to the base of excavation. No potentially significant cultural materials were found in the Test Pit 26 excavation.

5 Summary and Conclusions

At the request of Pālama Lāna'i, T. S. Dye & Colleagues, Archaeologists has completed an archaeological inventory survey for the proposed Hōkū-ao 201-H Residential Project, located at Kamoku, Lāhainā District, Lāna'i Island. A review of the historical background indicates the entire 105 ac. project area was modified by heavy equipment during the establishment of Lāna'i City and commercial pineapple fields in the 1920s. Previous archaeological inventory surveys on portions of the proposed Hōkū-ao 201-H Residential Project and on lands adjacent to it failed to find traditional Hawaiian historic sites.

The archaeological inventory survey included surface survey and test excavations with a backhoe. Three potentially significant historic properties were identified during the surface survey, all of which are historic-era artifacts that were transported into the project area for preservation. Two wood-frame buildings from the Kō'ele School complex, in poor condition a decade ago, have now been overgrown by vegetation and lack the integrity of condition to be listed on the Hawai'i Register of Historic Places. A pineapple harvester, "Machine 1," in the possession of the Lāna'i Culture & Heritage Center, possesses sufficient integrity to be significant under Criterion "a" due to its association with the commercial pineapple fields that for seven decades were the primary economic pursuit on the island.

It is recommended that "Machine 1" be moved to a sheltered location away from the proposed Hōkū-ao 201-H Residential Project prior to any construction activities and that funds for its restoration and interpretive display be pursued.
No potentially significant historic properties were found in the test excavations. The plow zone with pieces of black plastic mulch that was found throughout the western portion of the proposed Hōkū-ao 201-H Residential Project was actively forming into the 1990s and does not meet the age criterion for a historic property. The negative results of the test excavations are typical for the former pineapple fields.

Once “Machine 1” has been moved away, the proposed Hōkū-ao 201-H Residential Project will have “no effect” on historic properties because the inventory survey failed to find potentially significant historic properties, which are therefore reasonably believed to be absent from the project area.

Glossary

A horizon The surface layer in the soil containing humus, an eluvial layer from which minerals, etc., are leached. See also horizon.

alluvium Detrital deposits from rivers or streams.

B horizon The soil layer underlying the A horizon, an illuvial horizon into which minerals, etc., from the A horizon are washed. See also horizon.

C horizon A distinct layer in the soil underlying the A or B horizons, or the organic or mineral horizons, consisting of the parent material, i.e., the little altered but weathered bedrock, transported glacial or alluvial material, or an earlier soil, from which the soil is formed. See also horizon.

caldera A caldera is a cauldron-like volcanic feature usually formed by the collapse of land following a volcanic eruption. They are sometimes confused with volcanic craters.

Christmas berry The ornamental tree, Schinus terebinthifolius, known for its bright red berry-like fruits.

clastic Consisting of fragments of rocks or of organic structures that have been moved individually from their places of origin.

clay Fine earth particles less than 0.002 mm.

Contact A period in Hawaiian history marked by the arrival of Captain James Cook in 1778 and characterized by the social changes that eventually brought about the end of traditional Hawai‘i.

context A unit of stratification associated with a natural or cultural process or event.

detritus Material produced by the disintegration and weathering of rocks that has been moved from its site of origin, or a deposit of such material.

fee simple An estate of inheritance, held without limitation to a particular class of heirs; unconditional inheritance.

fill Any sediment deposited by any agent so as to fill or partly fill a valley, sink, or other depression.

habit A botanical term used to describe the general appearance, growth form, or architecture of a plant.

historic property According to Hawai‘i Administrative Rules §13–198–2, an “historic property” is any building, structure, object, district, area, or site, including underwater and subterranean parts.

ironwood A historically introduced large tree, Casuarina equisetifolia.

lantana A historically introduced shrub, Lantana camara.

paleosol A soil of the past, often buried.

pre-contact Prior to AD 1778 and the first written records of the Hawaiian Islands made by Captain James Cook and his crew.

project The archaeological investigation, including laboratory analyses and report preparation.

rood A land area unit equal to 1/4 acre.

sand Detrital material ranging in size from 0.5 mm to 2 mm in diameter. See also detritus.

scarp An escarpment, cliff, or steep slope along the margin of a plateau, mesa, terrace, or bench.

significance A quality of a historic property that possesses integrity of location, design, setting, materials, workmanship, feeling, and association. The qualities are set out in SHPD administrative rule §13–275–6, Evaluations of Significance.

silt A clastic sediment ranging in size from 0.002 mm to 0.5 mm in diameter. See also clastic.

site The fundamental unit of archaeological investigation, a location that exhibits material evidence of past human activity.

stone Rock fragment ranging from 250 mm to less than 600 mm.

subangular blocky A type of soil structure characterized by polyhedral shapes with sub-rounded and planar faces, lacking sharp angles.

sugarcane A grass, Saccharum officinarum, widely grown in warm regions as a source of sugar. See also kā.

tree A perennial woody plant with a single main stem, or trunk, typically taller than 5–6 m at maturity. See also habit.

very plastic A 2 mm diameter roll of soil will support itself if held on end.

very sticky Soil adheres to both fingers after release of pressure. Soil stretches greatly on separation of fingers.

Hawaiian Terms

ahu Heap, pile; altar, shrine, cairn.

ahupua‘a Traditional Hawaiian land division, usually extending from the uplands to the sea.

‘āina Land, earth.

akua God, goddess, spirit, ghost, devil, image, corpse.

‘alae A bird, Falica americana alae, the mudhen or Hawaiian gallinule. See also ‘alae kea.

‘alae kea A bird, Falica americana alai, the Hawaiian coot.

ali‘i Chief, chiefess, officer, ruler, monarch, peer, head man, noble, aristocrat, king, queen, commander.
aloha Love, affection, compassion, mercy, sympathy, etc.
‘apapane A honeycreeper, *Himatione sanguinea* with crimson body and black wings and tail, found on all the main Hawaiian Islands. Its feathers occasionally were used for featherwork.
‘aumakua Family or personal gods, deified ancestors who might assume the shape of animals, rocks, clouds, or plants.
‘awa A shrub, *Piper methysticum*, the root of which is the source of a narcotic drink of the same name used in ceremonies, prepared formerly by chewing, later by pounding.
hala An indigenous tree, *Pandanus tectorius*, whose leaves were used for mat making, canoe sails, baskets, and thatching.
hale House, building, station, hall.
he'e Octopus.
heiau Traditional Hawaiian place of worship.
helu To count, number, compute, take a census, figure enumerate, list, include, impute; to assess, as taxes; to chant a list of names, as of genealogy; including, counting, enumeration, census, list, rate, number, figure, total, inventory; statistics.
‘ili A land section, next in importance to ahupua‘a, and usually a subdivision of an ahupua‘a.
‘ili‘ili Native trees and shrubs belonging to the genus *Samia* or sandalwood. Traditionally, it was powdered and mixed with coconut oil to make perfume for *kapa*.
imu Underground oven.
‘inamona Relish made of the cooked kernel of kuku‘i mashed with salt. See also kuku‘i.
kahakō Macron, indicating a long vowel.
Kahiki Tahiti, foreign land.
kalo The taro, *Colocasia esculenta*, was a staple food in traditional Hawai‘i and all parts of the plant were used. The rootstock was baked or steamed, then eaten sliced or pounded to make poi, raw taro was also grated and mixed with coconut milk to make desserts, the leaves, leaf stems and flowers were also used in cooking. Medicinally the leaves and rootstock were used to treat many ailments. The plant was also used ritually, as bait for fish, glue, and to make dye.
kamā‘āina Native-born, one born in a place, host.
kapa Tapa cloth, as made from wauke or māmaki bark.
kapu Taboo, prohibition; special privilege or exemption from ordinary taboo; sacredness; prohibited, forbidden; sacred, holy, consecrated; no trespassing, keep out.
kauila A native tree, *Alphitonia ponderosa*, whose hard wood was valued traditionally for spears and tools; it was also used as beams in house construction.
kūlula Prophet, seer, magician.
kō Sugarcane, *Saccharum officinarum*, was introduced to Hawai‘i by Polynesian settlers, who cultivated it widely. The stalk was chewed between meals for its sweetness, brought on long journeys to ease hunger, and eaten in times of famine; juice from the stalk was fed to nursing babies, and used as a sweetening agent in medicinal herbal concoctions; the leaves were used as thatching for houses; the leaf midrib was used for plaiting braids that were made into hats; the stem of the flower was used to make darts for a child’s game.

koa A tree, *Acacia koa*, one of the largest endemic trees in Hawai‘i. Wood used for canoes, paddles, and surfboards.
koa haole A historically introduced small tree, *Leucaena glauca*.
konohiki Head man of an ahupua‘a land division under the chief; land or fishing rights under control of the konohiki. See also ahupua‘a.
kou A native tree, *Cordia subcordata*, with a wood prized for its grain and ease of carving. It was used for carving a wide variety of objects from platters to images of gods; the leaves were made into dye and the flowers were also used in lei making.
kūkī Runner, swift messenger, as employed by old chiefs, with a premium on their speed.
kukui The candlefruit tree, *Aleurites moluccana*, introduced to Hawai‘i by Polynesian settlers. The outer husk of the fruit or nut was used to make a black dye for tapa and tattooing; sap from the fruit was used as medicine to treat thirst, and used as a purgative; the hard shell of the nut was used in lei making; the kernel of the nut was the source of an oil that was burned for illumination and also used as a wood varnish for surfboards and canoes; the kernel was also chewed and spit on rough seas to calm the ocean and baked kernels were mixed with salt and chili pepper to make a relish (*‘inamona*); the trunk was used to make canoes and floats for fishing nets; a reddish dye was made from the bark and/or root; a gum exuded from wounded bark was used to treat tapa; the flower was mixed with sweet potato to treat thirst; the leaves were used in a poultice for swelling and infection.
kula 1. Plain, field, open country, pasture; land with no water rights; 2. School.
kuleana Right, title, property, portion, responsibility, jurisdiction, authority, interest, claim, ownership.
kupuna Grandparent, ancestor, relative, or close friend of the grandparent’s generation, grandaunt, granduncle.
lānai Porch, veranda, booth, shed; temporary roofed construction with open sides near a house.
lei Garland, wreath.
lo‘i A single irrigated taro patch; irrigated terrace, especially for taro.
lo‘i kalo Irrigated taro patch. See also lo‘i.
Māhele The mid-nineteenth century land division responsible for the introduction of fee simple land title in Hawai‘i.
mai’a All kinds of bananas and plantains.
maika Ancient Hawaiian game suggesting bowling.
makahiki Ancient festival beginning about the middle of October and lasting about four months, with sports and religious festivities and taboo on war.
makai Seaward.
māmaki A small native tree, *Pipturus albida*, also called māmāke; the berry was used as a laxative, a dressing for wounds, and a tonic for general debility; the berry was fed to children to treat thirst; the bark was used to make tapa cloth.
mauka Inland, upland, toward the mountain.
mōʻi King, queen, sovereign, monarch, or a rank of chiefs who could succeed to the government but who were of lower rank than chiefs descended from the god Kahē.
The canoe's smooth surface was polished with the pound of a wauke, a sturdy, durable fiber used for fishing nets, carrying containers, and as a base for ti-leaf raincoats and feather capes.

\[ \text{moku mau'u} \text{ Grassland section or pasture upon which livestock could graze.} \]
\[ \text{mokupuni} \text{ Island.} \]
\[ \text{mo'oa} \text{ 1. Narrow strip of land, smaller than an 'āli'i. 2. Lizard, reptile of any kind, dragon, serpent; water spirit.} \]
\[ \text{moʻoʻelo} \text{ A story, tale, myth, history, tradition, legend, fable, chronicle, or record.} \]
\[ \text{naio} \text{ A native tree, Myoporom sandwicense, with hard, dark, yellow-green wood. The wood was used traditionally for the main timbers of houses.} \]
\[ \text{naupaka} \text{ A native low shrub, Scaevola sieroea, from which the root was used medicinally and the fruit was occasionally eaten.} \]
\[ \text{'ohana} \text{ Family, relative, kin group.} \]
\[ \text{olona} \text{ A native shrub, Touchardia latifolia, whose bark was valued as the source of a strong, durable fiber for fishing nets, nets to carry containers, and as a base for ti-leaf raincoats and feather capes.} \]
\[ \text{pali} \text{ Cliff, precipice, steep hill or slope suitable for olona or wauke.} \]
\[ \text{pili} \text{ A native grass, Heteropogon contortus, whose leaves were used traditionally as house thatch.} \]
\[ \text{pipi} \text{ 1. Hawaiian pearl oyster, Pinctada radiata. In songs this is known as the 'i'a hāmua leo o 'Ewa, 'Ewa's silent sea creature—it was believed that talking would cause a breeze to ripple the water and frighten the pipi. 2. Cattle.} \]
\[ \text{po'i} \text{ The Hawaiian staff of life, made from cooked taro corms, or rarely breadfruit, pounded and thinned with water.} \]
\[ \text{pucio} \text{ Hawaiian short-eared owl, Asio flammeus sandwichensis, sometimes regarded as a deity.} \]
\[ \text{pule} \text{ Prayer, magic spell, incantation, blessing.} \]
\[ \text{'ula} \text{ The sweet potato, Ipomoea batatas, introduced to Hawai'i by Polynesian settlers, was a staple food. The tuber was cooked whole and eaten or it was made into poi and mixed with coconut milk to make a dessert; it was used as bait for mackerel fishing; and to make a fermented drink called 'ula 'awa'awa. The vine made a lei which was worn by nursing mothers to ensure a good flow of milk; when dried, the vine was also used as padding underneath floor mats. All parts of the plant were used as food for pigs. Kamapua'a was the god of the sweet potato.} \]
\[ \text{'ua'u} \text{ The endangered seabird, Pterodroma phaeopygia, or dark-rumped petrel.} \]
\[ \text{uhu} \text{ An adult fish in the family Scaridae. Commonly known as parrotfish.} \]
\[ \text{'ula} \text{ 1. Discoidal, smooth stone as used in 'ula maika game; 2. Breadfruit, Artocarpus altilis.} \]
\[ \text{'ula maika} \text{ Stone used in the maika game. See also maika.} \]
\[ \text{wahine} \text{ Woman, lady, wife; sister-in-law, female cousin-in-law of a man.} \]
\[ \text{wauke} \text{ A small tree or shrub, Broussonetia papyrifera, whose bark was made into kapa cloth. The inner bark was used to make cordage, and the shoots were used to treat childhood diseases. The leaves, along with banana and taro leaves, were used ceremonially to wrap the bodies of ali'i after death.} \]

Abbreviations

ac. A unit of land area equal to 4,840 square yards (0.405 hectare).
AD Anno Domini, the Christian era in the Gregorian calendar, starting from the year AD 1 as the calculated year in which Christ was born.

cm The centimeter, a derived unit of length in the International System of Units, equal to \(10^{-2}\) m. See also m.

DLNR The Hawai'i Department of Land and Natural Resources, a government agency responsible for the management and conservation of the natural, cultural, and historic resources of Hawai'i held in public trust. SHPD is a division of DLNR.

ft. A unit of linear measure equal to 12 inches or 0.3048 meter.

GPS Global Positioning System, operated by the government of the United States. The term is often used for the unit used to communicate with the GPS.

LCA Awards issued by the Board of Commissioners to Quiet Land Titles between 1846 and 1852 to persons who filed claims to land between 1846 and 1848.

m The meter, a base unit of length in the International System of Units, equal to the length of the path traveled by light in vacuum during a time interval of 1/299,792,458 of a second.

SHPD The State Historic Preservation Division of the Hawai'i Department of Land and Natural Resources, a government agency responsible for implementing the National Historic Preservation Act of 1966, as amended, and Chapter 6E of the Hawai'i Revised Statutes.

SHP State Inventory of Historic Places.

Bibliography

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44. Morita, A. (2010). Dole Harvester “machine 1”. Memorandum to the Lānaʻi Culture & Heritage Center Board of Directors on file at the Lānaʻi Culture & Heritage Center.


December 16, 2019

Susan Lebo, Ph.D.
Archaeology Branch Chief
State Historic Preservation Division
Kakuhihewa Building
601 Kamokila Blvd., Suite 555
Kapolei, HI 96707
Ph: (808) 692-8026
Susan.lebo@hawaii.gov


Aloha Dr. Susan Lebo,

This letter is regarding an impromptu field inspection conducted at the request of Pūlama Lāna‘i for the proposed Hōkūao 201-H Housing Project. The purpose of the current field inspection was to relocate four potentially significant historic properties within the proposed project area (Table 1 and Figure 1). The sites were previously documented during two archaeological inventory surveys, conducted for the Lāna‘i Affordable Housing Project in 2009 (Lee-Greig and Hammatt 2009) and the Hōkūao 201-H Housing Project in 2018 (Dye and Maly 2018, Log No. 2019.00221). The historic properties include two early 1900s historic wood-frame buildings (CSH-2 and CSH-3), a pineapple harvester (“Machine 1”), and a historic culvert headwall (SIHP #50-40-98-6649). A summary of the previously documented sites is presented, followed by a summary of current fieldwork.

CSH-2 and CSH-3, Historic Buildings

Two previous AIS reports describe CSH-2 and CSH-3 as two of three or four buildings constructed in the early 1900s that once comprised the Kō‘ele School Complex (personal communication by Kepā Maly July 27, 2009 referenced in Lee-Greig and Hammatt 2009:36,55; Dye and Maly 2018). Our supplemental research found a 1927 Land Court Application (LCAp) map (862) labeling an area just northeast of Lānai City as “School Lot” and numbered as Lot 16 (see Figure 1). LCAp 862:Map 002 lists Lot 16 as a “Government School Lot at Lanai City”. It is likely this area is where these buildings once stood.

CSH-2 was a wood-frame, two-room schoolhouse built in 1927 as the Koele Grammar School (Lee-Greig and Hammatt 2009, Ruzicka 2017a, Dye and Maly 2018). The schoolhouse was originally located about a half mile from the Lānai Ranch Headquarters/Koele Ranch Camp (Kō‘ele District, SIHP #50-40-98-1004), on current golf course property (Ruzicka 2017a). In 1928, the schools name
was changed to Lanai City School and it included two buildings, a two-room and a four-room building. In 1938, the Lāna‘i High and Elementary School was established near 7th Street and Fraser Street in downtown Lāna‘i City and the two buildings of the Lanai City School were moved to the new school campus. In the 1970s, the CSH-2 schoolhouse building was used as a meeting hall for the Lāna‘i City chapter of the Boy Scouts of America (Ruzicka 2017a). Therefore, the building is also referred to as the former Boy Scout Hall (Maly 2008).

CSH-3, also documented as Structure A of the Kōʻele District (SIHP # -1004), was the original Kōʻele single-room school house dismantled and moved to the Kōʻele District in the 1920s (also referred to as the Palawai School and Richardson House) (Wright 1974, Kaschko 1986, Ruzicka 2017b). A HABS survey (Ruzicka 2017b) details that the original schoolhouse structure was constructed in 1910 at Palawai School, approximately two miles south of Kōʻele, and was moved to Kōʻele between 1920-1922. A letter concerning CSH 3, describes that the school building was originally placed southeast of the Kōʻele District (SIHP # -1004) reservoir “in what is presently the seventh green of the golf course” (Morita 1998:3). The letter states around 1922 a larger school was established near the “present golf clubhouse” (Morita 1988:3). In 1927, the CSH-3-Structure A school building was moved within the Kōʻele District and was used as part of the Lānaʻi Ranch Camp where it was lived in by successive workers including John and Hannah Richardson. In 1986, during construction of the Koele Hotel/Four Seasons Resort the subject building was then moved west of Lānaʻi City, near the Lanai Power Plant.

The Kōʻele District (SIHP # -1004) is the location of the former Lāna‘i Ranch Headquarters. None of the original buildings of the ranch or buildings that once contributed to the recorded significance of the site exist in their primary location, instead they have all been either moved within the property or relocated to and from the location. Structures of SIHP # -1004 include five historic wood-frame buildings (Features A-D and F) and a reservoir (Feature E) in what is now known as the Four Seasons Resort at Kōʻele (Wright 1974 and Kaschko 1986). CSH-3 was documented as Structure A, prior to being relocated.

Both CSH-2 and CSH-3 were moved into the Hōkūao 201-H Housing Project area through efforts of community groups. “Around 1985-1986 and through the efforts of Lanaians for Sensible Growth, Hui Malama Pono o Lāna‘i, and the community of Lāna‘i, the two structures were relocated to the borders of Ninth Street and intended for preservation, restoration, and incorporation into the landscape at Kōʻele as part of a heritage program through an agreement with Castle and Cooke Resorts” (Lee-Greig and Hammatt 2009:56). Both structures were documented in extreme disrepair during the Lee-Greig and Hammatt (2009) study. However, they were still assessed as eligible for listing on the Hawai‘i Register of Historic Place (State Register) under Criterion d (Lee-Greig and Hammatt 2009:32).

The two structures, CSH-2 and CSH-3 were documented again during the AIS for the Hōkūao 201- H Housing Project in 2018 (Dye and Maly 2018:104-105). They were documented in worse condition than they were in 2009 and were assessed as lacking the integrity of condition to be listed on the State Register (Dye and Maly 2018:135).

In 2017, the two structures were documented to be partially collapsed and the City of Maui recommended mitigation for their demolition. A Historic American Buildings Survey (HABS) was completed for each of the structures (Ruzicka 2017a and b). The HABS surveys were submitted to SHPD on October 12, 2018 (Log No. 2018.02441, Log No. 2018.02442). The buildings have since been demolished.

Additional Documented Historic Properties Within the Project Area

The Dye and Maly (2018) study also documented a pineapple harvester recorded as “Machine 1”. The harvester originally used a conveyor belt on a long boom to transport handpicked fruit to a bin situated on a flatbed truck. It was moved from the Miki area of southwestern Lāna‘i in 2010 (Morita 2010). The Dye and Maly (2018) study indicated that the harvester “is now in the possession of the Lāna‘i Culture and Heritage Center, which assessed the condition of ‘Machine 1’ around the time it was moved to its current location. The assessment found the main frame to be sound and the diesel engine repairable, but other components, such as the electrical system, elevator, boom, conveyors, counterweight, crown blower system, walkways, rails, ladders, platforms, operator station, and bin were in various states of disrepair. Several pieces were noted as missing, and rust, which was widespread, threatened the structural integrity of several components” (Dye and Maly 2018:104). The harvester was assessed as eligible for the State Register under significance Criterion a “for its association with the commercial pineapple fields that for seven decades were the primary economic pursuit on the island” and it was recommended that it be moved to a sheltered location away from the project area for future restoration and interpretive display (Dye and Maly 2018:135). The study determined that once the machine had been moved away the project would have “no effect” on historic properties.

The Lee-Greig and Hammatt (2009) study also documented a historic culvert headwall (SIHP #50-40-98-6649) within the current project area. The headwall was constructed of four courses of cut basalt held together by fine sand aggregate mortar, the south wall was covered with a thin white layer of plaster that was peeling off, and the north wall was inscribed with the date “1948” (Lee-Greig and Hammatt 2009:32). The culvert headwall was determined to likely be related to the expansion of Lāna‘i City and the development of the associated drainage system (Lee-Greig and Hammatt 2009:55). The study determined the site was eligible for the State Register under significance Criterion d, due to its potential to yield information important for understanding the history of the region.

Current Field Inspection

A field inspection was conducted on November 6th, 2019 by Nathan DiVito B.A. of Honua Consulting under the general supervision of Rosanna Thurman, M.A. (principal investigator). The fieldwork required approximately 2 hours to complete and was performed under permit number 19-22 issued to Honua Consulting by the SHPD.

The current field inspection could not locate the structures documented as CSH-2 and CSH-3, as reviewed documents suggest they have been demolished. Only thick overgrowth was observed at their former locations. The pineapple harvester, “Machine 1”, was located in the same location as previously documented by Dye and Maly (2018). It was surrounded by a chain-link fenced area that was heavily overgrown and was in the same general rusty condition as previously described (Dye and Maly 2018). Photos and a GPS location were taken for the harvester (Figure 2). The historic culvert headwall (SIHP # -6649) was observed and found to be in the same condition as previously described (Lee-Greig and Hammatt 2009). Nothing else of archaeological note was observed or collected during the current project.

If you have any questions or recommendations, please feel free to notify either Dodge Watson at (808) 392-1617 or Rosanna Thurman at (808) 927-9920.
Sincerely,

Rosanna Thurman  
Principal Investigator  
Honua Consulting

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Site Type</th>
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<tbody>
<tr>
<td>Temporary Site Number CSH-2</td>
<td>Koele Grammar School, two-room schoolhouse built 1927 (also referred to as the Boy Scout Hall)</td>
<td>Destroyed</td>
<td>Was recommended significant under Criterion d (Lee-Greig and Hammatt 2009:32), determined to not retain integrity and not be eligible for the State Register (Dye and Maly 2018:135)</td>
</tr>
<tr>
<td>Temporary Site Number CSH-3; Structure A of SIHP # -1004 (Kōʻele District)</td>
<td>Kōʻele single-room schoolhouse built 1910 (also referred to as Palawai School &amp; Richardson House)</td>
<td>Destroyed</td>
<td>Was recommended significant under Criterion d (Lee-Greig and Hammatt 2009:32), determined to not retain integrity and not be eligible for the State Register (Dye and Maly 2018:135)</td>
</tr>
<tr>
<td>Pineapple Harvester “Machine 1”</td>
<td>Pineapple Harvester</td>
<td>Exposed within an open field, surrounded by a chain-link fence</td>
<td>Structural integrity found to be threatened but found eligible to State Register for significance Criteria a; recommends being moved to a sheltered location, restoration, and interpretive display (Dye and Maly 2018:135)</td>
</tr>
<tr>
<td>SIHP #50-40-98-6649</td>
<td>Historic culvert headwall</td>
<td>Good</td>
<td>Determined eligible for the State Register under significance Criterion d; sufficiently documented, no further work (Lee-Greig and Hammatt 2009:57-58)</td>
</tr>
</tbody>
</table>

References Cited

Dye, Thomas S., Kepā Maly  
2018 *Archaeological Inventory Survey for the Proposed Hōkū-ao 201-H Residential Project, Land of Kamoku, Lāhainā District, Lānaʻi Island, TMK (2) 4-9-002:061 por., TMK (2) 4-9-014:001 por., TMK: (2) 4-9-014:009 por., and TMK: (2) 4-9-014:011 por.* T. S. Dye & Colleagues, Archaeologists, Honolulu, HI. Prepared for Pūlama Lānaʻi.  

Lee-Greig, Tonya L. and Hallett H. Hammatt  
2009 *An Archaeological Inventory Survey Report for the Proposed Lanaʻi City Affordable Housing Project, Kamoku Ahupuaʻa, Lāhainā District, Lānaʻi Island, TMK (2) 4-9-002:058 and portions of (2) 4-9-014:001, 009, 011.* Cultural Surveys Hawaii, Wailuku, HI. Prepared for Munekiyo & Hiraga, Inc.  

Maly, Kepā  
2008 *Letter to Lānaʻi Archaeological Committee Members & Lānaʻi Culture & Heritage Center Board Members Regarding the old Kōʻele School Building and the former Boy Scout Hall. On file at the Lānaʻi Culture and Heritage Center, Lānaʻi.*  

Morita, Albert  
2010 *Dole Harvester “machine 1”. Memorandum to the Lānaʻi Culture and Heritage Center Board of Directors on file at the Lānaʻi Culture and Heritage Center, Lānaʻi.*  

Morita, Hemina M.  
1988 *Letter to Bill Mills Chairman and Chief Executive Officer of Oceanic Properties Inc. Regarding the John and Hannah Richardson Residence. On file at the Lānaʻi Culture and Heritage Center, Lānaʻi.*  

Ruzicka, Dee  


Wright, John C.  
1974 *Hawaii Register of Historic Places Form for Koele District. Department of Land and Natural Resources, Division of State Parks, State of Hawaiʻi, Honolulu.*
Figure 1. Portion of a 1999 Lānaʻi U.S.G.S. showing the proposed project area (outlined in red), previous archaeological studies within the project area, locations of previously documented sites within the project area, the location of the Kōʻele District, and the location of a former school lot as shown on LCEP 862.

Figure 2. Overview photo of the pineapple harvester recorded as “Machine 1.”
PHOTOGRAPHS

HI-###-1 OBLIQUE VIEW OF THE FRONT FAÇADE. VIEW FACING WEST.
HI-###-2 OBLIQUE VIEW OF THE REAR SIDE. VIEW FACING EAST.
HI-###-3 ELEVATION VIEW OF THE REAR SIDE. VIEW FACING SOUTHEAST.
HI-###-4 ELEVATION VIEW OF THE GABLE END. VIEW FACING SOUTHWEST.
HI-###-5 INTERIOR VIEW OF THE LEFT SIDE CLASSROOM SHOWING THE BUILT IN CLOSET AND COUNTER WITH CABINETS. VIEW FACING SOUTH.
HI-###-6 INTERIOR VIEW OF THE RIGHT SIDE CLASSROOM SHOWING THE BUILT IN CLOSET AND THE DOOR TO THE OTHER CLASSROOM. VIEW FACING SOUTHWEST.
Koele Grammar School
HABS No. Hi-###
Index to Photographs
(Page 2)

PHOTO KEY

HISTORIC AMERICAN BUILDINGS SURVEY
KOELE GRAMMAR SCHOOL
(Lanai City School)
HABS No. Hi-###

Location: Southwest of Fraser Avenue and 9th Street junction
Lanai City
Maui County, Hawaii
Located at latitude: 20.822800, longitude: -156.922120.
This point was obtained in December 2016, using Google Earth (WGS84). There is no restriction on its release to the public.

Date of Construction: 1927
Builder: Unknown

Original Owner/Use: County of Maui/ Schoolhouse
Present Owner/Use: Lanai Resorts LLC/ Vacant

Significance: Koele Grammar School is significant for its association with the development of the education system on the Island of Lanai. This building served as the main schoolhouse on Lanai about ten years.

Project Information: This Level III Historic American Buildings Survey (HABS) report was produced to fulfill the County of Maui’s recommendations for mitigation for the demolition of the Koele Grammar School. This HABS report was produced in March, 2017. Field work was conducted on March 13, 2017 by Dee Ruzicka of Mason Architects Inc., Honolulu, HI. Report written by Dee Ruzicka. Archival Photography was produced by David Franzen of Franzen Photography, Inc., Kailua, HI in 2013.

Historian: Dee Ruzicka
Mason Architects, Inc.
119 Merchant Street, Suite 501
Honolulu, HI 96813

Date of Report: March 2017

Description: The Koele Grammar School has been moved twice.

This single-story, gable roof, wood building has an overall footprint of 48' x 34'-6" which includes an 8' wide lanai along the front long side of the building that provides entry to the two classrooms. The building is set up on wood blocks and is beginning to collapse. A portion of the roof, lanai floor, and a section of the exterior wall at the lanai are collapsed, sagging, and broken. Areas of the interior floor that are unsupported are sagging.

The building is single wall construction of 5" wide tongue and groove boards with v-joint chamfered edges and a center v-shaped groove running the length of the interior faces of the boards. On the exterior, the boards have vertical battens of 1" wide, rounded bead molding on
Koele Grammar School  
HABS No. HI-###  
(Page 2)

5' spacing covering the joints. Exterior walls have a water table of a 12' high board. The gable ends of the building, along the shorter sides, each have a two-panel fixed wood louver vent with an opening about 6' wide x 1'-6' high.

The visible roof sheathing at the eaves and lanai is the same 5' wide, v-groove boards as the building walls. The open rafters are 2 x 4 on 2' spacing, the eave overhang is about 2'-6", and the roof covering is wood shingles. At the gable ends the end rafters are 2 x 8 and there are knee braces with pyramid cut ends at the ridge and the side walls.

The building has wood sash, double sliding windows with openings measuring 3'-6" high x 6'-6" wide. All glazing has been removed from the windows. The windows form a band along three sides of the building, with three windows along the shorter sides and six windows along the longer (rear) side. Facing the lanai (front) side of the building, the classroom on the right has two added window openings, each about 6' wide with no sash. The two entry doors to the classrooms are missing, having been broken off. Ball top hinges remain in these doorways. The collapsed lanai is about 28' long. It was supported by 5½ square wood posts with chamfered edges, only two of which are still in place. Facing the building, the left side of the lanai has a smaller collapsed room, about 20' long and 8' wide (the width of the lanai). This room is divided into two 10' long sections by a partition wall with a doorway. The room was originally entered by a doorway from the lanai.

The interior of the main portion of the Koele Grammar School is divided into two 24' x 26' classrooms by a partition wall with a doorway (no door). Typical interior finishes in both rooms are: 3½" wide tongue and groove wood flooring with degraded linoleum floor covering in some places, 5' wide v-grooved tongue and groove boards at walls, approximately 6' x 4' painted plywood-ceiling with half round molding covering panel joints, and suspended fluorescent light fixtures. Each room has a small built-in wood closet with shelving. Each closet is 4' wide, 6' high, and 1'-6" deep with no door. The classroom that is on the left when facing the front (lanai) of the building has a built in wood counter, 1'-4" wide and 3'-3" high, that extends along the two exterior walls, under the windows. Cabinet space with shelving is beneath the countertop. All cabinet doors have been removed.

Historical Context:  
The two-room Koele Grammar School was built by March of 1927, and by the 12th of that month it was occupied. The building was financed by the County of Maui, for an unknown amount over $1500.1 It was built about a half mile from the Koele Ranch Camp, to the south, across Iwoile Gulch on the site of what would become the Cavendish Golf Course.2 Students from Koele Ranch and from Lanai City attended. Eighth grade graduation ceremonies from Koele Grammar School were held at the Lanai Theater in Lanai City.3 In September 1928, the people of Lanai City petitioned the Maui County board of supervisors to have the school's name changed to Lanai City School.4

By the mid-1930s, school children of Hawaiian Pineapple Co. (HAPCo) employees had expanded public school enrollment on Lanai to such a degree that additional classes were held in the Lanai Japanese School and in the HAPCo plantation gymnasium.5 By about 1937 the Koele Grammar School complex consisted of at least two buildings, the 1927 two-room building and another four-room building.6

In January 1938, the Lanai High and Elementary School was opened at its present location on Fraser Avenue.7 The buildings of the Koele Grammar School complex were moved, in sections, to this new high school site.8 During the 1970s the Koele Grammar School, on its second site at the high school campus near 7th and Fraser Avenues, was used as a meeting hall for the Lanai City chapter of the Boy Scouts of America. At some time after 1976, the two-room Koele Grammar School building was moved to its present location.9

Sources:  
Drawings and Photographs:  
No historic drawings of the Koele Grammar School were located during research for this report.

Aerial photographs of Lanai are available in the collection of the Hawaii State Archives:

January 26, 1952, Folder PPA-1, photo # 1-5.  

Aerial photographs of Lanai are available in the MAGIS collection of the University of Hawaii at Manoa:

December 25, 1976, Folder GeoserverFiles/ShpFiles/MauiLanaiKahoolawe/035/jpegs.

Bibliography:  
Center for Oral History, Social Science Research Institute, University of Hawaii at Manoa.  


4 "Lanai Requests Change in Name Leading School."  Maui News, September 15, 1928.
5 "Lanai Starts High School."  Maui News, November 9, 1938.  5.
6 "Jean Forbes Adams," in Lanai Ranch.  4.


Location Map (Source: Google Earth).

Field sketch (Prepared by Mason Architects, Inc.)
The gray area indicates; collapsed, broken, sagging areas of the building. No scale.
Field Notes:
This photograph showing the condition of the building was taken on March 13, 2017. View facing north.

Field Notes:
This photograph showing the condition of the building was taken on March 13, 2017. View facing northeast.
Field Notes:
This photograph showing the condition of the building was taken on March 13, 2017. View facing northeast.

Field Notes:
This photograph showing the condition of the building was taken on March 13, 2017. View facing southeast.
PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN BUILDINGS SURVEY
INDEX TO PHOTOGRAPHS

PALAWAI SCHOOL
(Koele School)
(John and Hannah Richardson House)
Southwest of Fraser Avenue and 9th Street junction
Lanai City
Maui County
Hawaii

David Franzen, Photographer      September 2013

Note that these photographs were taken three years before this report was compiled.
A 2017 image of the building, now a ruin, is included in the field notes accompanying this report.

HI-###-1 OBLIQUE VIEW OF THE FRONT FAÇADE. VIEW FACING EAST.
HI-###-2 OBLIQUE VIEW OF THE REAR SIDE. VIEW FACING WEST.
HI-###-3 ELEVATION VIEW OF THE FRONT FAÇADE WITH SCALE DEVICE IN 1' INCREMENTS. VIEW FACING SOUTHEAST.
HI-###-4 INTERIOR VIEW. VIEW FACING SOUTHWEST.

Because of inability to orient these 2013 photos with the ruined 2017 building, a sketch photo key was not prepared for this report.
Palawai School
(Koele School) (John and Hannah Richardson House)

HABS No. HI-###

Location: Southwest of Fraser Avenue and 9th Street junction
Maui County, Hawaii
Located at latitude: 20.822615, longitude: -156.922375.

This point was obtained in December 2016, using Google Earth (WGS84). There is no restriction on its release to the public.

Date of Construction: Ca. 1910

Builder: Charles Gay

Original Owner/Use: Charles Gay/ Schoolhouse

Present Owner/Use: Lanai Resorts LLC/ Vacant

Significance: The Palawai School is significant for its association with the development of the education system on the Island of Lanai and as an example of single family housing at Koele Ranch. This building was one of the earliest schoolhouses on Lanai and it served as a school for about seventeen years. For over fifty years after that it was a single family dwelling at Koele Ranch.

Project Information: This Level III Historic American Buildings Survey (HABS) report was produced to fulfill the County of Maui’s recommendations for mitigation for the demolition of the Palawai School. This HABS report was produced in March, 2017. Field work was conducted on March 13, 2017 by Dee Ruzicka of Mason Architects Inc., Honolulu, HI. Report written by Dee Ruzicka. Archival Photography was produced by David Franzén of Franzén Photography, Inc., Kailua, HI in 2013.

Historian: Dee Ruzicka
Mason Architects, Inc.
119 Merchant Street, Suite 501
Honolulu, HI 96813

Date of Report: March 2017

Description: The Palawai School has been moved three times.

This single story wood building is completely collapsed into an irregular footprint that is indistinct in some areas but has overall dimensions of about 40’ x 31’. The building has collapsed onto the steel 55-gallon drums that it was set on after its last move. Remaining portions of the building in the collapsed jumble show that it was of board and batten construction, with 12” wide boards and 3” wide battens. The building had a corrugated metal roof with a narrow eave overhang of about 1’ and narrow fascia boards.

Historical Context: The Palawai School was built ca. 1910 by Charles Gay near the lower end of Keaaku Gulch where it opens into Palawai basin, about two miles south of Koele. The school was built like a house and had one classroom. Palawai was chosen for the location of the school because of its central location; students came from Koele, Malaeua, and Waiapaa. At the time it was built, another schoolhouse was located at Keomuku on the northeast coast of Lanai. Sometime about 1920-22, the Palawai School was moved to Koele, and set up at a site near where the 7th green of the Cavendish Golf Course is today. In 1922 the school became part of the public school system of the Territory of Hawaii. The Palawai (Koele) School ceased functioning as a classroom in 1927, when the two-room Koele Grammar School was built a short distance away.

Ca. 1927, with the construction of the new Koele Grammar School, the Palawai (Koele) School was moved to the Koele Ranch Camp by Morikazu Kawano, who was a carpenter for the ranch. The building was moved by dismantling and re-assembling, and it became a residence. It was set up within a cluster of residential buildings at the north corner of the Ranch Camp. Kawano was the first of several successive occupants of the building, including ranch saddle maker Simeon Kauakahi and his family. In 1946 the building became the home of John and Hannah Richardson. The building underwent numerous alterations since the time it was a one room school house, including a kitchen addition, bathroom, and the partitioning of the original single class room.

2 "Violet Gay," In Lanai Ranch. 442-443.
3 "Violet Gay," In Lanai Ranch. 437, 439.
4 "Violet Gay," In Lanai Ranch. 438.
6 "Violet Gay," In Lanai Ranch. 444.
7 "Lanai Starts High School," Maui News, November 9, 1938. 5.
9 "Hannah Richardson," In Lanai Ranch. 664-665.
11 "Hannah Richardson," In Lanai Ranch. 664-665.
13 "Hannah Richardson," In Lanai Ranch. 663, 666.
The Richardsons occupied the building until ca. 1986, when the Koele Lodge was being built. At that time, the Palawai School (Richardson House) was moved from Koele to its present site near the Lanai Power Plant.

Sources:

Drawings and Photographs:
No historic drawings of the Koele School were located during research for this report.

Historic photographs of the building are found in:

- Center for Oral History, Social Science Research Institute, University of Hawaii at Manoa. Lanai Ranch, The People of Koele and Keomuku, Volumes I and II. (Honolulu: University of Hawaii at Manoa). July 1989. Page li, Images 72-74. Photos of the building ca. 1921 when it was Koele School, and ca. 1986 when it was the home of John and Hannah Richardson.

Aerial photographs of Lanai are available in the collection of the Hawaii State Archives:
- January 26, 1952, Folder PPA-1, photo # 1-5.

Bibliography:


Location Map (Source: Google Earth).
Field Notes:
This photograph showing the condition of the building was taken on March 13, 2017. View facing southeast.

Field Notes:
This photograph showing the condition of the building was taken on March 13, 2017. View facing south.
Field Notes:
This photograph showing the condition of the building was taken on March 13, 2017. View facing west.
Glen Ueno
8/14/20
Page 2

Golf Course irrigation system. The route of the corridor ran north-south through the northeastern portion of the project area. At the time of the survey the entire project area consisted of excellent surface visibility due to low vegetation growth.

Lee-Greig and Hammatt (2009)

Cultural Surveys Hawai‘i, Inc. (CSH) conducted an AIS (Lee-Greig and Hammatt 2009) for an adjacent parcel along the north-northeastern boundary of the current 68.86-acre project area and identified a historic-era culvert headwall (SHIP 50-40-98-6649) located within the northeastern corner of the current project area. CSH determined the culvert headwall (SHIP 50-40-98-6649) to be significant under Criterion “a” and recommended no further work for the site. In addition, CSH recorded two historic properties located outside of the CSH’s project area but within the current project area. CSH documented two historic school buildings, the Ka‘ele Grammar School and the Palawai School House, identified as CSH-2 and CSH-3 (structure A [both buildings] of the Ka‘ele District (SHIP 50-40-98-1004). Both structures were relocated within the Hōkūle‘a 201-H Housing project area around 1985-1986, at the bottom of Nāhiku Street, and intended for preservation, restoration, and incorporation into the landscape at Ka‘ele. The AIS report assesses the condition of the structures being in extreme disrepair but significant under Criterion “d.” The AIS included five test trenches, two of which (BT-2 and BT-3) were within the current project area. No cultural materials or historic properties were identified during the test trenching portion of the AIS. The SHPD accepted the AIS report in a letter dated November 16, 2009 (Log No. 2009.4362, Doc. No. 0911PC28). SHPD concurred with the report’s recommendation that SHIP 50-50-999-6649 is significant under Criterion “a” and that no other historic preservation work is necessary. SHPD additionally agreed that archaeological monitoring be conducted during all ground disturbance activities associated with the proposed project.

T.S. Dye & Colleagues (Dye and Malay 2018)

At the request of Palama Lī‘i’s, T.S. Dye & Colleagues (Dye and Malay 2018) conducted an AIS including twenty-six backhoe test trench excavations and a surface survey of the original 105-acres project area for the Hōkūle‘a 201-H Housing project. The AIS was not requested by SHPD for the subject project, rather it was initiated at the request of the project proponent in advance of the project. The subject AIS report includes a description of the pedestrian survey and indicates a 100 percent surface inspection was not accomplished for the entire project area. The AIS newly identified one historic property and further documented two previously identified during the Lee-Greig and Hammatt (2009) AIS (Table 2).

Table 2: Significant historic properties within the current project area.

<table>
<thead>
<tr>
<th>SHIP No.</th>
<th>Type</th>
<th>Significance</th>
<th>Mitigation Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>-1004</td>
<td>Kurue Street Grammar School</td>
<td>Historic</td>
<td>Preservation (Reinforcement, restoration, and interpretive display)</td>
</tr>
<tr>
<td>-0200</td>
<td>Pineapple Harvester</td>
<td>Historic</td>
<td>Preservation (Relocation, restoration, and interpretive display)</td>
</tr>
<tr>
<td>-6649</td>
<td>Culvert Headwall</td>
<td>Historic</td>
<td>No further work (Assistance)</td>
</tr>
</tbody>
</table>

The historic properties include a Dole pineapple harvester (SHIP 50-48-98-02000) and two wood-frame buildings from the Ko‘ele School complex (Structure A of SHIP 50-40-98-1004). The SHIP 50-40-98-1004 school structures and the harvester were transported into the project area for preservation. Dye and Malay (2018) determine the Dole pineapple harvester (SHIP 50-48-98-02000) was significant under Criterion “a” due to its association with the seven decades of Lī‘i’s plantation economic pursuit. The two-wooden school structures (Structure A of SHIP 50-48-98-1004) were documented to be in poor condition and overgrown by vegetation. The historic culvert headwall (SHIP 50-40-98-1004) was not documented during the Dye and Malay (2018) AIS. Based on the previous 105-acre project area, the culvert headwall was situated immediately outside of the northern boundary of the project area.

Pilina Lī‘i’s proposes the construction of 200 single-family homes, including 102 affordable homes and 98 market rate homes within a 68.86-acre project area located in Kamoku Abpu‘au. According to the submittals, the project area was originally planned to cover 105 acres and has been reduced to 68.86 acres. Project-related ground disturbance work will include mass grading of the 68.86 acres, including 100,000 cubic yards of excavation. The project area will be grubbed to a maximum of 12 ft. deep and filled a maximum of 15 ft. in height. Mass grading will consist of grubbing and grading to create leveled residential pads (i.e., terraces and bank slopes) and will be stabilized with grass. Hammatt and Borthwick (1993) and Lee-Greig and Hammatt (2009) previously conducted AIS investigations on the subject property and the project areas had some overlap. The SHPD accepted the AIS (Lee-Greig and Hammatt 2009) in a letter dated November 16, 2009 (Log No. 2009.4362, Doc. No. 0911PC28).

Hammatt and Borthwick (1993)

The Hammatt and Borthwick survey (1993) identified no historic properties within the project area. The survey consisted of a 100- to 150-ft-wide wastewater corridor connecting the Lī‘i’s sewage treatment plant with the Ka‘ele...
Twenty-six test excavations (Test Pits 1-26) were conducted in places where, based on previous land use activities and historical data, it was assessed that potentially significant cultural deposits might exist. The test excavations averaged 2 meters long by 0.8 meters wide and more than 1 meter in depth and terminated within the natural subsoil. Most of the test excavations were conducted in the western portion of the original 105-acre project area due to the ongoing use of the Pālama Līnā‘i Nursery, the Community Gardens, and the green waste disposal areas. Seven test excavations (Test Pits 1, 5, 6, 7, 23, 24, and 25) are situated within the current 68.86-acre project area. No additional subsurface cultural deposits or historic properties were documented. The report includes the project area was modified by heavy equipment during the establishment of the Līnā‘i City and commercial pineapple fields in the 1920s and recommends a project determination of “no effect on historic properties” and that the Dole pineapple harvester (SIHP 50-40-98-02000) could be moved from the proposed project area. Dye and Maly (2018) recommends no archaeological monitoring be required for the proposed project.

Field Inspection Report (Thurman, December 2019)

Honua Consulting conducted an archaeological field inspection of the four previously recorded historic properties within the Hōlualoa 201-H Housing project area and produced an end-of-field report (Thurman, December 2019). These historic properties included a Dole pineapple harvester (SIHP 50-40-98-02000), two-wooden school structures (Structure A of SIHP 50-40-98-1004), and a historical culvert headwall (SIHP 50-40-98-6649). The report includes a cover letter providing a summary of the previously recorded historic properties, the results of the 2018 field inspection, an updated GIS map showing the current 68.86-acre project area, and the Historic American Buildings Survey (HABS) documentation forms for the two-wooden school structures (Ruzicka 2017; Kękule Grammer School and Palawai School House, Structures A of SIHP 50-40-98-1004). The historical culvert headwall (SIHP 50-40-98-6649) and Dole pineapple harvester (SIHP 50-40-98-02000) were found to be in the same condition as previously described by Lee-Greig and Hammett (2009). The two-wooden school structures (Structure A of SIHP 50-40-98-1004) were not relocated during the field inspection. The Historic American Building Survey reports (Mason Architects Inc., March 2017) indicates the survey was conducted to fulfill the County of Maui’s recommendations for mitigation for the demolition of the two-wooden school structures (Ruzicka, March 2017). Lastly, the report does not provide any information regarding if additional pedestrian surveys were conducted during the field inspection.

The HABS reports were submitted to SHPD on October 12, 2018 (Log No. 2018.02441 and Log No. 2018.02442). The HABS reports were not requested by SHPD for the two school structures, rather this documentation was conducted at the request of the project proponent, no record was found that SHPD accepted the submittals, the HABS reports do not have a National Park Service (NPS) number, and do not appear to have been formally reviewed and accepted by NPS. Additionally, the former MECO powerplant situated adjacent to the wooden structures were subjected to demolition between August to November 2018 and have since been removed from the project area (Dr. Keiki-Pua Dancil [Pālama Līnā‘i] to ‘Iolani Kauhane [SHPD] via email August 20, 2018). The field inspection confirmed the structures have been demolished and removed from the project area.

The AIS report meets the minimum requirements of an AIS as specified in HAR § 13-276-5. It is accepted. Please send two hard copies of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version of the report to the Kapolei SHPD office, attention SHPD Library. Additionally, please send a pdf copy of the report to lehua.k.soares@hawaii.gov.

The AIS report (Dye and Maly 2018) and end-of-field report (Thurman, December 2019) recommend a determination of “no effect on historic properties” for the Hōlualoa 201-H Housing Project. However, as the AIS was conducted without a detailed scope of work guiding the testing strategy, the pedestrian survey transects were not spaced at a maximum of 5 meters apart, and portions of the project area were not adequately tested. Thus, SHPD has insufficient information to determine if the project’s proposed mass grading will adversely affect historic properties within the current project area, particularly within areas proposed for deep excavation. Therefore, SHPD requests archaeological monitoring be conducted for identification purposes for all ground-disturbing activities during the proposed project and for the HABS reports to be completed per NPS standards. Additionally, SHPD requests that the archaeological monitoring plan stipulate the short- and long-term interim protection measures for the Dole pineapple harvester (SIHP 50-40-98-02000) and the historical culvert headwall (SIHP 50-40-98-6649). The plan should indicate the Dole pineapple harvester (SIHP 50-40-98-02000) will be moved to a sheltered location prior to any ground disturbance activities and, if not possible, will be protected by interim protection measures to ensure it is not impacted by the proposed project. Additionally, the culvert headwall provides interim protection measures for the site including temporary fencing or flagging during the proposed project.

As the AIS was 201-H Housing project area and produced an end-of-field report (Thurman, December 2019). However, as the AIS was conducted without a detailed scope of work guiding the testing strategy, the pedestrian survey transects were not spaced at a maximum of 5 meters apart, and portions of the project area were not adequately tested. Thus, SHPD has insufficient information to determine if the project’s proposed mass grading will adversely affect historic properties within the current project area, particularly within areas proposed for deep excavation. Therefore, SHPD requests archaeological monitoring be conducted for identification purposes for all ground-disturbing activities during the proposed project and for the HABS reports to be completed per NPS standards. Additionally, SHPD requests that the archaeological monitoring plan stipulate the short- and long-term interim protection measures for the Dole pineapple harvester (SIHP 50-40-98-02000) and the historical culvert headwall (SIHP 50-40-98-6649). The plan should indicate the Dole pineapple harvester (SIHP 50-40-98-02000) will be moved to a sheltered location prior to any ground disturbance activities and, if not possible, will be protected by interim protection measures to ensure it is not impacted by the proposed project. Additionally, the culvert headwall

(SIHP 50-40-98-6649) will be avoided and not impacted by the proposed project. Pālama Līnā‘i has agreed to provide interim protection measures for the site including temporary fencing or flagging during the proposed project (Dr. Keiki-Pua Dancil [Pālama Līnā‘i] to ‘Iolani Kauhane [SHPD] via email August 5, 2020).

Information about HABS can be found at: [https://www.nps.gov/help/standards/habs/guidelines.htm](https://www.nps.gov/help/standards/habs/guidelines.htm). Please contact Mary McPartland (mary_mcpartland@nps.gov) at the National Park Service to determine the level of the HABS report.

The HABS report is considered architectural survey report and therefore subject to filing fees per §13-284-4(a)(1), HAR. Please complete the filing fee form ([https://dlr.hawaii.gov/shpd/files/2013/05/SubmitAllFilingFees.pdf](https://dlr.hawaii.gov/shpd/files/2013/05/SubmitAllFilingFees.pdf)) and a State Inventory of Historic Places Request Form ([http://dlr.hawaii.gov/shpd/rev-compliance/forms/](http://dlr.hawaii.gov/shpd/rev-compliance/forms/)). The HABS report, filing fee form, and the SHPD form can be submitted concurrently to [dlr.intake.shpd@hawaii.gov](mailto:dlr.intake.shpd@hawaii.gov).

SHPD looks forward to receiving for review and acceptance an archaeological monitoring plan meeting the requirements of HAR §13-279-4 and the final HABS reports prior to the initiation of the proposed project. Additionally, SHPD requests to review future building permits associated with the Hōlualoa 201-H Housing Project.

SHPD shall notify the County when the archaeological monitoring plan and the final HABS reports are accepted, and the permit issuance process may continue.

Please contact Tanya Gumapac-McGuire, Architecture Branch Chief, at Tanya.Gumapac-Mcguire@hawaii.gov for matters regarding architectural resources, and ‘Iolani Kauhane, Historic Preservation Archaeologist III, at Iolani.Kauhane@hawaii.gov for matters regarding archaeological resources or this letter.

Aloha,

Alan Downer

Alan S. Downer, PhD
Administrator, State Historic Preservation Division

Deputy State Historic Preservation Officer

cc: County of Maui, building.permits@mauicounty.gov

Makawao Hi, 96766

Tanya.Gumapac-Mcguire@hawaii.gov

Keiki-Pua Dancil, Pālama Līnā‘i, kdancil@pulamalanai.com

Trisha Kehaulani Watson, Homeland Consulting, watson@homelandconsulting.com

Annalise Kehler, Annalise.Kehler@co.mau.hi.us

Please send two hard copies of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version of the report to the Kapolei SHPD office, attention SHPD Library. Additionally, please send a pdf copy of the report to lehua.k.soares@hawaii.gov.
December 30, 2019

Susan A. Lebo, Ph.D.
Chief, Archaeology Branch
State Historic Preservation Division
Kakouhewa Building
601 Kamokila Blvd., Suite 555
Kapolei, Hawai‘i 96706

Subject: Hawaii Revised Statutes, Chapter 6E Review
Proposed Hōkūao 201-H Housing Project
Kamoku Ahupua‘a, Lāhaina District, Lāna‘i Island

Dear Dr. Lebo,

Pūlama Lānai‘i (“applicant”) submits this letter to provide a project summary for the State Historic Preservation Division (SHPD) review per 6E-8, Hawaii Revised States (HRS) in connection with the following environmental assessment submitted by applicant Pūlama Lānai‘i for the proposed Hōkūao 201-H Housing Project, which includes the construction of 200 single family homes, including 102-affordable homes (priced at HRS Chapter 201-H guidelines) and 98-market rate homes, located in Kamoku Ahupua‘a, Lahaina District, Lāna‘i Island, TMK: [2] 4-9-002:001 por. The applicant also proposed to develop a one-acre park, a 1,500-square foot community center, comfort stations, and 100-parking stalls for use by the Hōkūao project residents.

Appraosals Required: State Land Use Commission 201-H Affordable Housing Approval
Maui County Council 201-H Affordable Housing Application Approval
Maui County Department of Public Works Subdivision Approval
Maui County Department of Public Works Building Permits Approval

Introduction

At the request of Pūlama Lānai‘i, T. S. Dye & Colleagues, Archaeologists (TSD) completed an archaeological inventory survey of the proposed Hōkūao 201-H Residential Project (Dye and Maly 2018). The proposed Hōkūao 201-H Residential Project currently intends to grade approximately 69 acres (ac.) in the land of Kamoku, Lāhaina District Lāna‘i Island. The irregularly shaped project area is located immediately west of and downslope from Lāna‘i City. The project area is bounded on the east by Fraser Avenue and two church parcels; on the north by 9th Avenue, and by Fraser Avenue on the south. Most of the western boundary is marked by the chain-link fence boundary of the wastewater treatment plant, while the southern boundary follows 12th Avenue and Awa'ula Avenue. The proposed Hōkūao 201-H Residential Project is identified on tax maps as TMK: [2] 4-9-002:061 por., TMK: [2] 4-9-014:001 por., and TMK: [2] 4-9-014:009 por. The AIS was conducted based on a previous version of the plan, which also included TMK: [2] 4-9-014:011 por. Therefore, the AIS conducted by T.S. Dye & Associates, Archaeologists actually includes a total property area of 105 acres, whereas the proposed current project area falls within this limit.

In November 2019, at the request of the applicant, Honua Consulting’s staff archaeologist, Nathan DiVito, B.A. conducted a field check to confirm the current status of the property area and historic sites. An End of Fieldwork Report4 was completed which provides data on all previously recorded historic properties within the project area, fieldwork results, site evaluations, and mitigation recommendations.

Identification and Inventory of Historic Properties within the Project Area

In 2009, during a previous AIS conducted by Cultural Surveys Hawai‘i for the Lānai‘i Affordable Housing Project, an historic culvert headwall (SHPD #50-40-98-6649) was documented within the current project area (Lee-Greig and Hammatt 2009)5. The headwall was constructed of four courses of cut basalt held together by fine sand aggregate mortar and it was inscribed with the date “1948” (Lee-Greig and Hammatt 2009:32). The culvert headwall was determined to likely be related to the expansion of Lānai City and the development of the associated drainage system (Lee-Greig and Hammatt 2009:55). In addition, the study recorded two buildings outside their project area, including a two-room schoolhouse designated temporary site number CSH-2 and a one-room schoolhouse temporarily designated CSH-3. The study found the buildings to be part of the Kō‘ele School Complex (Lee-Greig and Hammatt 2009:32).

Archaeological surface survey conducted during the 2018 AIS completed by TSD revealed the presence of three potentially significant historic properties within the proposed Hōkūao 201-H Residential Project, including a Dole Harvester “Machine 1” and two wood-frame buildings associated with the former Kō‘ele School Complex (CSH-2 and CSH-3) (Dye and Maly 2018).

The Dole Harvester “Machine 1” was moved to its current location adjacent to the Recycle Center from the Miki area of southwestern Lānai‘i in March 2010. In practice, the harvester used a conveyor belt on long boom to transport the handpicked fruit to a bin on a flatbed truck. “Machine 1” is now in the possession of the Lānai Culture & Heritage Center and physically located inside a fenced area that is open on three sides. There is heavy growth around the machine. Lānai‘i Culture

1 This AIS was not requested by the State Historic Preservation Division.
2 T.S. Dye & Colleagues, Archaeologists dissolved as a company in 2018 due to the retirement of the principal. The firm was in good standing with SHPD at the time of dissolution. The firm is no longer active and no longer holds an active archeology permit with SHPD. Honua Consulting has been hired by the applicant to continue TSD’s projects on Lānai.

*SHPD LOG No. 2019.00221*
& Heritage Center assessed the condition of “Machine 1” around the time it was moved to its current location. The assessment found the main frame to be sound and the diesel engine repairable, but other components, such as the electrical system, elevator, boom, conveyors, counterweight, crown blower system, walkways, rails, ladders, platforms, operator station, and bin were in various states of disrepair. Several pieces were noted as missing, and rust, which was widespread, threatened the structural integrity of several components.

Four treatment options were considered for the pineapple harvester in the TSD assessment, including full restoration, stabilization, storage, and disposal. To date, the storage option has been followed, with the machine now enclosed with a chain-link fence but otherwise unprotected from the elements. The pineapple harvester was recently assessed in November 2019 by members from the Lāna‘i Culture & Heritage Center. The machine remains in similar condition to its 2010 condition, but it has continued to deteriorate. It is unlikely the machine can be restored to working condition. The group intends to move the machine from its current location within the project area and store it at an appropriate location for preservation purposes.

The two school buildings, CSH-2 and CSH-3, were documented in poor condition when they were initially described in 2009 (Lee-Greig and Hammatt 2009) and were not subsequently maintained. The photographs in Lee-Greig and Hammatt (2009) show dilapidated buildings in a field of short grass. When the AIS was conducted in 2018, the buildings were overgrown by vegetation and were in worse condition than they were in 2009 (Dye and Maly 2018). In 2017, Mason Architects completed Historic American Buildings Surveys (HABS) for both Kō‘ele (Grammar) School (Lāna‘i City School; CSH-2)6 and Piilāwai School (Kō‘ele School; John and Hannah Richardson House; CSH-3)7 buildings (Ruzicka 2017a and b).

The HABS for Kō‘ele Grammar School (CSH-2) was submitted to SHPD on October 12, 2018. The Log No. for that submittal is 2018.02441. The HABS for Piilāwai School (CSH-3) was also submitted to SHPD on October 12, 2018. The SHPD Log No. is 2018.02442.

The two school buildings were subsequently demolished and are therefore no longer present within the project area.

No other historic properties were identified during the 2018 surface survey conducted by TSD.

Summary of TSD AIS

At the request of Piilama Lāna‘i, TSD previously completed an archaeological inventory survey for the proposed Hōkū-ao 201-H Residential Project, located at Kamoku, Lā‘iana District, Lāna‘i Island. A review of the historical background indicates the entire 105 ac. project area was modified by heavy equipment during the establishment of Lāna‘i City and commercial pineapple fields in the 1920s. Previous archaeological inventory surveys on portions of the proposed Hōkū-ao 201-H Residential Project and on lands adjacent to it failed to find traditional Hawaiian historic sites. The archaeological inventory survey included surface survey and test excavations.

During the TSD AIS, twenty-six test excavations were completed with a backhoe, Test Pits 1–26, situated throughout the proposed Hōkū-ao 201-H Residential Project. The test pits were placed to cover the entire proposed Hōkū-ao 201-H Residential Project; however, no test pits were excavated within the Piilama Lāna‘i nursery operation or within the Community Garden area due to the ongoing use of these facilities. Instead, Test Pits 6–11 were placed around the perimeter of these two facilities for the purpose of determining whether or not they were established on typical soil profiles. Also, a reduced level of test excavation was carried out at the northern end of the proposed Hōkū-ao 201-H Residential Project. This is an area that is used today for processing green waste and for storing large tanks of propane, and in the past housed industrial activities related to the pineapple plantation. Sparse vegetation growth and numerous push piles indicate that this area has recently experienced quite a bit of grading and earth moving. Test Pits 24 and 25 indicate the degree to which these modern activities have affected the landscape.

One of the main divisions of the proposed Hōkū-ao 201-H Residential Project, from a historical point of view, is between the former pineapple fields on the west and the uncultivated area on the east between the former fields and Lāna‘i City. The test pits were placed to investigate both of these areas. Test Pits 1–4 were excavated east of the former pineapple fields and Test Pits 5–26 were excavated within the former pineapple fields. These excavations augment the two long trenches, BT-2 and BT-3, excavated within the proposed Hōkū-ao 201-H Residential Project some years ago. BT-2 was excavated within the former pineapple fields and BT-3 was excavated east of them.

Finally, somewhat greater effort was expended at the southern end of the proposed Hōkū-ao 201-H Residential Project, where Test Pits 15–18 were placed relatively close to one another. Vegetation here is better developed than in other parts of the former pineapple fields. The increased level of effort was designed to investigate whether this was related to a less intensive use of this area for pineapple cultivation in the hope that evidence of earlier uses might be preserved.

Summary of Historic Properties and Evaluation of Significance

Four sites have previously been documented within the Hōkūao 201-H Residential Project, located at Kamoku, Lā‘iana District, Lāna‘i Island. Two historic schoolhouses were previously evaluated as significant under Criterion d (Lee-Greig and Hammatt 2009:32). However, the Dye and Maly (2018) study determined the buildings did not retain sufficient integrity to be eligible for listing on the State Register (Dye and Maly 2018:135). The buildings have since been demolished or moved off the property. Honua Consulting conducted a field check of the property in November 2019 and confirmed the buildings no longer exist on the property.

A pineapple harvester, “Machine 1,” in the possession of the Lāna‘i Culture & Heritage Center. The AIS completed by TSD did not include an integrity assessment for the Dole pineapple harvester, yet nonetheless found “Machine 1” to possess sufficient integrity to proceed with a significance evaluation. Machine 1 was found to be eligible to the State Register for significance Criterion a, for its association with the commercial pineapple fields that for seven decades were...
the primary economic pursuit on the island. It was also recommended the pineapple harvester be moved to a sheltered location, undergo restoration, and accompany an interpretive display (Dye and Maly 2018:135). At the request of Piilama Lānā'i, Honua Consulting conducted an integrity assessment for the pineapple harvester, the results are presented below and also provided within the End of Fieldwork Report.

One historic culvert headwall (SIHP # -6649) was documented by Lee-Greig and Hammatt (2009) within the current project area. The study determined the site was eligible for the State Register under significance Criterion d, due to its potential to yield information important for understanding the history of the region. The study determined the site was sufficiently documented and no further work was recommended (Lee-Greig and Hammatt 2009:57-58). No assessment of site integrity was provided, therefore, Honua Consulting included an integrity assessment in the End of Fieldwork Report and the information is also presented below.

Integrity

Integrity is the ability of a property to convey its significance. To be potentially eligible for the state or national register of historic places, a property must be shown to be both significant and have integrity. There are seven aspects of integrity: location, design, setting, materials, workmanship, feeling, and association.

“Machine 1”, the Dole Harvester, lacks integrity of location, as it was moved to its current location in 2010 and is not known to have operated in that location. The machine possesses integrity of design, as the machine is the last known machine to utilize this particular technology and design for its function and per both the 2010 and 2019 assessments, the machine is in disrepair but generally sound, although it is unlikely the machine could be restored to working condition. The machine lacks integrity of setting, as the current setting within the project area lacks the requisite character and surrounding features necessary to meet this threshold standard. While it is currently in a field, the field is overgrown and no longer used for agricultural purposes, which would have been the machine’s original and historic setting. The machine possesses integrity of materials and workmanship, as the machine contains the unique physical elements and craft of Lānā'i’s plantation period. It also retains integrity of feeling and association, for its ability to express the historic character of the plantation period and its direct link to that historic period.

The current study finds the historic culvert headwall (SIHP # -6649) to possess integrity of location as it is within its primary location and integrity of materials as it contains its original basalt construction stones and is in good condition.

Effect Determination

In consideration of its historic significance and the finding that the property does not possess integrity of location or setting, it is recommended that “Machine 1” be moved to a sheltered location away from the proposed Hōkūao 201-H Residential Project prior to any construction activities and that funds for its restoration and interpretive display be pursued.

Based on the historic background, review of previous archaeology, results of the previous AIS, and the results of the contemporaneous field check conducted by Honua Consulting, if “Machine 1” is relocated away from the proposed Hōkūao 201-H Residential Project prior to any construction activities then the project will have an effect determination of “no historic properties affected”.

Due to the extensive previous use of the land for commercial agriculture and industry, an archaeological monitoring program is not recommended for this project.

Conclusion

Per the guidelines set forth in Hawaii Administrative Rules Chapter 13-275 and based on the review and investigation conducted by T.S. Dye & Colleagues, Archaeologists and End of Field Report contemporaneously conducted by Honua Consulting, Honua Consulting is recommending and seeking SHPD concurrence on a determination of no historic properties affected. Based on the recommendation by T.S. Dye & Colleagues, Archaeologists, Honua Consulting is also not recommending archaeological monitoring for the project due to extensive previous use of the land in commercial and industrial agricultural activities; the applicant is seeking SHPD concurrence on this recommendation as well.

We thank you for your time and attention. If you have any questions, please feel free to contact Kepa Maly at kmaly@pulamalanai.com or (808) 237-2001.

Respectfully submitted,

Kurt Matsumoto
Chief Operating Officer
Piilama Lānā'i

Attachments
A - End of Field Report
B - HRS 4E Intake Form
C - Archaeological Inventory Survey for the Proposed Hōkūao 201-H Residential Project
D - Historic American Building Surveys
State Historic Preservation Division
HRS 6E Submittal Form

Per 6E, Hawai’i Revised Statutes, if the Project requires review by the State Historic Preservation Division (SHPD), please review and fill out this form and submit all requested information to SHPD. Please submit this form and project documentation electronically to:

dlnr.intake.shpd@hawaii.gov

If you are unable to submit electronically, please contact SHPD at (808) 692-8015. Mahalo.

The submission date of this form is:

1. APPLICANT (select one)
   - Property Owner
   - Government Agency

2. AGENCY (select one)
   - Planning Department
   - Department of Public Works
   - Other (specify):

Type of Permit Applied For: Grading/Utilities

3. APPLICANT CONTACT
   - Name: Kurt Matsumoto
   - Title: Chief Operating Officer
   - Street Address: 733 Bishop St Suite 2000
   - County: Honolulu
   - State: HI
   - Zip Code: 96813
   - Phone: (808)237-2001
   - Email: kmatsumoto@pulamalanai.com

4. PROJECT DATA
   - Permit Number (if applicable):
   - TMK [e.g. (3) 1-2-003-004]: 2-4-9-002:001, 2-4-9-014:001, 009
   - Street Address: Fraser Ave., Lanai City, HI 96763
   - County: Maui
   - State: HI
   - Zip Code: 96763
   - Total Property Acreage: 16,252.51 Acres
   - Project Area (acreage, square feet): 68.86 Acres
   - List any previous SHPD correspondence (LOG Number & DOC Number, if applicable):

   LOG NO. 2019.00221
   DOC NO.

5. PROJECT INFORMATION
   - Does the Project involve a Historic Property? A Historic Property is any building, structure, object,
6. PROJECT SUBMITTALS

6.1) Please submit a copy of the Tax Map Key (TMK) map

6.2) Please submit a copy of the property map showing the project area and indicate if the project area is smaller than the property area.

6.3) Please submit a permit set of drawings. A permit set is a set of drawings prepared and signed by a licensed architect or engineer and is at least 65% complete.

6.4) Are you submitting a survey?
☐ Yes ☐ No

Specify Survey: AIS for the Proposed Hokuao 201-H Residential Project and End of Field Report

6.5) Did SHPD request the survey?
☐ Yes ☐ No

If ‘Yes’, then please provide the date, SHPD LOG NO, and DOC NO:

Date: LOG NO. DOC NO.

6.6) SURVEY REVIEW FEES. Fee for Review of Reports and Plans (§§13-275-4 and 284-4). A filing fee will be charged for all reports and plans submitted to our office for review. Please go to:

http://dlnr.hawaii.gov/shpd/branches/archaeology/filing-fee-schedule/

A check payable to the Hawaii Historic Preservation Special Fund should accompany all reports or plans submitted.

6.7) Please submit color photos/images of the Historic Property (any building, structure, object, district, area, or site, including heiau and underwater site) that will be affected by the Project.
The following are the minimum number and type of color photographs required:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>Street view(s) of the resource and surrounding area</td>
</tr>
<tr>
<td>1-2</td>
<td>Over view of exterior work area</td>
</tr>
<tr>
<td>1</td>
<td>Exterior photo of the North elevation (if applicable)</td>
</tr>
<tr>
<td>1</td>
<td>Exterior photo of the South elevation (if applicable)</td>
</tr>
<tr>
<td>1</td>
<td>Exterior photo of the East elevation (if applicable)</td>
</tr>
<tr>
<td>1</td>
<td>Exterior photo of the West elevation (if applicable)</td>
</tr>
<tr>
<td>1-2</td>
<td>Interior photo(s) of areas affected (if applicable)</td>
</tr>
</tbody>
</table>

CHECKLIST

- [ ] SHPD FORM 6E (this form)
- [ ] PROJECT SUBMITTALS (any requested documentation for items 6.1 - 6.7 of this form)
- [ ] FILING FEE FORM (if applicable)
ARCHAEOLOGICAL MONITORING PLAN

APPENDIX D-2
Updated Condition Assessment of Dole Pineapple Harvester (SIHP 50-40-98-02001)

The Dole Harvester “Machine 1” was moved to its current location adjacent to the Recycle Center from the Miki area of southwestern Lāna’i in March 2010. In practice, the harvester used a conveyor belt on long boom to transport the handpicked fruit to a bin on a flatbed truck.

“Machine 1” is now in the possession of the Lāna’i Culture & Heritage Center, which assessed the condition of “Machine 1” around the time it was moved to its current location. Previous assessments (Dye and Maly 2018 and Thurman 2019) found the main frame to be sound and the diesel engine repairable, but other components, such as the electrical system, elevator, boom, conveyors, counterweight, crown blower system, walkways, rails, ladders, platforms, operator station, and bin were in various states of disrepair. Several pieces were noted as missing, and rust, which was widespread, threatened the structural integrity of several components.

An additional assessment was conducted of the pineapple harvester, “Machine 1,” in September 2020. Whereas the harvester previously possessed sufficient integrity to be significant under Criterion “a” due to its association with the commercial pineapple fields that for seven decades were the primary economic pursuit on the island. In September 2020, upon removal of surrounding vegetation and closer inspection, it was determined that the harvester no longer possesses sufficient integrity due to natural degrading of the machine. The machine has been irreparably impacted due to rust, and many of the machine’s components are significantly degraded, missing, and/or beyond repair.

Dr. Keiki Pua Dancil and Dr. Trisha Kehaulani Watson conferred with SHPD Maui staff via videoconference on September 25, 2020 regarding the condition and proposed preservation measures for “Machine 1,” during which time they shared photographic documents with SHPD Maui staff of the harvester. It was agreed during that meeting that the machine had lost integrity and that Honua Consulting will follow up with this written correspondence requesting a modification to the preservation measure for the harvester.

Therefore, based on the loss of integrity, we are recommending modifying the preservation measure for “Machine 1” (SIHP # 50-40-98-02001) from “preservation” to “no further work.”

Archaeological Monitoring Program

Per SHPD’s request (SIHP Log No. 2020.00018, Doc. No. 2008IK01), the project will conduct archaeological monitoring for identification purposes for all ground-disturbing activities during the proposed project.¹

Honua Consulting is submitting the attached draft Archaeological Monitoring Plan meeting the requirements of HAR §13-279-4 for SHPD’s review and acceptance prior to project initiation. This plan was written to fulfill state requirements for archaeological monitoring plans under HRS 6E-42

¹ HARPS reports, completed per NPS standards, were submitted by MASON to SHPD on November 25, 2020 (erroneously submitted under Log No. 2018.01708).
and Hawai‘i Administrative Rules (HAR) §13-279, Rules Governing Standards for Archaeological Monitoring and Reports.

The attached plan proposes the following Archaeological Mitigation Provisions:

Under HAR §13-279-3, “Archaeological monitoring may be an identification, mitigation, or post-mitigation contingency measure. Monitoring shall entail the archaeological observation of, and possible intervention with, on-going activities, which may adversely affect historic properties.” With SHPD concurrence, the monitoring program would be conducted for identification purposes, not as a mitigation measure, and will serve to ensure proper documentation and treatment of any historic properties encountered during project construction. HAR §13-279-4, requires that each monitoring plan discuss eight specific questions. The monitoring provisions below address these requirements for archaeological monitoring within the current project area.

1) Anticipated Properties
Based on background research and previous archaeological studies in the vicinity a single historic-era archaeological site has been documented within the project area. The types of potential sites that could be anticipated during monitoring include remnants of plantation and historic-era surface infrastructure, secondarily deposited traditional Hawaiian artifacts on the ground surface, exposed firepit remnants, and subsurface cultural deposits and features beneath the plow zone. No human burials have been documented outside of known historic cemeteries in the area and they are not anticipated.

2) Locations of Historic Properties
Cultural materials and deposits could be present beneath the plow zone throughout the project area. Based on the results of archaeological inventory surveys in the area, the plow zone generally extends to a maximum of 60 cm (2 ft) below the current ground surface. However, due to commercial pineapple cultivation within the project area, it is also possible secondarily deposited traditional Hawaiian artifacts could be encountered within plow zone soils during grading.

3) Fieldwork
On-site monitoring is recommended for all project related ground disturbance. Monitoring will be conducted by trained archaeological technicians of the Pūlama Lāna‘i Culture and Historic Preservation Department in coordination with Hōnau Consulting, under the general supervision of Rosanna Thurman, M.A. (Hōnau Consulting, principle investigator). The contractor shall provide advance notice to Pūlama Lāna‘i of planned excavations to ensure an on-site archaeologist is present. A change in methodology will only be allowed through consultation with and written concurrence from the SHPD. All fieldwork will be conducted under archaeological permit number 20-15 and subsequent permits issued to Hōnau Consulting by the SHPD/DLNR in accordance with HAR Chapter 13-282.

Archaeological fieldwork will use current standard archaeological recording techniques including drawing of trench wall profiles and documentation of stratigraphy where cultural features or artifacts are exposed as well as in representative areas throughout the project area.

Profiles will be photographed and noted on a construction map. Photographs will include a photo scale for ease in showing the size and depth of excavations. Sampling will include the collection of artifacts and bulk sediments samples, as determined appropriate.

SHPD will be notified in the event of significant findings including human remains. If human remains are identified, SHPD, the County Coroner’s Office and the County Police Department (in accordance with HAR §13-300-40) will be immediately notified. The State of Hawai‘i Department of Land and Natural Resources/SHPD Inadvertent Discovery of Human Skeletal Remains Checklist will be filled out and submitted to SHPD. All construction work within the vicinity of the finding of a human burial will be stopped and no exploratory work will be conducted unless requested by SHPD. All human skeletal remains encountered during archaeological monitoring will be handled in compliance with HAR Chapter §13-300-40, which states all treatment of inadvertent burials be determined by the SHPD in consultation with recognized descendants.

4) Archaeologist’s Role
The field archaeologists will ensure that the interim protection measures described in this plan are implemented during the project. If the protection measures are not adhered to then the archaeologist will notify the landowner (Pūlama Lāna‘i) and will assist in establishing and maintaining the recommended buffers when necessary.

Field archaeologists will have the authority to stop work immediately in the area of any findings so that documentation can proceed and appropriate treatment can be determined. In addition, the archaeologist has the authority to slow and/or suspend construction activities in order to ensure necessary archaeological documentation can be conducted.

5) Coordination Meeting
A coordination meeting will be held prior to any construction or ground disturbance activities to orient the construction crew to the requirements of this archaeological monitoring program. At the meeting, the archaeological monitor will emphasize his or her authority to temporarily halt construction and state that all finds (including artifacts such as bottles) are the property of the landowner and may not be removed from the construction site. At this time, it will be made clear that the archaeologist must be on-site during all subsurface excavations associated with the project.

At this meeting, preservation measures outlined in this plan will be discussed. The purpose of visible buffers around a site(s) will be explained and it will be expanded upon that no storing of equipment, materials, or supplies shall be conducted within the buffer zone. Additionally, no excavation will be allowed within a buffer surrounding a site. A copy of the AMP will be provided to the construction manager and crew and all appropriate parties will be informed of the monitoring procedures as stipulated in the AMP.

6) Laboratory Work
Laboratory work will be conducted at the office of the Culture and Historic Preservation Division of Pūlama Lāna‘i in accordance with HAR §13-279-5(6). Laboratory analysis of
nonburial related finds will be tabulated and standard artifact recording will be used. Artifacts will be catalogued with provenience information, measurements, weight, type of material, and presumed function. Collected marine shell and animal bone will be tabulated, weighed, and analyzed for species identification. Photographs of representative artifacts and materials will be taken for inclusion in the archaeological monitoring report.

In the event an intact cultural deposit is encountered, or a significant traditional stone artifact is recovered there are several lab analyses that may be conducted. Charcoalized material ideal for dating analysis will be sent for species identification at the International Archaeological Research Institute, Inc. (IARI) and a selected sample(s) may be sent to Beta Analytic, Inc. for radiocarbon dating. Traditional basalt artifacts may be sent to the University of Hawai‘i-Hilo Geoarchaeology Lab for Energy-Dispersive X-ray Fluorescence (EDXF) analysis to identify where the material may have been procured. All analyzed samples, methods for sample selection, results, and provenience information will be presented and summarized within the archaeological monitoring report.

7) Report Preparation
At the conclusion of project construction, an archaeological monitoring report (AMR) will be written following the requirements of HAR §13-279-5. The AMR will include sections on monitoring methods, archaeological results, stratigraphy, laboratory analyses of artifacts and collected materials, and identified historic properties. Photographs and profiles of excavations will be included in the monitoring report even if no historically significant sites are documented. If human skeletal remains are encountered during monitoring, the context in which they were found and detailed descriptions will be presented within the archaeological monitoring report. The monitoring report will be submitted to the SHPD for review and approval.

8) Archiving Materials
All collected materials from this investigation belong to the landowner, Pūlana Lāna‘i, and will be permanently stored at the Lāna‘i Culture and Heritage Center.

We thank you for your time and attention. Please do not hesitate to contact me with questions at (808) 392-1617 or watson@honuaconsulting.com.

Respectfully submitted,

Trisha Kehaulani Watson, J.D., Ph.D.
Honua Consulting

Draft Archaeological Monitoring Plan for the Hōkūao 201-H Housing Project,
Kamoku Ahupua‘a, Lāhaina District, Island of Lāna‘i,
TMK: [2] 4-9-002:061 por. and portions of
TMKs: [2] 4-9-014:001, 009, and 011

Prepared for
Polama Lāna‘i

Prepared by
Nathan J. DiVito, B.A.,
Kepā Maly,
Rosanna M. R. Thurman, M.A. and
Trisha Kehaulani Watson, Ph.D.
Honolulu, Hawai‘i
November 2020
Management Summary

This archaeological monitoring plan (AMP) was prepared by request of Pālama Lānaʻi and was written for proposed ground disturbances associated with the Hōkūlau 201-H Housing Project located in Kamoku Ahupuaʻa, Lāhaina District, Island of Lānaʻi TMK: [2] 4-9-002:061 por. and portions of TMKs: [2] 4-9-014:001, 009, and 011. The project area is located in central Lānaʻi adjacent and to the west of Lānaʻi City and is situated within pineapple fields. The project area totals approximately 87.26 acres (3,801,045.6 square feet [sq. ft.]) or 353,128.69 square meters [sq. m.], and is privately owned by Lanai Resorts LLC.

The proposed project includes the development of 200 single-family homes, a one-acre park, a 1,500-square foot community center, comfort stations, and 100 parking stalls for use by the Hōkūlau residents. Ground disturbance associated with the project will include mass grading of the 87.26 acre project area. It is estimated that 105,000 cubic of soil will be excavated to a maximum depth of 12 ft. below ground surface and will be filled a maximum of 13 ft. in height to create the house pads, and various support infrastructure. Other excavations include four sediment basins present throughout the southern portion of the project area and any associated trenching to connect to existing sewer, gas, drainage, and water utilities, and excavations associated with the removal and readjustment of any existing utilities within the project area.

This AMP was initiated by the State Historic Preservation Division (SHPD) in a historic preservation review letter dated August 14, 2020 (Log No. 2020.00018, Doc No. 20080DK01, Appendix A). The SHPD letter accepted a previous archaeological inventory survey (AIS) report (Dye and Maly 2018a) and a recent End of Fieldwork Report (Thurman 2019a) for the Hōkūlau 201-H Housing project area and requested an archaeological monitoring plan (AMP) be completed and accepted prior to any ground disturbance associated with the project. Additionally, SHPD requested that the AMP stipulate short- and long-term interim protection measures for two historic properties currently located on the property. This plan was written to fulfill state requirements for archaeological monitoring plans under HRS 6E-42 and Hawaiʻi Administrative Rules (HAR) Chapter 13-279, Rules Governing Standards for Archaeological Monitoring and Reports.

Background research indicates Kamoku Ahupuaʻa was retained by Kamehameha III as Crown Land. In 1906, Kamoku was conveyed to Charles Gay and then was granted to Walter M. Giffard in 1907, excluding all Land Grants (L.G.), Land Commission Awards (LCA), and public roads, trails, and right-of-way. No L.G., LCA, or Royal Patents (R.P.) were recorded within the project area. Historically, the area was used for ranching and subsequently for commercial pineapple cultivation. The project area has been the subject of archeological surveys for a wastewater pipeline, the Lānaʻi Affordable Housing project, and the Hōkūlau 201-H Housing project, and a field inspection to determine the status of existing historic properties within the Hōkūlau 201-H Housing project area (Hammatt and Borthwick 1993a, Lee-Greig and Hammatt 2009a, Dye and Maly 2018a, and Thurman 2019a).

Two previously documented sites are present within the project area and consist of SHP #50-40-98-6649, a historic culvert headwall, and SHP #50-40-98-02001, a Dole pineapple harvester. SHP #6649 was documented during an AIS for an affordable housing project in 2009 and was assessed as significant for its information content under Criterion d (Lee-Greig and Hammatt 2009a:57). An archaeological field inspection, conducted to determine the current presence or absence of historic sites within the project area, concurred with the prior significance assessment and found the historic culvert headwall to possess integrity of location and materials (Thurman 2019a:4). No further work was recommended for the site by Lee-Greig and Hammatt 2009a and Thurman 2019a.

The pineapple harvester, “Machine I” was moved into the project area for preservation purposes in 2010 and was documented during an AIS and subsequent archaeological field inspection for the current project (Morita 2010, Dye and Maly 2018a, Thurman 2019a). The AIS assessed the pineapple harvester as significant under Criterion a for its association with the history of pineapple cultivation on the island and preservation and interpretive display at an off-site location was recommended (Dye and Maly 2018:135). In 2019 field inspection concurred with the significance assessment and found the harvester possess integrity of design, feeling, and association (Thurman 2019a:4). The field inspection further recommended it be moved to a sheltered location away from the proposed project prior to construction activities and funds for its restoration and display be pursued. Following the field inspection, the Dole pineapple harvester was designated as SHP # 02001. In September of 2020, Doug Stevenson, Director of Fleet Maintenance of Pālama Lānaʻi and Albert Morita, retired mechanic and former board member of Lānaʻi Culture & Heritage Center assessed the structural integrity of the harvester. The plan was initially to stabilize the machine and replace a few parts in preparation for its relocation. However, it was found that the harvester would not be able to be moved without a very considerable amount of destruction due to vast deterioration throughout the machine. It was found that the harvester had degraded to a point in which it was not recommended to be salvageable and is a safety concern (Appendix D).

Two additional sites, consisting of two historic wood frame buildings, were formerly present within the eastern portion of project area along the proposed 9th Street Extension. They were moved there in the 1980’s for preservation purposes and were documented in disrepair during the 2009 AIS for the affordable housing project and in 2018 during the AIS for the current project (Lee-Greig and Hammatt 2009a, Dye and Maly 2018a). The buildings included the Kœle Grammar School (or Boy Scout Hall) and the Palawai School/ Richardson House (Structure A of the Kōʻele District [SHP #50-40-98-1004]). The buildings were each documented in Historic American Buildings Survey (HABS) and National Park Service (NPS) (before documents in 2008 and 2017b). An attempt was made to confirm the presence or absence of the two buildings in 2019 and it was confirmed that the buildings were no longer extant within the project area (Thurman 2019a). In addition, the Maui Electric Company (MECO) power plant which was built in the 1940s and was located within the eastern extent of the project area, was demolished in late 2018.

1 State and National Register criteria for evaluation includes integrity of location, design, setting, materials, workmanship, feeling, and association and: a.) that are associated with events that have made a significant contribution to the broad patterns of our history; or b.) that are associated with the lives of persons significant in our past; or c.) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or d.) that have yielded, or may be likely to yield, information important in prehistory or history. The State of Hawai‘i includes one additional significance criteria: e.) that have an important value to the native Hawaiian people or to another ethnic group of that state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events, or oral accounts—these associations being important to the group’s history and cultural identity.
This AMP includes descriptions of the environmental setting, background research, previous archaeological studies in the near vicinity and findings, and provides archaeological monitoring provisions which shall be adhered to during project construction activities. The potential site types that could be encountered during monitoring include remnants of plantation and historic-era surface infrastructure, historic and secondarily deposited traditional Hawaiian artifacts on the ground surface, exposed firepit remnants, and subsurface cultural deposits and features beneath the plow zone. No human burials have been documented outside of known historic cemeteries in the area and they are not anticipated.

On-site archaeological monitoring is recommended for all project related excavation. Monitoring will be conducted by trained archaeological technicians of the Pūlāma Lī‘i‘i Culture and Historic Preservation Department in coordination with Honua Consulting, under the general supervision of Rosanna Thurman, M.A. (Honua Consulting, principle investigator). The contractor shall provide advance notice to Pūlāma Lī‘i‘i of planned excavations to ensure an on-site archaeologist is present. Adherence to these recommendations will ensure that any potentially significant artifacts or subsurface cultural deposits encountered during construction activities will be appropriately documented and mitigated. Any departure from this will only be allowed through consultation with and written concurrence from the SHPD. All fieldwork will be conducted under archaeological permit number 20-15 and subsequent permits issued to Honua Consulting by the SHPD/DLNR in accordance with HAR Chapter 13-282.

In accordance with the SHPD review letter dated August 14, 2020 requesting discussion of short- and long-term interim protection measures for sites currently located in the project area, it is recommended that SHIP # - 6649, a historic culvert headwall, be avoided and not impacted by the proposed project. Additionally, a 10 ft. temporary buffer shall be erected around SHIP # - 6649. The buffer shall be demarcated by orange web event fencing, flagging, or other means that is highly visible and shall remain in place throughout the duration of the proposed project. No ground disturbance shall occur and no construction materials shall be stored within the site buffer.

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Section 1 Introduction

1.1 Project Background

This archaeological monitoring plan (AMP) was prepared by Honua Consulting LLC by request of Pilama Lāna‘i and was written for proposed ground disturbances associated with the Hōkūālo 201-H Housing Project located in Kamoku Aluapua‘a, Lāhaina District, Island of Lāna‘i, TMKs [2] 4-9-014:001, 009, and 011. The project area is located in central Lāna‘i adjacent and to the west of Lāna‘i City, within former pineapple fields. The project area totals approximately 87.26 acres (3,801,045.6 square feet [sq. ft.] or 353,128.69 square meters [sq. m.]) and is privately owned by Lanai Resorts LLC. A U.S. Geological Survey (USGS) map, aerial photograph, and Tax Map Key (TMK) show the location of the project area (Figure 1 through Figure 3).

The proposed project includes the development of 200 single-family homes, a one-acre park, a 1,500-square foot community center, comfort stations, and 100 parking stalls for use by the Hōkūālo residents. Ground disturbance associated with the project will include mass grading of the 87.26 acre project area. It is estimated that 105,000 cubic of soil will be excavated to a maximum depth of 12 ft. below ground surface and will be filled a maximum of 13 ft. in height to create the house pads, roads, and various support infrastructure. Other excavations include four sediment basins present throughout the southern portion of the project area and any associated trenching to connect existing sewer, gas, drainage, and water utilities, and excavations associated with the removal and readjustment of any existing utilities within the project area. The site grading plans are shown in Figure 4 through Figure 9 and a conceptual site plan is presented in Figure 10.

This AMP was initiated by the State Historic Preservation Division (SHPD) in a historic preservation review letter dated August 14, 2020 (Log No. 2020.00018, Doc No. 2008IK01, Appendix A). The SHPD letter accepted a previous archaeological inventory survey (AIS) report (Dye and Maly 2018a) and a recent End of Fieldwork Report (Thurman 2019a) for the Hōkūālo 201-H Housing project area and requested an archaeological monitoring plan (AMP) be completed and accepted prior to any ground disturbance associated with the project. Additionally, SHPD requested that the AMP stipulate short- and long-term interim protection measures for two historic properties currently located on the property. Accordingly, it is recommended that SIHP #50-40-98-6649, a historic culvert headwall, be avoided and not impacted by the proposed project. Additionally, a 10 ft. visible temporary buffer shall be erected around SIHP #6649 and remain in place throughout the duration of the proposed project. Originally SIHP #62001, the Dole pineapple harvester, was to be moved to a covered off-site location for preservation and interpretive display prior to commencement of project related ground disturbance. However, it was found that the harvester had degraded to a point in which it was not recommended to be salvageable and is a safety concern (Appendix D).

This AMP was written to fulfill state requirements for archaeological monitoring plans under Hawai‘i Revised Statutes (HRS) §6E-42 and Hawai‘i Administrative Rules (HAR) Chapter §13-279, Rules Governing Standards for Archaeological Monitoring and Reports. This report includes description of the environmental setting, background research, previous archaeological studies in the near vicinity and findings, and provides archaeological monitoring provisions which shall be adhered to during all project construction activities.
Figure 2. Aerial photo showing the proposed Hōkūloa 201-H Housing project area; notice a building within the eastern boundary of the project area which corresponds to a MECO building which has since been demolished (2011 USGS Orthophoto)

Figure 3. Portion of Tax Map Key (TMK): [2] 4-9-002 showing the location of the project area
Figure 4. General grading plan (Plans 1-5) for the Hokūao 201-H housing project (Provided by Pālama Lāna‘i)

Figure 5. Site grading plan 1 for the Hokūao 201-H housing project (Provided by Pālama Lāna‘i)
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1.2 Environmental Setting

1.2.1 Natural Environment

Lāna‘i is the sixth largest of the Hawaiian islands and was formed by a single shield volcano, the caldera of which, Pālāwai Basin, is located approximately 0.6 miles (1 km) to the south of the project area. The project area is located on the flat northwest rift zone in the center of Lāna‘i Island (Stearns 1940). It is located at approximately 1500-1600 ft. above sea level and between 4.5-6.5 miles (7.2-10.5 kilometers [km]) from the closest coastlines of the island. The project area is located within the ahupua‘a (traditional land division) of Kamoku, with Kalulu Ahupua‘a to the south and Paoma‘i Ahupua‘a to the north.

The climate of Lāna‘i is dry with minimal stream activity. Lāna‘i sits within the rain shadow of the larger, higher islands of Maui and Moloka‘i. The project area receives a mean annual rainfall ranging between 690 and 740 millimeters (mm), with wetter months November through March (Giambelluca et al. 2013). The closest drainage to the project area is Iwi‘ole Stream approximately 0.5 miles (1.6 km) to the north.

The two soil types present within the project area include Lahaina Silty Clay and Waihuna Clay. The majority of the soil within the project area consists of Waihuna Clay with Lahaina Silty Clay present along relatively small portions of the northeast, east, and south central boundaries of the project area (Figure 11). The Waihuna Clay soil within the project area is present on slopes ranging from 1-3% (WoA). The Waihuna soil series consists of well-drained and moderately well-drained soils on alluvial fans and in depressions on the islands of Lāna‘i and Moloka‘i and formed in old, fine-textured alluvium (Foote et al. 1972:129-130). The runoff for this soil is slow and the erosion hazard is slight. This soil type is typically used for pineapple cultivation. Natural vegetation on Waihuna soils includes Natal redtop (*Melinis repens*), lantana (*Lantana camara*), and guinea grass (*Megathyrsus maximus*).

Lahaina Silty Clay soils within the project area are present on slopes from 0-3% (LaA), 3 to 7% (LaB), and 7-15% (LaC). The Lahaina soil series consists of well-drained soils on the uplands of the islands of Lāna‘i, Maui, Moloka‘i, and O‘ahu and developed from material weathered from basic igneous rock (Foote et al. 1972:78-79). Permeability for this soil is moderate, runoff is slow, and the erosion hazard is slight. This soil type is typically used for sugarcane and pineapple cultivation with smaller acreages used for truck crops, pasture, homesites, and wildlife habitat. Natural vegetation on Lahaina soils includes bermuda grass (*Cynodon dactylon*), feather finger grass (*Chloris virgata*), ‘ilima (*Sida fallax*), kiawe (*Prosopis pallida*), lantana (*Lantana camara*), osi, and ‘uhala (*Waltheria americana*).

1.2.2 Built Environment

The project area is situated in central Lāna‘i to the west of Lāna‘i City and is located within former pineapple fields. The former Pālāwai Lāna‘i nursery, community gardens, and green waste disposal areas comprise the southern half of the project area. The community gardens consist of gridded fenced garden plots with small structures accessed by dirt roads cutting through the project area. The electrical utilities appear to be above ground throughout the project area, but water and other subsurface utilities may be present. The former Lāna‘i Maui Electric Company (MECO) power plant was once located in the eastern portion of the project area and was demolished and removed from the project area in 2018. The northern portion of the project area remains relatively undeveloped except for several dirt access roads cutting through the area.
Section 2  Traditional and Historical Background

This section presents a general historic background for the island of Lāna‘i. It was compiled by Kopā Maly, a cultural historian and Hawaiian language expert, and edited and expanded upon by Thomas S. Dye Ph.D., a professional archaeologist with a career spanning over 50 years in Hawaiian and Pacific archaeology. The words, photos, tables, and figures presented below have been used with the permission of the authors. Footnotes are provided by the original authors.

This background is based on firsthand observation of cultural practices in the 1970s, interviews with older kama‘āina (native-born individuals) at that time, and an exhaustive review of pertinent documentary sources, including records held by Kumu Pono Associates and the Lāna‘i Culture & Heritage Center. The historical narratives cited on the following pages provide readers with access to some of the most detailed and earliest accounts recorded from Lāna‘i. The narratives offer a glimpse into the history recorded from the experience and memory of native residents and eyewitness accounts of those who participated in the events which now make Lāna‘i’s history. Some of these historical narratives have been translated from Hawaiian-language accounts for the first time, and other accounts rarely seen since their original date of composition. They are compiled here to provide a more detailed history of the land than has been previously available.

2.1 He Wahi Mo‘olelo No Lāna‘i a Kaululā‘au: Some Traditions from Lāna‘i of Kaululā‘au

The earliest traditional lore of Lāna‘i describes the arrival of the gods Kāne, Kanaloa, and their younger god-siblings and companions to the southern shores of the island. Later accounts describe the visit of the goddess Pele and members of her family to the windward region of Lāna‘i. Subsequent narratives describe the settlement of Lāna‘i by evil spirits, and the difficulties that the early human settlers encountered in attempts to safely colonize the island. Another tradition relates that in the early 1400s AD, a young Maui chief by the name of Kaululā‘au traveled around Lāna‘i vanquishing the evil ghosts/spirits of the island, making it safe for people to live on Lāna‘i, and is the source of the island’s name (Lāna‘i a Kaululā‘au).

By the early 1600s AD, all the islands of the Hawaiian group were settled sufficiently to develop an organized way to manage scarce resources. Each island was divided into political and subsistence subdivisions called ahupua‘a, which generally ran from the ocean fishery fronting the land area to the mountains. Under the rule of Pi‘ilani, Lāna‘i was divided into 13 ahupua‘a. Native tradition describes ahupua‘a divisions as being marked by stone cairns (ahu) with a carved pig (pua‘a) image placed upon them, and these ancient divisions remain the primary land unit in the Hawaiian system of land management on Lāna‘i today.

The culture, beliefs, and practices of the Hawaiians mirrored the natural environment around them. They learned to live within the wealth and limitations of their surroundings. There is significant archaeological evidence on the island indicating that in the period before Western contact, more people lived on the land sustainably—growing and catching all they needed—than currently live upon the island. Several important traditions pertaining to the settlement of Lāna‘i and the beliefs and practices of the ancient residents are commemorated at such places as Kaululā‘au, Kalae‘ahi, Ke-ahi-a-Kawelo, Hālului, Pu‘upuehe, Pōhaku 5, Kāne‘au, Ka‘ena iki, Nānāhū, Ha‘alelepa‘akai, and Puhi-o-Ka‘ala.
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Ancient Hawaiian villages, ceremonial features, dryland agricultural fields, fishponds, and a wide range of cultural sites dot the shoreline of Lāna‘i at places like Keone, Kua‘nīlāpua‘u, Kau‘olō, Mānākī, Kapalaoa, Huaweia, Kapū‘au‘a, Hulopoe‘e, Mānele, Kamanui, Na‘a, Kehemanu, Lōpū, Kahalepalaoa, Kah‘ē‘a, Kē‘ōoku, Kā‘a, Hauola, Maunalei (including a wetland taro field system in the valley), Kahōkūkini, Kaiaolohia, Kahū‘ulehale, Kahue, Lapa‘iki, Awa‘ula, Polihua, and Ka‘ena.

In the uplands, localities at Ho‘opūlupuluamao and Malulani, Kö‘ele and Kihamāni‘anea, Kahu‘ula, Kaunolū‘uka, Kēkōlialii, Kūlalii, Aupuni, and Pāhe‘wai were also locations of significant traditional settlements and agricultural endeavors. We also know that over the generations, families with permanent residences in the Lāhaina District of Maui frequented Lāna‘i to take advantage of its rich fisheries.

In the period leading up to 1800 AD, there was a decline in the native population, and in the capacity of Lāna‘i to produce agricultural resources. This was, in part, due to disputes between the rulers of Maui and Hawai‘i which overflowed onto Lāna‘i in the mid- to late-eighteenth century. In the late-eighteenth century and early-nineteenth century, foreign diseases and influences spread across the islands, leading to a further decline in the population. By the 1840s, there were approximately 600 inhabitants residing on Lāna‘i. By the 1870s, the population hovered around 300 residents, and by the early 1890s, there were just 175 native residents.

2.1.1 Native Lore and Historical Accounts: The Gods Walked the Land—Early Settlement of Lāna‘i

Several traditions pertaining to the gods and people of ancient Lāna‘i were found in a review of Hawaiian-language newspapers. These accounts describe the island condition and the life and practices of Lāna‘i’s ancient people. The narratives establish the bond between Lāna‘i and neighboring islands of the Hawaiian group and more distant Kahiki—the ancestral homeland of the gods—as Kāne, Kanaloa, Pele, and others of the god-family shaped the natural environment and lives of the people of the land. Coming into the historic period, readers find significant changes on the land and in the lives of the people of Lāna‘i. Selected accounts are related here that transition readers through the history of Lāna‘i and a native landscape to one of change under western settlement.

A Famine on Lāna‘i—an Ancient Prayer Offered by Pakeaulani to the God Kāne‘pā‘ina

This tradition tells of two ancient residents of Lāna‘i, a period of famine across the islands, and the death of the population. We learn the name of a god of one of the heiau (traditional place of worship) on Lāna‘i, Kāne‘pā‘ina. The word anela (Hawaiianized angel) is used by the writer in place of the traditional words ‘aumakua (family god) or akua (god). Also cited within this account is a pule (prayer) uttered by ancient residents of Lāna‘i.

No na Akua ka Wa Kahiko...

Eia mai he wahi moolelo no ka malama ana o kekahi anela paha, a mau anela paha, ʻoia hoia hau Kane paha. Penei u wahi moolelo la. Aia ma Lāna‘i ka noho ana o Kaimumahana, a me ke kana keiki o Pakeaulani, a he mai loa no na kanaka ma Lāna‘i ia manawa; a hiki mai ke kau wai, pau aku la na kanaka i ka make a ka aia, a koe elua o Kaimumahana, a me Pakeaulani, kokoke make nae ka makaukane. O ka Pakeaulani hana; oia keia. Hele wale aku la no keia e e wale aku no i kuina uala, a loa ka uala lilii, (he au ia uala) kalua a moa, lawe aku la keia e a wahi heiau a ianei i hana‘i kaumaha aku la, ala‘a, pule aku la, penei kahi hapo o ka pule.

Kini o ke akua
E ka lehu o ke akua
E ka puuki akua
E ka laalani akua
E ka kuhale, e kahele
E ka wahine e moe ana ke alo iluna
Eia ka ai a a Pakeaulani keiki a Kaimumahana. Pau ka pule, hoi keia i ami hou i ai no ke akahai, a moa ia ai lawe aku, i lawe aku ka hana, ua pau kela ai, kai keia ai, pule no ho i like me mamua. I kekahi imu lilii ana a ianei, honi mai la kona makaukane i ke ale o ka uala! I mai la kela. “Ahera hoa kau uala e kau keiki e auala ma nei?” Pane mai la kela. “He ai ia na kuu akua.” Pane hou mai kona makaukane, “Aho e o’u akua, a he akua ka hoi kou?” A hala ae la na la ʻelima o kana hana ana pela, ala‘a, i ka po kamailio mai la kekahi anela o Kanepaina. I mai la, “Ea, a keia po e panipani aku ovei na pukapuka ilili o ke olua hale, e noho malie mai kamailio pu me kou makaukane a pau aku la ka laau kamailio pu ana, a hele aku la ia, ‘Owai ou hoa i kamailio mai la.’ I aku la oia, ‘O kuakauhia ia a‘u e malama ne‘i. Aole iauiu la ma i ahe iho, haule mai ana ka ua he nut, ka ua no ia a ao ka po a po ua la nei, a ao ua po nei, malie iho la ka ua. I puka aku ka hana iwaui o ualaka ka Maia, ahu me ko Ke a Ka a oia mai, hele ke anakii o ka uala a keke, ua hele ka Ape a hila la ka ha; o

The Gods of Ancient Times

Here is a little tradition pertaining to observances for a certain angel (guardian), angels, or perhaps men. The story is this. There was residing on Lāna‘i, Kaimumahana, and Hōkūlau 201-H Housing AMP

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Kaimumahana, a me kana keiki o Pakeaulani, a he mai loa no na kanaka ma Lāna‘i ia manawa; a hiki mai ke kau wai, pau aku la na kanaka i ka make a ka aia, a koe elua o Kaimumahana, a me Pakeaulani, kokoke make nae ka makaukane. O ka Pakeaulani hana; oia keia. Hele wale aku la no keia e e wale aku no i kuina uala, a loa ka uala lilii, (he au ia uala) kalua a moa, lawe aku la keia e a wahi heiau a ianei i hana‘i kaumaha aku la, ala‘a, pule aku la, penei kahi hapo o ka pule.

Kini o ke akua
E ka lehu o ke akua
E ka puuki akua
E ka laalani akua
E ka kuhale, e kahele
E ka wahine e moe ana ke alo iluna
Eia ka ai a a Pakeaulani keiki a Kaimumahana. Pau ka pule, hoi keia i ami hou i ai no ke akahai, a moa ia ai lawe aku, i lawe aku ka hana, ua pau kela ai, kai keia ai, pule no ho i like me mamua. I kekahi imu lilii ana a ianei, honi mai la kona makaukane i ke ale o ka uala! I mai la kela. “Ahera hoa kau uala e kau keiki e auala ma nei?” Pane mai la kela. “He ai ia na kuu akua.” Pane hou mai kona makaukane, “Aho e o’u akua, a he akua ka hoi kou?” A hala ae la na la ʻelima o kana hana ana pela, ala‘a, i ka po kamailio mai la kekahi anela o Kanepaina. I mai la, “Ea, a keia po e panipani aku ovei na pukapuka ilili o ke olua hale, e noho malie mai kamailio pu me kou makaukane a pau aku la ka laau kamailio pu ana, a hele aku la ia, ‘Owai ou hoa i kamailio mai la.’ I aku la oia, ‘O kuakauhia ia a‘u e malama ne‘i. Aole iauiu la ma i ahe iho, haule mai ana ka ua he nut, ka ua no ia a ao ka po a po ua la nei, a ao ua po nei, malie iho la ka ua. I puka aku ka hana iwaui o ualaka ka Maia, ahu me ko Ke a Ka a oia mai, hele ke anakii o ka uala a keke, ua hele ka Ape a hila la ka ha; o

The Gods of Ancient Times

Here is a little tradition pertaining to observances for a certain angel (guardian), angels, or perhaps men. The story is this. There was residing on Lāna‘i, Kaimumahana, and Hōkūlau 201-H Housing AMP
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ke kalo hoi ua makaole kekahi kihapai, a o kekahi pumaia ka ha o ke kalo. Ke kalua iho la no ia o ka ai a mea, kaumaha e akua la keia ke Akua osa nei, a pau hoi mai la laua nei ai ka uala, ke kalo, a ai no hoi ka mai a maona; o ka laha hou no ia o kanaka o Hawaii nei, ma Lanai wale no. Oua iho la kahi mooolelo o ka malama ana o kekahi o na Kane ia mau kanaka…”

Owau no me ka mahalo. John Puniwai.

Nupena Kuokoa, November 8, 1862.
Translated by Maly.

He Mo’olelo no Kauhulau: A Tradition of Kaulula’au

One of the best known traditional accounts of Lāna’i dates from the early-fifteenth century and associates the island with the ruling chiefs of Maui. In these narratives, a young chief, Kaululau, was born to Kaka’alaneo and Kanikaniaula. Kaka’alaneo’s elder brother was Kākā’e, and Formander reported that these royal brothers jointly ruled Maui and Lāna’i (Formander 1973 II:82-83). During Kākā’e and Kaka’alaneo’s rule, and for many generations preceding it, anyone who attempted to live on Lāna’i experienced great difficulties, as the island was inhabited by evil ghosts/spirits ruled by their king, Pahulu.

While there are numerous narratives that describe how Kaululau came to free Lāna’i from the rule of Pahulu, thus making it safe for people to inhabit the island (Beckwith 1940, Emory 1969), there are two major versions of this tradition with variations on the events. The best known is the version published by King David Kalākaua in 1888, but the most detailed version was published in the Hawaiian language in 1863 in association with another tradition from Maui, “Ka Moolelo o Eieio”.

King Kalākaua’s version provides a significant description of Lāna’i and the ability of its people to sustain themselves by working the land and fishing the sea around the island. Through the encouragement of his friend and advisor Walter Murray Gibson2 the king compiled the traditions found within The Legends and Myths of Hawaii (Kalākaua 1990) and described Lāna’i as being richly supplied with food crops, natural resources, and fisheries that, but for the presence of the evil beings, made it a desirable place to live.

Excerpts of Kalākaua’s version follow, entitled “The Sacred Spear-Point” and “Kelea, the Surf Rider of Maui.” These are followed by an excerpt of the Hawaiian-language version of Kaululau’s legend entitled “Ka Mooolelo o Eieio.”

“The Sacred Spear-Point” and “Kelea, the Surf Rider of Maui”

Kaululau was one of the sons of Kakaalaneo, brother of, and joint ruler with, Kakae in the government of Maui. . . . The court of the brothers was at Lele (now Līhina), and was one of the most distinguished in the [island] group.

The mother of Kaululau was Kanikanaulua, of the family of Kamauaua, king of Molokai, through his son Haali, who was the brother or half-brother of Keoloewa and Kaupeepee . . .

Kaululau was probably born somewhere between the years 1390 and 1400. He had a half-sister, whose name was Wao, and a half-brother, Kahiwulaa...[Kaululau] had a congenial following of companions and retainers, who assisted him in his schemes of mischief...He would send canoes adrift, open the gates of fish-ponds, remove the supports of houses, and paint swine black to deceive the sacrificial priests. He devised an instrument to imitate the death-warming notes of the alae [mudhen bird], and frightened people by sounding it near their doors; and to others he caused information to be conveyed that they were being prayed to death.

Notwithstanding these misdemeanors, Kaululaau was popular with the people, since the chiefs or members of the royal household were usually the victims of his mischievous freaks. He was encouraged in his disposition to qualify himself for the priesthood, under the instruction of the eminent high-priest and prophet, Waolani, and had made substantial advances in the calling when he was banished to the island of Lanai by his royal father for an offence which could neither be overlooked nor forgiven.

At that time Lanai was infested with a number of gnomes, monsters and evil spirits, among them the gigantic moo [lizard], Mooaleo. They ravaged fields, uprooted cocoanut-trees, destroyed the walls of fish-ponds, and otherwise frightened and discomfited the inhabitants of the island. That his residence there might be made endurable, Kaululau was instructed by the kaulus [prophets] and sorcerers of the court in many charms, spells, prayers and incantations with which to resist the powers of the supernatural monsters. When informed of these exercising agencies by Kaululau, his friend, the venerable Waolani, told him that they would avail him nothing against the more powerful and malignant of the demons of Lanai.

Disheartened at the declaration, Kaululau was about to leave the heiau to embark for Lanai, when Waolani, after some hesitation, stayed his departure, and, entering the inner temple, soon returned with a small roll of kapa [bark cloth] in his hand. Slowly uncoiling and removing many folds of cloth, an ivory spearpoint a span in length was finally brought to view. Holding it before the prince, he said:

Take this. It will serve you in any way you may require. Its powers are greater than those of any god inhabiting the earth. It has

2 Walter Murray Gibson settled on Lāna’i by early 1862, and came to control most of the land on the island through fee-simple and leasehold title. A friend of many chiefs, some of whom had been on Lāna’i with Kamehameha I, Gibson recorded a number of traditions from the island, and is generally attributed with the Lāna’i’s narratives cited by King Kalākaua.

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been dipped in the waters of Po, and many generations ago was left by Lono upon one of his altars for the protection of a temple menaced by a mighty fish-god who found a retreat beneath it in a great cavern connected with the sea. Draw a line with it and nothing can pass the mark. Affix it to a spear and throw it, and it will reach the object, no matter how far distant. Much more it will do, but let what I have said suffice.

The prince eagerly reached to possess the treasure, but the priest withdrew it and continued:

I give it to you on condition that it pass from you to no other hands than mine, and that if I am no longer living when you return to Maui—as you some day will—you will secretly deposit it with my bones. Swear to this in the name of Lono.

Kaululaau solemnly pronounced the required oath. The priest then handed him the talisman, wrapped in the kapa from which it had been taken, and he left the temple, and immediately embarked with a number of his attendants for Lanai.

Reaching Lanai, he established his household on the south side of the island. Learning his name and rank, the people treated him with great respect—for Lanai was then a dependency of Maui—assisted in the construction of the houses necessary for his accommodation, and provided him with fish, poi, fruits and potatoes in great abundance. In return for this devotion he set about ridding the island of the supernatural pests with which it had been for years afflicted.

In the legend of “Kelea, the Surf-rider of Maui,” will be found some references to the battles of Kaululaau with the evil spirits and monsters of Lanai. His most stubborn conflict was with the gnome god Moolaeo. He imprisoned the demon within the earth by drawing a line around him with the sacred spear-point, and subsequently released and drove him into the sea.

More than a year was spent by Kaululaau in quieting and expelling from the island the malicious monsters that troubled it, but he succeeded in the end in completely relieving the people from their vexatious visitations. This added immeasurably to his popularity, and the choicest of the products of land and sea were laid at his feet.

His triumph over the demons of Lanai was soon known on the other islands of the group, and when it reached the ears of Kakaalaneo he dispatched a messenger to his son, offering his forgiveness and recalling him from exile. The service he had rendered was important, and his royal father was anxious to recognize it by restoring him to favor.

But Kaululaau showed no haste in availing himself of his father’s magnanimity. Far from the restraints of the court, he had become attached to the independent life he had found in exile, and could think of no comforts or enjoyments unattainable on Lanai. The women there were as handsome as elsewhere, the bananas were as sweet, the coconuts were as large, the awa was as stimulating, and the fisheries were as varied and abundant in product. He had congenial companionship, and bands of musicians and dancers at his call. The best of the earth and the love of the people were his, and the apapani [‘apapane, Hawaiian honey creeper bird] sang in the grove that shaded his door. What more could he ask, what more expect should he return to Maui? His exile had ceased to be a punishment, and his father’s message of recall was scarcely deemed a favor.

However, Kaululaau returned a respectful answer by his father’s messenger, thanking Kakaalaneo for his clemency, and announcing that he would return to Maui sometime in the near future, after having visited some of the other islands of the group; and three months later he began to prepare for a trip to Hawaii. He procured a large double canoe, which he painted a royal yellow, and had fabricated a number of cloaks and capes of the feathers of the oo and manmo. At the prow of his canoe he mounted a carved image of Lono, and at the top of one of the masts a place was reserved for the proud tabu standard of an aha alii [chiefly bloodline].

This done, with a proper ritana he set sail for Hawaii. (Kalakaua 1990:209–213)

The tradition continues by describing events in which Kaululaau participated in battles with various demons similar to those on Lāna‘i. His journey took him to the islands of Hawai‘i, Moloka‘i, and O‘ahu prior to his return to Maui.

Upon returning to Maui, Kaululaau was welcomed home by his father, and learned that Waolani, his priestly instructor and friend, had died. Recalling the promise made to Waolani, Kaululaau secretly hid the sacred spear-point of Lono with the bones of Waolani. Kaululaau married Laiwa-a-Ewa, a high chiefess of O‘ahu, and together they lived out their lives, residing at Kaau‘ula‘ula in Līhāna and parented six children (Kalakaua 1990:225).

In the tradition of “Kelea, the Surf-Rider of Maui” (Kalakaua 1990:229–246), mention is made again of Kaululaau and his adventures on Lāna‘i. The account is centered on Kelea, the daughter of Kahelilii, elder cousin of Kaululaau. It is reported that when Kahelilii ascended to the throne (ca. 1415), he “became king of Maui and Lāna‘i; for during that period the latter island was under the protection of the mo‘o kings of Maui, while Molokai still maintained its independence” (Kalakaua 1990:229).

King Kalakaua described the introduction of ‘ulu (breadfruit) to Lele, now known as Līhāna, and Kaululaau’s banishment to Lāna‘i:

It was Kakaalaneo who introduced the bread-fruit there from Hawaii . . . For some disrespect shown to his royal brother [Kaka], whose mental weakness doubtless subjected him to unkind remarks, he banished his son Kaululaau to Lanai, which island, traditions avers, was at that time infested by powerful and malignant spirits. They killed pigs and fowls, uprooted coconuut-trees and blighted taro patches, and a gigantic and mischievous gnome amused himself by gliding like a huge mole under the huts of his victims and almost upsetting them.

The priests tried in vain to quiet these malicious spirits. No sooner were they exercised away from one locality that they appeared in another, and if they gave the taro patches a rest it was only to tear the unripe bananas from their stems, or rend the walls and embankments of artificial ponds, that their stores of fishes might escape to the sea. Aware of these grievances, Kaululaau took with him to Lanai a talisman of rare powers. It was the gift of his friend, the high-priest of his father,
Ka Moolelo o Eleio

The tradition of Eleio is set in the time of Kaka‘alaeno’s rule over Maui, Lāna‘i, Moloka‘i, and Kahoolawe (ca. 1400), and was published by W. N. Puaulewa, in the Hawaiian-language newspaper Kaokou in 1863. The account tells us that Eleio was a famous ki‘eki‘i associated with the court of the king. He was noted for his ability to travel the circuit of the island, to fetch a choice fish from one district and bring it to the court in another district, keeping it alive. When it was learned that Kelekeleiokea‘ula, Kaka‘alaeno’s wife, was expecting, the king granted Eleio the privilege of naming the child. Eleio stated his desire, that if it was a boy, he should be named Kaulula‘au (The-forest-grove). When the child was born, it was indeed a boy, and he was named Kaulula‘au. As the child grew, his mysterious manner and mishmash nature created many problems for his parents and the people of Maui. Eventually, the youth was banished from Maui and sent to Lāna‘i to fend for himself. At that time in history, Lāna‘i was reportedly inhabited by hordes of akau under the rule of Pahulu. While on Lāna‘i, Kaulula‘au was accompanied by his own personal god, Lono. Together, the two traveled about Lāna‘i, tricking the ghosts, killing them, and setting the lands free from their dominion.†

In this version of the tradition, Kaulula‘au traveled around Lāna‘i. We are told that he has already killed many of Pahulu’s minions, and that Pahulu then feigned friendship with Kaulula‘au, telling him that he would help him seek out the other akau who remained on the island. Pahulu’s real objective was to round up the remaining akau to fight and kill Kaulula‘au. The party traveled around the island counterclockwise, leaving the Keelmuku region, passing through Ka‘ena, Honopū, Kaumalapau‘u, Kaunolū, and Mānele. The excursive below cover the lands of the southern coast of Lāna‘i between Kaunolū and Mānele.

† Nūpepa Kuokoa, October 24 & 31, 1863

Ka Moolelo o Eleio

A mamuli o keia olele ana a Pahulu: alaia, ua nee io aku no lakou a noho ma Honopua, aia ia wahi ma kahi e ane kokoke aku ana ia i kai pali o Kaholu, aia, o Kaumalapau nae kahi e pili pu anu ma Kaholu. A hiki lakou nei ma Honopu, a noho malaila i kekahi mau po, aole nee he akua oia wahi, no ka mea, ua kaupuni hele o Pahulu ia mau la a me ia mau po ma ia apana mai o a o, mai a kai a, aole ona ha lawai iki me ke akua, nolaila, aole o lakou kuleana e noho hou ai malaila.

Nolaila, ua nee hou aku la a noho a Kaholu, a malaila a noho lohi hou lakou ma ia wahi, no ka mea, ua ike o Pahulu he wahi akoakoia ia o ke akua.

Nolaila, oeleo aku la o Pahulu ia Kaumalapau, “E abo e noho kakou ianei, no ka mea, ua ike mai nei au, aia iulana pono o Kahilikalani ke akua kahi i nohoao. Eia nae ka mea hai aku ia oe e Kaumalapau, e luku auanei oe ia koi o ke akua apau, ao ke akua auanei e kapai‘na la o Kanemakua, alaia, mai pepehi auanei oe iaia no ka mea, he hana nui kana. O kana hana, oia ke kamanaa mau o keia wahi, a nana no e malama ia kela i-a o ke kai. Oia ke akua, no ka mea, ia oia e make, aole mea nana e kiai pono e i keia lae akua. No ka mea, malama paha e pau io ana ke akua o keia aina ma keia hana au e hana nei, a e noho mai ana paha ka mea i like pu me kou ana a u e ike aku nei. Alaila, ua koe iho ia no ke kumu e laka mai ai o ke akua, a ma ona la e hiki ai ke kaumaha aku, a e lilo o Kanemakua i aumakua lawaia no ia poe.”

Alaila, ua maikai ia mea i ko Kaumalapau maiako. A noho lakou malaila, me ka hana aku i kana oihana mau o ke akua oia wahi, a malaila ho o Kaumalapau i ao ai i ka paeaea ana i ke akua, e like me ka hana ana o na kanaka o Molokai i pae mai ai ma Kaumalapau, a no ka lehulehu o na hana maalea i loaia ia Kaumalapau mamului o ke ao ao ana mai a konu aku a Lono, nolaila, ua pau na akua i ka make o Kaumulou.

The Tradition of Eleio

Pahulu then flew on ahead, and they went on to stay at Honopū. This place is situated not too far away from the cliffs of Kaholo, though Kaumalapau‘u is there, adjoining Kaholo.

They arrived at Honopū, and stayed there several nights. Pahulu had traveled all about the place, from one side to the other of the land, and into the uplands, but he could find no akua in the district. Therefore, they had no reason to stay there for long.

Then they traveled once again, and stayed at Kaunolū. They remained at this place for quite a long time, because Pahulu knew that this was a place where the akua gathered.

Therefore Pahulu said to Kaulula‘au, “Let us stay here a while, for I see there atop Kūhilikalani, is the place where the akua reside. But this is what I have to tell you, Kaulula‘au, that you shall indeed destroy all the akua; but you should not kill the god. I instruct you, for he has an important job here. His work, is to let him remain free, that he may be worshipped. So it was that he is the native of this place, it is he who cares for the fish of the sea. He is the god, and if he should be killed, there shall be no other god who can watch over this godly point. So be careful that you do not destroy the akua of this land as you do your work. From what I have seen, he is perhaps like you in what he does. So let him remain free, that he may be worshipped. Kānemakua will become the god of the fishermen of this place.”

Kaulula‘au thought this was a good idea. So they dwelt there, and he did his work, killing all the akua of this place. Kaulula‘au then instructed them in praying to the gods, as he had done with the men of Moloka‘i, who had washed ashore at Kāhulehule. So it was that the multitudes do this, as Kaulula‘au had been instructed by his god, Lono. Thus vanished, were the akua of Kaunolū.
Traditional and Historical Background

A pau ka lakou hana ana mau Kaunolu, atalma, mano ho la lakou e haalele ia wahi a e nee hou aku ma kekahi wahi hou aku. Nee iki ae lakou a noho ma Mamaki, a malaila i luku ia aku aii...

A pano ke koena o ke Aku a Kaunolu a ka lukuia, a pepahi pu ia kekahi akua opu ohao, o Kuahulua ka inoa oia akua, a no ka make ana oia akua ia Kaaululaua, nolaila, hele hou ae ia lakou a noho ma Manele.

A malaila, ua noho loihi loa lakou i kekahi mau la me kekahi mau po, a o ka Pahulu hana mau no i ka hele e nana i ke aku mau a maanei. A no ka halawai ole o lakou me ke aku, nolaila, hooholo lakou i ka olelo e pui o Kaaululaua ame Lono tuka, a o Pahulu hoi, ua hele loa oia makahaki a hiki aku i Naha, a malaila oia e hui ae ai ia Kaaululaua ma.

A o Kaaululaua ma hoi, hele aku la lau mai Manele aku a pui aku a hiki i Kanaaua, a malaila aku no a ke kuahiwi o Kaohai, a hele ae la no malaila a Kahalelelepaakai, a ma ia kuahiwi aku no ka hele ana a hiki ae i Ohialalo, a malaila aku ka hele ana hiki i ka mauna o Lainahale, kahi hoi a Kaaululaua i kapili ai i ka maka o ke akua i ke kepau.

Nupera Kaolu, October 24 & 31, 1863
Translated by Maly.

Traditional and Historical Background

Kealaikahihi: “Canoe Man’s Path to Kahiki”
The island of Lāna‘i plays a role in some traditions describing the arrival of the gods and people in Hawai‘i. The famed Kealaikahihi, “canoe man’s path to Kahiki,” reportedly starts at Kaunolu on Lāna‘i.4 The residency of the god-navigator Kāne‘āpuia is commemorated in a place name to this day, as is the place called Miki (Puuomokii), as a source of water, at Kaunolu. Below is one of the traditions of this god and his place in the life of the families of Lāna‘i.

He Moolelo no Wahanaui me Kaneapua ma Lanai
O Wahanaui kekahi ali o Oahu i hol o Kahiki. O Wahanaui ke ali, o Kiloho ke kilo, o Moopuaiki ke kahuna a me na hookele moana. I ko lakou hol o ano a pae ma Haleolono ma Molokai. I ka wanaao hol o aku la lakou ma ka pali o Kaholo ma Lanai, i ke ao ana, kaalo ae la lakou ma ka lae o Kaunolu, a ma ka hikina heme iko a laaila, o ka Loe o Aupua, ka inoa oia wahi a hiki i kea la. E noho ana kekahi kanaka o Kaneapua ka inoa. Kaheha mai la ua kanaka nei penei, “Ke ko waa, no wai he waa?” “No Wahanaui.”

“O Wahanaui ke ali, o wai ke kahuna?” “O Moopuaiki.” “O Moopuaiki ke kahuna, o wai ke kilo?” “O Kiloho.” “He waa e hol o ano a Kahiki i ka Kahi, i Kahiki, i Kahi kapaakapaakua a Kane, he waa e holo ano e koekekehi i ka houpou o Kane.”

“O kou houpou la hoi o ko ke kanaka, ka houpou la hoi o ke akua keeheia iho, a pau ola, a ko make. Peheha la hoi owau kekahi maluna o ka waia?”

Olelo mai o Kiloho ke kilo. “Ua piha loa ka waa, aole o e hiki.” I ka holo ano ma kekahi ma-ka-lae mai, looa i ka ino, me ka makanai, a me ka puahiohihi, o ka hulu waa, hoolana aku la, a kono i ka lulu o Kaunolu, a pae i Kaumalapau.

A Tradition of Wahanaui and Kāne‘āpuia on Lāna‘i

Wahanaui was a chief of O‘ahu who went to Kahiki. Wahanaui was the chief. Kiloho was the astronomer, and Mo’opoauika was the navigator. They sailed and landed at Haleolono, Moloka‘i.

In the early morning, they sailed along the cliffs of Kaholo, on Lāna‘i, at daylight, they passed by the point of Kaunolu. Just a little to the south east of there, is the Point of ‘Āpuia. That is the name of this place to the present day. There was dwelling there a man by the name of Kāne‘āpuia. The man called out, thus, “The canoe, whose canoe is it?” “It is for Wahanaui.”

“So Wahanaui is the chief, who is the priest?” “It is Mo’opoauika.” “So Mo’opoauika is the priest, who is the astronomer?” “It is Kiloho.” “Where is the canoe sailing to?” “The canoe, is sailing to Kahikīkū and Kahikimoe, Kahiki of the rain drops of Kāne, to tread upon the bosom of Kāne.” “Your chest is that of a man, and to tread upon the bosom of Kāne, is the end of life, only death will remain. How about if I become one of them upon the canoe?”

Kiloho, the astronomer said, “The canoe is completely loaded, you cannot come.” As they sailed on by, passing a certain point, a storm arose, along with wind and water sprouts. Lest the canoe be overturned, they sheltered the canoe at Kaunolu, and then landed at Kaumalapa’u.

1 cf. “He Moolelo no Makalii” in Ka Hoku o Hawaii, January 31 through August 21, 1928.
Traditional and Historical Background

Ma ka moolelo o keia kanaka o Kaneapua, no Kahiki mai no oia, ua hele pu mai me kona mau kaikuaana a no ka wu ole, hooona ia o Kaneapua, e pi'i i ka wai i uka o Miki, aia no ia wai maua o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, ia aina momona o Kaneapua, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku aina o Kahalapiko aina, oia ka aina i Kahalapiko aina, o ia wahi mauka o Lanai, aka, he kuko ua mau kaikuaana nei o Kaneapua, i ka aina moku a

In the story of this man, Kāneʻāpua, it is said that he came here from Kahiki. He came with his elder brothers, and because there was no water, they sent him to the uplands at Miki, to get some water. It is there in the uplands of Lānaʻi. But because the older brothers coveted the rich lands of Kāneʻāpua, that is the land of Kahalapiko, they abandoned Kāneʻāpua on Lānaʻi. He mated with a woman of that place, and became an elder of some of the people there.

Wahanui folks continued trying [to sail], and frequently came close to dying, as storms came upon the canoe at Keaikaikahi, Kahoolawe, where one sails to Kahiki. It is said in the tradition of Wahanui’s sailing to Kahiki, that there was much trouble that came upon them in the sea. When Kāneʻāpua became the steersman, they reached the lands of Kahiki. He was foremost of the navigators, and knew all of the stars of the sky and heavens…

Nupepa Kuokoa, January 5, 1867, pg. 1
Translated by Maly.

2.1.2 Chiefly Lineages of Lānaʻi

It was after the events in which Kaululūʻau participated that we see references to chiefly lineages associated with Lānaʻi, and the island fell under the dominion of Maui rulers. The role and fate of Maui’s chiefs in warfare with the chiefs of other islands also spilled over to Lānaʻi in the centuries following Kaululūʻau, and lasted through the time of Kamehameha I. In fact, a review of Lānaʻi’s history since the time of western Contact reveals that the island and its people have been subjected to Maui’s political policies throughout modern times.

Between the time of Kaululūʻau and his immediate peers until the middle 1700s, there are only a few notable references to chiefly associations on Lānaʻi and several passing references—generally one or two liners—to some event in which a chief visited or was associated with Lānaʻi. Samuel M. Kamakau made an interesting reference to Lānaʻi in his discussion of the Hawaiian nation in 1869:

Ka Moolelo o Hawaii—Helu 108

He aupuni kahiko loa ke aupuni Hawaiʻi ma keia pae aina, aka, he aupuni liilii a mokuʻuhaana nae o ka noho ana, a ua le helelehu wale naʻi Mōi ma keia mau pae aina, aole i lilo ka pae aina o Hawaiʻi i ka Mōi hookahi, i kekahui ella Mōi o Maui, a he ali o koa ko Lānaʻi, a pele ko Molokai, ko Oahu, a me ko Kauai. A ma ko Kamehameha iaika i ka kaua a naʻi i kokua pu iaia ma ke kaua ana, ua huipua ma ke aupuni hookahi ke aupuni Hawaiʻi. Mai ia manawa mai a ia loa wale mai ia kakou i ka poe o keia wa ka kapaia o keia mau pae moku ke Aupuni Hawaiʻi.

Nupepa Kuokoa, March 18, 1869
Translated by Maly.

According to Fornander, a review of genealogies and traditions indicated that Lānaʻi’s, while “independent at times,” nonetheless shared a “political relation” with Maui a few generations after the cleansing of Lānaʻi by Kaufuʻula’au. This relationship was probably fortified during the reigns of Kiha-a-Piʻilani and his son Kamālālāwalu (Fornander 1996:94, 207). The research of Kamakau and Fornander makes several passing references to the fact that in ca. 1500 AD, Kiha-a-Piʻilani5 was for a time forced to hide on Lānaʻi, until the path was open for him to take his throne from a cruel elder brother, Lono-a-Piʻilani. Kiha-a-Piʻilani’s reign was one of progress and peace, though nothing more is mentioned of Lānaʻi’s (Kamakau 1961:22 and Fornander 1996:87, 206).

Following Kiha-a-Piʻilani’s death, Kamālālāwalu became the king of Maui, attempted to invade the island of Hawaiʻi, and was killed. His son Kauiʻi-a-Kama took the throne, and was subsequently succeeded by his son, Kaui. It is during the later years of Kamālālāwalu’s reign that we find reference to a chief of Lānaʻi. Fornander (1916) published an account compiled from native informants whose narratives reference a king named Kāuialii who was said to have unified the Hawaiian islands several generations before Kamehameha I. Kāuialii was imbued with godlike characteristics, and reportedly lived between ca. 1555 and 1730 AD. He was a sacred chief, feared by all, and famed for his strength. In ca. 1600 AD, Hālōalena was the king of Lānaʻi, though he ruled under the authority of Kamālālāwalu and Kauiʻi-a-kama. Fornander reported that:

Hālōalena, the chief of Lānaʻi was considered a very good ruler. His great favorite pastime was the collection of the skeletons of birds. When the chief’s bird tax was about due it was the usual custom of the agents to go out and proclaim the chief’s wishes. (Fornander 1916, IV:422)

Hālōalena had the skeletons of the birds cleaned, prepared, and posed for safe keeping in one of several large storehouses on Lānaʻi as his personal treasures. Kaui, a mischievous son of Kauiʻi-a-Kama, destroyed all the skeletons.

This was the cause of the hostilities between the king of Lānaʻi and the king of Maui, and the reason why the king of Lānaʻi wanted to be independent and not be any longer under the king of Maui. At this time the chiefs of Lānaʻi were under the control of Kamālālāwalu, king of Maui. (Fornander 1916, IV:424)

5 Kiha, son of Piʻilani, who lived in about the fifth generation after Kaufuʻula’au.
Kīāli‘i was drawn into the dispute, and settled it without bloodshed, though Hāloalena and Lāna‘i remained under the Maui kingdom (Fornander 1916, IV:426). It is not until the 1760s–1770s that we find references to Lāna‘i, its people, and chiefs, having been drawn into the path of war between the kings of Hawai‘i and Maui. This period of Lāna‘i’s history has a direct impact on the lands of the Ka‘a‘i region, and several prominent native and foreign historians described this time in Lāna‘i’s history. Samuel M. Kamakau’s series on Kamehameha I—which includes background information on the chiefs in historical events predating and during the youth of Kamehameha—names several chiefs from Lāna‘i:

Ka Moolelo o Kamehameha I—Helu 5
I ka makahiki 1769, oia ka lawe ana o Kālanîopou u ia Hana a me ke ka puali hikina o Maui. I ka ho‘o ana o Kālanîopou u i Hawai‘i, a mahope iho o ia manawa, hele mai la o Kamehameha Nui ka Moi o Maui, a kaua ia Puna ke ali‘ia Kaaaina Kālanîopou u i hoonoho ai no ka puali hikina o Maui. He kaau kaualana keia no na aoao elua. Ma ka aoao o Kamehameha Nui, ka Moi o Maui, ua hui pu mai na‘ili o Molokai, oia ho‘o o Kaohelo, Kaolohaka a Keawe, o Awili, o Kumukoa, o Kapooloku; o na ‘ili o Lanai, oia ho‘o o Namakeha, o Kalainanua, o Kelisaa a me na ‘ili o Maui.

Nupepa Kuokoa, December 1, 1866. Translated by Maly.

Kālanî‘opu‘u failed in an attempt to take control of Maui in ca. 1778, and took the battle directly to Lāna‘i. Fornander (1996) reported that Kālanîopou u ravaged the island of Lanai thoroughly, and the Lanai chiefs, unable to oppose him, retreated to a fortified place called “Hoooki,” inland from Maunalei. But being short of provisions, and their water supply having been cut off, the fort was taken by Kālanîopou u, and the chiefs were killed. This Lanai expedition is remembered by the name of Kamoikui. (Fornander 1996:156–157)

Forty-five years after Kalani‘opu‘u’s raid on Lāna‘i, his granddaughter, Keōpūolani, also the sacred wife of Kamehameha I and mother of his acknowledged heirs, died. She had been an early and influential convert to the Protestant mission, and her passing was documented in the Missionary Herald.

Keōpuolani was greatly beloved by her people . . . Her native disposition was incredibly amiable and conciliatory, and her treatment of her subjects was ever humane.

The History of Kamehameha—No. 5
In the year 1769, that is when Kalani‘opu‘u took Hāna and the eastern district of Maui. Kalani‘opu‘u then returned to Hawai‘i, after which time, Kamehamehanau went to make war on Puna, whom Kalani‘opu‘u had left in charge of the eastern district of Maui. This was a famous battle for both sides. On the side of Kamehamehanau, the King of Maui, there were joined the chiefs of Moloka‘i, being Kaohelo, Kaolohaka a Keawe, Awili, Kumukoa, and Kapooloku; and the chiefs for Lāna‘i, being Namakeha, Kalaimanuia, Kelisaa, and the other chiefs of Maui.

Nupepa Kuokoa, December 1, 1866. Translated by Maly.

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Keōpuolani was greatly beloved by her people . . . Her native disposition was remarkably amiable and conciliatory, and her treatment of her subjects was ever humane.

We are informed by her biographer, who is a missionary at the Sandwich Island, that she was born on the island of Mowee [Mau], in the year 1773; that her father’s family had governed the island of Owhyhee [Hawaii] for many generations; and that her mother’s family belonged to the islands of Mowee, Wouhoo [Oahu], Ranai [Lana] and Morokai [Molokai]. Her grandfather was the king of Owhyhee when it was visited by Capt. Cook, in 1777 [1778].

2.2 Historical Events: Transitions in Land Use and Population on Lāna‘i

In the 1770s, around the time of western Contact with Hawaiians, Kalani‘opu‘u, sovereign of Hawai‘i Island, attempted to take the Maui group of islands by force. Repelled from Maui, the invading force settled on Lāna‘i for a time and reportedly killed many of the native residents and laid the land to waste (Fornander 1996 and Kamakau 1961). Apparently, Lāna‘i’s native population never recovered from this event. In 1804, the first major epidemic brought to the islands on foreign ships swept through the group. It is estimated that by 1805, 150,000 Hawaiians from Ni‘ihau to Hāna died. On Lāna‘i the decline didn’t end. One estimate of the native population on Lāna‘i in ca. 1793 is 6,000 (Bowser 1880). By 1823, Mission Station Journals estimate the population on Lāna‘i to be between 2,600 and 3,000 people, and by the early 1890s the population was around 200. By 1902, the native population dropped to 80 residents, most of whom were descendants of Lāna‘i’s long-term native families. One can only guess how much traditional knowledge of place, practices, and traditions was lost as the population fell from 6,000 to 80 in a little more than a century.

With the exception of the periods from 1854 to 1864 and 1899 to 1901, there were no increases in the population on Lāna‘i. The two periods of increase were tied to western initiatives, the first being an experiment by members of the Mormon Church to establish a station on Lāna‘i between 1854 and 1864. This period led to an increase of more than 300 Hawaiians and a few foreigners, with the majority living in the ahu dedicated to the Mormon church and developing groundwater resources. In addition to the introduction of herbivores, the western demand for staple crops such as potatoes, along with the demand for ‘ili ali‘i

6 “Keopuolani, Queen of the Sandwich Islands Died on September 16th, 1823, while in residence at Lihaina,” Missionary Herald, July 1825:234–255.

7 Pacific Commercial Advertiser, Nov. 6, 1864.

8 Archaeological fieldwork conducted over the last decade supports this estimate, which is higher than that given by Kenneth Emory in 1924.
Traditional and Historical Background

(sandalwood) as a trade item, and the hunger for firewood to be used in processing whale blubber, led to the clearing of vast tracts of land. Just as the Hawaiians had no immunities or natural protection from introduced diseases, the native plants, animals, and ecosystems were also unprepared for the impacts of human clearing of the landscape and foraging animals that browsed and trampled everything that was visible, thus killing the land.

In light of the incredible population losses on Lāna‘i, we are fortunate that any traditional knowledge of place survived. A number of historical accounts—those recorded by native residents, visitors, and in various government documents—shed light on a wide range of aspects of the history of Lāna‘i’s people. The historical records below provide us with glimpses into the changes on Lāna‘i between ca. 1820 and the early 1900s.

Lāna‘i in 1823

William Ellis, an English missionary who worked with the early Protestant missionaries in the Hawaiian islands, described Lāna‘i, the nature of its resources, and the estimated population in the early 1820s:

RANAI, a compact island, seventeen miles in length and nine in breadth, lies north-west of Tahaurawe, and west of Lāhaina, in Maui, from which it is separated by a channel, not more than nine or ten miles across. Though the centre of the island is much more elevated than Tahaurawe, it is neither so high nor broken as any of the other islands: a great part of it is barren, and the island in general suffers much from the long droughts which frequently prevail; the ravines and glens, notwithstanding, are filled with thickets of small trees, and to these many of the inhabitants of Maui repair for the purpose of cutting posts and rafters for their small houses.

The island is volcanic; the soil shallow, and by no means fertile; the shores, however, abound with shell-fish, and some species of medusae [jellyfish] and cuttle-fish. The inhabitants are but few, probably not exceeding two thousand. Native teachers are endeavouring to instruct them in useful knowledge and religious truth, but no foreign missionary has yet laboured on this or the neighboring island of Morokai. The inhabitants of those islands have very little communication with any other place except Lāhaina. If therefore they are illuminated at all, they must derive their light from this station. Tawawa [Kahoolawe], too communicates with no other island except Maui, though there are few inhabitants there, and those mostly fishermen, who are not permanent residents.8

Missionary Visits to Lāna‘i in July 1828

The earliest eyewitness description of travel on Lāna‘i was penned in 1828, when William Richards, in the company of Kamehameha I’s sacred daughter, Princess Nahī‘ena‘ena, made a visit to the island. The journal notes were forwarded to the secretary of the American Board of Commissioners of Foreign Missions (A.B.C.F.M.), through a communication on December 25, 1834, and the excerpts from the journal cited below describe conditions on Lāna‘i at the time. It is notable that there is a discussion on the practice of people living near the shore, where there is easy access to fisheries and brackish water sources; the occurrence of an upland plantation moistened by the cloud and fog drip—the bench lands above the Pālāwai Basin; and the practice of the people to travel seasonally between the coastal region and the uplands to tend their plantations of dryland kalo and other crops.

As it is especially desirable that you have correct information respecting all our fields of labor, I prepare in this letter to give you some account of Lāna‘i, the little island which lies directly opposite Lāhaina & about seven miles, distant. You will perceive by the accompanying map, that its greatest length is about 1 ½ miles and its greatest breadth is about 12 miles. The land rises from the shore to the interior, and terminates in lofty points. The sides of the mountains are cut up by innumerable ravines or alternate ridges and hollows. But these valleys are not like

8 August 9, 1825, Letter of William Richards Describes Progress of Instruction—Four Schools Established on Lanai, Missionary Herald, June 1826:174-175.
10 Kepl and Onaona Maly researched the American Board of Commissioners of Foreign Missions (A.B.C.F.M.) collection at Harvard in 2004, and subsequently digitized it for return to Hawai‘i. This journal, along with thousands of other records of importance to Hawaiian history, have been lost to Hawai‘i’s for 177 years and are seen here in print for the first time.
11 The map referred to by Richards was not found in files with this letter and cannot now be identified.
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the valleys on the windward side of the other islands, furnished with openings & rivulets.

There is but one permanent brook on the island, and that is so small that it is all lost in a few small talo ponds, and their fare does not reach the shore except in the wet seasons of the year. There is not a well of good water on the island, except such as are prepared after the manner of the Hebrews. These wells, though few on Lanai, are common at many parts of the Sandwich Islands. They are either natural or artificial pits, sometimes only a few feet in diameter, and at other times many yards. They are so prepared as that when it rains the water for a distance may flow into them. There are steps to go down into them, but they are not often very deep. In places where they are exposed to direct light & from the wind, they are uniformly covered and even where they are not thus exposed they are often covered, to prevent the water from drying up as soon as it would otherwise. Some of these wells are never exhausted even though they are not replenished for eight or nine months. Others which are small, depend entirely on the almost nightly rains which fall on most of the high mountains of the Sandwich Islands, though in many places these rains are little more than heavy dews.

There are many people who make no use of water for washing either themselves or their clothes, except the dew or water on the grass and some times, there is so little of that this that they resort to the juice of the succulent plant which they collect. Most of these people however, have two places of residence, and only spend a part of the year on the mountain where there is also a great scarcity of water. In the sea shore, both at Lanai and throughout the islands, with few exceptions, there is a full supply of brackish water, but such as none can drink except those who are accustomed to it. I know not a single well on the Sandwich Islands, supplied with water from the bottom, except such as are on the sea shore on a level with the sea.

Owing to the scarcity of water on Lanai, the inland is barren almost beyond conception. I have recently been quite round the island, and visited every principal village on the island except one, and during my whole tour, I saw but one good well of water; and no spring or brook, and I saw nothing growing which was suitable for food, either for man or beast, and nothing grows except sea weeds and sea grass. I should except a few cocoanut trees and two or three 14 or four have trees.

Most of the people live near the shore for the purpose of taking fish in which the shores of Lanana abound, and a considerable portion of their vegetable food they receive from Lāhaina, in barter for fish. There is however one inland plantation of some extent, which furnishes considerable food. It is watered by the mist or light rain which falls during the night, in sufficient quantities for the growth of potatoes and in wet seasons some upland - taro is raised. There are few people that reside at that place constantly, but considerable number who reside generally on the shore, go up & spend a month or two at a time so as to keep their land under cultivation, and then return again to the sea side where they can have abundance of fish, and water too, such as it is for there is a plenty of that which is brackish.

The numbers of inhabitants on the island, has been estimated at about 1600; but at the present time I think there are not so many though there has been no regular census of the island taken & it is impossible to make such an estimate as can be relied upon.

The island is always under the same governance as the island of Maui, but the direct care of it has for years been given to Kapelaumoku, an elderly man, who is a member of our church, and a man of established reputation...

In a letter of mine written Oct. 15th, 1828 I alluded to a tour around the island of Lanai, made by myself in company with the Princess, and promised a full account of it. The following is from my journal kept at that time, but which was never sent.18

July 24, 1828 – Thursday.

A few missionaries located at the principal places on each of the islands exert an important influence not only over those inhabitants who receive their constant instruction, but also over all the inhabitants of the several islands. They do it, in part, through the chiefs in part, through native teachers, but principally, in consequence of the roving habits of the people which induce them often to visit the principal places by which means they are brought under the occasional sound of the gospel and for a season under the direct influence of missionary instruction.

The chiefs too are after calling the people to the places where they reside to do work for them. In the winter & spring of 1832, all the able bodied men of Maui, Molokai & Lanai were called to Lāhaina, and most of them spent several weeks there. It is probable that scarcely a year passes in which most of the people are not thus called to the residence of the chiefs.17

The following are extracts from the Lāhaina Report dated October 15, 1828. It mentions the people of Lanai assembling for prayer and instruction, as well as population and school enrollment statistics.

You are already aware that this place is the centre of missionary operations for Maui, Molokai, Lanai, and Kahoolawe. Lāhaina is the only place where there is regular preaching. It is, however, by no means the only place where people assemble for religious worship on the Sabbath. There are not less than twenty places on this island, and several on Molokai and Lanai, where people assemble for prayer and instruction. The native teachers take the direction of the meetings, occupying

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12 Here Richards is referring to kalo, or taro.
13 Page 1 - Reel 797:762.
14 Page 2 - Reel 797:763.
15 Page 3 - Reel 797:764.
16 At this point Richards inserts lengthy narratives from his personal journal of 1828, and his visit to Līna’s with Chiefess Nah‘u‘ema‘ena and the near loss of Kapelaumoku while traveling from Līhāina to Līna’s.
17 Win. Richards to Rev. Rufus Anderson, Secretary of the A.B.C.F.M., Recounting Trips to Lanai in 1828 and 1834 [page 17 - Reel 797:778].
the time in reading and teaching the various Scripture tracts and other books, and conclude with prayer. By this course the people are inspired with a reverence for the Sabbath; and though the teachers are themselves extremely ignorant, yet they are able, in this manner, to communicate some instruction, and the people are thereby kept from assembling for vicious purposes, and worse than idle conversation.

**Examination of the Schools**

During the summer and early part of the fall of 1828, subsequently to the arrival of the late reinforcements, owing to an increase of their numbers, the missionaries at Lāhaina were enabled to make tours over Maui and the small island adjacent, for the purpose of preaching the Gospel, examining the schools, and giving the people such counsel and encouragement as their circumstances required...

<table>
<thead>
<tr>
<th>Island</th>
<th>Sch’s.</th>
<th>Male</th>
<th>Fem.</th>
<th>Writers</th>
<th>Readers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranai</td>
<td>11</td>
<td>236</td>
<td>249</td>
<td>31</td>
<td>201</td>
<td>485</td>
</tr>
</tbody>
</table>

...A great proportion of the pupils are persons of middle age, and still they have learnt to read the Scriptures. According to the estimate we made, only one fifth of the scholars are under fourteen years of ages.

The people of every district which we visited were addressed particularly on this subject, both by ourselves and the princess [Nahienaena]. We have received the fullest evidence that our exertions have not been in vain. Since our return from the tour of the island, about 5,000 spelling books have been called for, principally to establish schools among children. This increases the whole number enrolled in the schools to about 18,000; viz. 15,500 to this island [Maui]; 1,000 to Molokai; and 700 to Ranai. It is not probable that, with the present population, so large a number as this can ever appear at an examination. But 18,000, we think less than the full number of those who are now enrolled in the schools under the direction of this station...

The population of Maui has been heretofore estimated at 20,000, that of Molokai at 3,000 or 4,000, and that of Ranai at 2,000 or 3,000, making the whole population on these three islands not more than 27,000. The present estimate represents the population as probably amounting to 37,000. Upon comparing with this the number of learners in the schools on these islands, as just given, it will be seen that almost half the whole population, of both sexes, and all ages, are in the schools; a larger portion of the people, probably, than are enjoying the advantages of instruction in any other country on the globe.\(^{18}\)

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18 *Missionary Herald, July 1829:208–211.*

2.3 Alanui Aupuni: Government Trails and Roadways

In the ancient land system, trails crossed the landscape, both mauka to makai and laterally along the shore, and at various elevations. As a result of western Contact, and the development of wagon and horse trails, a more formalized system of roadways was needed. By 1847, King Kamehameha III promulgated a law establishing the Alanui Aupuni kingdom/government road system. Major trails which provided access around islands and between primary places of habitation and business were integrated into the Alanui Aupuni system and maintained through funding from the government and public work days by tenants of the lands through which the roads and trails passed.

Beginning in the mid-1850s, native and foreign residents of Lāna`i began written documentation of government and community public service efforts in developing a road system that would facilitate not only foot traffic, but also cart/wagon traffic to major locations in the uplands and along the shore of the island. Several Alanui Aupuni routes were identified on Lāna`i. These included five major points of access, and one for which little information has been found: i) The road from Mānele landing to the uplands through Pālālāwai Basin; ii) the road from Pālālāwai Basin to Kō`ele; iii) the road from Kō`ele to Awalua, situated in Paoua`i Ahupua`a; iv) the road from Awalua to Keōmoku, crossing the coastal lands of Paoua`i Ahupua`a; v) the road from Keōmoku to Naha, up to Waiakeakua flats and down into Pālālāwai; and vi) the road that follows the Kalulu-Kamoku Boundary down to Kaumālāpua`u Harbor.

From these major routes, smaller trails provided native tenants with access to their personal properties and access collection areas. Kingdom Registered Map No. 1394 (Figure 12) is the master map of the Alanui Aupuni on Lāna`i, and is the basis of the routes that are protected under the Highways Act of 1892.

The earliest communication found to date was penned in 1854, which identifies native resident, Kaaina as the “Road Supervisor” for Lāna`i. Kaaina reported that public labor of 148 residents over the period of 36 days had been completed on the roads at “(1) Paouai; (2) Maunalei; (3) Kaa; (4) Kaunoilū; (5) Palawai; (6) Kaohū.”\(^{19}\)

As a part of Land Patent Grant 5011 dated to 1907, all government interest in the public lands on Lāna`i were confirmed to Walter Giffard on behalf of Charles Gay, grant conditions included the exclusion of all roads, trails, and right of way:

- Reserving therefrom all lands covered by Grants and Land Commission Awards,
- Reserving to Government ownership for public uses, all existing roads, trails and right of way.\(^{20}\)

With the advent of the Hawaiian Pineapple Company, Limited ownership of nearly 99 percent of Lāna`i’s, the corporation undertook research and filing of title for all lands on Lāna`i—those held by the company, and those held by private parties or the government. Land Court Application proceedings of the Hawaiian Pineapple Company, Limited reconfirmed the exclusion of all roads, trails, and right of way, stating: “Also excluding all existing roads, trails, and rights-of-way as shown on Government Survey Registered Map No. 1394.”\(^{21}\)

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19 *Missionary Herald, July 1829:208–211.*

20 Land Patent Grant 5011, February 1, 1907, p. 476.
21 Land Court Application No. 862, Map 1, June 5, 1929.
Historical communications provide background information on the evolution of the Alanui Landing, and connecting with other thoroughfares on Lānaʻi. The excerpted letter below regards the Lānaʻi road report. It is written by L. Kaaina, the Assistant Road Supervisor, to C. B. Analu on December 14, 1854.

Love to you.

I have heard your orders by the mouth of Pualewa, saying, that my road report which was sent is wrong, is it true that it is wrong?

This is my explanation now in order to make it clear. The number of labor days was 36, persons subject to road tax 148, 1 man paid in full $2.00. Government tools and implements with me, none. This is how those 36 working days were arrived at.

Here in Lanai, 6 roads were repaired,--at (1) Paomai; (2) Maunalei; (3) Kaa; (4) Kaunolu; (5) Palawai; (6) Kaohai.

On each road were 6 days work, multiply 6 roads, will equal 36 days work as above described, that is the number of work days.

The persons subject to road tax are 148, multiplied by 6 days for each person, will be 888 days. The 888 days, all the 36 days were worked.

Walter M. Gibson was, for a time, the acting Superintendent of Roads on Lānaʻi. During that time, he wrote the following, dated December 22, 1876, to I. Mott-Smith:

I was assured by your predecessor in office, His Ex. W. L. Moehonua, that a certain proportion of the road monies appropriated for Maui, Molokai, and Lanai, would be set apart for Lanai, and according to the recommendation of Mr. Meyers road superintendent for Molokai, and Lanai. I understood the amount for Lanai to be $600. This could not be drawn at the time, but I was assured, both by your predecessor, and the late Minister of Finance that I might commence certain needed improvements on a road leading from Awalua to Manele on Lanai, with full assurance that in return of Mr. Meyers from the coast in December as expected, the proportion of public money designated for Lanai roads would be paid to me. Will your Excellency, kindly inform me, what action I may expect of your Department in this matter.

An article from the Hawaiian Gazette entitled “Legislative Appropriation for Roads on Lanai,” and published on August 4, 1880, indicated that $2,000 was appropriated for Lānaʻi.

Another letter regarding the roads was written by Henry H. Gibson to H. A. P. Carter, Minister of the Interior, on September 12, 1881.

Dear Sir:

I beg to submit herewith a statement in relation to roads on Lanai.

A highway leading from the landing of Manele in the S.E. end of the island, and terminating at the landing of Awalua on the N.W. end of the island, a distance of about fifteen miles, is known as a government road (ala nui aupuni). For a distance of about a quarter of a mile leading from Manele, and for about the same distance leading from Awalua, the road is impassable for a vehicle on account of masses of volcanic rock or aa. It would require an amount of labor and blasting at these two ends of the road that would cost about $400 each, or a total of $800.

Another government road, “ala nui aupuni,” leads from the landing of Maunalei in the N. side of the island, into an upper valley, where a junction is formed with the Manele and Awalua road. Part of the Maunalei road is an ancient paved ala nui through the aa. This is much broken up and not passable for a vehicle. Labor and blasting material to the amount of about $300 would be required to put the road in good travelling order. In the

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22 Hawaiʻi State Archives, Interior Department Roads, Misc. Box 146.
23 Hawaiʻi State Archives, Interior Department, Roads.
24 Hawaiian Gazette, August 4, 1880, supplement, p. 5.
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A. Kaaloa wrote the following newspaper article in 1897, describing the progress of the road building.

There was started again work on our roads this year, on the 22nd day of March, on the road that runs to the boat landing of Awalua to Koele. It has been two weeks or more, and this week the work began on the road from Maunalei. S. K. Peleaumoku is the supervisor. In the past years, our landlord was the road supervisor, for many years past. Only recently has our friend in the Maa winds of Kahalepalaoa been given the task.

This is the first time that a native has been given this work to do, it has not been known to have happened in the Interior Department before, that someone’s name was taken at his place of residence. He has taken the work with skill and thoroughness. Blessings upon the one who does this work.

A. Kaaloa
In the Kumumaomao wind of Keomoku, Lanai.28

Cecil Brown, a representative of William M. Gibson, wrote to James A. King, Minister of the Interior, about funds for the Lānaʻi roads on April 18, 1899.

Sir: I note that there is to the credit of Lanai Road account a sum approximating $144, and also an appropriation by the last Legislative assembly of $500 more.

This last amount I believe was for a specific road, i.e. from Koele to Awalua, the then landing for Lanai. The conditions now however, are changed, for since the appropriation was made, the landing at Awalua has been wiped out, and the buildings and pens there and the road have been washed away by freshets, so that as a landing Awalua is no longer a port.

I would therefore ask Your Excellency to direct that the $500 appropriated for the road from Awalua to Koele (road from Awalua to Koele) be applied to the road from Koele to Manele.

Roads and Bridges:

I have seen Mr. Hassinger and he has a map that will more fully explain the requirements.

25 Hawaiʻi State Archives, Interior Department, Roads – Molokai & Lanai.
26 Hawaiʻi State Archives, Interior Department, Roads Box 46.
28 A. Kaaloa, “New Work is Progressing on the Roads of Lānaʻi Kauhualii,” Ka Makaainana, April 26, 1897, p. 3. Translated by Maly.
I will guarantee that the money will be properly and economically expended, and I will furnish Your Excellency detailed bills of expenditure properly endorsed and authorized.29

2.4 Land Tenure

The Māhele ʻĀina of 1848 set the foundation for fee-simple property rights in the Hawaiian Islands. As a part of major ethnographic work conducted by Kūhiō and Onaona Maly for the development of the Lānaʻi Culture & Heritage Center, a full history of land tenure on Lānaʻi in the period between 1848 and 1960 has been conducted and made available to the public.30

The narratives below summarize the Māhele ʻĀina on Lānaʻi, drawn from a review of all records compiled as a part of the Māhele ʻĀina of 1848, with subsequent actions of the Land Commission and government through issuance of Royal Patents on the Awards.

Māhele ʻĀina Statistics on Lānaʻi

A total of 110 claims which could be verified for Lānaʻi were recorded. These include both chiefly and commoner/native tenant claims.

- 105 claim records were located in the volumes of the Native Register.
- 88 claim records were located in the volumes of the Native Testimony.
- 2 claim records were located in the volumes of the Foreign Register.
- 21 claim records were located in the volumes of the Foreign Testimony.
- 64 of the claims were surveyed and recorded in the Māhele Award Survey Books.
- 51 claim records were recorded in the volumes of the Royal Patent Books.

The combined claims from Lānaʻi represent 331 separate documents (some overlapping in records of the Native and Foreign Books):

- 56 claims were awarded. Of those awarded, five claimants were chiefly awardees, who received entire ahupua’a.
- 51 awards made to native tenants and individuals of lower chiefly lineage, totaled a little over 600 acres of the approximately 89,000 acres of land on Lānaʻi.

Place Names Referenced in Claims by Applicants

A total of 86 place names for the island of Lānaʻi are in the records provided to the Land Commissioners. Place Names from Kamoku are Aumoku 1 & 2, Iwīʻole, Kaumalapau (Kaumālapaʻu), Kulelehu (Kalelehu), Makaliʻiliʻi, and Moʻoʻloa.

### Table 1

<table>
<thead>
<tr>
<th>Konohiki</th>
<th>Land</th>
<th>Fish</th>
<th>Wood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mataio Kekuanaoa</td>
<td>Ka’i</td>
<td>Uhu</td>
<td>Koko</td>
</tr>
<tr>
<td>Mataio Kekuanaoa</td>
<td>Kaohai</td>
<td>He’e</td>
<td>Nāio</td>
</tr>
<tr>
<td>Naahoelelau</td>
<td>Maunalei</td>
<td>He’e</td>
<td>Kukui</td>
</tr>
<tr>
<td>Kanaina</td>
<td>Paoma’i</td>
<td>He’e</td>
<td>‘Aiea</td>
</tr>
<tr>
<td>Haalelea</td>
<td>Pālīwai</td>
<td>Anae</td>
<td>‘Ahakea</td>
</tr>
<tr>
<td>Kaeo</td>
<td>Keālia (Kapu)</td>
<td>Uhu</td>
<td>—</td>
</tr>
<tr>
<td>Kaahou</td>
<td>Kama’o</td>
<td>He’e</td>
<td>Koko (ʻAkoko)</td>
</tr>
<tr>
<td>Iʻi</td>
<td>Kalulu</td>
<td>He’e</td>
<td>‘Ahakea</td>
</tr>
<tr>
<td>Pali</td>
<td>Kamoku</td>
<td>Uhu</td>
<td>Koko (ʻAkoko)</td>
</tr>
<tr>
<td>Pali</td>
<td>Keālia (Aupuni)</td>
<td>Uhu</td>
<td>Koko (ʻAkoko)</td>
</tr>
</tbody>
</table>

Your Highness, this is for you to decide in your office.*

*Hawaiʻi State Archives, Interior Department Lands

Buke Māhele (Land Division Book), 1848

In preparation for the final division of lands between the king, konohiki, and government, a Buke Māhele was kept as a log of the agreed upon division. This book is the basis of the Crown and Government land inventory now known as the Ceded Lands. There are 13 ahupua’a on Lānaʻi.

Disposition of 10 ahupua’a was recorded in the Buke Māhele (1848) and before the Land Commissioners. Three ahupua’a were apparently dropped through an oversight on the part of the king, Commissioners, and staff. Titles confirmed at the close of the Land Commission are presented in Table 2.

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29 Hawaiʻi State Archives ID Roads, Molokai & Lanai.
30 Lānaʻi Culture & Heritage Center, http://www.lanainchs.org/
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Table 2. Disposition of Ahupua’a of Lāna‘i (Buke Māhele 1848)

<table>
<thead>
<tr>
<th>Ahupua‘a</th>
<th>Claimant</th>
<th>Disposition</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ka‘ā</td>
<td>Victoria Kamamalu</td>
<td>Awarded</td>
<td>Page 4, Jan. 27, 1848</td>
</tr>
<tr>
<td>Kalaʻu</td>
<td>Daniela II</td>
<td>Crown</td>
<td>Testimony of M. Kekauonohi, Dec. 1847</td>
</tr>
<tr>
<td>Kamau‘o</td>
<td>Kahanuaimakai</td>
<td>Government</td>
<td>Page 47, Jan. 31, 1848</td>
</tr>
<tr>
<td>Kamoku</td>
<td>No record</td>
<td>Crown</td>
<td>Record of Boundary Commission 1877</td>
</tr>
<tr>
<td>Kaoihi</td>
<td>M. Kekauwawa (M. Kekuanaao)</td>
<td>Awarded</td>
<td>Page 14, Jan. 27, 1848</td>
</tr>
<tr>
<td>Kaunolu</td>
<td>Keliiahonui</td>
<td>Government</td>
<td>Page 130, Feb. 9, 1848; Page 209, Mar. 8, 1848</td>
</tr>
<tr>
<td>Ke‘elii</td>
<td>Aupuni</td>
<td>Kahanuaimakai</td>
<td>Page 47, Jan. 31, 1848; Page 209, Mar. 8, 1848</td>
</tr>
<tr>
<td>Ke‘elii</td>
<td>Kapu</td>
<td>Keliiahonui</td>
<td>Page 47, Jan. 31, 1848; Page 209, Mar. 8, 1848</td>
</tr>
<tr>
<td>Mahana</td>
<td>Wm. C. Lunalilo</td>
<td>Government</td>
<td>Page 22, Jan. 28, 1848</td>
</tr>
<tr>
<td>Maunalei</td>
<td>Pane (Fanny Young)</td>
<td>Awarded</td>
<td>Page 161, Feb. 12, 1848</td>
</tr>
<tr>
<td>Palalawai</td>
<td>M. Kekauonohi</td>
<td>Awarded</td>
<td>Page 26, Jan. 28, 1848</td>
</tr>
<tr>
<td>Paoma‘i</td>
<td>No record</td>
<td>Crown</td>
<td>Testimony of C. Kanaina, Dec. 1847</td>
</tr>
<tr>
<td>ʻIli of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaumalapa 1 &amp; 2</td>
<td>Ogleoa (wahine)</td>
<td>Government</td>
<td>Page 105, Feb. 7, 1848; Page 209, Mar. 8, 1848</td>
</tr>
</tbody>
</table>

The following is a translation of a Land Commission document from the Native Register. It is from the claimants on Lāna‘i and describes the land to which they stake claim.

Aloha to you Commissioners who Quiet Land Claims of the Hawaiian Kingdom. We hereby petition to enter our claims on the Island of Lanai.

Here are our claims — moo (planting parcel) lands; kula (open plains and planting) lands; the mountains; the wood, woods to be taken under the Konohiki; fishes, fishes to be taken under the Konohiki; the length is from the moana (open ocean) to the fishery of Kaholo; from one fishery to the other fishery. We are the people in the Ahupuaa of Palawai, Pawili, Kaunolu, Kala‘u, Maunalei and Mahana. Here are our names (Table 3). That is the end.31

31 Helu 10041 (Recorded with Helu 10024), Kanekeleia (and Lono et al.), Palawai, Native Register 6:510-511, Lanai, February 12, 1848, translated by Maly.

Table 3. Names of Lāna‘i claimants (Native Register 6, 1848)

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<tr>
<th>Helu (Number)</th>
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Boundary Commission Surveys and Testimonies

Following the Māhele ‘Aina, there was a growing movement to fence off lands and control access to resources which native tenants had traditionally been allowed to use. By the 1860s, foreign land owners and business interests petitioned the Crown to have the boundaries of their respective lands—which were the foundation of plantation and ranching interests—settled. In 1862, the king appointed a Commission of Boundaries, a.k.a. the Boundary Commission, whose task was to collect traditional knowledge of place, pertaining to land boundaries and customary practices, and determine the most equitable boundaries of each ahupua‘a that had been awarded to ali‘i, konohiki, and foreigners during the Māhele. The commission proceedings were conducted under the courts and as formal actions under the law. As the commissioners on the various islands undertook their work, the kingdom hired or contracted surveyors to begin the surveys, and in 1874, the Commissioners of Boundaries were authorized to certify the boundaries for lands brought before them.32

In the period of 1876-1877, William D. Alexander, Surveyor General; M. D. Monsarrat, Assistant Surveyor; J. F. Brown; and party surveyed the entire island of Lāna‘i, traveling with elder native tenants. Alexander’s field book,33 covering late March and early April 1876, contains his notes, compiled through interviews and fieldwork. The book provides readers of the present day with glimpses into the cultural and natural landscape of Lāna‘i, and identifies several elder informants on Lāna‘i. Of particular importance is documentation of traditional sites such as heiau,

32 Register Book No. 153; copied from the collection of the State Survey Division.
areas of residence, burial sites, shrines, former ‘ua‘u (dark-rumped petrel [Pterodroma phaeopygia sandwichensis], an endangered sea bird) nesting grounds, and trails. In the record are also found a number of place names and descriptions of features not mentioned in other documentary sources. Unfortunately, few of the narratives recorded in Register Book No. 153 made it into the formal proceedings and documents of certification authorized by the Boundary Commission. The court proceedings focused on metes and bounds, relying on the authenticity and accuracy of the documentation provided by the surveyors. Thus, the notes copied verbatim from Register Book No. 153 provide us with the background as to how the boundaries were determined, and identify significant cultural resources of Lāna‘i.

The following from Register Book No. 153 are notes on Lāna‘i’s boundaries at Halepalaoa. It is dated March 28, 1876. Note that Alexander uses macron accents-kakahō-on certain place and people names as indicated.

Kaumalapau & Kalama are both Ilis of Kamoku. Three lands run across from sea to sea, viz., Palawai, Kalulu, & Kaunolu…

April 1.
Appr. elevation of the water shed near the road from Maunalei to Kamoku = 1750 ft.
Appr. Elevation of the Koele station 1550 ft…

April 3rd. 76. Monday.
Keliihue widow of Nahuna, was born on Kalulu, & testifies that the boundary between Kalulu and Kamoku comes down from a hill known as Puunene down the North bank of the Kapano valley to the Govt. road, passing near Kawaonahele’s house, keeping straight on across a side ravine coming in from the north, called Keaakā, to the top of the north wall of the Palawai crater at a place called Pulehulu, near Keliihananui’s house.

Kamoku
Thence it skirts to the northwestern slope of the crater till it meets the old road to the sea, which it follows down to Kaumalapau Harbor. Papaula another old resident agrees with the above in the main, but declares that from Pulehuluoa the boundary runs to a rocky eminence called Pau Nanaihawai, where he says that Makalena set up his compass. From thence he says it runs to the site of an old heiau called Ka Ili o Lono, near which Papahā’s house formerly stood, near the present road. Kaaiai, an old kamaaina, insane however, points out a pile of rocks nearly on a line between these two points called Kuanaipu, to which he says he guided Makalena. From the Ili o Lono the line follows the old road to the neighborhood of Kaumalapau Harbor. The whole of the harbor belongs to Kamoku. Starting from the edge of the pali on the south side of the harbor, the line follows the ridge on the south side of Kaumalapau ravine till it meets the old road.34

Traditional and Historical Background

From the Ili o Lono the line follows the old road to the neighborhood of Kaumalapau Harbor. The whole of the harbor belongs to Kamoku. Starting from the edge of the pali on the south side of the harbor, the line follows the ridge on the south side of Kaumalapau ravine till it meets the old road.36

Below is a letter from M. D. Monsarrat, a surveyor, to W. D. Alexander dated 1877. There is some description of Monsarrat’s process, as well as the areas of Lāna‘i which he has already surveyed.

**Palawai, Lāna‘i**

Since writing my last letter I have found an old Kamaaina by the name of Pali who has been absent for some time. He gives his age at ninety nine and is pretty helpless as I had to lift him off and on his horse. I could not get him to come for less than two dollars a day but I think that he is worth it as he seems to be very honest. He puts Kamoku boundary the same as Kelihue and not wrongly as Papalua did.

I have surveyed Kaunolu boundary on this side of the mountain, also both sides of Palawai from the top of the mountain to the South wall of Palawai crater from there to the sea. I will leave until I return from the other side of the mountain, where I intend starting early Monday morning. Don’t you think that I had better survey the boundary between the government land of Kamao and Kaohai which is very short and will survey with Paawili on the upper side of the island to Palawai form a survey of Kaohai. I have started to carry a set of triangles around from Puu Manu to Halepalaoa and find that it can be done with little effort and few triangles. When I was in Lāhainal Mr. Gibson spoke of having me stop here and complete the survey of the island as he is very anxious for a map.

It is beginning to get very dry here and water scarce. Potatoes are also very scarce and expensive. Pai ai are a dollar apiece in Lāhaina now having jumped from seventy five cents since I came over…

As soon as I finish Kaunolu I will send you the notes of survey as the minister of interior is very anxious to get them. Mr. Gibson is going to start his men shearing at Palawai in a few day[s]. Hoping to hear from you soon. I remain yours.37

The following Boundary Commission document gives testimonies of the surveyor Monsarrat, as well as the kama‘aina Pali on the boundaries of lands on Lāna‘i. Pali states that he was the konohiki of Kamoku.

**Hooponopono Palena Aina a ke Komisina**

Ma ka la 14 o Julai, a.d. 1877, ua waiho mai o Prof. W.D. Alexander he palapala no i ke Komisina Palena Aina o Maui, no ka konohiki o Kamoku.

On the 14th day of June, A.D. 1877, Prof. W.D. Alexander, set before the Boundary Commissioner of Maui, an application to certify the boundaries of several lands which have all been surveyed on the Island of Lāna‘i. They being, “Palawai” of W.M. Gibson Esq. “Kahului” of Her Highness R. Keelikolani; “Kalalau” and “Kamoku,” Crown Lands; “Kamao,” “Kealia,” “Pawili,” & “Kaunolu,” Government Lands.

On the 17th day of September, A.D. 1877, the Commission convened to hear the above applications. M.D. Monsarrat (Assistant Government Surveyor) was present on behalf of the applicant. Also as the one who Surveyed all of the lands. Jno. O Dominis was authorized to bring the matter forward to the Commission by those adjoining the Crown Lands on Lāna‘i.

Sworn and stated: I surveyed all these lands; I went along all the boundaries of these lands with natives. They were all in agreement, My surveys are correct and true. Rev. N. Pali was my primary guide, he pointed things out, others have since passed away. Because Pali did not arrive this day, the Commission moved Await his arrival before reconvening.

On the 30th day of September, 1877, Pali arrived, and The Commission reconvened. Pali sworn and stated:

I am Pali. I am a native of Lāna‘i, my parents pointed them (the boundaries) out to me. And as a result of my having been Land overseer under Kauikeaulani, the boundaries are known to me. I was the konohiki of “Kalalau” and “Kamoku.” Kamao, Kealia, Pawili, and Kaunolu are Government lands. I know them well.


Translated by Maly.

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37 M. D. Monsarrat (Surveyor) to W. D. Alexander (Surveyor General), June 2, 1877, Hawai‘i State Archives, DAGS 6 Box 1 - Survey.
The following is a decision by the Commissioner of Land Boundaries recorded by the Boundary Commission. It certifies the land boundaries of Lāna’i as determined by the survey of Monsarrat. The translation is by Keōpūlily Malý.

**Olelo Hooholo**

Ke hooholo nei au. O na palena o na aina apau ma Lāna‘i anaia e M.D. Monsarrat, oia hoi o “Palawai” no W.M. Gibson, “Kaohai” no ka Mea Kiekie R. Keelikolani, “Kalulu” a me “Kamoku” he mau aina Leilialii ame “Kamao,” “Kealia,” “Pawili” & “Kamolu” he mau aina Aupuni, e like me na ana pakahi i hoikeia maloko nei, ua pono a ua poolei.

Kakauia ma Lāhaina i keia la 30 o Sept. 1877.

Koisina P. A. Apana Elua, ko H. P. A.

The following are the metes and bounds of Kamoku Ahupua‘a as surveyed by Monsarrat.

Commencing at a pile of stones over a cross cut in a large stone on South side of Kaumalapau Harbor on edge of gulch. The boundary runs:

1. N 86° 27' E true 3254 feet along Kalulu up South edge of gulch to a stone marked with a cross on edge of gulch a little above a branch that comes into the main gulch from the South. Thence:

2. N 88° 46' E true 5225.9 feet along Kalulu, up South edge of gulch to a cross cut in a stone on South edge of same. Thence:

3. N 84° 40' E true 2594 feet along Kalulu to head of gulch. Thence:

4. N 72° 43' E true 2080 feet along Kalulu to a cross cut in a stone amongst a lot of stones at the former site of an old Heiau called “Ili o Lono.” Thence:

5. N 46° 19' E true 10144.4 feet along Kalulu up road to a point a little North of a cactus chump marked by two triangular pins.

6. N 65° 44' E true 4939 feet along Kalulu along North edge of crater to a red wood post on the North wall of the crater at a place called Pulehuula near Kaikahanu’s house. Thence:

7. Thence along Kalulu down across a small ravine (coming in from the North called Keaaku) to Government Road and up the N.W. edge of the Kapano valley, passing near Kawonahele’s house to a point on ridge marked with four triangular pits and ditch thus;

8. N 45° 49' E true 1067.9 feet along Kalulu across valley passing to the S. E. of a water hole called Kaulohena to a red wood post on ridge that comes from the central mountain range. Thence:

9. N 62° 37' W true 6742.5 feet along Paomai down above mentioned ridge and across valley into a small ridge and down said ridge to a red wood post at end of same.

10. S 84° 37' W true 1316.8 feet along Paomai to a cross cut in a stone.

11. S 74° 8' W true 6258 feet along Paomai passing to the North of a couple of Hala clumps to two Triangular pits at an old house site.

12. S 74° 07' W true 3045 feet along Paomai to a cross cut on a stone at head of gulch.

13. N 86° 6' W true 1368 feet along Paomai down South side of gulch.

14. S 83° 45' W true 1455 feet along Paomai to a cross cut in a stone.

15. S 74° 9' W true 920 feet along Paomai.

16. N 55° 12' W true 898 feet Paomai across gulch to a red wood post a little West of a cactus clump; here ends the Crown land of Paomai. Thence:

17. S 65° 58' W true 1617 feet along Kaa down North side of gulch to a cross on a stone.

18. S 64° 57' W true 2040 feet along Kaa down North side of gulch to a cross on a stone. Thence:

19. S 70° 33' W true 3590 feet along Kaa to a point 10 feet East of a large rock with cross cut on it. Thence:

20. S 68° 53' W true 1664 feet along Kaa to Sea Shore. Thence:

21. S 1° 55' W true 13460 feet along sea shore to point of Commencement. Area 8291.09 Acres.

Surveyed by M.D. Monsarrat, Assistant Hawaiian Government Survey

Lāna‘i. June 1877.

An Interior Department letter from 1878 gives a list of the lands and length of coastline of Lāna‘i. It states that Kamoku, a crown land, has 1.54 mi. of coastline. The following is a series of correspondence regarding Walter M. Gibson’s desire to lease government lands on Lāna‘i. The first is a letter written by Gibson in which he first expresses his desire to lease Lāna‘i’s land.

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38 Boundary Commission Volume No. 1, Palawai Ahupua‘a, Island of Lāna‘i, p. 113.

39 An Interior Department letter from 1878 gives a list of the lands and length of coastline of Lāna‘i. It states that Kamoku, a crown land, has 1.54 mi. of coastline.

On March 23, 1866, Walter M. Gibson applied to the Minister of the Interior, F. W. Hutchinson, for a lease on the government lands on Lāna‘i, including lands in Kamoku. With his application, Gibson submitted a sketch map, included here as Figure 13.

In compliance with your request I have the honor to lay before the Department, a statement respecting Government lands on Lanai.

There are six ahupuaas of land belonging to Government on the island, named: Kamao, Paawili, Kealia, Kalulu, Kaunolu, and Kamoku; comprising about 24,000 acres, with a population of 80 persons. About one eighth of this surface is good arable “dry” land; perhaps one half is more or less adapted for grazing; and the remaining three eights, the portion bordering on the beach, an utter barren waste.

I made application to the Department in October 1862 to lease all of these lands. My application was favorably entertained by the Department, but owing to want of proper surveys, a lease was not made out at the time, as I was informed by letter, written by authority of His Majesty, then Minister. A copy of this letter, dated Feb. 20th, 1863 is enclosed.

Feeling myself fortified by a guarantee from the Department, I proceeded to make improvements; to enclose lands with stone wall, to make roads, construct dwelling for laborers, and cultivate on the Government lands, until my operations were interrupted by a lease of Kamoku, the most important of these lands, by the Department, to another party. I had expended much labor on Kamoku, which was thus rendered fruitless.

However, I would still propose to the Government to lease the five lands, Kamao, Paawili, Kealia, Kalulu, and Kamoku. They are now mere commons, upon which roam many thousand head of sheep and goats that do not yield one cent of revenue to the Government… Accompanying this, a rough draft map of Lanai.⁴¹

Six months later, on September 18, 1866, Gibson applied again to the Minister of the Interior.

I beg to be informed if the Government lands in this island have been rented or leased. A certain number of natives whom I opposed in their destruction of the little shrubbery of the island, in order to make charcoal, assert that the land is in their possession, and have attempted to subject me to a great deal of annoyance.

I cannot believe in the truth of their assertion that such a lease has been made, in view of the pledge given to me by your predecessor in office, his Majesty.

I am not at all anxious to lease all the Government lands on Lanai. The bulk of these lands, comprised in the districts named Kaunolu, Kalulu and Kamoku, can be better utilized by the native residents at present, and I should waive any pretensions I may have in respect to them; but the smaller lands of Kamao, Paawili, and Kealia, which comprise about one fourth of the Govt. lands, I desire to lease, as they adjoin my own lands.

Your Excellency will observe in the rough draft map I left at the Interior Office, that the lands of Pawili and Kealia are enclosed between my lands of Palawai and Kealia Kapu. Kamao is a barren corner, lying between my lands Palawai, and the leased land Kaohai. There are not more than half a dozen families residing on these

⁴¹ Hawai‘i State Archives, Interior Department Lands.
small lands, and little or no stock upon them, and they may be properly detached from the bulk of the Govt. lands on the Western half of the island, where the chief part of the population resides.

I trust that some equitable adjustment of these lands will shortly be made, and I beg to be notified respecting any contemplated disposal of them by lease or otherwise…

P.S. It is proper to mention that I have made improvements on Kamao, Pawili, and Kealia, and it would be an act of gross injustice were I to be dispossessed of the advantages to be derived from them, without being allowed a proper opportunity to enter into competition for leasing the lands upon which the improvements are situated, especially in view of the solemn pledge given me by the Interior Department.42

The following correspondences detail the matter of leasing government lands on Lāna‘i to Gibson. The first is from Chas. T. Gulick, Interior Department clerk, to P. Nahaolelua, the governor of Maui and regards the receipt of Gibson’s application. The attached sketch mentioned is included here as Figure 14.

There was received at this Office, an application from Walter Murray Gibson (Kipekona), desiring to lease some of the Government Lands on Lanai. Here are their names: Kamao, Pawili, Kealia Aupuni, Kaunolu and Kalulu. At the time that L. Kamehameha was the Minister of the Interior, he agreed to lease the lands to him, should he build the walls at appropriate places on the land. But when he became King, Gibson was deprived of the right. Gibson has sent the application to Stephen Spencer, secretary of the Minister of Interior, who confirms that the King agreed to it when he was in the office. Will you please look into this and tell me what you think about this request. There is attached, a sketch that shows the location of the lands. It is not an accurate sketch but gives a general rendering.


And that during the time that L. Kamehameha had the Interior, he had consented that he was to get the lease of said lands. That statement is true. Here I will explain the reasons why Gibson was refused said lands during the time that Kamehameha V was King.

Governor Nahaolelua replies to Gulick with the following, dated May 28, 1873, which essentially asks that the lease request by Gibson be denied so as not to deprive the natives of access to the lands. Nahaolelua plainly expresses that Gibson is an untrustworthy individual. Gibson had claimed no more than a half-dozen families resided on the lands; however, Nahaolelua says that “quite a number of natives” live on the lands, who would thus be dispossessed should Gibson acquire the lease.

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Figure 14. 1873 sketch map depicting disposition of lands of Lāna‘i (W. M. Gibson, Hawai‘i State Archives)

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Traditional and Historical Background

The King had heard after that what Gibson had done. This is the first: Gibson set fire to the grass on the land and the land was all burnt up by the fire, then Gibson said to the natives of Lanai, that there was no benefit from raising animals, that farming is what will enrich the land, and will make the body of the person strong, and would be the means of having a lot of children born. When the natives heard these words, they took their sheep to sell to Gibson, and in one month and a little over, Gibson had plenty of sheep, but the place which had been burnt, was not cultivated, the King heard of these doings of Gibson.

Here is another, Gibson told the members of the Mormon Religion on Kauai, Oahu, Molokai, Maui, and Hawaii to buy land on Lanai, that was Palawai. Gibson said it was to belong to the Religion and to be their land, but when the deed of said land of Palawai was made out, only Gibson’s name was written on the deed, and to his heirs. The Mormon Religion had nothing, Because of these smart doings of Gibson, and which fell upon the Hawaiian Nation, doubt was entered into the King’s mind of this distress having fallen on some of his subjects, that is the reason why Gibson was without any land.

Here is another smart doing of Gibson which was reported by the people of Lanai. Gibson bought the land of Kaa, and it be came his, a pen was built on said land of Kaa, then he took his sheep to Kaa from Palawai, the native sheep went too, and entered the pen at Kaa and remained there about two weeks. Then they were taken again from Kaa to Palawai, they mixed again with the natives’ sheep and again entered that pen. The natives saw that theirs were inside the pen, having their marks. They went after them to bring them back. Gibson said very nicely to them, wait a while, I am busy now, I am going to Lahaina. And when he got to Lahaina, and some days passed, then he went to Honolulu. And after some days were passed there, he came back. The owner of the sheep went to get his, and only the parent sheep which had the mark was released, and the ewes were kept on Lanai who saw Gibson doing this.

Therefore, I am only letting you know what I think, that the lease to this fellow is unsatisfactory. If this report, however, is acceptable to the one in authority over such matters, that is, the Minister of the Interior, “E.O. Hall.” And there are quite a number of natives living on these lands. But I do admire Gibson for being so smart.

Governor Nahahololenu writes again to Gulick on June 5, 1873.

Your letter of the 2nd day of June was received, and I note what is said. It is true that there are quite a number of persons living on some of these lands of Kalulu and Kaunolu, and there are some on Pawili, and I am not quite familiar with Kamao and Kealia, because their living together is rather mixed up.

As to inquire about their awards or occupancy under lease. Some of them have awards, but they are small ones. Therefore, they leased these lands from the Government but under the instructions of the Minister of the Interior to me, the same as now. And about my animals, I too have paid towards said lease:

During that lease, the natives paid properly for four years, and during the fifth year, there was a balance of $265. which remained unpaid. The amount of money that was paid was $1735.00 that is the receipts and the balance.

If Kalulu and Kaunolu are given to Gibson, those are the places where there are a number of natives, there are not very many natives on Lanai. That is all I wish to tell you.
Hawai'i State Archives, Interior Department Lands

Translated by Maly.

Governor Nahaolelua writes the following to the Minister of the Interior, E. O. Hall, on June 13, 1873.

I received your letter, and noted what is said therein. I have better give you a list of all the lands on Lanai: Pawili, Kamao, four Kealia, Kaunolu, Kalulu, Kamoku & Paomai. These are all the Government lands, and Gibson has acquired six lands, and three lands remain.

Hawai'i State Archives, Interior Department Lands

Translated by Maly.

E. O. Hall responds to Governor Nahaolelua on June 16, 1873 with the following letter, which proposes a rental rate to be paid by Gibson for government lands on Lāna'i.

Your letter of the 13th of June, has been received. This is the opinion of the King and the Ministers, regarding lands of Lāna'i. The lands of Kaunolu and Kalulu, the residents shall occupy those lands, and that you collect the rent of same, as had been the custom.

Enclosed please find copy of an application on behalf of W.M. Gibson Estate for surrender and for releasing of certain Public Lands held by Gibson Estate on the Island of Lāna'i. The total area concerned in this application is about 29,341 acres.

In the context of the land description it appears that Pawili 2 is the section of Pāwili that runs into the basin, between Pālāwai and Ke'di'a Aupuni.
satisfaction of applicants who desire the matter to be brought before the Executive, I would respectfully refer the same to their opinion at a convenient early date.\(^43\)

The document below conveys lands (fee-simple and leasehold), livestock, and personal property on the island of Lāna‘i from the Gibson Estate to Charles Gay, as ordered by court decision.

This Indenture made this 28th day of August A.D. 1902, between Albert Barnes, Commissioner, of Honolulu, Island of Oahu, Territory of Hawaii of the first part, and Charles Gay of Makaweli, Island of Kauai, in said Territory, of the second part.

Whereas, in proceedings duly taken in the Circuit Court of the First Judicial Circuit of said Territory at Chambers in Equity, by and between Gustave Kunst, designs of S.M. Damon, J.H. Fisher, and H.E. Waity, copartners under the firm name of Bishop & Company, Plaintiffs and H.N. Pain and Elise S. U. Neumann, sole devisee and Executive under the last will and testament of Paul Neumann, deceased, and Henry Holmes, Trustee of Elsie S.V. Neumann, and S.M. Damon, S.E. Damon and H.E. Waity, copartners doing business under the firm name and style of Bishop & Company defendants to enforce the Decree of Foreclosure and Sale theretofore made and filed in the suit of S.M. Damon et al vs. Cecil Brown, Administrator with the Will annexed of Walter Murray Gibson, deceased, under said Will et al., it was ordered adjudged and decreed by an order made on the 24th day of June A.D. 1902 by the Honorable George D. Gear, Second Judge of the said Circuit Court that the said Decree of Foreclosure and Sale be enforced by a sale of all and singular the real and personal property and assets of the estate of the said Walter Murray Gibson, deceased, hereinafter set forth, and that the same be sold at public auction in said Honolulu at the front door of the Court House (Aliiolani Hale), by and under the direction of the said Albert Barnes, who was by said Decree appointed a Commissioner to sell the said property and was duly authorized to give public notice of, make arrangements for and conduct the sale as set forth in said order.

And whereas, the said Commissioner, pursuant to the said order and direction, after giving public notice of the time and place of sale as in said order required did, on the sixteenth day of August A.D. 1902, at the front door of the Court House (Aliiolani Hale) in said Honolulu expose to sale at public auction all and singular the said premises and property with the appurtenances at which sale the said premises and property hereinafter described were sold to the said Charles Gay for the sum of One Hundred and Eight Thousand Dollars ($108,000.00) that being the highest sum bid for the same, and Whereas the proceedings of said Commissioner in the premises were duly reported to the said court, and the sale approved and confirmed on the 25th day of August A.D. 1902, as by the records of said court more fully appears, and the said Commissioner was thereupon by an order of said court then made, directed to execute to said Charles Gay a conveyance of said premises and property, pursuant to the sale so made as aforesaid…

\(^43\) FO & Ex. 1899 Pub Lands Comm.

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And the said Albert Barnes, Commissioner, as aforesaid, doth hereby covenant with the said Charles Gay and his heirs and assigns that notice of the time and place of said sale was given according to the order of said Court, and that the said premises and property were sold accordingly at public auction as above set forth.

**Schedule “A”**

**Fee Simple.**

First. All that tract or parcel of land situate on the Island of Lanai, containing Five Thousand Eight Hundred and Ninety-Seven and 1/10 (5897, 1-10) acres, and known as the Ahupuaa of Palawai, and comprised in Royal Patent No. 1093…

Fourteenth. All that land described in Royal Patent 4767, L.C.A. 10041 conveyed by John S. Gibson to W.M. Gibson by deed dated July 17, 1876 of record in liber 47 fol. 49…

**Leases**

First. All leases of land on the Island of Lanai held by said Walter Murray Gibson on August 31st, 1887, so far as he had the right to assign the same without incurring any forfeiture…

**Personal Property**

First. All those flocks of sheep on the 20th day of June A.D. 1902 or thereabouts of mixed ages and sexes, on said day depasturing, running or being upon the said Island of Lanai and also all that herd of cattle and all horses on said 20th day of June, 1902, also depasturing and running upon the said Island of Lanai on said day, all formerly belonging to the Estate of Walter M. Gibson, deceased, together with all the natural increase of the said flocks and herds, and also all the wool, then upon the said sheep and which has since that time been produced and shorn from said sheep, and their said increase save and except such sheep, cattle and wool as have been sold with the consent of the said plaintiff.

Second. All wool presses, wagons, carts, harnesses, tools implements, chattels and effects belonging to said Walter Murray Gibson on said August 31st, 1887, situated on the Island of Lanai, at said time and now in and upon said lands or any of them.

The flocks of sheep and their increase are now estimated at about 18,000 head. The herd of cattle with their increase are now estimated at about 240 head. The herd of horses with their increase are now estimated at about 210 head.

In witness whereof the said Albert Barnes has hereunto set his hand and seal the day and year first above written.\(^46\)

\(^44\) Bureau of Conveyances, Liber 242, p. 91–95.

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\(^45\) Hōkūloa 201-H Housing AMP 57
2.5 Ranching Operations on Lāna‘i, 1854–1951

Goats, sheep, cattle, the European boar, and horses were introduced to the islands between 1778 and 1810. During those early years, Kamehameha I and his chiefs placed kapu over the newly introduced animals to ensure that their populations would grow. In the fifty-year period from 1780 to the 1830s, populations of these non-native animals—like the hipa (sheep) and pua‘a bipi or pipi (wild steer or cattle), and kao (goats)—grew to become a great nuisance to the Hawaiian population, and had devastating effects on the Hawaiian environment.

Records indicate that the first of these introduced ungulates were brought to Lāna‘i around the 1830s, where a few native tenants, living under landed chiefs, managed the populations. In 1848, a new system of land management was instituted in the Hawaiian Kingdom, and individuals of means were granted large tracts of land. When fee-simple title to land was granted to native Hawaiians and foreign residents who had sworn oaths of allegiance to the king, formal efforts at controlling the hipa, pipi, kao, and other grazers were initiated.

Initially, Mormon elders brought livestock to Lāna‘i as a part of their effort to establish a mission in the uplands at Pālāwai. In 1862, Walter Murray Gibson took over the Mormon settlement, and focused the livestock efforts on herds of sheep and goats, of which nearly 100,000 roamed the island, almost uncontrolled by the 1890s. As a result, Lāna‘i suffered from rapid deforestation and a drying up of the island’s water resources. This impacted every other aspect of life on Lāna‘i and was one of the contributing factors to the continual decline in the native population of the island.

2.5.1 Lanai Ranch at Kō‘ele

During the early history of ranching on Lāna‘i, ranch headquarters were established in the Pālāwai Basin but in the mid-1870s they were moved to Kō‘ele where they remained until the ranch was closed down in 1951 (Hammatt et al. 1988:23-36). The ranch manager’s house at Kō‘ele was built around 1880 for W.M. Gibson’s daughter Talula and her husband, Fred Hayelden, who managed the ranch until the end of the century when financial difficulties forced sale of the ranch. It was eventually bought up in fee by Charles Gay in 1902-1903. Shortly after moving into the ranch manager’s house at Kō‘ele in 1904, Gay established a laborer’s camp behind the manager’s house, moving plantation houses from a defunct sugar company camp at Keomoku. The reservoir that today serves as a water feature on the Lodge grounds was also constructed at that time. In 1908, it was estimated that half of Lāna‘i Island’s population of 150 lived at Kō‘ele.

From 1910 to 1951, Lāna‘i ranch operations focused on cattle and a steady decline in the population of other livestock. The steady transition to cattle grazing led to the eradication of tens of thousands of goats, sheep, and pigs—many driven over the cliffs of Ka‘apulu in Ka‘ū—in an effort to reduce impacts on the steadily decreasing pastureland. In 1914, the Maui News reported on a visit by rancher-investor J. T. McCrosson to Lāna‘i under the heading “Big Improvements on Lanai.” McCrosson makes specific reference to the leeward pastures on the island, extending from the 150 ft. to 1,000 ft. elevation.

I spent a week on Lanai inspecting the ranch. The lee side of the island is greener that it has been for years. The finest Pili grass pastures in the Territory extend in a broad belt the whole length of the island, from 150 feet above sea level to about 1000 feet elevation. The belt varies from a quarter to two miles wide. Up in the shallow crater that occupies the center of Lanai a good many hundred acres have been plowed and planted in Rhodes grass and Paspalum. It formerly took twenty acres of the wild pasture land to support a bullock. The Paspalum pastures now fatten fifty head of stock on every hundred acres.45

In 1929, L. A. Henke published A Survey of Livestock in Hawaii (1929), which included the following description of the Lāna‘i Ranch operations. Henke notes that a water line system and extensive fences were made on the island. Describing the basic ranching operations on Lāna‘i, Henke reported:

The Island of Lanai, while primarily given over to the growing of pineapples since 1924, still has an area of 55,000 acres of fairly well grassed but rocky and rather and country extending in a belt around the 55 miles of coast line of Lanai, that are utilized as ranch lands and carry about 2,000 Herefards and 180 horses. This belt is from two to four miles wide and extends from the sea to about 1,000 feet in elevation.

The total area of the Island is about 140 square miles and it ranges in height from sea level to about 3,376 feet elevation, with an average annual rainfall on a great part of the uplands of about 34 inches.

In 1922 before the upper lands were given over to the more profitable pineapples an area of some 2,000 acres had been planted to Pigeon peas (Cajanus indicus) and Paspalum dilatatum. On the lower, rather rocky, present ranch lands the algaroba tree (Prosopis juliflora) is valuable because of its bean crop, and Koa haole (Leucaena glauca) and Australian salt bush (Atriplex semibaccata) are considered desirable forage crops. It is planned to further improve the lower pastures by additional planting of the above crops and by light stocking and resting present pastures.

In the future the ranch will not do much more than raise beef and saddle horses for the pineapple plantation needs. The ranch, though a part of the Hawaiian Pineapple Company’s property, still operates as the Lanai Company, Ltd.

The Hawaiians formerly herded goats, probably for their skins on the uplands of Lanai, and some agricultural work was done by Walter Murray Gibson, who arrived in 1861, in connection with the Mormon Church. Gibson acquired considerable land and when he died in 1888 his daughter, Talula Lucy Hayselden, became the owner. Gibson and the Hayseldens developed a sheep ranch on the island, much of which was then owned by the Government and by W.G. Irwin.

Irwin later acquired the Government lands and the Hayseldens about 1902 sold out to Charles Gay and nearly the whole island of 89,600 acres was combined under the ownership of Charles Gay, which passed to Irwin in 1910 and from him to John D. McCrosson and associates in the same year, when the Lanai Company, Ltd., was formed. Their interests were sold in 1917 to H.A. and F.F. Baldwin, who in turn sold the property to the Hawaiian Pineapple Co., Ltd., in December 1922, who are the present owners.

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45 Maui News, October 24, 1914, p. 5, c. 1.
Mr. Gay continued with the sheep ranch started by Gibson and Hayselden, probably carrying as high as 50,000 at times, but when the Lanai Company, Ltd., was started in 1910 they changed to cattle and put in extensive provisions for water and fences, and a count in April 1911, gave 20,588 sheep and 799 head of cattle. At the end of 1920 there were only 860 sheep and early in 1923 a count showed that the number of cattle had increased to 5,536 and besides 4,462 had been sold during the previous five years. Reduction of the herd to make room for pineapples was started on a large scale in 1924, and from the end of 1922 to October 1928, 6,764 head of cattle were sold.

Mr. Moorhead was manager for the Hayseldens, Mr. Gay managed his own property for a time, Lt. Barnard was manager for the Lanai Company in 1910, and G.C. Munro, the present manager, took charge in 1911. (Henke 1929:51–52)

A 1938 map of the ranch headquarters drawn up by the Hawaiian Pineapple Company shows the layout of the settlement at Kōʻeʻele (Figure 15). It includes the manager’s house and associated outbuildings, the ranch office, several garages, a stable with associated outbuildings, and a second house with a greenhouse and laundry. The laborer’s camp consisted of a dozen houses, a club house, a bath house and laundry, and a toilet.

Ranching was a part of Lānaʻi’s history for close to 100 years, in the period from ca. 1854 until closure of the ranch in 1951. The ranch ended operations when the Hawaiian Pineapple Company decided to focus all its efforts on the pineapple plantation. The ranch manager’s house was torn down a few years after the ranch closed and most other buildings were either demolished or moved from their original locations. When plans for building the Lodge at Kōʻeʻele were implemented in the late 1980’s, only two houses from the ranch headquarters remained, and were subsequently moved. The church, which stands today at a new location close to the road, was originally located north of the reservoir between the ranch manager’s house and the laborer’s camp. The former Lanai Ranch Headquarters is now referred to as the Kōʻeʻele District and is designated as SHIP #50-40-98-1004, approximately 0.9 miles to the north of the current project area. Structures of the Kōʻeʻele District are discussed further in Section 3 of this report.

### 2.5.2 Kōʻeʻele Ranch Cemetery

One area of particular cultural-historical sensitivity is a small cemetery for Kōʻeʻele Ranch workers and their families that was established in Paamahaiʻa around 1875 during W. M. Gibson’s tenure at Kōʻeʻele. An earlier western-style cemetery at Kihamāniāni, dating back at least to the 1830s, had previously served the purpose. Initially, burials in the Kōʻeʻele Ranch Cemetery were either unmarked or were marked with perishable materials, but since 1935 many of the burials have been marked with headstones and stone or concrete monuments. The permanently marked burials were inventoried by HAPCo through at least 1980 (Figure 16), resulting in a record of more than 30 burials at the cemetery. The exact number of burials in the cemetery is not known. Unmarked burials before 1935 were not inventoried by HAPCo and the cemetery has remained active since it was last inventoried. Similarly, the boundaries of the cemetery have not been established (Hammatt and Borthwick 1989:33-34) and it may be the case that the cemetery straddles the boundary between Paomaʻi and Kamoku.

Figure 15. A 1938 Hawaiian Pineapple Company Limited map of the Layout of Lanai Ranch (Lānaʻi Culture & Heritage Center Collection 1938)
2.6 Lānaʻi: From Ranch to Pineapple Plantation

By the time of the Māheʻeleʻaina in the late 1840s, it was recognized that goats and sheep were impacting the lands and practices of native tenants, and that there was some money to be made from the animals. Several native tenants of Lānaʻi cited goats in the kuleana claims. In the 1850s, Mormon elders who settled in Pālāwai Basin began importing additional livestock, and informal, free-range ranching was underway. In the early 1870s King Kamehameha IV and Walter Murray Gibson formalized the ranching venture focusing on sheep and goats,46 with smaller herds of cattle, horses, pigs, and fowl. The king’s operation focused on sheep, and Awaalua landing on the coast of Paʻomaʻi served as the port for imports and exports.

By 1875, Gibson’s ranching operation centered around Kōʻele, with the “home pastures taking in upper Kamoku and Paomaʻi” (Ibid). Gibson’s heirs continued the ranching operation, and also ventured into several other fields of agriculture, including the raising of vegetables in the Kōʻele uplands for Honolulu markets and development of a sugar plantation in the Maunalei-Kahalapalaoa region of windward Līnaʻi.

The following item from a newspaper indicates that the ranching business was bustling.

Business on Lanai. By arrival from the wool-growing island of our friend W. M. Gibson, we learn that one day during last week, three vessels were lying at anchor in the harbor of Awaalua, busily engaged, the Kamaile in loading wool, the Warrick in discharging freight for the ranch, and the Kapiolani in loading sheep.47

In 1902, Charles Gay secured his first interest in the Lānaʻi lands assets. He also began to develop more cattle on the ranch lands. Subsequent to Gay’s tenure, ranching operations steadily moved away from sheep to cattle. This was particularly important following an outbreak in 1913 of cerebrospinal meningitis among the sheep herds. The ranch improved the cattle herd, and operations focused on cattle and pigs. When the ranch was finally closed by Hawaiian Pineapple Company, Limited in 1951, grazing had been restricted to the slopes beyond the ca. 20,000 acres dedicated to pineapple cultivation in a series of paddocks that encircled the island. Figure 17 is a portion of the 1947 Lanai Ranch Paddock Map. The map shows that the current project area was not a designated ranch paddock during this time period.

The ranch operated on some 55,000 acres of land which extended from the shore to around the 1,000 foot elevation along the leeward side, with Kōʻele serving as the ranch hub.

Mr. Gay continued with the sheep ranch started by Gibson and Hayselden, probably carrying as high as 50,000 at times, but when the Lanai Company, Ltd., was started in 1910 they changed to cattle and put in extensive provisions for water and fences, and a count in April 1911, gave 20,588 sheep and 799 head of cattle. At the end of 1920 there were only 860 sheep and early in 1923 a count showed that the number of cattle had increased to 5,336 and besides 4,462 had been sold during the previous five years. Reduction of the herd to make room for pineapples was started on a large scale in 1924, and from the end of 1922 to October 1928, 6,764 head of cattle were sold (Henke 1929:52).

Charles Gay picked up the ranching program on Lānaʻi from the heirs of Walter Murray Gibson. Between 1903 and 1907, Gay secured fee-simple title to 99% of the land on Lānaʻi, but his ranch was in debt beyond its ability to generate income. Verging on bankruptcy, Gay conveyed all of his Lānaʻi assets to his creditor W. G. Irwin and Company on September 7, 1909.48 Gay remained on Lānaʻi with residences at Kōʻele and Keōmoku, while Irwin explored opportunities for new business ventures on the island.

46 Hawaiʻi State Archives, M-88, Records of Lot Kamehameha.
47 “Notes of the Week,” Pacific Commercial Advertiser, May 15, 1875, p. 3.
48 Bureau of Conveyances, Liber 316, p. 474-479.
On April 28, 1910, Cecil Brown and Robert Shingle, partners with J. T. McCrosson, purchased Irwin’s Lāna’i’s interests, and formed the Lanai Company, Limited and Lanai Ranch. Through this transaction, all of Lāna’i, except for small native holdings, were conveyed to the new partnership.

In 1910, Ralph Hosmer, Superintendent of Forestry in the Territory of Hawai’i, conducted an investigation of Lāna’i, and provided the following assessment.

The following report is drawn up by the Division of Forestry of the Territorial Board of Agriculture and Forestry at the request of the Lanai Company, under the offer of assistance to tree planters contained in Circular No. 1 of the Division of Forestry. Its purpose is to outline a comprehensive program of forest protection and forest planting for the Island of Lāna‘i. From its nature such work must be done gradually. It is not the expectation that all the recommendations in this report will be carried out at once; rather that the several parts of the plan can be put into effect as the property is developed and as opportunity offers.

The West End of the Island

As the result of continued overstocking in former years, a large section at the western end of Lāna‘i has now reached a condition that makes it not only of little value in itself but a menace as well to the better land in that vicinity. The problem is how best to check the present waste and restore this section to a permanently productive condition. It is a situation that demands the most energetic measures, but from work that has already been done there is every reason to believe that the reclamation of this section can be successfully accomplished.

From the head of the Maunalei gulch there extends toward the west end of the island a flat topped ridge having an average elevation of about 2000 feet. On the windward side the slope is fairly regular down to the north shore of the island. On the south there is a sharp descent into the extension of the Great Basin that lies to the west of Koele. The area in question is a belt of varying width, principally from the west branch of the Maunalei Gulch to a point somewhat to the north of the hill on the land of Kaa known as Kanepuu. Blowing down the channel between West Maui and Molokai, the full force of the trade wind is concentrated on this portion of Lāna‘i. The soil cover once broken, erosion by wind and rain goes on a pace. The upper layers of soil being lost the surface is worn down to hardpan or to the only slightly less compact subsoil. In places where the soil is somewhat more sandy, dunes are forming the unless speedily checked will spread and render valueless still further areas. With the example of Kahoolawe as a warning the Lanai Company cannot afford not to undertake prompt and strenuous measures of reclamation. The extent and character of the damage over the exposed areas is by no means uniform. The area may in fact be divided into four main sections: (1) The land between the main road and a line roughly parallel thereto, from the crest of the ridge down across the basin in the Paomai Gulch, where it is proposed to construct the dam and storm water reservoir; (2) the section of “bad lands”, including the dunes, immediately to the west of this line; (3) the slope on the southern side of the crest of the ridge, above the Basin; and (4) the section along the crest and extending...
toward Kanepeu, already reclaimed through the planting of Manienie grass. On the windward slope of the ridge are several groves of native trees, the remnants of the old time forest. These groves consist mostly of the Wild Olive Ulupua (Osmanthus) sandwicensis. Other trees are Lama (Diospyros Maba sandwicensis) and in scattering groups, Halapepe (Dracaena Pleomele spp.).

The object in the reclamation of this area should be to restore it to a condition of permanent productiveness. It is primarily a questions of finding suitable grasses and other soil binding plants that can in time be themselves used for grazing, or that when they have checked erosion can be made to give place to other plants of greater forage value. Comparatively little of this area is suitable for any agricultural crop. Part of it should be kept permanently in forest, both because trees are the most valuable crop that such land can produce and also because groves in the more exposed parts would afford protection to the better land. It goes without saying the that the groves now on the land form a starting point.

The solution of this problem rests in the establishment of certain grasses and other soil binding plants, rather than in tree planting pure and simple. That much work is feasible and will yield results is amply proved by the Manienie grass planting done by Mr. Morehead.

As early as 1910, the Lanai Company was also exploring the possibility of pineapple cultivation on the island, as reported in the Hawaiian Gazette:

Several thousand pineapple tops have been sent to Lanai by the Lanai Company to develop its pineapple enterprise. The pineapple experiment on Lanai has been successful. The first ones raised weighed about eight and a half pounds each, but later ones were not so heavy, on account of the rows being too close. The industry will be developed on the island and made one of the principal of crops.

By November 28, 1910, it was reported that nearly 7,000 pineapple plants had been planted on Lānaʻi.

In 1911, George C. Munro was hired as the new ranch manager, and operations quickly shifted to cattle operations and work in stabilizing the landscape through planting of eucalyptus, black wattle, ironwood, and various grasses; his work also extended up the mountain lands, and led to the planting of thousands of Cook Island Pine seedlings as a means of drawing moisture out of the clouds and recharging the diminishing aquifer.

The efforts at developing diversified agriculture on Lānaʻi in this period failed, and in 1917 Lānaʻi was once again on the market. In January 1917 it was reported that both the Hawaiian Pineapple Company and Libby, McNeill & Libby were exploring the possibility of purchasing Lānaʻi for pineapple cultivation. The sale did not progress, and on March 3, 1917, Frank and Henry Baldwin purchased the entire island, along with all the Lanai Ranch lands, livestock, and personal property for $588,000.

In 1922, Ulupalakua Ranch, which also operated ranching on the island of Kahoʻolawe, came on the market. The Baldwin brothers wanted to add the ranch to their already substantial Maui holding, so they offered the island of Lānaʻi with all the ranching assets for sale. This time James Dole’s Hawaiian Pineapple Company (HAPCo) stepped up and on December 5, 1922, the Hawaiian Pineapple Company, Limited purchased all of the Baldwin holdings on Lānaʻi.

The purchase price of the island was $1.1 million. In 1923, Dole began development of the Lānaʻi plantation, and land in Kamoku was selected for the new city, with the ranch operations continuing to run out of Kōʻele. Nearly $2 million was spent on improvements to the island, for the development of macadamized roads and the town of Lānaʻi’s City. In 1926, Dole hosted a tour of the plantation and developing city. The 150-person tour of politicians, businessmen, and friends were impressed with the progress that had been made in the short time on Lānaʻi (Smith and Dougherty 1926).

Lānaʻi had been often overlooked because the appearance of the island from offshore was dry and desolate, but Dole saw that inland were some arable lands. There were 20,000 acres of land suited to pineapple on the island of Lānaʻi—Hawaiian Pineapple Company considered it as the last desirable acreage left in Hawaiʻi. The soil and conditions were desirable, but many improvements had to be made. Many miles of cactus had to be dragged out and removed from the landscape. The Hawaiian Pineapple Company built a harbor at Kaumilapaʻu with a breakwater made of a solid rock cliff that they had blasted and transferred. Roads from the fields to the harbor were paved. One of Hawaiian Pineapple Company’s old photos shows neat rows of pineapple, with Lānaʻi’s City in the background. Lānaʻi’s City was developed for the workers that were brought over (Hawaiian Pineapple Company Ltd. 1927:17–23).

In 1927, HAPCo began the process of confirming title to all of its Lānaʻi land holdings and recording them through the Land Court System. The notice reproduced below, dated May 11, 1928, pertains to Land Court Application No. 862 and is entitled “Identifying Ownership of all Lands on Lānaʻi” (Figure 18). It refers to all ahupuaʻa, kuleana, and grant parcels on the island. Eventually some 20,000 ac. of the top lands of Lānaʻi came under the plow of the pineapple plantation.

To all whom it may concern: Hawaiian Pineapple Company, Limited, a Hawaiian corporation, hereby gives notice that on the 11th day of May 1928, it filed an application in the Land Court of the Territory of Hawaii to have its title to certain land, in said application described, registered and confirmed pursuant to Chapter 186 of the Revised Laws of Hawaii 1925.

Said land is the Island of Lānaʻi, Territory of Hawaii, U.S.A., lying between 20° 44’ and 20° 57’ North Latitude and 156° 45’ and 157° 02’ West Longitude (as shown on Government Survey Registered Map No. 1394), containing an area of 88,953 acres, or 139.0 square miles, more particularly described as follows:

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91 Hawaiian Gazette, November 22, 1910, p. 8.
92 Evening Bulletin, November 22, 1910, p. 3.

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The following Ahupua‘a’s cover the Island of Lanai, and with the exceptions of Exclusions 1 to 32-B (inclusive) are owned by the Hawaiian Pineapple Company, Limited:55

1. Paomai – Grant 5011 to Walter M. Giffard
   Area 9,078 Acres

2. Mahana – Grant 5011 to Walter M. Giffard
   Area 7,973 Acres

... 

12. Kamoku – Grant 5011 to Walter M. Giffard
   Area 8,291 Acres

   Victoria Kamamalu
   Area 19,468 Acres

By the mid-twentieth century, the current project area became dominated by commercial pineapple cultivation. Figure 19 is a portion of a 1947 HAPCo field map, with details of the lands in the upper Kamoku region and numbered fields. The map shows the project area entirely within numbered pineapple fields, with a roadway running through the far eastern boundary.

Figure 20 and Figure 21 are aerial photographs from 1952 and 1965 showing the project area under commercial pineapple cultivation. By that time, the plantation had absorbed all ranch lands, turning them into cultivated pineapple fields. Surface features were commonly destroyed in this process. The 1950-1960s aerial maps show a roadway, a large structure, and several small structures within the eastern extent of the project area, with all other areas under pineapple cultivation. The large structure shown in the images was the old Maui Electric Company (MECO) building, built in the 1940s. The MECO building was the second power plant on Lāna‘i and provided power for the entire city. According to the SHPD review letter dated August 14, 2020, the MECO building was demolished in late 2018 (Appendix A).

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Figure 19. Portion of a 1947 HAPCo Lāna‘i Plantation Map showing the project area entirely within former pineapple fields (Courtesy of HAPCo Collection, Lāna‘i Culture & Heritage Center Collection 1947b)

Figure 20. A 1952 USGS aerial photograph of the Lāna‘i City showing the project area under commercial pineapple cultivation (Photo courtesy of the Lāna‘i Culture and Heritage Center)
2.7 Land Tenure, Places, and Events in Kamoku Ahupua‘a

Throughout the large majority of Hawaiian- and English-language accounts, the name Kamoku is given for the ahupua‘a (Figure 22). In one narrative recorded by Martha Beckwith (1940), Beckwith cites the place name “Kumoku” on Lāna‘i, and associates it with the god Ki‘i’s first encounter with Lāna‘i:

According to Kupihea the great gods came at different times to Hawai‘i. Ku and Hina, male and female, were the earliest gods of his people. Kane and Kanaloa came to Hawai‘i about the time of Maui. Lono seems to have come last and his role to have been principally confined to the celebration of games. At one time he was driven out, according to Kupihea, but he returned later. Kane, although still thought of as the great god of the Hawaiian people, is no longer worshiped, but Ku and Hina are still prayed to by fishermen, and perhaps Kanaloa—Kupihea repeating to me softly the prayer with which he himself invoked the god of fishes.

Of the coming of the gods he had explicit evidence to offer: “Ku and Hina were the first gods of our people. They were the gods who ruled the ancient people before Kane. On [the island of] Lāna‘i was the gods’ landing, at the place called Ku-moku. That is the tradition of our people. Kane and Kanaloa [arrived there], but not Lono. Some claim that Lono came to Maui. It is said that at the time Kamehameha quartered his men at Kaunakakai on Molokai before the invasion of Oahu, he went to Lanai to celebrate the Makahiki [New Year] festival and on that occasion he said, ‘We come to commemorate the spot where our ancestors first set foot on Hawaiian soil.’ So it seems as if it must be true that the first gods who ruled our people came to Lanai.” (Beckwith 1940:11)

An earlier version of this tradition has not yet been found in the volumes of research in native-language history or earlier foreign accounts for Lāna‘i. In a few of the English-language narratives published by Walter Murray Gibson—an article and land application letters—he writes of “Kumoku.” Gibson’s account of Pūhī o Ka‘āla, published in the Nukou April 1, 1873 (page 4), Gibson described the journey of Opunui and Ka‘ala, referencing the forest of Kalulu and Kumoku (Kamoku). Opunui and Ka‘ala passed “through the groves of Kalulu and Kumoku [Kamoku],” and he then forced her down the trail towards the shore at Kaunālāpa‘u. To date, other specific locational reference to the place name “Kumoku” have not been found.
2.7.1 Place Names of Kamoku

In addition to the ahupua’a name, several place names survived the passing of time in Kamoku. The site numbers listed are from Emory’s 1924 archaeological inventory survey on Lāna‘i (Emory 1969).

Anapuka Arch (Site 175). A rocky point with an arch.
Hōkūao Morning Star (Site 84). A level land below Lāna‘i City.
Hulupu‘uniu Translation uncertain (Site 78). A level land area below Hōkūao.
Iwīole No bones, or no boundary wall (Site 87). Named for a native tenant who lived on the land below Kō‘ele, in the early to mid-1800s.
Kaiholena The plantain tree (Site 89). An area above Kō‘ele, where bananas were grown formerly. A favored region of Lāna‘i, where enough water could be found to tend cultivated crops.
‘Ili o Lono The land section of Lono, site of an ancient heiau of the agricultural class, near the former house site of Papalua, and boundary point between Kalulu and Kamoku Ahupua‘a

Hōkūao 201-H Housing AMP

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Traditional and Historical Background

Pu‘u kaula Kaula tree hill (Site 74). A boundary point between Kalulu and Kamoku Ahupua’a.
Pu‘ukoa Koa tree hill (Site 76). A low hill on the flat lands below Hulupu‘unui.
Pu‘unānāhawai‘i Hill from which to look to Hawai‘i (Site 77), a high prominence in Kamoku Ahupua’a close to the boundary with Kalulu (Boundary Commission records).
Pu‘unēnē Goose hill.

2.7.2 Ali‘i and Native Tenant Claims from Kamoku Ahupua’a

Kamoku means literally “the district or cut-off portion” (Pukui et al. 1974:82). Emory explains that the ahupua’a “was once cut off from a number of ahupuaas for the use of the whole district, hence its name” (Emory 1969:31). Kamoku is located on the leeward side of the island and includes 8,291 acres. It is bounded by the ocean on the southwest and the mountains on the northeast. On the north, it is bounded by the ahupua’a of Ka‘a‘ā, and on the south, by Kalulu Ahupua’a. Kamoku was noted for its upland forest and springs, with areas the Hawaiians developed into an extensive forested dryland agricultural system. Temporary and long-term residences, from which the rich fisheries fronting the ahupua’a were accessed, were spotted around the sheltered coves along the shore.

Pali was the konohiki of Kamoku under the Kamehameha’s, and at the time of the Māhele, Kamehameha III retained the ahupua’a as Crown Land. At that time, uhu was the kapu fish, and koko (Euphorbia sp.) was the kapu wood. Table 4 lists Land Commission Awards (LCA) of native tenants who between 1847–1855 filed claims for kuleana (fee-simple property rights for commoners) lands in the Kamoku Ahupua’a and reveal some of the activities that occurred in the area. Appendix B provides original source materials and translations done by Kepā Maly of documents associated with Māhele claims in Kamoku Ahupua’a. No LCA are within the current project area.

Table 4. Land Commission Awards claimed in Kamoku Ahupua’a

<table>
<thead>
<tr>
<th>LCA</th>
<th>Claimant</th>
<th>Land</th>
<th>Claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>2686</td>
<td>Olelo</td>
<td>Kaumalapau at Kamoku</td>
<td>—</td>
</tr>
<tr>
<td>4145</td>
<td>Kauihou</td>
<td>Pālīwai &amp; Kamoku</td>
<td>1 house lot, cultivated land</td>
</tr>
<tr>
<td>6833</td>
<td>Kaaiai</td>
<td>Kalulu &amp; Kamoku</td>
<td>1 house lot</td>
</tr>
<tr>
<td>8556</td>
<td>Kaawawaeaina</td>
<td>Pueo at Kamoku</td>
<td>1 pānūkū (section)</td>
</tr>
<tr>
<td>10630</td>
<td>Pali</td>
<td>Kamoku</td>
<td>Several moku mau‘u (sections of grasses), sweet potato and gourd fields</td>
</tr>
</tbody>
</table>

Hōkūao 201-H Housing AMP
At the time that fee-simple property rights were established in the Hawaiian Kingdom, Kamoku Ahupua’a was identified as ‘Aīna Lei Ali’i’s (Crown Lands) having been retained by Kamehameha III in the Māhele ‘Aīna of 1848. In 1906, Territorial Governor George R. Carter entered into an exchange agreement which conveyed Kamoku, along with seven other ahupua’a on Lāna’i, to Charles Gay. Thus, with the exception of kuleana ‘Aīna and Royal Patent Grant lands, all of the ahupua’a of Kamoku became private property, eventually transferring to the Hawaiian Pineapple Company, Limited (HAPCo) and subsequently to the present ownership. It is within the uplands of Kamoku Ahupua’a, at Kō’ele and Kīhamānīa, that the earliest western residences were established, and in 1923, James Dole selected Kamoku as the site for building Lāna’i City.

There are several resources on the cultural landscape and in the archival records which help us understand some of the history of Kamoku. Among these are place names, the occurrence of the traditional boundary alignment markers between Kalulu and Kamoku, and parcels of land which were at one time held by native tenants.

2.7.3 Kīhamānīa and the Koʻele Vicinity

Situated on the edge of Lāna’i City, on the side of Iwi’ele and the old Cavendish golf course, are found the ruins of the oldest historic structure in Lāna’i City. Under the growth of ironwood and Christmas berry trees are the walls, made of stone and coral mortar, of an old church and schoolhouse, on which construction began in 1840. On the makai side of the ruins is an historic cemetery, marked only by some simple stone alignments and depressions in the ground (Figure 24).

While the Kīhamānīa vicinity was the main upland settlement on Lāna’i in the early to mid-nineteenth century, by the late 1860s the population was dispersed. In the 1870s, business interests, in the form of ranching, became established in the Koʻele vicinity, and the Kīhamānīa Church and schoolhouse fell into disuse. Based on the recollections of elder kamaʻāina, we know that the cemetery continued to be used by native families in the area through the early 1900s. To date, only limited documentation pertaining to the construction and uses of this site have been found, however, a research project is being undertaken in association with development of the Lāna’i Culture & Heritage Center which hopes to uncover more interesting historical facts. Figure 24 shows a photo of the Kīhamānīa School ruins.

At present, only a few historical accounts of the Kīhamānīa area, dating from 1840 to 1917, and the memory of elder kamaʻāina of Lāna’i, who learned about the location from their kūpuna, provide information on the site. Provided below are native texts that are translated by Kepā Maly.

Kaliliamoku, the resident teacher at Kīhamānīa in the 1840s, wrote the following article to readers of the Hawaiian newspaper Ka Nomanona in which he described the difficulty in getting the stone house for the church and school constructed:

Anhea oukou e ka poe kaukulu luakini o keia pae aina, e nana mai oukou i ka makou hana ana i keia luakini: o ka ha keia o ka makahihi o ka hana ana o keia hale, aole i paa, ua hiolo kekahi aoao, ke hana hou nei nae makou, ke halihali nei makou i ke one; ua mou ka puna; o ka uhai hou koe.

I ko’u nana ana ma keia hana, nui ka hemaheha: eia ka lohi o kahi o ka wai i waiho ai, hookahi mile a me ka hapa ka lohi o ka wai.

Eia ka lohi o ka puna a me ke one, eha mile a me ka hapa ka lohi ma ka aoao komohana, pela no hoi ke kai aku i ke one ma ka aoao hikina.

Eia ka lohi o ka pohaku, elua mile ka lohi.

Eia ka pohaku kokoke he kohi ilalo e like me ka ai, pēle i loa; ka pohaku, nui ka hemaheha o ka makou hana.

Ke ake nei ko makou manao e paa ko makou luakini, kahi e hai ai ai ka olelo a ke Akua. Aole no hon e pono loa ka hale molii ma keia wahi, no ka nui o ke anuanu, aole e pono na mahihi ke hele mai me kahi kaihe wale no: eia ka pono me ke kapa mahauha ka pono.

Hear ye, o people who build churches in these islands, you should look to us and our work at this church. This is the fourth year of work on this house. It is not completed. One side collapsed, and we have built it again. We had to carry the sand, bake the coral, and the building yet remains to be done.

As I look at this work, there are many problems. The place for the water is far away. The water is about one and one half miles distant.

Here is the distance to the stones, two miles away.

Here the stones that are close, are gathered like the taro, that is how the stones are gathered.

In our thoughts, we desire to complete our church, a place in which the word of God may be spoken. The native houses are not adequate in this place, for it is very cold, and not good for the visitor come with only a shoulder wrap.

Here is what is needed, a strong (thick) clothing.
Nolaila o keia hale pohaku ka pono loa no keia wahi. Eia no keia hemahema, o ka laau ole, he kakaikahi ka laau loa loa: ia eha kaloa, a me ka iwilei alaila hiki.

Nui ko makou makemake e paa ko makou luakini i keia makahiki. Aka, aole i ikeka ma manawa. O kekahiki poe o makou i hana i keia hale, ua hele aku kekahiki poe.

Ua make kekahiki mau hoahanau ekolu i ai i ke kino o ka Haku. O kekahiki luakini o makou, aia ma ka aoao hikina o keia aina, aole hemahema loa e like me keia hale; ua kokoke no ka puna a me ke one, a me ka pohaku, a me ka wai, hookahului wale no mea hemahema, o ka wahie, oia wale no ka mea kui aku i kahi lohi. Eia kahi olelo ninau, ina i manao oukou i kuu hoike ana i ka hemahema o keia hale, he pono paha, he hewa paha keia hoike ana a‘u? Na‘u na Kaliaiauomoku. Kumu ao Kihamaniania.


Shortly after the stone church and schoolhouses on Lāna‘i were built, Reverends Cochran Forbes and Dwight Baldwin visited Lāna‘i. This being Forbes’s first visit, the scenery was new to him, and he took the time to describe the land and people in his journal. The full entry is not cited here, as it places in context and relationship, the settlement of Kihamaniania with other settlements on Lāna‘i.

Sept. 24. On the 20th left home about sunrise for Ranai [Lānai] in company with Bro. Baldwin. Kaoluloo took us over in his boat. We had a very pleasant sail, until within some 3 miles of the landing when the fresh trades spattered us a little.

We landed safely however, after about 3 hours sail, at Kaunolu [this being the section of Kaunolu on the Kealohama side of the island], where there is a meeting house. The same evening we met with and preached to a congregation of about 125 persons, and next day held four meetings with them. They appeared very attentive to the truth. Our congregation was about 180 on the Sab.

Monday morning after meeting with them we went by canoe to Maunalei, the place of the teacher Waimalu. There we again met with the people of that neighborhood & prepared to ascend the mountains to visit the people on the south side. The north side is a miserable, arid barren rocky place, except a few rods of low sandy soil, evidently made by the wash of the sea, on which grows a sparse, coarse kind of grass.

When we reached the high land we found the air much more cool & invigorating and after we had crossed the ridge the soil became better and vegetation more lively. There is an extensive piece of tabelland there, perhaps 10 miles one way & 3 or 4 the other, on which are very few stones. There we spent the night & met with the people, near 200 in all who had come together to hear & see the strangers. Pali the Lunaauhau [tax collector] for the whole island resides at this place called Kihamaniania. His influence is manifestly good. We found several pious people around him & himself a good man. He told us that his little children only 6 & eight years old had read the Bible through. He also gave us a list of all the men—the women & children on the island, the whole numbering 584 inhabitants. Most of the chiln, are in school and very few of them who are 12 years old that cannot read.

The atmosphere was cool & invigorating at Kihamaniania. We spent the night there and early in the morning held another meeting with them, after which we left and many greetings for the seaside at Koahai, Pia’s place.

We travelled constantly only stopping once to hold meetings at the place of Kamalu (presumably in Pālāwai), who teaches a school and is Lunakanawanai [Magistrate] for the whole island. He showed us his prison, after meeting. It was a large hole in the side of the hill, some 10 feet in diameter and about 20 feet deep. He said he put prisoners in there when they became rebellious and required punishment. Sometimes he had two in at once but rarely more than one.

He had a turkey baked for us and a fowl roasted which he set before us with sweet potatoes sufficient & two watermelons. After dinner we pursued our course & children on the island, the whole numbering 584 inhabitants. Most of the children are in school and very few of them who are 12 years old that cannot read.

In a short article submitted to the native newspaper Ka Hae Hawaii in 1856, we learn about the lesson work, and the names of the teachers at both Kihamaniania and Maunalei schools. At Kihamaniania, Solomon Kahi‘olahalaha, who later became the island magistrate, was the resident
teacher. The Kahoʻohanohalala family still maintains its generational attachment and residency on Lānaʻi.

E ka Hae Hawaiʻi e:
Aloha oe—ʻI ka Poho, oia ka la 25 o Dekernab, hoike kula ma Lānaʻi nei. I ka hora e kake ai ke kaka kiʻakahi, ke kula ma Maunalei ka mua.

O S. Halekai ke kumu, 19 haumanaka: ma ka A 5; ma ka Heluhelu 14; ma ka Helanaau 14; ma ka Honkonhoa 7; ma ka Huiaheulu 7; ma ka Palapalaina 7.

Hora 10 1/2, hoike ke kula o Kihamaniānia, S. Kahoʻohanolahala ke kumu, 34 haumanaka: ma ka A 22; ma ka Heluhelu 12; ma ka Palapalaina 12; ma ka Huiaheulu 12; ma ka Hoaiholohelu 5; ma ka Pa ko li 9.


Ka Hae Hawaiʻi, March 4, 1857. Translated by Malay.

In the following two short articles, penned by native residents, associates of church in the Lāhaina District, we learn that the Kihamaniānia Church and School, as well as that at Maunalei, had fallen into disuse, disrepair, and had become home to goats, sheep, and dogs. The first article is called “Luakini ole ma Lānaʻi” which means “There is no church on Lānaʻi.”

Ma ka mokupuni au o Lānaʻi i loko o na la mua o Sepatemaba ma ka la Sapati ua hele au ka pule ma Maunalei, ata malaʻai kahi e haʻoomoana ai na Ekaeiesa me kuu manao he Luakini malaia, i koʻu ike ana he lanai wale no a puni, he hakakahale a nahaha ma kau wahi, he opala a he lepo kahi e noho ai, a he nui na ilo i komo pu, a noho pu me na Ekaeiesa e e nui ana na Kao me na lua pa kiʻiki i ka wa ua, a pela no maunau o Kihamaniānia, he hale pahuku a paa loa i ka wa e ola ana o Kahiliainomoku, a me Malalu a i keia wa ua ilo i ʻale holoholona...

S. W. Naiilili
Hōkūloa 201-H Housing AMP

To the Hae Hawaiʻi:
Aloha to you—On Thursday, that is the 25th day of December, there was a school exhibition on Lānaʻi. It was at nine o’clock in the morning, and Maunalei school was the first.

S. Halekai is the teacher, there are 19 students: 5 in Science; 14 in Reading; in Mental Arithmetic; 7 in Geography; 7 in General Arithmetic; and 7 in Mapping.

At 10:30 o’clock, the School at Kihamaniānia did its exhibition. S. Kahoʻohanalahala is the teacher, and there are 34 students: 22 in Science; 12 in Reading; 12 in General Arithmetic; and 7 in Written Arithmetic; and 9 in music.

Done by me, R. Koiku. Kahalepalaoa, Dec. 31, 1856

The second article is entitled “Ka ho aloha na Kaupuni i Lānaʻi...” which translates as “A Journey around Hawaiʻi...”

Okatopa 21. Ua loa na waapa e holo ania Lānaʻi, a poelee e holo ai o Mrs. Kapuhoonoua a me Luku, ua kauoana mai o Lotua Kuauhelani ia’u e malama ia laua ma Lānaʻi. Aole no he laulau o laua ma keia hele ana, a auumoe kau ai ma Manele, a malama ia e ke kaikaina o Mr. Pualewa.

Okatopa 23. Ma ke awakea, ua lawe ia mai na lio ekolu no makou, a pīi aku makou i uka o Kihamaniānia, ua mahalo ai uka o Lānaʻi, he aina maikai ia he lepo o uka, aole he aa nui, he maikai wale no. O Lānaʻi ka o i o na mokupuni uku o o ka maikai loa.

Okatopa 24. Ua hele nui mai na kanaka e lohe i na mea hou, a pau kaʻu hain, ua hawi mai laku i na dala $4.00. Eia koʻu kahaha. Aole he halepule maemae ma Lānaʻi, ua nahaha o Kihamaniānia, he moe ia e na kai i ka wa ua. Aloha nui me Rev. N. Pali a me S. Kahoʻohanalahala...

(na Rev. Kaukau)

The third article is entitled “Ka Hoku o Hawaii...” Desha described the Kihamaniānia Church, and I thought that there was a Church there. When I saw it, there was only a shelter, for it is broken apart and scattered about. There is rubbish and dirt where one sits, and there are many dogs which enter as well, and reside in the Church. There are also many goats and sheep that enter in when it rains. It is the same at Kihamaniānia, where there is a stone house made in the time when Kaliliaumoku and Malulu were living. But in this time, it has become a house for animals...

He mau makahiki i ke olia ana o ka mea e kakau nei keia huakai i hooalahai ai ma keia Mokupuni o Kaululauai i na la oipo, a ia manawa he aneane eono hale kula o keia mokupuni, oia hoi he hooakahali hale kula ma Awaahu, he hooakahai ma Poaami, Ka Home o ko'ua Okana i

S. W. Naiilili
Pueuhue, Lāhaina.

Nupepa Kuokoa, October 20, 1866, p. 4. Translated by Malay.

The second article is entitled “Ka ho aloha na Kaupuni i Lānaʻi...” which translates as “A Journey around Hawaiʻi...”

Okatopa 21. A boat was gotten to travel to Lānaʻi. It was dark when Mrs. Kapuhoonoua, Luku (and I), sailed. Lotua Kuauhelani instructed me to care for them on Lānaʻi. That they should not wander about. Around midnight we landed at Mānele, and were cared for by the younger brother of Mr. Pualewa.

Okatopa 23. At noon, we took three horses for ourselves, and we ascended to Kahalepalaoa. Dek. 31, M.H. 1856.

There is rubbish and dirt of the good, small islands. There is not a clean church on Lānaʻi, it is a good land. There is dirt in the uplands, not lots of stones, it is very good. Lānaʻi is foremost of the good, small islands.

October 23. Many people came together to hear the news, and my speaking was completed, they gave $4.00. Here is what astonished me. There is not a clean church on Lānaʻi. Kihamaniānia is broken apart, and the goats sleep in it when it rains. Aloha nui to Rev. N. Pali and S. Kahoʻohanalahala. (By Rev. Kaukau)

Nupepa Kuokoa, November, 1867, p. 4. Translated by Malay.

In 1917, members of the Congregational Churches visited Lānaʻi. One of the visitors was the part-Hawaiian Reverend Steven Desha, who had also visited Lānaʻi in his youth. In an article published in the Hawaiian-language newspaper Ka Hoku o Hawaʻi, Desha described the Kihamaniānia-Koʻele vicinity, and the relationship of the Kihamaniānia facility to others on the island of Lānaʻi. An excerpt from Desha’s Hawaiian texts and the translation follow below. The article is entitled “Ka Huakai i na Hono a Piilani.”

There were some years past in the young life of the writer of this journey to the Island of Kaululau’au, a time when there were six school houses on this island. There was one at Awaʻula; one at Poamai’a, the place where my family resided; one at Maunalei; one close to...
noho ai, a he hookahi no hoi i Maunalei, he hookahi no hoi i kahi kokoke i Kahalepalaoa, a he hookahi i uka o Kahanania, a he hookahi no hoi i Palawai. A ina la hoike nui o ka makahiki, e hui ana kela mau kula ma Kahalepalaoa Luakini, a mailoha e hoike ia ai na kula like ohe, a i kekahi makahiki hoia ma ka Luakini iuka o Kahanania e hoike ai, a ia maluno o ka 250 mau hauamana o keia mau kula e hoike ia ai, a he la laukana maoli no ia o ua Mokupuni nei o Kaululaau. Keia ike hou ana aku nei hou ua nele na wahi i noho ia e na kanaka i ke kanaka ole, a he meahameha wale ka aina ma na wahi lehulehu…

Ka Hoka o Hawai‘i, October 11, 1917, p. 3
Translated by Maly.

In 1921, Kenneth Emory conducted his survey of cultural resources on Lāna‘i. During the course of his fieldwork, he visited Kahanania and took a photograph of the site (Figure 25). His photograph shows us a very different setting than the one we see today. More of the walls were standing, and the ground about the area was completely open, clear of trees, with only low grass surrounding the region. This was a result of years of sheep and cattle grazing, for these lands made up some of the important pastureage of the Lanai Ranch. Of the Kahanania ruins, Emory reported:

Two Protestant stone meeting houses were begun on Lanai in 1842. One of them was finished in 1851 and represents the ruins at Kahanania, near Koele. The other church, at Maunalei, seems not to have been finished in 1858. (Emory 1969:9)

Figure 25. Kahanania Church and School ruins in 1921. Source: Kenneth Emory Collection.
Copy work courtesy of Robin Kaye, 1975

Kumu‘aina Knowledge

Over the years, members of older Hawaiian families of Lāna‘i have passed down their recollections that, at one time, the lands around Kahanania (the Kō‘ele vicinity) were an important area of residence for the people of Lāna‘i. In traditional times, the lands in the Kahanania, Kō‘ele, Kaholena, and Nininiwai area were noted for their agricultural resources which supported the life of the people. This was in part a result of the environmental conditions of the region, and the traditional place names, themselves, tell us something about the environment.

Kō‘ele

 Pronounced with a long ō, and a break between the ō and e. Elder kama‘aina of Lāna‘i say that Kō‘ele was named because of the cool, moisture-laden breeze and clouds which blow off of Lāna‘i’s Hale, darkening the land. In this case, kō means windsborne, the ‘ele means darkness (Kō‘ele — Darkness-borne upon the wind). These dark mists carried with them. The life-giving waters which settled upon the land, and made it an area capable of sustaining the people of the land.

Kihā-mānienia

Also written Kiha-mānienie, is said to describe someone sneezing in fits. The name was perhaps given as a result of the cold, moist nights of the area.

Ka‘iholena

Named for a native type of banana (The-iholena), which was a choice crop of the area.

Nininiwai

Describes the dripping (pouring) water, resulting from the moist clouds and mist which came down the mountain slopes, and enabled the cultivation of crops.54

In the early 1970s, Abraham Pi‘i‘anā‘a—an elder Hawaiian descendant of the chief Pi‘i‘anā‘a that resided on Lāna‘i during the occupation by Kanehameha I—said that in his ‘ohana, there was a tradition about Kahanania in times before the making of the church and school. Abraham’s father and sister were both born on Lāna‘i in the late nineteenth century, and are descended from the Chinese resident who at one time held the government lease on Kamoku Ahupua‘a.

2.7.4 Lāna‘i City

The story of Lāna‘i City begins when James Dole purchased nearly the entire island of Lāna‘i in November 1922, as a part of the holdings of the Hawaiian Pineapple Company, Ltd. Prior to 1922, the lands on which the city would be built had been grazed as part of the old Lāna‘i Ranch operations, and a large horse paddock at Kauinakalohi dominated the pre-city landscape. Plans for building Lāna‘i City were drawn up in early 1923, as Dole and his partners set out to make Lāna‘i the world’s largest pineapple plantation. Coming from Connecticut, Dole was familiar with the design of the “town square” and grid system of laying out streets in such a way that everything was connected to the “green” or park in the middle of town. Under Dole’s tenure, the Lāna‘i plantation and city grew, and at one time the island supported nearly 20,000 acres of cultivated pineapple, making it the world’s largest plantation. For seventy years, from 1922 to 1992 when the last harvest took place, the name “Lāna‘i” was synonymous with pineapple.

Between 1924 and 1929, Lāna‘i City blossomed upon the landscape; most of the buildings and streets which we still see today were constructed during this short period (Figure 26). By March 1924, the general layout of Lāna‘i City was established and some 40 buildings—many of which remain in the present-day Lāna‘i City—were built or were under construction.

54 From Keōpū Maly’s notes and personal communications with elder members of the Cockett, Ka‘opūliki, Kauila, Knowena‘ele, and Richardson families in the 1970s and 2006.
In the early years of the plantation, the largest group of immigrant laborers was made up of skilled Japanese carpenters and stone masons. Their initial work was undertaken on an almost barren landscape, overgrazed by years of sheep, goat, and cattle pasturing.

Following a brief and successful experiment in planting pineapple on Lāna‘i by Charles Gay, James Dole, president of the Hawaiian Pineapple Company, purchased the island of Lāna‘i for $1.1 million dollars in 1922. In 1923, he sent engineers to begin the design of Lāna‘i City, the Kaumāla‘apu‘u Harbor, fields, and facilities which would support the envisioned pineapple plantation. Between 1923 and 1925, the city was laid out. It included houses for individual families and group homes for single men; a hospital dispensary; a theater; stores; churches; a hotel; offices; and labor yards. Outlying plantation camps, overlooking Pālīwai, at Miki, Quarry Camp and

Kaumāla‘apu‘u, were also built. The Kaumāla‘apu‘u Harbor was also built during this time. As this work was going on, and housing became available, tracts of land in Pālīwai were being cleared of stones and boulders both by hand and with livestock, and then planted in pineapple.

In 1926, James Dole and a large group of island politicians and business backers visited Lāna‘i. They were greeted by the new residents of the island, who were mostly of Japanese origin. By 1930, the population of plantation employees and their families included 965 Japanese, 867 Filipinos, 102 Koreans, 82 Puerto Ricans, 78 Chinese, 46 Caucasians, and 43 Portuguese. There was also a population of 173 Hawaiians, mostly representative of the old native families, but few were working directly for the plantation (Figure 27).
A series of articles published in the Maui News between 1926 and 1939 provide us with eyewitness accounts of the growth and development of the Lāna‘i pineapple plantation operations and city. Several of these articles are cited below. The first, published in the Maui News on February 3, 1926, told readers of the visit by James Dole and his associates, as he unveiled the plantation and city to all Hawai‘i. The account, describing development which had occurred on Lāna‘i between 1923 and January 1926, reads:

Sunday was show day at Lanai, the Hawaiian Pineapple Company having chartered the Inter-Island steamer Kilauea to take almost 150 prominent Honoluluans to see what it has done with the property it purchased from Baldwin interests in the way of pineapple developments. The Governor and other territorial officials as well as some of the city and county officials were in the party. The Kilauea sailed from Honolulu at 10 o’clock Saturday night and discharged her passengers at Kaumalapau at 6 Sunday morning. Awaiting them were some 40 automobiles and they were taken about in cars for their sightseeing trip, most of which were brought with them from Honolulu. James D. Dole, president of the company personally conducted the party. The motorcade started at 7:50 headed by H. Bloomfield Brown in charge of affairs for the company on the island.

Dinner was served at noon and there was speech making, among the speakers being the Governor. A heavy rainfall cut short the sightseeing trip and the Kilauea sailed on her return trip at 3:30. The Hawaiian Pineapple Company has spent for purchase of the property and its development more than $3,000,000 and the visitors were much impressed with what has been done on the property.

Statistics Furnished

The following facts and figures as to Lanai are taken from a folder which was prepared for the excursionists:

Island of Lanai, 140 square miles, 90,000 acres; located 65 miles southeast of Honolulu; estimated pineapple land, 15,000 to 20,000 acres; option on Lanai taken September 5, 1922; option exercised December 5, 1922; population at that time about 150; present population, 1000; elevation of Lanai City, 1650 feet; building of Lanai City commenced August 1923; number of schools, two; attendance, 150; seven miles of asphalt macadam road to Lanai City, eight to 12 inches thick, and 200 feet wide; widened at turns; maximum grade of road to Lanai City, about 6 per cent; water supply lifted 750 feet by electric pump from tunnels in bottom of Maunalei gulch; water brought in six inch redwood pipe through three riders by three tunnels, aggregating 5300 feet in length; capacity of old Kaoholena reservoir, 500,000 gallons; capacity new Kaoholena reservoir, 3,900,000 gallons; electric power generated by 100 KW oil engine generator set, generated at 440 volts, transmitted at 2300 volts; capacity moving picture theater, 450; Kaumalapau harbor development work commenced September 1923; length of breakwater 300 feet; tonnage of rock in breakwater, 116,000; minimum depth of Kaumalapau harbor, 27 feet; depth of Kaumalapau harbor entrance, 65 feet; length of wharf, 400 feet; number of cattle on ranch at present time, 4000.

By 1930, the population on Lāna‘i totaled 2,336 residents. In the mid-1930s, efforts in expanding the amount of acreage were made, and new laborers, primarily of Filipino and Japanese background, settled on Lāna‘i. All planting, picking, weeding, and most field clearing was done by hand. There were no pineapple picking machines. The pickers picked by hand, loaded bags, walked to the end of the rows and then loaded the pineapples in boxes. The boxes were then hand loaded onto trucks and driven down to Kaumalāpā‘u, where cranes would load the truck bins onto the barges for shipping to the cannery at Iwilei in Honolulu.

Later, Maui News articles document the following developments:

Ten years ago, Lanai was just another unimportant island on the map of the Hawaiian group; today the Hawaiian Pineapple Co. operates on it the largest pineapple plantation in the world, to supply fruit for its cannery in Honolulu, also the largest in the world.

Ten years ago, Lanai’s population was approximately 600, and about 4,000 acres were under cultivation. Today the land under cultivation, has increased five-fold to 20,000 acres, and the island’s population has grown to an estimated 3,500.

The five year period from 1925 to 1930 was one of great building activity on Lanai as the pineapple company conducted an extensive building program to provide housing for the hundreds of workers who were arriving almost on every boat to make their homes on the island.

Homes for married couples were erected by blocks, in numerical order. There were model two bedroom homes, with large airy living rooms and spotless kitchens, running water, electricity and spacious grassed yards.

Single men’s houses were divided in two by a partition with three furnished rooms in each section. All these houses were supplied with running water and electricity. They were laid out to provide ample space around each house.

Attractive as these homes were eight years ago, they are now being remodeled and made better, finer homes. More spacious rooms are being added and sanitary toilet and baths installed.

These new homes are painted cream white inside and out, with doors stained walnut. Each contains six rooms, four of which are 10 by 12 foot bedrooms with built in drawers and closets. The living room has a floor space of 12 by 16 feet, and the kitchen is 14 by 16 feet. All have built in cabinet cases and pantries. All are supplied with running water.

Sanitary toilets, baths and wash basins are installed in all of the homes.58

A story elsewhere in this issue of the Maui News describes some of the progress which is being made on all sides on Lāna‘i Isle. It is a story of the building of a happy community and reflects credit on all who are having a hand in the Pineapple Isle’s development.

The cooperation which has been forthcoming from everyone is a splendid example of the Lāna‘i spirit and in the years to come, this little Island will be as famous for its spirit as any other place in the Territory.

More power to Dexter Fraser and the hundreds of Lāna‘i residents who are supporting him in his efforts to make Lāna‘i City the finest in all the land.59

The following Maui News article is from August of 1938. In the article, many of the developments occurring on Lāna‘i are described. The article is entitled “Lāna‘i Sees Big Things Ahead Under Leadership of Dexter ‘Blue’ Fraser.”

County recognition of Lāna‘i, signaled by last weekend’s visit of the board of supervisors to look over the site for a $30,000 road to Keomuku is only an incident in the development of a community that has made rapid strides during the past few years under the leadership of Dexter “Blue” Fraser, Hawaiian Pineapple Co. superintendent on the Pine Island.

The Lāna‘i of today is a community of happy people, working in harmony for the better island. Moral of Hawaiian Pineapple Co. employees is high. Everyone is pulling together, and this unanimity of purpose has resulted in a way of life for the people of the island that stands as a model for other communities in the Territory.

Painting the City.

The physical aspect of Lāna‘i City has been improved recently by a program of renovation and modernization. When the board of supervisors arrived on Lāna‘i last Saturday for an inspection trip, members of the party saw a neat city, freshly painted in green and white, shaded by cool evergreens.

The painting program is not quite complete, but even now there is an appearance for fresh cleanliness. The city is, as it always has been, spotless. Crews of men are assigned to keep the community clean from fallen leaves, weeds, and refuse and to trim the lawns which surround each of the comfortable homes in which the pineapple workers live.

Aside from the County’s projected road to Keomuku, the planting is doing a bit of road work itself. About a month ago, work was started on a project to eliminate some of the dangerous hair pin curves on the Lāna‘i City-Kaumalapau road and widen it to provide ample room for the large pineapple trucks which haul fruit to the port for shipment to the cannery in Honolulu.

Have Safety Program.

Safety has become almost a fetish on Lāna‘i. There is a safety committee composed of community leaders. Workers are invited to submit suggestions and as result of the committee’s activities, guards have been placed on machinery, instruction has been given in first aid, and safety first signs have been conspicuously posted.

In the fields mechanical loading machines have relieved some of the back breaking toil which heretofore has been the bane of the field worker. These machines are by no means perfected as Hawaiian Pine freely admits, but progress is being made and experiment is constantly in progress.

In order to correct one deficiency discovered in the fields, the company is now spending about $500 on each loading machine, an outlay of $10,000 for the twenty loaders now in operation. With the pineapple marked as uncertain as it is, Hawaiian Pine is proceeding carefully. There is a definite trend toward improvement in quality. Marginal fields have been abandoned for the time being. Small pineapples, lacking in quality, are left in the fields.

Carrying out the quality idea, Hawaiian Pineapple Co. is now replanting after the first crop rather than after the third as has been the practice in the past.

Athletic Program.

Community life is becoming more pleasant as the years go by. An extensive program of athletics has been developed. This reached its peak during the summer picking months when Maui and Hawai‘i send young men to Lāna‘i to work in the fields. Most of these are high school students, and many of them are athletes who have found that work in the fields is an ideal conditioner for football and other strenuous sports.

At present, two Maui high school football teams are on Lāna‘i preparing for the forthcoming season under the direction of their coaches…

The Lāna‘i City golf course has recently been remodeled and is becoming increasingly popular. The course is laid out on the slope above the city, which offers a number of good natural hazards, not the least of which is the road to Ko‘ele, which cuts through the course. This is no course for the exclusive use of the “big shots.” Anyone on the island may use it if he chooses, and the result has been a growing interest in golf…

Lions Active.

Lāna‘i also is finding that the Lions club is filling a definite community need. This organization has been particularly active and only recently sponsored an eye clinic in which more than 100 individuals had their eyes examined…

The fine spirit that has developed on Lāna‘i is due in no small part to the fine leadership of Mr. Fraser. He is universally beloved. He joins enthusiastically in the life of the community. His wise, just dealing with his employees has made him a respected friend of everyone on the island.

58 1938: “Hawaiian Pine Improves Conditions on Lāna‘i Isle. The past ten years have brought phenomenal development to the island of Lāna‘i under the guidance of the Hawaiian Pineapple Co., which is creating ideal working conditions for its employees.” Maui News Editorial, January 22, 1938, p. 1, c. 2.

59 Maui News Editorial, January 22, 1938, p. 8, c. 2.
The board of supervisors found last weekend how persistent Blue Fraser can be despite his constant joviality and penchant for playing schoolboy pranks. If someone started to a joke about two Scotchmen, Mr. Fraser somehow or other swung the conversation about so that he could get in another, “Now about the Keoumu road.”

Mr. Fraser, the board found, is determined that Lanai shall have full and complete recognition as an integral part of Maui County, and that extends to the budget meetings when the money is being passed out.

Voters Total 507.

Lanai is becoming a political factor not to be overlooked. Mr. Fraser pointed out on a number of occasion; There are 507 voters on the island at present, nearly twice as many as there were in the 1966 election. One of the reasons for the increase is that Lanai youngsters are reaching voting age. This portion of the electorate, Mr. Fraser points out, is keenly interested in government affairs and exercises its voting privilege with discretion.

Mr. Fraser and other Lanai leaders recognize that the $30,000 available for Lanai roads “is only a fly speck,” to use Mr. Fraser’s expression. “But it is a start,” he went on to say.

Jim Munro readily agreed with County officials that it would be desirable to spend $5,000 or more of the amount for a complete survey, even if it does mean less road to start with. Lanai is confident that the board, having once recognized Lanai’s needs will augment the $30,000 as time goes by and that eventually the county will do more for the Pineapple Island than replace a $67 cesspool cover.

Uncertainty of the pineapple market on the mainland, Lanai regards as “one of those things.” But it is not allowed to interfere with the community’s peace of mind, solidarity and intense joy of living in a land where every factor is favorable and better days loom just ahead.60

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60 Maui News Editorial, August 17, 1938, p. 1, c. 4, and p. 6, c. 1-3.
### Section 3  Previous Archaeological Research

Four previous archaeological studies have been conducted within the current project area and numerous archaeological investigations have been completed in the vicinity (Figure 33, Figure 34, and Table 5). The studies focused on development projects in Lāna‘i City and Kō‘ele, and include the Four Seasons Lodge at Kō‘ele, the Kō‘ele Golf Course, and various other properties. Kamoku is the most developed ahupua‘a of the island and contains Kaumālāpu‘u Harbor, the Lāna‘i Airport, the Four Seasons Resort at Kō‘ele, and the main residential area and population center of the island, Lāna‘i City. Due to this, it has undergone the most archaeological study of the thirteen ahupua‘a of the island. Additional archaeological studies in Kamoku include investigations associated with the Lāna‘i Airport, the Lāna‘i Sanitary Landfill, and development areas around the airport, all of which are well outside the 1.5 mile vicinity of the current project area.

The results of studies in the vicinity indicate that widespread clearing and subsequent commercial pineapple cultivation of the interior plateau lands has obscured or destroyed all of the surface archaeological sites and features present in the area. The few sites and places of archaeological interest that have been recorded consist of secondarily deposited scatters of traditional Hawaiian and historic artifacts on the ground surface, truncated and exposed firepit remnants, and plantation era infrastructure. Wood species identification and radiocarbon dating of charcoal from firepits has provided useful information on pre-contact use and ecology of the cultivated lands surrounding the project area.

The radiocarbon dates from seven firepit features in the pineapple fields of the island indicate pre-contact use of the Kō‘ele area and plateau lands beginning sometime in the 16th century with dates continuing into the early historic period (DiVito et al. 2019a, DiVito et al. 2019b, Dye and Maly 2016, Dye 2018, and Dye 2019). The wood species identifications indicate use of locally available native Hawaiian vegetation in fire building practices primarily fueled with ‘akoko and ‘ilima wood extending from pre-contact times well into the early historic period. The results of the most current archaeological studies tend to support sparse traditional Hawaiian habitation in the area and a widespread dryland forest prior to land clearing, ranching, and subsequent pineapple cultivation.

#### 3.1 Previous Archaeological Studies of the Project Area

The project area and portions of the project area have been the subject of archeological surveys for a wastewater pipeline, the Lāna‘i Affordable Housing project, the Hōkūloa 201-H Housing project, and field inspection to determine the status of existing historic properties within the Hōkūloa 201-H Housing project area (Hammatt and Birthwick 1993a, Lee-Gregg and Hammatt 2009a, Dye and Maly 2018). A total of four archaeological sites have been recorded in the project area and include a Dole Pineapple Harvester (Machine 1) recorded as SIHP #50-40-98-02001, a historic culvert headwall recorded as SIHP #50-40-98-6649, and two historic wood-frame buildings consisting of the Koʻele Grammar School (CSH-2), and the Palawai School Richardson House (CSH-3) formerly documented as Structure A of the Kō‘ele District, SIHP #50-40-98-1004. A map showing previous archaeological studies within the project area, historic properties, and the former locations of the buildings in the project area is presented in Figure 28.
The Koele Grammar School (CSH-2), and Structure A of SIHP #1004, the Palawai School/Richardson House (CSH-3) were relocated to the project area through community efforts to preserve the structures during the development of Kōʻele in the 1980’s (Moriya 1988). The condition and history of each structure was fully documented in Historic American Buildings Survey (HABS) surveys conducted by Mason Architects Inc. in 2017 (Ruzicka 2017a and 2017b). The HABS survey provided the following historical context for the Koele Grammar School (CSH-2):

“The two-room Koele Grammar School was built by March of 1927, and by the 12th of that month it was occupied. The building was financed by the County of Maui, for an unknown amount over $1500. It was built about a half mile from the Koele Ranch Camp, to the south, across Iwiole Gulch on the site of what would become the Cavendish Golf Course. Students from Koele Ranch and from Lanai City attended. Eighth grade graduation ceremonies from Koele Grammar School were held at the Lanai Theater in Lanai City. In September 1928, the people of Lanai City changed to Lanai City School.

By the mid-1930’s, school children of the Hawaiian Pineapple Co. (HAPCo) employees had expanded public school enrollment on Lanai to such a degree that additional classes were held in the Lanai Japanese School and in the HAPCo plantation gymnasium. By about 1937 the Koele Grammar School complex consisted of at least two buildings, the 1927 two room building and another four room building.

In January 1938, the Lanai High and Elementary School was opened at its present location on Fraser Avenue. The buildings of the Koele Grammar School complex were moved, in sections, to this new high school site. During the 1970’s the Koele Grammar School, on its second site at the high school campus near 7th and Fraser Avenues, was used as a meeting hall for the Lanai City chapter of the Boy Scouts of America. At some time after 1976, the two room Koele Grammar School building was moved to its present location.” (Ruzicka 2017a:2-3)

The Palawai School/Richardson House (CSH-3) was previously documented as Structure A of SIHP #1004. The HABS survey provided the following historical context for the Palawai School/Richardson House (CSH-3):

“The Palawai School was built ca. 1910 by Charles Gay near the lower end of Keaaku Gulch where it opens into Palawai basin, about 2 miles south of Koele. The school was built like a house and had one classroom. Palawai was chosen for the location of the school because of its central location; students came from Koele, Malaeua, and Waiapaa. At the time it was built, another schoolhouse was located at Keaomuku on the northeast coast of Lanai. Sometime about 1920-22, the Palawai School was moved to Koele, and set up at a site where the 7th green of the Cavendish Golf Course is today. In 1922 the school became part of the public school system of the Territory of Hawaii. The Palawai (Koele) School ceased functioning as a classroom in 1927, when the two room Koele Grammar School was built a short distance away.

Ca. 1927, with the construction of the new Koele Grammar School, the Palawai (Koele) School was moved to the Koele Ranch Camp by Morikazu Kawano, who was a carpenter for the ranch. The building was moved by dismantling and reassembling, and it became a residence. It was set up within a cluster of residential buildings at the north corner of the Ranch Camp. Kawano was the first of several successive occupants of the building, including ranch saddle marker Simeon Kauakahiau and his family. In 1946 the building became the home of John and Hannah Richardson. The building underwent numerous alterations since the time it was a one room school house, including a kitchen addition, bathroom, and the partitioning of the original single class room.

The Richardsons occupied the building until ca. 1986, when the Koele Lodge was being built. At that time, the Palawai School (Richardson House) was moved from Koele to its present site near the Lanai Power Plant.” (Ruzicka 2017b:2-3)

The HABS surveys were conducted in response to a survey conducted by the City and County of Maui that documented the structures in disrepair and recommended mitigation for their demolition. The HABS surveys were submitted to SHPD on October 12, 2018 (Log No. 2018.02441, Log No. 2018.02442). The field survey conducted by Honua Consulting in 2019 indicated the buildings were demolished sometime between March of 2017 and November of 2019 and are no longer extant within the project area (Thurman 2019a).

A pineapple harvester “Machine 1” was moved into the project area for preservation purposes by Castle and Cooke in March of 2010. It had been parked in the Miki area since the end of commercial pineapple cultivation in the early 1990’s. The harvester was photo documented and a detailed assessment of its condition was undertaken as part of a letter report providing recommendations on possible restoration and interpretive display. Albert Morita’s letter report is included as Appendix C (Morita 2010). It was subsequently documented in the same location during the AIS survey for the current project and a field inspection to relocate sites within the project area in 2019 and remains in its current location (Lee-Greig and Hammatt 2009a and Dye and Maly 2018a).

3.1.1 Hammatt and Borthwick 1993a

In 1993, Cultural Surveys Hawai’i (CSP) conducted an archaeological inventory survey for the proposed Kōʻele Waste Water Treatment project which connected the Lānāʻi Treatment plant with the Kōʻele Golf Course irrigation system (Hammatt and Borthwick 1993a). The survey consisted of the pedestrian reconnaissance of a 13,000 ft long (4000 m), 100-150 ft (30-40 m) wide wastewater pipeline corridor, a portion of which ran through the east-northeastern portion of the current project area. No historic properties, subsurface deposits, or cultural materials were documented. The lack of archaeological sites identified during the survey was attributed to use of the area for commercial pineapple cultivation.

3.1.2 Lee-Greig and Hammatt 2009a, Dagan et al. 2009b

In 2009, CSP conducted an archaeological inventory survey and a cultural impact assessment for a 73-acre parcel for the Lānāʻi Affordable Housing project (Lee-Greig and Hammatt 2009b, Dagan et al. 2009b) which included a portion of the current project area. The inventory survey consisted of a pedestrian survey and the excavation of five backhoe trenches. The study documented a historic culvert headwall (SIHP #50-40-98-6649) within the current project area.
during the pedestrian survey (Figure 29). The headwall was constructed of four courses of cut basalt held together by fine sand aggregate mortar with a thin white layer of plaster that was peeling off the south face of the wall. The top of the wall was inscribed with the date “1948” and the name “H. Shimono or Shimong” (Lee-Greig and Hammatt 2009:32). The culvert headwall was determined to likely be related to the expansion of Lāna’i City and the development of the associated drainage system (Lee-Greig and Hammatt 2009:55). The study determined the site was eligible for the State Register under significance Criterion d, due to its potential to yield information important for understanding the history of the region, and no further work was recommended.

Figure 29. Photo of SHP # -6649, a historic culvert headwall documented within the project area (Lee-Greig and Hammatt 2009:34, Figure 20)

Additionally, two 1920’s wood frame buildings documented as CSH-2 and CSH-3 were documented outside of their project area during the survey. CSH-2 was identified as a building associated with the Kōʻeʻe School complex (Koeele School Building) and CSH-3 was identified as the original Kōʻeʻe single-room schoolhouse (Palawai School Building). The buildings were moved into the Hōkūao 201-H Housing Project area through efforts of community groups. “Around 1985-1986 and through the efforts of Lānaian for Sensible Growth, Hui Malama Pono o Lānaʻi, and the community of Lānaʻi, the two structures were relocated to the bottom of Ninth Street and intended for preservation, restoration, and incorporation into the landscape at Kōʻeʻe as part of a heritage program through an agreement with Castle and Cooke Resorts” (Lee-Greig and Hammatt 2009:56). Both structures were documented in extreme disrepair during the Lee-Greig and Hammatt (2009) study. However, they were still assessed as eligible for listing on the Hawai‘i Register of Historic Place (State Register) under Criterion d (Lee-Greig and Hammatt 2009:32).

No cultural materials or subsurface deposits were documented in any of the backhoe trenches excavated. The lack of sites in the project area was attributed to modification of the area for commercial pineapple production and the development of Lānaʻi City.

3.1.3 Dye and Maly 2018a

In 2018, T.S. Dye conducted an archaeological inventory survey for the proposed Hōkūao 201-H Housing project which contained the current project area. (Dye and Maly 2018a). The survey consisted of a pedestrian reconnaissance and the excavation of 26 backhoe trenches (Test Pits 1-26) throughout the 105-acre project area. Eight trenches (Test Pit 1, 5, 6, 7, 8, 23, 24, and 25) were situated within the current project area (Figure 30). Trenches measured approximately 2 m long by 0.8 m wide and over 1 m in depth. Test Pit 1 was excavated in the east side of the project area and was placed there because historically, that area was not utilized for pineapple cultivation; whereas all other trenches were in former pineapple fields. Documented stratigraphy found all trenches to contain dark reddish brown terrestrial soils. Photos of trenches conducted within the current project area are provided as Figure 31. Test Pits 5-7, 23, and 24 contained pieces of black plastic mulch extending from the surface to approximately 47 cm below the surface (cmbs), representing the former plow zone. Test Pits 24 and 25 were discussed as indicating the degree of modern activity within the project area. Test Pit 24 was capped by a thick layer of asphalt and Test Pit 25 included a red soil fill layer with black plastic mulch to 15 cmbs over the top of layers of imported sand fill to 65 cmbs, followed by the ubiquitous terrestrial soils documented throughout the project area. No artifacts or cultural deposits were documented in any of the backhoe trench excavations. The lack of sub-surface sites or deposits was attributed to the area being under pineapple cultivation for many years.

Three potential historic properties were documented during the surface survey and include two historic wood-frame buildings from the Kōʻeʻe School complex and a pineapple harvester, all of which were moved to the area for preservation purposes in the mid-1980’s. The two wood-frame buildings, the Koeele Grammar School Building (CSH 2) and the Palawai School Building (CSH 3), were originally documented during an archaeological inventory survey in 2009 (Lee-Greig and Hammatt 2009b). The structures were assessed to be in poor condition at that time and had become more dilapidated and overgrown since. The Dye and Maly (2018a) study also assessed the buildings to be in poor condition and as lacking the integrity to be listed on the Hawai‘i Register of Historic Places.

A pineapple harvester in the possession of the Lānaʻi Culture and Heritage Center was located on the property and was assessed as possessing sufficient integrity for listing under Criterion a, due to its association with commercial pineapple pursuits on the island. It was recommended that the machine be moved to an off-site sheltered location for restoration and interpretative display which was later revised due to its condition. However, in September of 2020 it was found that the harvester had degraded to a point in which it was not recommended to be salvageable and is a safety concern (Appendix D).
Figure 30. Aerial imagery showing locations of test trenches excavated during the AIS (Dye and Maly 2018a)

Figure 31. Profile Photos from Dye and Maly (2018a) showing trenches excavated within the current project area (Top to Bottom, Left to Right: Test Pit 1, 5; 6, 7; 8, 23; 24, 25)
3.1.4 Thurman 2019a

In 2019, Honua Consulting conducted an impromptu field inspection for four previously recorded historic properties within the Hōkūloa 201-H Housing project area (Thurman 2019a). The field inspection could not relocate the structures documented as the Koele Grammar School Building (CSH-2) and Palawai School Building (CSH-3). Only thick overgrowth was observed at their former locations. The pineapple harvester, “Machine 1”, was located in the same location as previously documented by Dye and Maly (2018a) (Figure 32). It was surrounded by a chain-link fenced area that was heavily overgrown and was in the same general rusty condition as previously described. Photos and a GPS location were taken for the harvester and it was later designated as SIHP #50-40-98-02001. The historic culvert headwall (SIHP # -6649) was observed and found to be in the same condition as previously described (Lee-Greig and Hammatt 2009). The study assessed the two sites for integrity, due to the lack of this assessment in prior studies. The purpose of the survey was only to relocate the existing sites and conduct integrity assessments therefore no further survey was conducted and no additional cultural materials were observed or collected.

Figure 32. Photo of SIHP # -2001, a Dole pineapple harvester present within the current project area

3.2 Nearby Archaeological Studies

Island-wide surveys of Lāna‘i that included the area were conducted during the early-20th century by Emory (1924) and later by Hommon (1974). Aside from these studies, archaeological investigations in the area began in the mid-1980’s with development of the area for the Koele Hotel and golf course which would later become the Four Seasons Resort at Kō‘ele. Archaeological studies conducted in the area have been in support of infrastructure and development projects associated with the Four Seasons Lodge at Kō‘ele, the Kō‘ele Golf Course, and various other recreational and residential properties. Previous archaeological studies and documented sites within 1.5 miles of the project area are presented in Figure 33, Figure 34, and Table 5.

3.2.1 Emory 1924 and 1969

The first archaeological survey of Lāna‘i Island was conducted by Kenneth Emory of the Bishop Museum in 1924 (Emory 1924, Emory 1969). The study is an archaeological and ethnographic description of the island, which broadly summarizes the Hawaiian cultural traditions of Lāna‘i. It includes discussions on the traditional oral histories, place names, material culture, and archaeology of the island geographically organized around an inclusive gazetteer that is keyed to numbers on an accompanying map. It should be noted that the numbers on Emory’s map refer to places of cultural interest but not necessarily places of archaeological interest. The survey primarily documented the larger archaeological sites of the island, the most remarkable of which is the village of Kaumōli, located on the southwestern shore of the island. No sites were documented within the current project area.

The closest sites documented to the current project area during Kenneth Emory’s island wide survey include a stone house terrace at Kana‘ena‘e (SIHP #50-40-98-009) and an excavated terrace at Puluhua (SIHP #50-40-98-107) far to the south of the project area.

3.2.2 Statewide Inventory of Historic Sites, Hommon 1974

The next archaeological survey of the island of Lāna‘i was conducted five decades later during the statewide inventory of archaeological sites in 1974. The focus of the survey was the relocation and documentation of previously identified archaeological sites for inclusion in the new State Inventory of Historic Places system. It was during this time that State Inventory of Historic Places numbers were assigned. Since searching for new archaeological sites was not the focus of the survey, site identification was left for future studies.

The only site documented nearby was the Kō‘ele District, SIHP #50-40-98-1004, an approximately 66.8-acre area associated with the ranching era and commercial pineapple production, spanning from the 1870s-1951. The Kō‘ele District was originally described on the Hawai‘i Register of Historic Places (HRHP) form as a “complex of buildings including two office structures, a church, and a house” (Wright 1974:1). The structures included a house once used as the Koele School House, the Ka Lokahi Oka Malanilama Hoomana Na‘auao O Hawai‘i Church, and 2 house/office structures. The site was assessed as having “moderate” value, “reserve” status, and was determined significant as the former location of the Lanai Ranch Headquarters and its association with the growth and development of Lāna‘i.
Figure 33. Portion of a 2013 Lāna‘i USGS topographic quadrangle map showing previous archaeological studies within 1.5 miles of the project area.

Figure 34. Portion of a 2013 Lāna‘i USGS topographic quadrangle map showing documented sites in the vicinity of the project area.
Table 5. List of Previous Archaeological Studies in the Vicinity

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Type of Study</th>
<th>Location</th>
<th>Findings (SIHP #50-40-98)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emory 1924, Emory 1969</td>
<td>Archaeological Investigation</td>
<td>Island-Wide</td>
<td>Closest sites include a stone house terrace at Kana‘ena‘e (SIHP # -099) and an excavated terrace at Pulehua (SIHP # -107)</td>
</tr>
<tr>
<td>Hommon 1974</td>
<td>Inventory of Historic Sites</td>
<td>State-Wide</td>
<td>Recorded the Kō‘ele District, SIHP # -1004</td>
</tr>
<tr>
<td>Wright 1974</td>
<td>Hawai‘i Register of Historic Places</td>
<td>Koele Hotel (Four Seasons Lodge at Kō‘ele)</td>
<td>Kō‘ele District, SIHP # -1004, a complex of buildings including a house once used as the Koele School House, the Ka Lokahi Oka Malamalama Hoomana Na‘auo O Hawai‘i Church, and 2 house/office buildings</td>
</tr>
<tr>
<td>Kaschko 1986</td>
<td>Archaeological Reconnaissance and Sub-Surface Testing</td>
<td>Koele Hotel (Four Seasons Lodge at Kō‘ele)</td>
<td>Kō‘ele District, SIHP # -1004, including previously documented buildings (Features A-D, respectively) and 2 newly documented (Feature E: dry reservoir, and Feature F: house)</td>
</tr>
<tr>
<td>Hammatt 1987</td>
<td>Archaeological Reconnaissance</td>
<td>Lalakoa III Subdivision, Lāna‘i City, TMK: (2) 4-9-02, Lot 768</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Estiko-Griffin 1988, Pietruszewsky 1988</td>
<td>Letter Report, Osteological Analysis</td>
<td>Keomuku Road, TMK: (2) 4-9-002: por. 1</td>
<td>Recorded SIHP # -1528, a pre-contact subsurface cultural deposit and juvenile burial</td>
</tr>
<tr>
<td>Hammatt and Borthwick 1988</td>
<td>Archaeological Investigation (Surface Collection)</td>
<td>Lalakoa III Subdivision, Lāna‘i City, TMK: (2) 4-9-14, por. 1</td>
<td>Seventy-five secondarily deposited lithic artifacts were collected and analyzed, artifacts were attributed to an off-site source, no site number designated</td>
</tr>
<tr>
<td>Hammatt et al. 1988</td>
<td>Archaeological Investigation (Excavation and Monitoring)</td>
<td>Lanai Ranch Headquarters at Kō‘ele (Four Seasons Lodge at Kō‘ele)</td>
<td>Excavations encountered over1,000 historic-era artifacts ranging from the 1870’s to the 1930’s from two trash pits associated with the Kō‘ele District (SIHP # -1004); Monitoring documented 9 historic features including a cesspool, charcoal and ash concentrations, an imu, a dry well, a possible fire pit, a cistern, and trash deposits</td>
</tr>
<tr>
<td>Borthwick and Hammatt 1989</td>
<td>Archaeological Reconnaissance</td>
<td>Waialua Multi-Family Housing, TMK: (2) 4-9-08:12, 13</td>
<td>A single basalt flake collected; no site number designated</td>
</tr>
<tr>
<td>Hammatt and Borthwick 1989</td>
<td>Archaeological Reconnaissance</td>
<td>Kō‘ele Golf Course, Kō‘ele Single-Family Housing, Queen’s Multi-Family Housing, and Olopu Woods Subdivision</td>
<td>Six features documented at the Kō‘ele Golf Course, Features 1-3 later became SIHP # -1592 (reservoir), SIHP # -1593 (reservoir), SIHP # -1594 (ditch system), SIHP # -1595 (historic debris associated with the Charles Gay Lilikoi homestead), and SIHP # -1596 (volcanic glass quarry)</td>
</tr>
<tr>
<td>Hammatt and Borthwick 1990</td>
<td>Archaeological Survey</td>
<td>Kō‘ele Golf Course</td>
<td>A late-19th century ditch and charcoal scatter associated with the Kō‘ele reservoir complex, no site number designated at that time but later subsumed within as previously-recorded SIHP # -1594 (ditch system)</td>
</tr>
<tr>
<td>Hammatt and Chiogioji 1992</td>
<td>Archaeological Investigation</td>
<td>Waialua Single Family Housing</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Borthwick and Hammatt 1992</td>
<td>Archaeological Investigation</td>
<td>Kō‘ele Reservoir and Access Road</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Type of Study</td>
<td>Location</td>
<td>Findings (SIHP #50-40-98)</td>
</tr>
<tr>
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</tr>
<tr>
<td>Hammatt and Borthwick 1993a</td>
<td>AIS</td>
<td>Pipeline Connecting Lāna‘i Treatment Plant and the Kō‘ele Golf Course; Within Project Area</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Hammatt and Borthwick 1993b</td>
<td>Data Recovery</td>
<td>Kō‘ele Golf Course</td>
<td>Data recovery of SIHP # -1592 (reservoir), SIHP # -1593 (reservoir), SIHP # -1594 (ditch system), SIHP # -1595 (historic debris associated with the Charles Gay Līlākau homestead), and SIHP # -1596 (surface lithic scatter), no subsurface deposits or artifacts recorded</td>
</tr>
<tr>
<td>Hammatt and Chiogioji 1993</td>
<td>AIS</td>
<td>Lāna‘i Veterans Cemetery, TMK: (2) 4-9-002:001 por.</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Creed et al. 2000</td>
<td>AIS</td>
<td>50-acre Hawaiian Home Lands Parcel, TMK: (2) 4-9-002</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Fredericksen 2002</td>
<td>AIS</td>
<td>Lāna‘i Police Station, TMK: (2) 4-9-14-1 por. and 11 por.</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Raymond 2003</td>
<td>Cultural Resources Investigation</td>
<td>Lāna‘i Summit Fence</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Hammatt and Shideler 2004, Lee-Greig and Hammatt 2007</td>
<td>AIS, Preservation Plan</td>
<td>Lower West Slope of Niniwai Hill, TMK: (2) 4-9-01: por. 2, Documented four sites, SIHP # -1946 (Kihāmāniania Church), SIHP # -1947 (the church’s associated graveyard), SIHP # -1600 (a historic “altitude breaker”), and SIHP # -1601 (historic improved trail)</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Conley-Kapoi and Hammatt 2005</td>
<td>AIS, (AA Report)</td>
<td>7.673 acre-parcel, TMK: (2) 4-9-014:018</td>
<td>No sites recorded</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Type of Study</th>
<th>Location</th>
<th>Findings (SIHP #50-40-98)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lee-Greig and Hammatt 2005</td>
<td>Field Inspection</td>
<td>Court Family Housing</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Lee-Greig and Hammatt 2006</td>
<td>Archaeological Monitoring</td>
<td>Lower West Slope of Niniwai Hill, TMK: (2) 4-9-18: por. 3</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Dagan and Hammatt 2009</td>
<td>Archaeological Monitoring</td>
<td>2 Million Gallon Water Tank, Lāna‘i City, TMK: (2) 4-9-01: por. 3</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Hill et al. 2009, Dagan et al. 2009a</td>
<td>Literature Review and Field Inspection, Cultural Impact Assessment (CIA)</td>
<td>Lāna‘i Senior Center, TMK: (2) 4-9-006:006</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Lee-Greig and Hammatt 2009a, Dagan et al. 2009b</td>
<td>AIS, CIA</td>
<td>Lāna‘i City Affordable Housing Project, TMK: (2) 4-9-002:58 por. and por. of (2) 4-9-014:001, 009, and 011; Within Project Area</td>
<td>One site within their project area, SIHP # -6649 (historic culvert headwall), and two wood-framed historic school buildings outside the project area (within the current project area), the Koele Grammar School Building (CSH-2) and Palawai School Building (CSH-3)</td>
</tr>
<tr>
<td>Lee-Greig and Hammatt 2009b, Dagan et al. 2009c</td>
<td>AIS (AA Report), Cultural Impact Assessment (CIA)</td>
<td>Lāna‘i High and Elementary School Expansion, TMK: (2) 4-9-002:058 por</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Madeus et al. 2010, Cordova et al. 2010</td>
<td>Literature Review and Field Inspection, CIA</td>
<td>Lāna‘i Community Health Center, TMK: (2) 4-9-006: por. of 11</td>
<td>No sites recorded, presents a review of an architectural study of three small multi-family buildings removed prior to construction of the center</td>
</tr>
<tr>
<td>Pfennig et al. 2014</td>
<td>Archaeological Monitoring</td>
<td>Lāna‘i High and Elementary School, TMK: (2) 4-9-014:002</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Type of Study</td>
<td>Location</td>
<td>Findings (SIHP #50-40-98)</td>
</tr>
<tr>
<td>---------------------------</td>
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<td>----------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>DiVito et al. 2015</td>
<td>AIS (AA Report)</td>
<td>Miki Basin Pipeline, Central Services Warehouse, Multi-Purpose Field, TMK: (2) 4-9-0012:001 and (2) 4-9-014:0011</td>
<td>Multi-Purpose Field project area was near the current project area, no sites recorded</td>
</tr>
<tr>
<td>Dye and Maly 2015</td>
<td>Archaeological Assessment</td>
<td>Proposed Helistop Pads, TMK: (2) 4-9-002:001 por.</td>
<td>Secondarily deposited traditional and historic artifacts collected from five locations outside the project area, no sites recorded</td>
</tr>
<tr>
<td>Dye and Maly 2016</td>
<td>AIS</td>
<td>Lāna'i Well #7, TMK: (2) 4-9-002:001 por.</td>
<td>Documented a fire pit, SIHP # -1984 and collected secondarily deposited traditional Hawaiian artifacts from two locations</td>
</tr>
<tr>
<td>Dye and Maly 2017a</td>
<td>AIS (AA Report)</td>
<td>Kō'ele Adventure Center, TMK: (2) 4-9-018:003 (Four Seasons Resort Lodge at Kō'ele)</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Dye and Maly 2017b</td>
<td>AIS (AA Report)</td>
<td>Construction Staging Area, Four Seasons Resort Lodge at Kō'ele, TMK: (2) 4-9-002:001 por.</td>
<td>No sites recorded</td>
</tr>
<tr>
<td>Dye and Maly 2017c</td>
<td>AIS</td>
<td>Four Seasons Resort Lodge at Kō'ele, TMK: (2) 4-9-018:001</td>
<td>Ranch-era trash pit documented and removed, likely associated with Kō'ele District (SIHP # -1004)</td>
</tr>
</tbody>
</table>
Previous Archaeological Research

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Type of Study</th>
<th>Location</th>
<th>Findings (SIHP #50-40-98)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thurman 2019a</td>
<td>End of Fieldwork Report</td>
<td>Hōkūloa 201-H Residential Project, TMK; (2) 4-9-000-61 por., (2) 4-9-014-001 por., (2) 4-9-014-009 por., and TMK; (2) 4-9-014-011, Within Project Area</td>
<td>Relocated previously recorded SIHP # -6649, a historic culvert headwall, relocated a previously recorded pineapple harvester (later assigned as SIHP # -02001), and documented the absence of the Kokele Grammar School Building (CSH-2) and Palawai School Building (CSH-3), also previously documented as Structure A of SIHP # -1004, indicating they had likely been destroyed</td>
</tr>
<tr>
<td>Thurman 2019b</td>
<td>End of Fieldwork Report</td>
<td>Malana Estates Housing Project; TMK; (2) 4-9-021-001, 003, 006, 011, 020, 021</td>
<td>No sites recorded within the project area</td>
</tr>
</tbody>
</table>

Additional sites documented in Kamoku Ahupua'a during the Statewide Inventory of Historic Sites (Hommon 1974) were mostly house platforms located at the mouths of the gulches along the coast and were documented as an historic district known as the Kamoku Complex, SIHP #50-40-98-204. The Kamoku Complex is comprised of House Sites at Kaumālāpua'a, SIHP #50-40-98-098; Kamoku House Site, SIHP #50-40-98-106; Kalanani Complex, SIHP #50-40-98-103, Kalanaki Complex, SIHP #50-40-98-104; Kei Complex, SIHP #50-40-98-113; Keone Complex, SIHP #50-40-98-100; Naupaka Complex, SIHP #50-40-98-105; and Anapuka House Sites, SIHP #50-40-98-109. These sites are located well outside the project area, approximately 5 miles (8 km) to the west.

Following his work on the statewide inventory of historic places, Robert Hommon outlined his impression of the archaeology of Lāna'i Island. This was done in order to protect the cultural resources of the island and to guide future archaeological investigations. In his comments on the archaeology of the island Hommon states that:

Through a happy set of circumstances, the archaeology of Lāna'i is almost entirely intact. Despite the fact that nearly 20% of the area of the island is under cultivation for pineapple, less than 2% of the archaeological features recorded by Emory in the early 1920's have been destroyed in the process. The reason for this is that most of the ancient population lived along the coast, and the pineapple plantation is situated on the central plateau. Today, most of the coastal sections of Lāna'i are visited only by fishermen, who leave the ancient sites undisturbed.

The high degree of preservation on Lāna'i is in sharp contrast to the situation on the five larger islands in the group, where numerous sites have been expunged from the landscape by ranching, agriculture, and urban and resort development. (Hommon 1974:1)

Hommon also recommended that due to the completeness of the archaeological record an island-wide research design be developed. This recommendation was in response to a development plan by Castle and Cooke that would have substantially altered a large portion of the island. However, the development plans never materialized, and no island-wide research design is known to have been written.

3.2.3 Kaschko 1986

In 1986, International Archaeological Research Institute Inc. (IARI) conducted an archaeological reconnaissance survey with limited subsurface testing for the Kokele Hotel, now known as the Four Seasons Lodge at Kōʻeʻele (Kaschko 1986). The survey consisted of a pedestrian survey and the excavation of 20 auger tests to depths ranging from 100-140 cm below the ground surface (cmbs). Features of the Kōʻeʻele District (SIHP # -1004) were presented. No subsurface deposits were encountered in any of the auger excavations. Sparse artifacts were observed on the ground surface, including marine shell, old bottle glass, and ceramic fragments. It was also noted that during routine work near a nursery area a quadrangular polished adze was found by grounds workers. The lack of prehistoric archaeological sites was attributed to overgrazing and use of the area for ranching. It was also noted that historic ranch-associated deposits were likely to be present.

The Kōʻeʻele District (SIHP # -1004) was described within Kaschko (1986) as containing four previously documented features and two newly documented features. Previously documented features included a house once used as the Kokele School House (Structure A, also referred to as the “Richardson House” and known as the oldest house in Kōʻeʻele), the Ka Lokahi Oka Malamalama Hoomana Na‘auao O Hawai‘i Church (Structure B, built in 1930), and 2 house/office buildings (Structures C and D) as well as a George Oahashi house (Kaschko 1986:10). Structures C and D were dismantled and moved from the Maunalei Sugar Plantation to the north of Kōʻeʻele sometime between 1902-1917 as a result of a lack of water in the Kōʻeʻele area (Kaschko 1986:16, Hammatt 1988:35). It was noted that while at Kōʻeʻele, Structure D had been used as the ranch office and once had an addition which served as a store with a post office (Kaschko 1986:17). The study included two new features within the Kōʻeʻele District, including an old reservoir (Structure E) and the Ernest and Rebecca Richardson house (Structure F). The reservoir was thought to have been constructed circa 1900 and was used to water livestock. Figure 35 provides a map of the Kōʻeʻele District showing locations of all these features.

A description of the Kōʻeʻele District property is described by Mr. Ernest Richardson and provided by Kaschko (1986). The description states that in 1926 when Mr. Richardson arrived he was 16 years old and the ranch was thriving:

Kokele was a community composed of more than 30 major buildings, including the ranch manager’s house, the office and store, bachelor quarters, the stables, a blacksmith shop, etc. as well as many regular houses...after the pineapple plantation started up the size of the ranch settlement at Kokele slowly declined. The ranching operation ceased entirely in 1951, and the old ranch manager’s house was torn down in about 1953 or 1954. The old reservoir (Structure E) went out of use about 1945 or 1946, and Mr. Richardson used it as an arena for training horses after this. (Kaschko 1986:11)
Several of the houses documented within the Kōʻele District (SIHP # -1004) have been relocated. The old Koele School House (Structure A) was moved to a location just outside Lānaʻi City. The building was documented in disrepair during two archaeological surveys of that area for the Lānaʻi City Affordable Housing project (Lee-Greig and Hammatt 2009b) and the Hō Kiau 201-H Residential project (Dye and Maly 2018a). Due to the building being exposed to the elements for many years it was assessed as lacking sufficient integrity to be listed on the National Register of Historic Places (NRHP) (Dye and Maly 2018a:135). The church building (Structure B) has also been moved and is currently situated adjacent to Keomoku Road on the front lawn of the Lodge at Kōʻele, a short distance west of its original location. The two house/offices buildings (Structures C and D) were moved to the north of the hotel property during its construction in the late 1980’s. One of the houses is currently occupied by tenants and the other is the office for the Culture and Historic Preservation Division of Pālama Lānaʻi.

3.2.4 Hammatt 1987
In 1987, Cultural Surveys Hawaiʻi (CSH) conducted an archaeological reconnaissance for the Lalakoa III subdivision, located within Lānaʻi City (Hammatt 1987). The results of the reconnaissance survey indicated that long-term use of the area for pineapple cultivation had destroyed any historical or archaeological remains that might have been deposited there. The proposed subdivision was determined to have no impact on archaeological resources and no historic properties were documented.

3.2.5 Estioko-Griffin 1988, Pietrusewsky 1988
In 1988, Agnes Estioko-Griffin and Matt Spriggs documented SIHP #50-40-98-1528, a subsurface cultural deposit and an associated juvenile burial exposed during improvements to Keomuku Highway (Estioko-Griffin 1988). The site is interpreted to date to the pre-contact Hawaiian period based on radiocarbon dating of unidentified wood charcoal. The osteological analysis was conducted by Dr. Michael Pietrusewsky of the University of Hawaiʻi at Manoa (Pietrusewsky 1988).

3.2.6 Hammatt and Borthwick 1988
In 1988, CSH conducted an archaeological investigation for the Lalakoa III subdivision (Hammatt and Borthwick 1988). The investigation included the surface collection of 71 basalt artifacts and 4 volcanic glass flakes. The basalt artifact assemblage was comprised of basalt flakes, retouched basalt flakes, and adze preforms. Subsurface excavations included a single test pit excavated in the northeast portion of the project area to a depth of 100 cmbs. A cut bank profile in the northwest corner of the project area was also documented. A plow zone ranging in depth from 30-40 cmbs over B and C horizons was documented throughout the project area. The basalt materials on the property were found in association with quarried road gravel presumably taken from near the Kʻoʻi Adze Quarry in Pālīwai Basin and were attributed to that source. Due to the lack of subsurface remains on the property no further work was recommended.

3.2.7 Hammatt et al. 1988
In 1988, CSH conducted an archaeological investigation and monitoring of a 20-acre parcel for the Four Seasons Lodge at Kōʻele, located adjacent to the current project area (Hammatt et al. 1988). Excavations were conducted on two historic ranch-era trash pits found near the former Lanai Ranch Headquarters (inferred as part of the Kōʻele District [SIHP # -1004]). Over 1,000 artifacts dating from the 1870’s to 1930’s were recovered during the project and contributed much to the knowledge of ranch life at Kōʻele. The report provides a comprehensive background on Lanai Ranch.

Archaeological monitoring was also conducted for the project. A total of nine historic features were documented including a circa 1970s cesspool (Feature 1), a charcoal and ash concentration (Feature 2), an imu pit (Feature 3), a circa 1970s drywell (Feature 4), a possible fire pit containing bottle glass (Feature 5), an ash and charcoal deposit containing historic refuse (Feature 6), a possible cistern (Feature 7), historic refuse (Feature 8), and a portion of large trash pit (Feature 9) which was also excavated by hand earlier in the project.

Hammatt et al. (1988:36) noted that during their study the “only buildings remaining of the ranch days were John and Hannah Richardson’s house [Structure A], Ernest and Rebecca Richardson’s house [Structure F] the small Sunday School building and the church building..."
3.2.8 Borthwick and Hammatt 1989

In 1989, CSH conducted a reconnaissance survey of the Waialua Multi-Family Housing Project, now known as the Iwiole Dormitories (Borthwick and Hammatt 1989). A single basalt flake was collected during the project and the area was determined to have been disturbed during cultivation activities in the area. No historic properties or intact subsurface deposits were recorded.

3.2.9 Hammatt and Borthwick 1989

In 1989, Cultural Surveys Hawai‘i (CSH) conducted reconnaissance surveys of four localities in Lāna‘i City, including the Kō‘ele Golf Course, Kō‘ele single-family housing, Queen’s multi-family housing, and the Olopu Woods subdivision (Hammatt and Borthwick 1989). No historic properties, subsurface deposits, or cultural materials were observed at the Kō‘ele single-family housing, the Queen’s multi-family housing, or the Olopu Woods subdivision. The lack of sites was attributed to the areas being under pineapple cultivation for many years.

3.2.10 Hammatt and Borthwick 1990

In 1990, CSH conducted an addendum AIS for an additional 100 acres of land associated with the Kō‘ele Golf Course (Hammatt and Borthwick 1990). The survey consisted of pedestrian reconnaissance across the entire project area. An eroded 600 ft long ditch associated with the late-19th century Kō‘ele reservoir complex was documented along the southwest side of Kahiolena Gulch. The ditch was interpreted as being used for flood water diversion and did not empty into any of the reservoirs. An associated charcoal deposit was documented in alluvial sediments truncated by the ditch and was attributed to clearing of the area for the construction of the reservoirs. No site number was designated for the drainage ditch.

3.2.11 Borthwick and Hammatt 1992

In 1992, CSH conducted an archaeological assessment for the proposed Kō‘ele Reservoir and access road (Borthwick and Hammatt 1992). The survey consisted of pedestrian reconnaissance of a 100 ft wide, 900 ft long access road corridor and the approximately 3-acre reservoir. No historic properties, subsurface deposits, or cultural materials were documented. The lack of sites documented during the project was attributed to the steep soil slope of the project area.

3.2.12 Hammatt and Chiogioji 1992

In 1991, CSH conducted archaeological monitoring for a short length of sewer line located within the Waialua Annex subdivision (Hammatt and Chiogioji 1992). The plow zone was observed in the trench to a depth of 70 cmbs and no historic properties, subsurface deposits, or cultural materials were documented during the project.

3.2.13 Hammatt and Borthwick 1993b

Following the AIS and Addendum AIS, monitoring and data recovery was conducted by CSH in 1990 for sites identified during the reconnaissance survey. The temporary features/sites were reconfigured and designated as State Inventory of Historic Places (SIHP) numbers (Hammatt and Borthwick 1993). The sites are primarily historic in age and include five historic properties, SIHP #s 50-40-98-1592 and 50-40-98-1593, historic reservoirs in Kahiolena Gulch, SIHP # 50-40-98-1594, a historic weir and ditch system located in Kahiolena Gulch, SIHP # 50-40-98-1595, a surface scatter of historic debris associated with the Charles Gay Homestead at Lālākoa, and SIHP # 50-40-98-1596, a surface scatter of pre-contact lithic artifacts. SIHP #’s -1592, -1593, and -1594 are located on the edge of the golf course and are focused around Kahiolena Gulch.
Data recovery excavations at the SHIP #1596 consisted of 4 backhoe trenches which documented the plow zone and natural A-horizon over undisturbed natural soil deposits. No artifacts or cultural deposits were documented in any of the trenches excavated and the site was assessed as no longer significant (Hammatt and Borthwick 1993:39).

3.2.14 Hammatt and Chiogioji 1993
In 1993, CSH conducted an archaeological inventory survey of a 1-acre parcel for the Lāna‘i Veterans Cemetery (Hammatt and Chiogioji 1993). The survey consisted of pedestrian reconnaissance of the project area. Heavy erosion was noted and no artifacts, surface architecture, or cultural deposits were observed during the project. Following the survey, no further work was recommended for the project.

3.2.15 Creed et al. 2000
In 2000, CSH conducted an archaeological inventory survey consisting of a pedestrian survey of a 30-acre Hawaiian Homelands parcel located at the northwest corner of Lāna‘i City (Creed et al. 2000). No cultural materials were observed, and no historic properties were recorded due to the use of the area for pineapple cultivation.

3.2.16 Raymond 2003
In 2003, the U.S. Fish and Wildlife Service conducted a cultural resources investigation for the Lāna‘i Summit Fence (Raymond 2003). The survey was conducted on a 7.5 km long 6 meter wide corridor. No cultural resources were identified in the project area. However, Hi‘i Heiau, SHIP #50-40-98-029, was relocated during the project approximately 25 meters northeast of the project corridor.

3.2.17 Raymond 2004, Lee-Greig and Hammatt 2007
In 2004, CSH conducted an archaeological inventory survey of sites located on the lower west slope of Niniwai Hill (Hammatt and Shideler 2004). During the project they documented and mapped Kihimāniana Church, SHIP #50-40-98-1946, and identified 18 burials within the associated graveyard, SHIP #50-40-98-1947. A historic “altitude breaker”, SHIP #50-40-98-1600, and a historic improved trail, SHIP #50-40-98-1601, were also documented during the project. The altitude breaker served to catch water running off Niniwai Hill and dissipate its force (Hammatt and Shideler 2004:39). No pre-contact sites or surface artifacts were observed. In 2007, a preservation plan was written for the Kihimāniana Church (SHIP # -1946) and its associated graveyard (SHIP # -1947) (Lee-Greig and Hammatt 2007).

3.2.18 Lee-Greig and Hammatt 2005
In 2005, CSH conducted an archaeological inventory survey for a 7.673-acre parcel northwest of Lāna‘i City (Conley-Kapoi and Hammatt 2005). Due to the negative survey results it was termed an archeological assessment. During the project, a pedestrian survey of 4.5 acres of the parcel was conducted. The remaining 3.3 acres was not surveyed as it was part of the previously developed Kanehu‘u Subdivision. No historic properties or cultural remains were documented during the project.

3.2.20 Lee-Greig and Hammatt 2005
In 2005, CSH conducted a field inspection for the Court Family Housing project (Lee-Greig and Hammatt 2005). No cultural materials or historic properties were identified during the pedestrian survey.

3.2.21 Lee-Greig and Hammatt 2006
In 2006, CSH conducted archaeological monitoring for a sewer pipeline extending down the slope of Niniwai Hill from Lauhala Place to Sixth Street (Lee-Greig and Hammatt 2006). Due to miscommunication, the excavation of the sewer line was not monitored and an after-the-fact inspection of 30-40 meters of trench was conducted. No historic properties, subsurface deposits, or cultural materials were documented during the project.

3.2.22 Dagan and Hammatt 2009
In 2006, CSH conducted archaeological monitoring for a two million gallon water tank at a 1.5-acre project area located at Kō‘ele (Dagan and Hammatt 2009). A cow bone, a glass marble and a glass insulator were collected during monitoring. No historic properties, subsurface deposits, or pre-contact artifacts were documented during the project.

3.2.23 Hill et al. 2009, Dagan et al. 2009a
In 2009, CSH conducted an archaeological inventory survey and cultural impact assessment for the proposed Senior Center at Lāna‘i City (Hill et al. 2009, Dagan et al. 2009a). No historic properties, subsurface deposits, or cultural materials were documented during the project.

3.2.24 Lee-Greig and Hammatt 2009b, Dagan et al. 2009c
In 2009, CSH conducted an archaeological inventory survey and cultural impact assessment for the Lāna‘i High and Elementary School expansion (Lee-Greig and Hammatt 2009b, Dagan et al. 2009c). Due to the negative results the project was termed an archaeological assessment. The assessment consisted of a pedestrian survey of the approximately 50-acre project area. No historic properties or cultural materials were documented during the project. The lack of sites was attributed to use of the area for commercial pineapple cultivation.

3.2.25 Madeus et al. 2010, Cordova et al. 2010
In 2010, CSH conducted a literature review and field inspection and CIA for the Lāna‘i Community Health Center (Madeus et al. 2010, Cordova et al. 2010). No historic properties, deposits, or artifacts were observed during the pedestrian survey of the property. Three historic multi-family homes on the property were removed prior to construction and the architectural survey of these structures is discussed in the report. They were determined to be non-contributing features of Lāna‘i City.

3.2.26 Pfennig et al. 2014
In 2014, CSH conducted archaeological monitoring for the Lāna‘i High and Elementary School (Pfennig et al. 2014). Modern trash was observed in all stratigraphic layers. No historic properties, subsurface deposits, or significant cultural materials were documented.
Previous Archaeological Research

3.2.27 DiVito et al. 2015
In 2013, T.S. Dye and Colleagues conducted an archaeological inventory survey for the Miki Basin Pipeline, the Central Services Warehouse, and a Multi-Purpose Field (DiVito et al. 2015). Due to the negative survey results the project was termed an archaeological assessment. The multi-purpose field was located within Lāna‘i City whereas the pipeline and warehouse areas were well to the south. A visual inspection of the multi-purpose field was conducted and eight shovel test probes extending to a depth of 60 cmbs were excavated. No historic properties, subsurface deposits, or cultural materials were documented.

3.2.28 Dye and Maly 2015
In 2015, T.S. Dye and Colleagues Archaeologists Inc. (T.S. Dye) conducted an archaeological assessment for two proposed Helistop pads, one near the Four Seasons Lodge at Kō‘ele and one near the Four Seasons Resort at Mānele (Dye and Maly 2015). The assessment consisted of a pedestrian survey at both locations. The Kō‘ele Helistop location borders is located approximately 480 meters southeast of the current project area and is adjacent to Keomuku Highway. Secondarily deposited basalt flakes, two polished adze flakes, glass, and rebar were collected from the ground surface at five separate locations outside the proposed helistop area. No artifacts were observed or collected from the surface of the proposed helistop pad. The secondarily deposited artifacts and lack of archaeological sites were attributed to the area being under commercial pineapple cultivation for many years.

Nothing was observed or collected from the ground surface of the Mānele Helistop pad. The lack of sites and artifacts were attributed to previous grading of the area for a nursery facility. Based on the negative field results it was determined that no historic properties would be affected by helistop construction.

3.2.29 Dye and Maly 2017a
In 2017, T.S. Dye conducted an archaeological inventory survey for the proposed Kō‘ele Adventure Center at the Four Seasons Resort Lodge at Kō‘ele (Dye and Maly 2017a). Due to the negative survey results the project was termed an archaeological assessment. The assessment consisted of a pedestrian survey of the 20.5-acre project area and the excavation of four shovel test probes. No historic properties, subsurface deposits, or cultural materials were documented.

3.2.30 Dye and Maly 2017b
In 2017, T.S. Dye conducted an archaeological inventory survey for a construction stockpiling and staging area at the Four Seasons Resort Lāna‘i, Kō‘ele (Dye and Maly 2017b). The assessment consisted of a pedestrian survey of the 3.1-acre project area and excavation of four backhoe trenches. No historic properties, subsurface deposits, or cultural materials were documented.

3.2.31 Dye and Maly 2017c
In 2017, T.S. Dye conducted an archaeological inventory survey for proposed improvements at the Four Seasons Resort Lāna‘i, Kō‘ele (Dye and Maly 2017c). Due to the negative survey results the project was termed an archaeological assessment. The survey consisted of a mixture of backhoe and shovel trenches in sixteen excavation areas. A single historic-era trash pit was documented during the project, containing materials similar to those documented in the ranching-era trash pits identified in the 1980’s (Hammatt et al. 1988). The trash pit is inferred to be part of the Kō‘ele District (SHP # -1004) although the site number is not stated in either Hammatt et al. (1988) or Hammatt et al. (1989).

Dye and Maly (2017c). Secondarily deposited artifacts from the demolition of ranch buildings were also observed. Dye and Maly (2017c) note that "excavations in the vicinity of the Lodge established that grading associated with development has removed the sediments typically investigated by archaeologists. The grading appears to have cut well into the subsoil to depths beyond which historic properties are likely to be found." It was determined that the project would not affect historic properties in the area.

3.2.32 Dye and Maly 2018b
In 2018, T.S. Dye conducted an archaeological inventory survey for the proposed Kō‘ele Sculpture Garden (Dye and Maly 2018b). Due to the negative survey results the project was termed an archaeological assessment. The project proposed placing sculptures at various locations on the Kō‘ele Golf Course. Based on a thorough review of the historical background, previous archaeological surveys of the golf course, and the grading plans it was determined that the potential for subsurface remains in the project area was minimal and the project would not affect nearby historic properties.

3.2.33 Dye and Maly 2018c
In 2018, T.S. Dye conducted an archaeological inventory survey for the proposed Lāna‘i Cemetery expansion (Dye and Maly 2018f). Due to the negative survey results the project was termed an archaeological assessment. The assessment consisted of a pedestrian survey and the excavation of six backhoe trenches. No artifacts or surface architecture were observed on the ground surface and no cultural deposits or artifacts were encountered in the backhoe trench excavations. The lack of artifacts and historic properties was attributed to modification of the area for various construction and stockpiling uses. The negative findings were consistent with the previous findings for the area (Hammatt and Borthwick 1989).

3.2.34 DiVito et al. 2019a
In 2019, Honua Consulting conducted an archaeological inventory survey for the proposed relocation of the Lāna‘i Community Gardens. (DiVito et al. 2019a). Due to the negative survey results the project was termed an archaeological assessment. The assessment consisted of a pedestrian survey and the excavation of ten backhoe trenches across the area. No artifacts, subsurface deposits, or cultural materials were documented. The negative results were attributed to use of the area for commercial pineapple production.

3.2.35 DiVito et al. 2019b
In 2019, Honua Consulting conducted an archaeological inventory survey addendum to the previous survey of Lāna‘i Well #7 (DiVito et al. 2019b). The survey documented two fire pit features and a surface scatter of secondarily deposited traditional Hawaiian artifacts recorded as components of SHIP # -1984, documented during the previous survey of Lāna‘i Well #7 (Dye and Maly 2016). The fire pits were designated feature components B and C. Fire pit B was located along the northern boundary of the project area and was sampled for analysis. Wood charcoal was sampled from the base of the fire pit and was sent for species identification and radiocarbon dating. Radiocarbon dating on a piece of wood charcoal from the Sapote family returned a calibrated date range of A.D. 1447-1634. Fire pit C was located outside the project area to the east and was not sampled during the project.

A total of 39 secondarily deposited artifacts were collected from the ground surface during the project. 35 of which were pieces of volcanic glass. The remaining four artifacts were finished...
Two historic properties have been documented within the project area and 17 historic properties are present within a 1.5 mile radius of the project area (see Figure 34). The two sites within the project area consist of SIHP #50-40-98-2001, a Dole pineapple harvester moved into the project area for preservation purposes in 2010, and SIHP #50-40-98-6649, a historic culvert headwall documented during an archaeological inventory survey for an Affordable Housing project in 2009 (Morita 2010, Dye and Maly 2018a, Lee-Greig and Hammatt 2009a). Two additional historic properties were formerly located within the project area but have since been demolished. The structures include the Koele Grammar School (CSH-2), and the Palawai School/Richardson House (CSH-3) previously recorded as Structure A of the Kōʻele District. SIHP # -1004. Both structures were moved into the project area for preservation purposes during the development of Kōʻele and were documented in disrepair during two previous AIS surveys (Lee-Greig and Hammatt 2009a and Dye and Maly 2018a). Due to the buildings being exposed to the elements for many years they were assessed as lacking sufficient integrity to be listed on the National Register of Historic Places (NRHP) (Dye and Maly 2018a:135). In 2017, Historic American Buildings Surveys (HABS) were conducted for the structures prior to their demolition and removal from the property (Ruzicka 2017a and 2017b). They were determined to be no longer extant during a 2019 field inspection of the current project area and were demolished sometime between March of 2017 and November of 2019 (Thurman 2019a).

The Kōʻele District, SIHP # -1004, is located approximately 0.9 miles to the north and originally consisted of the former location of the Lanai Ranch Headquarters (circa 1870s-1951) and four preserved ranch-era structures in and around the Lodge at Kōʻele. None of the former Ranch Headquarters buildings currently exist on the property, rather, all buildings that contribute to the significance of the site have been moved from their original locations.

The district was recorded during the Statewide Inventory of Historic Places study conducted in 1974 (Hommom 1974, Wright 1974). Originally, SIHP # -1004 included four buildings (Structures A-D). Two additional structures (Features E-F) were subsumed into the site during an archaeological survey of the Koele Hotel (subsequently named the Four Seasons Resort at Kōʻele) (Kaschko 1986).

Several of the houses documented within the Kōʻele District have been relocated. The Palawai School/Richardson House (Structure A) was moved into the current project area and documented in disrepair during archaeological inventory surveys for an affordable housing project and the current project (Lee-Greig and Hammatt 2009a and Dye and Maly 2018a). The church building (Structure B) has also been moved and is currently situated adjacent to Keōmuku Highway on the front lawn of the Lodge at Kōʻele, a short distance west of its original location. The two house/office buildings (Structures C and D) were moved to the north of the hotel property in the late 1980’s during the construction of the Four Seasons Resort.

Subsurface deposits associated with SIHP # -1004 were documented during the salvage excavation of two historic ranch-era trash pits found near the former Lanai Ranch Headquarters (inferred as part of the Kōʻele District [SIHP # -1004]) during construction of the hotel (Hammatt 1988). An additional nine features were documented during subsequent archaeological monitoring and included a circa 1970s cesspool (Feature 1), a charcoal and ash concentration (Feature 2), an imu pit (Feature 3), a circa 1970s drywell (Feature 4), a possible fire pit containing bottle glass (Feature 5), an ash and charcoal deposit containing historical refuse (Feature 6), a possible cistern...
Previous Archaeological Research

98-099 and an excavated terrace at Pulehua recorded as SIHP # 50-40-98-107. The sites are located in neighboring Kaluulu Ahu'au'a.

Table 6. Archaeological Sites Documented Within the Vicinity of the Project Area

<table>
<thead>
<tr>
<th>Reference</th>
<th>SIHP #</th>
<th>Site Type</th>
<th>Site Significance</th>
<th>Recommendation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emory</td>
<td>1924</td>
<td>-099</td>
<td>Traditional House</td>
<td>Unknown</td>
<td>None</td>
</tr>
<tr>
<td>Emory</td>
<td>1924</td>
<td>-107</td>
<td>Traditional House</td>
<td>Unknown</td>
<td>None</td>
</tr>
<tr>
<td>Hommon</td>
<td>1974</td>
<td>-1004</td>
<td>Kōʻele District</td>
<td>Unknown</td>
<td>Moderate value, “Reserve” status</td>
</tr>
<tr>
<td>Kaschko</td>
<td>1986</td>
<td>-1004</td>
<td>Kōʻele District</td>
<td>Unknown</td>
<td>Relocated 4 buildings (Structures A-D) and added 2 feature components, Feature E (historic reservoir) and F (Richards House)</td>
</tr>
<tr>
<td>Hammatt et al. 1988</td>
<td>-1004</td>
<td>Kōʻele District</td>
<td>Unknown</td>
<td>Conducting salvage excavations on two historic trash pits, documented 9 additional historic feature components during monitoring</td>
<td></td>
</tr>
<tr>
<td>Dye and Maly 2017c</td>
<td>-1004</td>
<td>Kōʻele District</td>
<td>Unknown</td>
<td>Documented a single trash pit during monitoring</td>
<td></td>
</tr>
<tr>
<td>2018</td>
<td>-1006</td>
<td>Lanai City Country</td>
<td>Unknown</td>
<td>Info provided by SHPD</td>
<td>Historic District</td>
</tr>
</tbody>
</table>

The remaining sites in the vicinity are two isolated habitation features recorded by Emory (1924) in the 1920’s and include a stone house terrace at Kana‘ena’ae recorded as SIHP # 50-40-
<table>
<thead>
<tr>
<th>Reference</th>
<th>Site Type</th>
<th>Site Significance</th>
<th>Recommendation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estioko-Griffin 1988, Pietrusewsky 1988</td>
<td>Komokou Road Complex</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Inadvertently discovered human skeletal remains and cultural deposit</td>
</tr>
<tr>
<td>Hammatt and Borthwick 1993a</td>
<td>Historic Reservoir</td>
<td>Not stated</td>
<td>No further work</td>
<td>Data recovery conducted</td>
</tr>
<tr>
<td>Hammatt and Borthwick 1993a</td>
<td>Historic Reservoir</td>
<td>Not stated</td>
<td>No further work</td>
<td>Data recovery conducted</td>
</tr>
<tr>
<td>Hammatt and Borthwick 1993a</td>
<td>Ditch System</td>
<td>Not stated</td>
<td>No further work</td>
<td>Data recovery conducted</td>
</tr>
<tr>
<td>Hammatt and Borthwick 1993a</td>
<td>Historic Artifact Scatter</td>
<td>Not stated</td>
<td>No further work</td>
<td>Data recovery conducted</td>
</tr>
<tr>
<td>Hammatt and Borthwick 1993a</td>
<td>Secondarily Deposited Lithic Scatter</td>
<td>No longer significant</td>
<td>No further work</td>
<td>Data recovery conducted</td>
</tr>
<tr>
<td>Hammatt and Shideler 2004</td>
<td>Historic &quot;Altitude Breaker&quot;</td>
<td>Criterion d</td>
<td>Consultation in writing with SHPD prior to any substantial alteration</td>
<td></td>
</tr>
<tr>
<td>Hammatt and Shideler 2004</td>
<td>Historic Improved Trail</td>
<td>Criterion d</td>
<td>Consultation in writing with SHPD prior to any substantial alteration</td>
<td></td>
</tr>
<tr>
<td>Hammatt and Shideler 2004</td>
<td>Kīhāmāniani a Church</td>
<td>Criteria a, c, d, and e</td>
<td>Preservation</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reference</th>
<th>Site Type</th>
<th>Site Significance</th>
<th>Recommendation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hammatt and Shideler 2004</td>
<td>Kilhānāniani a Church Burial Area</td>
<td>-1947</td>
<td>Criteria d and e</td>
<td>Preservation</td>
</tr>
<tr>
<td>Dye and Maly 2016, DiVito et al. 2019b</td>
<td>Traditional Hawaiian Fire Pits and Artifact Scatter</td>
<td>-1984</td>
<td>Criterion d</td>
<td>No further work</td>
</tr>
<tr>
<td>DiVito et al. 2019c</td>
<td>Traditional Hawaiian Fire Pit</td>
<td>-1988</td>
<td>Criterion d</td>
<td>No further work</td>
</tr>
<tr>
<td>DiVito et al. 2019c</td>
<td>Historic Concrete and Stone Slab</td>
<td>-1989</td>
<td>Unknown</td>
<td>Additional documentation</td>
</tr>
<tr>
<td>Dye and Maly 2019a, Thurman 2019a</td>
<td>Dole Pineapple Harvester</td>
<td>-2001</td>
<td>Criterion a</td>
<td>Preservation and interpretative display (Within the project area)</td>
</tr>
<tr>
<td>Lee-Greig and Hammatt 2009a</td>
<td>Historic Drain Culvert Headwall</td>
<td>-6649</td>
<td>Criterion d</td>
<td>No further work (Within the project area)</td>
</tr>
<tr>
<td>Lee-Greig and Hammatt 2009a</td>
<td>The Kūʻeʻe Grammar School</td>
<td>CSH-2</td>
<td>Criterion d</td>
<td>No further work (Demolished) Formerly within the project area</td>
</tr>
<tr>
<td>Lee-Greig and Hammatt 2009a, Dye and Maly 2019a</td>
<td>Palawai School/ Richardson House</td>
<td>CSH-3</td>
<td>Criterion d</td>
<td>No further work (Demolished) Formerly within the project area</td>
</tr>
</tbody>
</table>
Summary and Recommendations

This Archaeological Monitoring Plan (AMP) is for the Hōkūloa 201-H Housing Project, located in Kamoku Ahupua‘a, Li‘ihau District, Lānā‘i Island, TMK: [2] 4-9-014-001, 009, and 011. The project area is located in central Lānā‘i’s adjacent and to the west of Lānā‘i City and is situated within former pineapple fields. The project area totals approximately 87.26 acres and is privately owned by Lanai Resorts LLC.

The proposed project includes the development of 200 single-family homes, a one-acre park, a 1,500-square foot community center, comfort stations, and 100 parking stalls for use by the Hōkūloa residents. Ground disturbance associated with the project will include mass grading of the 87.26 acre project area. It is estimated that 105,000 cubic of soil will be excavated to a maximum depth of 12 ft. below ground surface and will be filled a maximum of 13 ft. in height to create the house pads, roads, and various support infrastructure. Other excavations include four sediment basins present throughout the southern portion of the project area and any associated trenching to connect to existing sewer, gas, drainage, and water utilities, and excavations associated with the removal and readjustment of any existing utilities within the project area.

This AMP was initiated by the SHPD in a historic preservation review letter dated August 14, 2020 (Log No. 2020.000018, Doc No. 2008JK01, Appendix A). The SHPD letter accepted a previous AIS report (Dye and Maly 2018a) and a recent End of Fieldwork Report (Thurman 2019a) for the Hōkūloa 201-H Housing project area and requested an AMP be completed and accepted prior to any ground disturbance associated with the project. Additionally, SHPD requested that the AMP stipulate short- and long-term interim protection measures for two historic properties currently located on the property. This plan was written to fulfill state requirements for archaeological monitoring plans under HRS 6E-42 and HAR Chapter 13-279, Rules Governing Standards for Archaeological Monitoring and Reports. The review letter also noted that a Maui Electric Company (MECO) power plant which was built in the 1940s and located within the eastern boundary of the project area was demolished in late 2018.

Background research indicates Kamoku Ahupua‘a was granted to Walter M. Gifford in 1907. No Land Commission Awards (LCA’s) or Royal Patents (R.P) were recorded within the project area. The lands comprising the project area were used for ranching as early as the 1870’s and were almost entirely under commercial pineapple cultivation from the 1920’s until the early 1990’s. Archaeological research on the island of Lānā‘i indicates that the traditional Hawaiian settlement pattern was focused along the coastline. It is believed that the interior of the island was used seasonally for agricultural pursuits and habitation within the Kō‘ele and Pālōwai areas. Except for a few studies, archaeological investigations in the area have had largely negative results. This is likely due in part to modifications made to the land for ranching activities, commercial pineapple cultivation, the construction of Lānā‘i’s City, and subsequent erosion from land clearing and ungulates roaming unchecked.

The results of studies in the vicinity indicate that widespread clearing and subsequent commercial pineapple cultivation of the interior plateau lands has obscured or destroyed all of the surface archaeological sites and features once present in the area. The few sites and places of archaeological interest that have been recorded consist of secondarily deposited scatters of traditional Hawaiian and historic artifacts on the ground surface, truncated and exposed firepit remnants, and plantation era infrastructure. Wood species identification and radiocarbon dating of charcoal from firepits has provided useful information on pre-contact use and ecology of the cultivated lands surrounding the project area.

The radiocarbon dates from seven firepit features in the pineapple fields of the island indicate pre-contact use of the Kō‘ele area and plateau lands beginning sometime in the 16th century with dates continuing into the early historic period (DiVito et al. 2019a, DiVito et al. 2019b, Dye and Maly 2016, Dye 2018b, and Dye 2019). The wood species identifications indicate use of locally available native Hawaiian vegetation in fire building practices primarily fueled with ‘akoko and ‘ilima wood extending from pre-contact times well into the early historic period. The results of the most current archaeological studies tend to support sparse traditional Hawaiian habitation in the area and a widespread dryland forest prior to land clearing, ranching, and subsequent pineapple cultivation.

The project area has been the subject of archaelogical surveys for a wastewater pipeline, the Lānā‘i’s Affordable Housing project, the Hōkūloa 201-H Housing project, and a field inspection to determine the status of existing historic properties within the Hōkūloa 201-H Housing project area (Hammatt and Borthwick 1993a, Lee-Greig and Hammatt 2009a, Dye and Maly 2018a, and Thurman 2019a). The AIS for the current project (Dye and Maly 2018a) conducted 26 backhoe trenches, 8 of which were within the current project area. The study encountered dark reddish brown soil with black plastic fragments to a depth of approximately 47 cmbs over natural terrestrial soil.

A total of four surface archaeological sites have been recorded in the project area and include a Dole Pineapple Harvester (Machine 1) recorded as SIHP #50-40-98-0201, a historic culvert headwall recorded as SIHP #50-40-98-6649, and two historic wood-frame buildings placed in the project area in the 1980s consisting of the Koele Grammar School (CSH-2) and the Palawai School/Richardson House (CSH-3, formerly documented as Structure A of the Ko‘ele District). The AIS for the current project (Dye and Maly 2018a) documented during the AIS for an affordable housing project in 2009 and was assessed as significant for its information content under Criterion d (Lee-Greig and Hammatt 2009a:57). The pineapple harvester, “Machine 1” was moved into the project area for preservation purposes in 2010 and was documented during the AIS for the current project (Morita 2010 and Dye and Maly 2018a). The AIS assessed the pineapple harvester as significant under Criterion a for its association with the history of pineapple cultivation on the island and preservation and interpretive display at an off-site location was recommended (Dye and Maly 2018:135). The 2019 field inspection further recommended it be moved to a sheltered location away from the proposed project prior to construction activities and funds for its restoration and display be pursued (Thurman 2019a). However, in September 2020 it was found that the harvester had degraded to a point in which it was not recommended to be salvageable and is a safety concern (Appendix D). Following the field inspection, the Dole pineapple harvester was designated as SIHP # -0201.
Other sites documented in the Lāna‘i City area are associated with the early settlement (early-to-mid-19th century) and ranch-era (mid-19th century to early-20th century). The few traditional Hawaiian sites nearby have been documented northeasts of the current project area within and on the periphery of the pineapple fields along Keōmuku Highway. They include three truncated traditional Hawaiian fire pits (1430-1635 A.D.) with associated artifacts on the ground surface and a burial and associated cultural deposit. Secondly, deposited traditional Hawaiian artifacts lacking integrity of location and truncated fire pit remnants are the traditional Hawaiian site types documented in the pineapple fields of the island.

4.1 Recommendations

Based upon a written recommendation from the SHPD, an on-site archaeological monitoring program is recommended (Appendix A). A qualified archaeologist will be on-site during all ground disturbance associated with the project. This will ensure that any potential significant artifacts, surface deposits, or surface architecture encountered during construction activities will be appropriately documented and mitigated and that existing historic properties within the project area are protected and appropriately mitigated during the proposed project. Table 7 lists historic properties located within the project area, integrity and significance evaluations41, and recommendations.

Additionally, the SHPD review letter dated August 14, 2020 requested discussion of short- and long-term interim protection measures for sites currently located in the project area (Appendix A). Interim protection measures are typically only short-term and apply to significant historic properties that will be within or near a construction area (HAR 13-277-5). It should be noted that SIHP # 02001 (Dole pineapple harvester) was initially recommended for preservation, however, SIHP -6649 (historic culvert headwall) is not (Lee-Greig and Hammatt 2009a, Thurman 2019a). Further investigation of SIHP # -02001 (Dole pineapple harvester) it was found that the harvester had degraded to a point in which it lacked integrity, is a safety concern and is no longer recommended for preservation (Appendix D). In agreement with SHPD, the landowner (Pālāma Lāna‘i) has agreed to avoid SIHP # -6649 during the current project. An aerial photo showing the location of the two sites and their recommended mitigation measures is presented as Figure 37.

Table 7. Table listing historic properties within the project area, integrity and significance evaluations, and recommendations

<table>
<thead>
<tr>
<th>Site (SIHP #50-80-40)</th>
<th>Integrity</th>
<th>State Significance</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>-6649</td>
<td>location and materials</td>
<td>d</td>
<td>No Further Work; Avoid and Protect during the current monitoring project</td>
</tr>
<tr>
<td>-02001</td>
<td>design, materials, workmanship, feeling, and association</td>
<td>a</td>
<td>Relocate prior to start of the construction project. Updated to 4.1.1 SIHP #50-40-98-6649, Short- and Long-Term Protection Measures</td>
</tr>
</tbody>
</table>

The short-term interim protection measures for SIHP # -6649, a historic culvert headwall, to be implemented during the current monitoring project consist of the establishment of a visible 10 ft-radius buffer around the perimeter of the site. The site is located within TMK: [2] 4-9-014:009, along the northern side of the proposed 9th Street Extension near the entrance into the project area from Lāna‘i City. The buffer shall be demarcated by orange web event fencing, flagging, or other means that is highly visible and shall remain in place throughout the duration of the proposed project. No ground disturbance shall occur and no construction materials shall be stored within the site buffer.

There has been no recommendation to preserve SIHP # -6649 outside of this project, therefore, there are no long-term mitigation measures proposed for the site and no current provisions to address future impacts.

4.1.2 SIHP #50-40-98-02001, Short- and Long-Term Protection Measures

In 2019, a field inspection was conducted for the Hōkūlāo 201-H Housing Project by Honua Consulting and an End of Fieldwork Report was written (Thurman 2019). The harvester was confirmed to be in the same location as previously documented by Dye and Maly (2018). It was surrounded by a chain-link fenced area that was heavily overgrown and observation through the fence line found it to be in the same general rusty condition as previously described and noted that its “structural integrity [was] found to be threatened” by its apparent decay (Thurman 2019:5). At the request of Pālāma Lāna‘i, Honua Consulting conducted an updated assessment for the Dole Pineapple Harvester. Honua Consulting found the machine possessed integrity of design as it is the last known machine to utilize this particular technology and design for its function, integrity of materials and workmanship as it contains the unique physical elements and craft of Lāna‘i’s plantation period, and integrity of feeling and association for its ability to express the historic character of the plantation period and its direct link to that historic period. The study agreed with Dye and Maly (2018) that the harvester was deemed significant under Criterion a and may be eligible for the State Register. It was recommended that the harvester be moved to a sheltered location away from the proposed Hōkūlāo 201-H Residential Project prior to any construction activities and that funds for its restoration and interpretive display be pursued.

An August 14, 2020 historic preservation review letter from SHPD agreed with the recommendations provided in the Dye and Maly (2018) AIS and the Thurman (2019) End of Fieldwork Report and recommended the harvester be moved to a sheltered location prior to any ground disturbance activities and, if not possible, be protected by interim protection measures to ensure it is not impacted by the proposed project (Log No. 2020.00018, 2008IK01).
In September of 2020, Doug Stevenson, Director of Fleet Maintenance of Pūlama Lāna‘i and Albert Morita, retired mechanic and former board member of Lāna‘i Culture & Heritage Center assessed the structural integrity of the harvester. The plan was initially to stabilize the machine and replace a few parts in preparation for its relocation. However, it was found that the harvester would not be able to be moved without a very considerable amount of destruction due to vast deterioration throughout the machine. It was found that the harvester had degraded to a point in which it was not recommended to be salvageable and is a safety concern.

Figure 37. Aerial imagery showing the proposed interim protection measures for SIHP # -6649 (historic culvert headwall, 10 ft. buffer) and SIHP # -02001 (Dole pineapple harvester, to be relocated outside of the project area)

Archaeological Monitoring Provisions

Section 5 Archaeological Monitoring Provisions

Under HAR §13-279-3, “Archaeological monitoring may be an identification, mitigation, or post-mitigation contingency measure. Monitoring shall entail the archaeological observation of, and possible intervention with, on-going activities, which may adversely affect historic properties”. SHPD requested that archaeological monitoring be conducted for all ground disturbing activities associated with the project in an historic preservation review letter dated August 14th, 2020 (Log No. 2020.00018, Doc No. 2008IK01, Appendix A).

HAR §13-279-4, requires that each monitoring plan discuss eight specific questions. The monitoring provisions below address these requirements for archaeological monitoring within the current project area.

1) Anticipated Properties:

Based on background research and previous archaeological studies in the vicinity a single historic-era archaeological site has been documented within the project area. The types of potential sites that could be anticipated during monitoring include remnants of plantation and historic-era surface infrastructure, secondarily deposited traditional Hawaiian artifacts on the ground surface, exposed firepit remnants, and subsurface cultural deposits and features beneath the plow zone. No human burials have been documented outside of known historic cemeteries in the area and they are not anticipated.

2) Locations of Historic Properties:

Cultural materials and deposits could be present beneath the plow zone throughout the project area. Based on the results of archaeological inventory surveys in the area, the plow zone generally extends to a maximum of 60 cm (2 ft) below the current ground surface. However, due to commercial pineapple cultivation within the project area, it is also possible secondarily deposited traditional Hawaiian artifacts could be encountered within plow zone soils during grading.

3) Fieldwork:

On-site monitoring is recommended for all project related ground disturbance. Monitoring will be conducted by trained archaeological technicians of the Pūlama Lāna‘i Culture and Historic Preservation Department in coordination with Honua Consulting, under the general supervision of Rosanna Thurman, M.A. (Honua Consulting, principle investigator). The contractor shall provide advance notice to Pūlama Lāna‘i of planned excavations to ensure an on-site archaeologist is present. A change in methodology will only be allowed through consultation with and written concurrence from the SHPD. All fieldwork will be conducted under archaeological permit number 20-15 and subsequent permits issued to Honua Consulting by the SHP/DLNR in accordance with HAR Chapter 13-282.

Archaeological fieldwork will use current standard archaeological recording techniques including drawing of trench wall profiles and documentation of stratigraphy where cultural features or artifacts are exposed as well as in representative areas throughout the project area. Representative stratigraphic profile drawings (absent of significant artifacts or deposits) will be at least 2 meters in length. Profiles will be photographed and noted on a construction map. Photographs will include a photo scale for ease in showing the size and depth of excavations.
Archaeological Monitoring Provisions

Sampling will include the collection of artifacts and bulk sediments, as determined appropriate. The location of any potential sites, feature components, and any other points of interest will be collected using a GPS device capable of sub-meter accuracy.

SHPD will be notified in the event of significant findings including human remains. If human remains are identified, SHPD, the County Coroner’s Office and the County Police Department (in accordance with HAR §13-300-40) will be immediately notified. The State of Hawai‘i Department of Land and Natural Resources/SHPD Inadvertent Discovery of Human Skeletal Remains Checklist will be filled out and submitted to SHPD. All construction work within the vicinity of the finding of a human burial will be stopped and no exploratory work will be conducted unless requested by SHPD. All human skeletal remains encountered during archaeological monitoring will be handled in compliance with HAR Chapter §13-300-40, which states all treatment of inadvertent burials be determined by the SHPD in consultation with recognized descendents.

4) Archaeologist’s Role:

The field archaeologists will ensure that the interim protection measures described in this plan are implemented during the project. If the protection measures are not adhered to then the archaeologist will notify the landowner (Pili‘ama Lāna‘i‘i) and will assist in establishing and maintaining the recommended buffers when necessary.

Field archaeologists will have the authority to stop work immediately in the area of any findings so that documentation can proceed and appropriate treatment can be determined. In addition, the archaeologist has the authority to slow and/or suspend construction activities in order to ensure necessary archaeological documentation can be conducted.

5) Coordination Meeting:

A coordination meeting will be held prior to any construction or ground disturbance activities to orient the construction crew to the requirements of this archaeological monitoring program. At the meeting, the archaeological monitor will emphasize his or her authority to temporarily halt construction and state that all finds (including artifacts such as bottles) are the property of the landowner and may not be removed from the construction site. At this time, it will be made clear that the archaeologist must be on-site during all subsurface excavations associated with the project.

At this meeting, preservation measures outlined in this plan will be discussed. The purpose of visible buffers around a site(s) will be explained and it will be expanded upon that no storing of equipment, materials, or supplies shall be conducted within the buffer zone. Additionally, no excavation will be allowed within a buffer surrounding a site. A copy of the AMP will be provided to the construction manager and crew and all appropriate parties will be informed of the monitoring procedures as stipulated in the AMP.

6) Laboratory Work:

Laboratory work will be conducted at the office of the Culture and Historic Preservation Division of Pili‘ama Lāna‘i in accordance with HAR §13-279-5(6). Laboratory analysis of non-burial related finds will be tabulated and standard artifact recording will be used. Artifacts will be catalogued with provenience information, measurements, weight, type of material, and presumed function. Collected marine shell and animal bone will be tabulated, weighed, and analyzed for species identification. Photographs of representative artifacts and materials will be taken for inclusion in the archaeological monitoring report.

In the event an intact cultural deposit is encountered, or a significant traditional stone artifact is recovered there are several lab analyses that may be conducted. Charcoalized material ideal for dating analysis will be sent for species identification at the International Archaeological Research Institute, Inc. (IARI) and a selected sample(s) may be sent to Beta Analytic, Inc. for radiocarbon dating. Traditional basalt artifacts may be sent to the University of Hawai‘i-Hilo Geoarchaeology Lab for Energy-Dispersive X-ray Fluorescence (EDXF) analysis to identify where the material may have been procured. All analyzed samples, methods for sample selection, results, and provenience information will be presented and summarized within the archaeological monitoring report.

7) Report Preparation:

At the conclusion of project construction, an archaeological monitoring report (AMR) will be written following the requirements of HAR §13-279-5. The AMR will include sections on monitoring methods, archaeological results, stratigraphy, laboratory analyses of artifacts and collected materials, and identified historic properties. Photographs and profiles of excavations will be included in the monitoring report even if no historically significant sites are documented. If human skeletal remains are encountered during monitoring, the context in which they were found, and detailed descriptions will be presented within the archaeological monitoring report. The monitoring report will be submitted to the SHPD for review and approval.

8) Archiving Materials:

All collected materials from this investigation belong to the landowner, Pili‘ama Lāna‘i and will be permanently stored at the Lāna‘i Culture and Heritage Center.

5.1 Research Objectives

If the current project encounters significant historic materials and deposits, the following research objective may be explored during the monitoring program:

1.) Are there intact, undisturbed cultural deposits remaining within the project area?

2.) Do the encountered materials and/or deposits provide data on previous land use activities conducted within the project area? What land use activities are represented?

3.) What do the encountered materials or deposits tell us about the cultural landscape? Is this new information or does it build on existing data?
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Appendix A: SHPD Request for AMP

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
STATE HISTORIC PRESERVATION DIVISION
KAMEHAMEHA II BUILDING
401 KAMEHAMEHA AVENUE, STE 300
KAPALUA, MAUI

Appendix A
SHPD Request for AMP

August 14, 2020

City Clerk, Administrator
County of Maui
Department of Public Works
Development Services Administration Division
250 South High Street
Wailuku, Maui, Hawaii (96793)

Dear Mr. Ume:

SUBJECT: Chapter 54-42 Historic Preservation Review – Hōkūloa 201-H Housing Project
Grading and Grubbing Permit Application – G 220997219
Archaeological Inventory Survey Report (Dye and Male 2018)
Archaeological Field Inspection End of Fieldwork Report (Harrman 2019)
Kahoolawe Archaeology, Lahaina District, Island of Maui

This letter provides the State Historic Preservation Division’s (SHPD) review of the draft archaeological inventory survey (OAS) report titled, “Archaeological Inventory Survey for the Proposed Hōkūloa 201-H Residential Project” Land of Kahuku, Lahaina District, Lāna’i Island District (Dye and Male 2018) and associated grading permit application (G 220997219). SHPD received the subject project application (G 220997219) as a cover letter, a copy of the OAS, a 60-page report on the project area, a permit, and an archaeological field inspection (afi) report (Harrman, December 2019). SHPD received the subject draft afi report on February 1, 2020 (Log No. 2019-00221), and an oral field report on January 3, 2020 (Log No. 2020-00018).

Table 1. Summary of Submitted Associated with the Hōkūloa 201-H Housing Project:

<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>Description</th>
<th>SHPD Log No.</th>
<th>Issued Date</th>
</tr>
</thead>
<tbody>
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<td>G 220997219</td>
<td>Hōkūloa mass grading</td>
<td>2019-042740</td>
<td>12/23/2019</td>
</tr>
<tr>
<td>G 220997219</td>
<td>AIS for the proposed project</td>
<td>2019-0822</td>
<td>10/21/2019</td>
</tr>
<tr>
<td>G 220997219</td>
<td>Field Inspection End of Fieldwork Summary Report</td>
<td>2020-00018</td>
<td>01/05/2020</td>
</tr>
</tbody>
</table>

Pūlama Lānai proposes the construction of 200 single-family homes and 102 affordable homes on 94.65 acres of land on the island of Lānai. According to the submission, the project area was originally planned to cover 15 acres and has been reduced to 68.26 acres. Project-related ground disturbance will include mass grading of the 68.26 acres, including 105,000 cubic yards of excavation. The project area will be reduced to a maximum of 7.5 feet and will include a maximum of 13.5 feet in height. Mass grading will consist of grubbing and grading to create level residential pads (i.e., terraces and banks) and will be stabilized with grass, Harrman and Bartwick (1993) and Lee-Greg and Harrman (2009) previously conducted AIS investigations on the subject property and the project area has been revised. The SHPD accepted the Lānai’s submission (Lee-Greg and Harrman 2009) in a letter dated November 16, 2009 (Log No. 2009-0328, Doc. No. 0551P203).

Harrman and Bartwick (1993)

The Harrman and Bartwick survey (1993) identified no historic properties within the project area. The survey consisted of a 200- to 500-foot-wide wastewater corridor connecting the Lānai’s sewage treatment system with the Kâali

Hōkūloa 201-H Housing AMP

Appendix A: SHPD Request for AMP

G. Ume
8/14/20
Page 2

Golf Course irrigation system. The route of the corridor run north-south through the northern portion of the project area. At the time of the surveys the entire project area consisted of excellent surface visibility due to low vegetation growth.

Lee-Greg and Harrman (2009)

Cultural Survey Hawaii, Inc. (CSH) conducted an AIS (Lee-Greg and Harrman 2009) for an adjacent parcel along the northeast-corner boundary of the current 60-plus acre project area and identified a historical-culturally significant baseball field (SHIP 50-48-98-05) located within the northeast corner of the current project area. CSH determined the baseball field (SHIP 50-48-98-04) to be significant under Criterion “a” and recommended no further work for the site. In addition, CSH recorded two historic properties located outside of the CSH’s project area but within the current project area. CSH documented two historic model buildings, the Kāali Grammar School and the Palauea School House, identified as SHIPs 21 and 31 (Lahaina A [bathhouse] and Moana A [bathhouse]) of the Kaif ‘Oki District (SHIP 50-48-98-04). Both structures were relocated within the Hōkūloa 201-H Housing project area around 1985–1996, at the bottom of Nahale Street, and intended for preservation, restoration, and incorporation into the landscape at Kâali. The AIS report assesses the condition of the structures and whether in-corporation but significant under Criterion “a.” The AIS included five test trenches, two of which (T-2 and T-3) were within the current project area. No cultural materials or historic properties were identified during the test trenching portion of the AIS. The SHPD accepted the AIS report as a letter dated November 16, 2009 (Log No. 2009-0328, Doc. No. 0551P203). SHPD concurred with the report’s recommendation that SHIP 50-48-98-04 is significant under Criterion “a” and that no further historic preservation work is necessary. SHPD additionally agreed that archaeological monitoring be conducted during all general disturbance activities associated with the proposed project.

T.S. Dye & Colleagues (Dye and Male 2018)

At the request of Pūlama Lānai, T.S. Dye & Colleagues (Dye and Male 2018) conducted an AIS involving twenty-six 500-foot test trenches excavations and a surface survey of the original 105 acres project area for the Hōkūloa 201-H Housing project. The AIS was not supported by SHPD for the subject project, rather it was initiated at the request of the project proponent in advance of the project. The subject AIS report includes a description of the pedestrian survey and indicates a 100 percent surface inspection was not accomplished for the entire project area. The AIS merely identified one historic property and further documented two previously identified during the Lee-Greg and Harrman (2009) AIS (Table 2).

Table 2. Significant historic properties within the current project area

<table>
<thead>
<tr>
<th>SHIP No.</th>
<th>Description</th>
<th>Formal Description</th>
<th>Significance</th>
<th>Mitigation Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>-094</td>
<td>Historic Pineapple Harrower</td>
<td>Historic pineapple harrower in a pineapple field</td>
<td>d</td>
<td>No further work (documented)</td>
</tr>
<tr>
<td>-094</td>
<td>Historic Pineapple Harrower</td>
<td>Historic pineapple harrower in a pineapple field</td>
<td>d</td>
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<td>-094</td>
<td>Historic Pineapple Harrower</td>
<td>Historic pineapple harrower in a pineapple field</td>
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</tr>
<tr>
<td>-094</td>
<td>Historic Pineapple Harrower</td>
<td>Historic pineapple harrower in a pineapple field</td>
<td>d</td>
<td>No further work (documented)</td>
</tr>
</tbody>
</table>

The historic properties include a Dele pine apple harrower (SHIP 50-48-98-0502), and two wood-frame buildings from the Kāali School complex (Structure A of SHIP 50-48-98-04). The SHIP 50-48-98-04 school structures and the baseball field were transported into the project area for preservation (Dye and Male 2018). Structures (Structure A of SHIP 50-48-98-04) were documented to be in poor condition and overgrown by vegetation. The historic baseball field (SHIP 50-48-98-04) was not documented during the Dye and Male (2018) AIS. Based on the previous 50 acres project area, the baseball field was situated immediately outside of the northern boundary of the project area.
Appendix A: SHPD Request for AMP

Field Inspection Report (Thurman, December 2019)

Hana Consulting conducted an archaeological field inspection of the four previously recorded historic properties within the Kulikoo 201-H Housing Project area and produced an end-of-field report (Thurman, December 2019). These historic properties included a Dole pineapple harvester (SHIP 50-40-98-0200), two-wooden school structures (Structure A of SHIP 50-40-49-19.044), and a historical cultural headwall (SHIP 50-40-98-6449). The report includes a cover letter providing a summary of the previously recorded historic properties, the results of the 2019 field inspection, an updated GIS map showing the current 68.88-acre project area, and the Historic American Buildings Survey (HABS) documentation forms for the two-wooden school structures (Kamaka 2017, Kili‘i Grimmer filmed and Palaniac School House, Structures A of SHIP 50-40-49-19.044). The historical cultural headwall (SHIP 50-40-98-0249) and Dole pineapple harvester (SHIP 50-40-98-623209) were found to be in the same condition as previously described by Lee & Spring and Hamamoto (2009). The two-wooden school structure (Structure A of SHIP 50-40-49-19.044) was not relocated during the field inspection. The Historic American Building Survey report (Thurman Consultants Inc., March 2017) indicates the survey was conducted to fulfill the County of Maui’s requirements for mitigation for the demolition of the two-wooden school structures (Kamaka, March 2017). Lastly, the report does not provide any information regarding if additional pedestrian surveys were conducted during the field inspection.

The HABS reports were submitted to SHPD on October 12, 2018 (Leg No. 2018-0244), and Leg No. 2018-024424). The HABS reports were not requested by SHPD for the two school structures, rather this documentation was conducted at the request of the project proponent; no record was found that SHPD accepted the submissions, the HABS reports do not have a National Park Service (NPS) number, and do not appear to have been formally reviewed and accepted by NPS. Additionally, the former MECC power plant situated adjacent to the woodd structures were subjected to demolition between August and November 2018, and have since been removed from the project area (Dr. Keli‘i-Pua Daniell [Pili Pua Line] to Nalani Lina‘u; SHIP 50-40-98-0249) via a Gerald T. H. Smith consent to desist dated March 31, 2020. The field inspection confirmed the structures have been demolished and removed from the project area.

The AHS report meets the minimum requirements of an AS as specified in HARR § 12.276-5. It is accepted. Please send two hard copies of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version of the report to the Kapolei SHPD office. Attention SHPD Library. Additionally, please send a pdf copy of the report to kehua.housing@hawaii.gov.

The AHS report (Day and Maly 2018) and end-of-field report (Thurman, December 2019) contained a determination of “no effect on historic properties” for the Kulikoo 201-H Housing Project. However, as the AS was conducted without a detailed scope of work guiding the testing strategy, the pedestrian surveytransits are spaced at a maximum of 5 meters apart, and portions of the project area were not adequately tested. Thus, SHPD has insufficient information to determine if the project’s proposed mass grading will adversely affect historic properties within the current project area, particularly within areas proposed for deep excavation. Therefore, SHPD requests that archaeological monitoring be performed for identification purposes for all ground-disturbing activities during the proposed project and for the HABS reports to be completed per NPS standards.

Additionally, SHPD requests that the archaeological monitoring plan stipulate the short- and long-term interim protection measures for the Dole pineapple harvester (SHIP 50-40-98-623209) and the herbicide high wall (SHIP 50-40-98-6649). The plan should indicate the Dole pineapple harvester (SHIP 50-40-98-623209) will be moved to a sheltered location prior to any ground disturbance activities and, if not possible, will be protected by interim protection measures to ensure it is not impacted by the proposed project. Additionally, the cultural headwall...
Appendix B  Māhele Data for Kamoku Ahupua’a

The following are translations done by Kepā Maly of documents associated with Māhele claims in Kamoku Ahupua’a. The kinds of documents included are LCA claims documented in the Native Register, Native Testimony, Foreign Testimony, Māhele Award Book, and Royal Patents. Reproductions of the original documents which are in Hawaiian are included in accompanying figures. The descriptions of the claims included in the Māhele documents offer a glimpse into the kinds of activities that occurred in Kamoku.

Helu 2686: The Claim of Oleloa

- **Helu 2686** (see also Helu 367)
- **Claimant**: Oleloa (w.)
- **Location**: Kaumalapau at Kamoku
- **Recorded at**: Lāhaina
- **Date**: January 8, 1848

**Native Register**

Greetings to you John Ii and Kaauwai, and the Commissioners who quiet claims. I hereby tell you of my several land claims from the King. Here are the names of my lands: Puunau in Lāhaina; Kalama II [Kona]; Kaumalapau [Lanai]; and Kanoni [Kau]. I have five lands, and my residency is from the King. Therefore, I provide before you, my document to you, that you, the Commissioners who quiet claims may see. Here also is my lot at Puunau, and I give to you my document, Kolopapela Kaau [wa] and Richards to quiet by your hands. Aloha to you with peace.

Done by me, Oleloa, Widow. (Figure 38).

![Figure 38. Helu 2686 of Oleloa. Source: Native Register Volume 6:15](image)

Helu 4145: The Claim of Kauihou

- **Helu 4145**
- **Claimant**: Kauihou
- **Location**: Palawai & Kamoku

**Native Testimony**

He received this Parcel from Hua in the time of Kamehameha II, and has dwelt there peaceably to this time. No one has objected. Naoopu, Sworn. The words above are all true. My knowledge is the same. (Figure 39)

Figure 39. Helu 4145 of Kauihou. Source: Native Testimony 13:282

Helu 6833: The Claim of Kaaiai

Claimant Kaaiai

Location Kalulu & Kamoku

Native Testimony

Pali, Sworn. I know his Parcels of land at Kalulu, Lanai. 3 Parcels of land in the ili below.

Parcel 1. 1 moku mauu in the ili of "Ahipau."
Parcel 2. 1 moku mauu in the ili of "Elali."


Parcel 3. The boundaries are thus. Mauka and all about, land of Konohiki.

He received these Parcels of land from his parents in the year 1840, and his parents received them from Daniela II. He has resided there peaceably to this time. No one has objected.

Kawaaiki, Sworn. All the words above are true. My knowledge is the same. (Figure 40)

Figure 40. Helu 6833 of Kaaiai. Source: Native Testimony 13:272-273
Māhele Award Book

There in the Ahupuaa of Kaluula, Island of Lanai. Three Parcels.

Parcel 1. There in the Ili of Ahupuaa… [metes and bounds] … 6 Acres. 3 Roods…


Parcel 3. There in the Ili of Kamoku… [metes and bounds] … 5 Acres, 3 Roods, 2 Rods…

(Figure 41)

Figure 41. Helu 6833 of Kaaiai. Source: Māhele Award Book 7:215

Helu 8556: The Claim of Kaauwaeaina

Helu 8556, Claimant Kaauwaeaina

Location Maunalei, Kaluula, and Kamoku. Recorded at Lanai

Date February 7, 1848

Royal Patent 5137 (Figure 42 and Figure 43)

Figure 42. Page 1 of 2. Royal Patent 5137 of Kaauwaeaina. Source: Book 20:501-502

Figure 43. Page 2 of 2. Royal Patent 5137 Kaauwaeaina. Source: Book 20:501-502
Native Register

Greetings Commissioners who Quiet Land Titles. I have three loi (taro pond fields) at Maunalei.

Here are other claims of mine, several moku mauu at Kalulu, and a pauku at Pueo. By Kaauwaeaina. (Figure 44)

Figure 44. Helu 8556 of Kaauwaeaina. Source: Native Register 6:468

Native Testimony

Kawaaiki, Sworn. I know his parcels of land on Lanai. They are in the ili and Ahupuaa below.
3 parcels.
Parcel 1. 3 loi kalo (taro pond fields) in the ili of Ainaiki, Maunalei Ahupuaa.
Parcel 2. 1 moku mauu, in the ili of Kapano uka, Kalulu Ahupuaa.
Parcel 3. 1 Pauku land in the ili of Pueo, Kamoku Ahupuaa.
Par. 1. The boundaries are thus. Mauka, my land. Kaena and all about, land of Konohiki.
Par. 2. The boundaries are thus. Mauka and all about, land of Konohiki.
Par. 3. The boundaries are thus. Mauka and all about, land of Konohiki.

He received Parcel 1 from Kawaaiki in the year 1844. Par. 2 from his parents in the time of Kamehameha II. Par. 3 from his parents in the time of Kamehameha I. He has resided there peaceably to this time. No one has objected.

I, Kaliiaumoku, Sworn. All the statements above are correct. My understanding is exactly like that as spoken by Kawaaiki. (Figure 45)

Māhele Award Book

There in the Ahupuaa of Kalulu & Kamoku, Lanai.

Parcel 2. There in the ili of Kapanouka. . . [metes and bounds] . . . 1 Acre, 0 Roods, 35 Rods

Figure 45. Helu 8556 of Kaauwaeaina. Source: Native Testimony 13:265

Figure 46. Helu 8556 of Kaauwaeaina. Source: Māhele Award Book 7:212
Appendix B: Māhele Data

Helu 10630: The Claim of Pali

Helu 10630
Claimant Pali
Location Kamoku
Recorded at Lanai
Date February 5, 1848
Royal Patent 4800 (Figure 47 and Figure 48)

Native Register

Aloha to you Kaauwai, J. E. and Armstrong, Commissioners who Quiet Land Claims. Here are my thoughts to you, that you will look upon my land claim. Here are the lands which the King gave me on Lanai. Aueha gave them to me. I am a Konohiki of the King, the lord of the land. That is what he said to me.

Here is this claim of mine. We spoke with Aueha, about my being the tax collector, that when the reign of the King in the Government was finished, then my position would end. That is what we spoke of. But the Government would not consider my claim if my work should be at fault.

Here is this responsibility of mine, a responsibility of prayer [as an overseer of the Lanai Church] from Ricord and Hoapili. Richards is my overseer. I have attended this work for 13 years. That is what I took care of. Now Baldwin tends to the work, and I am under Baldwin.

School overseer is another responsibility of mine, gotten from those people who had it. That is it. The decision to approve or deny it, is now up to you as you decide. (Figure 49)

Native Testimony

Lanai. July 10, 1851.

Poupou, Sworn. I know his parcels of land in the Ahupuaa of Makaliilii, Kulelelua, Iwiole and the 2 Aumoku on Lanai. They are combined into one, being several moku maau, sweet potato and gourd fields.


He received his land from M. Kekauluohi in the year 1839, and has resided there peaceably to this time. No one has objected, and he is the Overseer of these lands.

Keawe, Sworn. All the words above are true. My knowledge is the same. Pali, Sworn. The reason for my thinking of joining them together as one, is because there are many places of mine which are cultivated here and there, and where are built houses. I go from one place to another to cultivate, as announced in the Elele [newspaper].

Therefore I’ve joined my places together. It is as the witnesses have stated above. My claims for the other places are ended. (Figure 50)

Foreign Testimony

Jany. 17th, 1853.

Resolved, that the Land Commission be and is hereby authorized to award fee simple titles to Pali (Claim No. 10,630), Kalaihoa (No. 3719 B) and Malulu (No. 6846) as surveyed by Asa, containing respectively 112 1/4, 75 1/10 & 90 Acres.

By order of Privy Council
(Sig.) Lorrin Andrews,
Secretary. (Figure 51)

Figure 47. Page 1 of 2. Royal Patent 4800 of Pali. Source: Book 19:473–474

Hōkūloa 201-H Housing AMP

Appendix B: Māhele Data

B-9

B-10
Appendix B: Milestone Data

**Figure 48.** Page 2 of 2. Royal Patent 4800 of Pali. Source: Book 19:473–474

**Figure 49.** Hele 10630 of Pali. Source: Native Register 6:526

**Figure 50.** Hele 10630 of Pali. Source: Native Testimony 13:259

**Figure 51.** Hele 10630 of Pali. Source: Foreign Testimony 15:40
Māhele Award Book

There in the ili of Kaumalapau, Mooloa, Makaliili, Kalelehua and 2 Aumoku, in the Ahupua'a of Kamoku, Island of Lanai. One Parcel.

Beginning at the Western corner and running . . . [metes and bounds] . . . 112 Acres, 1 Rood, 23 Rods. (Figure 52)

Table 8. Royal Patent Grants on Lāna‘i

<table>
<thead>
<tr>
<th>RP Grant No.</th>
<th>Grantee</th>
<th>Location</th>
<th>Acreage</th>
<th>Book</th>
<th>Year</th>
</tr>
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<tbody>
<tr>
<td>1928</td>
<td>Koiku</td>
<td>Pawili</td>
<td>34.93</td>
<td>10</td>
<td>1855</td>
</tr>
<tr>
<td>1929</td>
<td>Kekua</td>
<td>Pawili</td>
<td>18.57</td>
<td>10</td>
<td>1855</td>
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<tr>
<td>1930</td>
<td>Nalimakaua</td>
<td>Pawili</td>
<td>31.96</td>
<td>10</td>
<td>1855</td>
</tr>
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<td>1931</td>
<td>Makaholohoe</td>
<td>Pawili</td>
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<td>10</td>
<td>1855</td>
</tr>
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<td>2214</td>
<td>Lonopaaawela</td>
<td>Pawili</td>
<td>1.64</td>
<td>12</td>
<td>1857</td>
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<td>Puupai</td>
<td>Pawili</td>
<td>52.00</td>
<td>14</td>
<td>1863</td>
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<tr>
<td>2971</td>
<td>Kapahoa</td>
<td>Pawili</td>
<td>33.00</td>
<td>14</td>
<td>1864</td>
</tr>
<tr>
<td>3029</td>
<td>Nahuina and Keliihue</td>
<td>Kalulu</td>
<td>236.68</td>
<td>14</td>
<td>1866</td>
</tr>
<tr>
<td>3030</td>
<td>Kapeleauaumoku</td>
<td>Pawili</td>
<td>32.00</td>
<td>14</td>
<td>1866</td>
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<tr>
<td>3031</td>
<td>Kaaina</td>
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<td>Pali</td>
<td>Kaunolu</td>
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<tr>
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<td>Keamo</td>
<td>Kaunolu</td>
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<tr>
<td>3045</td>
<td>Wm. Beder</td>
<td>Kaunolu</td>
<td>128.00</td>
<td>14</td>
<td>1867</td>
</tr>
</tbody>
</table>

One Royal Patent Grant was awarded in Kamoku Ahupua‘a, with a parcel also situated in the adjoining Kalulu Ahupua‘a. This land is approximately two miles below the study area. The application and records follow. The original records were written in Hawaiian.

Nahuina & Keliihue, he aina kuai ka laua me ke Aupuni, Kalulu i Lanai. 236.68 Eka, hookahi dala o ka Eka 1.

No ka aina 236.75
No ke Sila 5.00
No ke Ana ana 20.00 261.75
Kaa mua ia loane Richardson 158.00
Kaa hope ia P. Nahaolehua 103.75

Ua kaa loa keia aina, ua hoolili a ke dala i ke Kuhina Kalaiaina. E nana ma ka Bake 2 aoao 31. Ua loaa mai ka P. Sila Nui, Helu 3029, ua haawiia ia Nahuina & Keliihue.62

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62 Hawai‘i State Archives, DLNR 2 Vol. 37.38.
A translation by Kepā Maly of the preceding document follows.

Nahuina & Keliihue have purchased land of the government in Kalulu, Lanai.  
236.68, at $1.00 per Acre.  
Price of the Land 236.75  
Price of the Patent 5.00  
Price of the Survey 20.00 261.75  
The land has been paid for in full, with the money collected by the Minister of the Interior. Look in Book 2, page 31. The R. Patent, Number 3029 has been received by Nahuina and Keliihue.  
The Royal Patent documents are included as Figure 53 and Figure 54.

Figure 53. Page 1 of 2. Royal Patent 3029 of Nahuina and Keliihue.  
Source: Volume 14, p. 113–114

The following is from the Notes of Survey for Royal Patent 3029 to Nahuina & Keliihue, at Kalulu and Kamoku. The original document was written in Hawaiian. The sketch map accompanying the Notes of Survey is included as Figure 55.

Apana 1. Ma ke Ahupuaa o Kalulu, Mokupuni o Lanai.
He. 52 ½º Hi. 2532 pauku pili me Aupuni;
Ak. 52º Hi. 2653 pauku pili me Aupuni;
Ak. 43 ¾º Ko. 2030 pauku pili me Aupuni;
He. 30 ¼º Ko. 514 pauku pili me Ahupuaa o Kamoku;
He. 53 ¾º Ko. 718 pauku pili me Ahupuaa o Kamoku;
He. 68 ½º Ko. 2930 pauku pili me Ahupuaa o Kamoku;
He. 45 ½º Ko. 2080 pauku pili me Ahupuaa o Kamoku;
Hiki i ke kihi mua. O kona ili 133 1/10 Eka.

Apana 2. Ma ka ili o Kaumalapau i loko o ke Ahupuaa o Kamoku.
E hoomaka ana ma ke kihi Hikina Akau o keia apana a holo aku i ka:
Ak. 52 ¾º Ko. 415 pauku pili me Aupuni;
Ak. 44º Ko. 2144 pauku pili me Malulu;
He. 32 ½º Ko. 4664 pauku pili e Aupuni;
He. 43º Hi. 2320 pauku pili me Ili o Pueo;
Ak. 29º Hi. 2540 pauku pili me Ili o Pueo;
Ak. 43º Hi. 2200 pauku pili me Ili o Paeo;
Hiki ke kihi i hoomaka ai.
O kona ili, 103. 58/100 Eka.

[John Richardson]  
Waikapu  
Nov. 1855.63

Figure 54. Page 2 of 2. Royal Patent 3029 of Nahuina and Keliihue.  
Source: Volume 14, p. 113–114

Hawai‘i State Archives.  

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63 Hawai‘i State Archives.
Figure 55. Sketch map accompanying the Notes of Survey for Royal Patent 3029 of Nahuina and Kehiliue. Source: Hawai‘i State Archives

Appendix C Pineapple Harvester Assessment (SIHP # -02001) Assessment (Morita 2010)

<table>
<thead>
<tr>
<th>Date</th>
<th>DRAFT 050510</th>
</tr>
</thead>
<tbody>
<tr>
<td>To:</td>
<td>LCHC Board of Directors</td>
</tr>
<tr>
<td>From:</td>
<td>Albert Morita</td>
</tr>
<tr>
<td>Subject:</td>
<td>Dole Harvester “Machine 1”</td>
</tr>
</tbody>
</table>

In mid March of 2010, Captain and Cooke transported Dole Harvester, Machine 1 from the Mālika area to the lower 9th street area of Lanai City, adjacent to the Recycle Center. Machine 1 has been in the Mālika area since the closing of the Lanai pineapple operations by Dole in the early 1980’s and was probably parked there in running condition. Over the years it has deteriorated and pieces have been damaged, lost or salvaged for other uses. However Machine 1 is largely intact and is instantly recognizable to many. The harvesters were an important part of the pineapple era, being the work site of hundreds of workers from the 1950’s to the closing of the plantation as they harvested the carefully nurtured fruit. Machine 1 has had many visitors since arriving in its current location, “it brings back memories” is probably the comment most often heard as they recall their pineapple field experiences.

LCHC Executive Director, Kepa Maly and others have initiated efforts to assess Machine 1 for possible acquisition by LCHC for inclusion in its inventory of Lanai artifacts. As part of the assessment, visits were made to Machine 1 with former Dole workers who used and repaired the machines as well as with other interested persons.

GENERAL CONDITION OF MACHINE 1:

- **Main frame:** Good, major pieces are sound.
- **Hydraulic system:** Pump intact. Valves, leg control valves probably serviceable, others are frozen. Most of the control linkages are frozen. Metal hydraulic piping appears to be sound. Hydraulic hoses have brittle outer covering and rusted end fittings. 3 leg jacks are in good external condition, the left front leg has severe rust pips up to ½ inch deep on the cylinder. Elevator and counter weight cylinders have very rusted rods. Hydraulic tank is in good condition, it is about 46 gal. capacity. There is some fluid at bottom about 1” deep.
- **Electrical/lighting system:** Generator is intact, hose frozen. Most lighting fixtures missing or damaged. Wiring missing or damaged. Identification/signal lights missing.
- **Elevator:** Severe damage and rust at upper and lower ends. Missing about 1/3 of belts. Support rods and struts rusted, not attached.
Appendix C: Pineapple Harvester Assessment

Date: DRAFT 05/310
To: LCHC Board of Directors
From: Albert Morita
Subject: Dole Harvester “Machine 1”

- Boom: Detached from elevator and is in 4 pieces. Largest pieces are 19 and 6 feet long. Other pieces are severely twisted, are probably useful only for parts.

- Attachment bracket to elevator missing. All of boom conveyor belt is missing. Support cables rusted, some missing.

- Upper conveyors and plane: About 1/3 of the upper conveyor belt is missing. Cross supports for plane is bent. Rear truss and plane track is severely rusted. Many of the weld joints of the truss are completely rusted through.

- Counter weight: Missing. Counter weight boom, ok.

- Crown blower system: Blower ok. Blower housing, about 2/3 of sheet metal missing. Teflon pieces cracked or missing.

- Walkways, rails, ladders, platforms: Most of the walkways are sagging due to rust at their attachment points to the main frame. Most of the guard rails are rusted at the weld joints. Some are completely missing or rusted off.

- Operator station: Plywood in the front cabin area is in poor condition. Some angle iron framing rusted through. Plexiglass windows missing or deteriorated.


OPTIONS FOR MACHINE 1

1. Full restoration. This option is probably not within the current means of LCHC. However there may be a time in the future when an interested person or organization may be able to do a historically accurate restoration.

2. Stabilization and minimal restoration of major components. The objective of this option would be to slow down the deterioration of the machine and to repair major components such as the boom, and operator station, to a semblance of operating condition. This option could be carried out in phases, as resources allow.

3. No stabilization or restoration. Storage only.

4. Scrap and dispose. As the other options will require varying and continuing degrees of LCHC resources and thus be in competition with other LCHC projects, this option must be seriously considered, even if it results in the loss of a “last of its kind” piece of equipment.

A POSSIBLE LIST OF “PHASE 1” TASKS FOR OPTION 2:

- Remove and dispose unrelated items from machine. Record location of loose items and store for possible reuse or as patterns for replacement parts. Power wash machine.

- Repair or replace structurally unsound pieces of elevator. Repair and replace mounting struts and rods. Rotate belting to hide missing section on underside of elevator.

- Salvage longer pieces of boom to reconstruct a shortened version. Reassemble to elevator and install on machine with new cables.

- Remove engine and generator for assessment to determine if suitable to repair. (It would be desirable to have engine, hydraulic and electrical system working to facilitate moving machine when necessary and to have power available for future maintenance needs)

- Repair walkways, ladders and guard rails.

- Repair operator station.

- Repair crown blower system ducting.

- Chip rust, by hand tools or air needle guns (sand blasting?), and treat with rust converter or similar. Spot prime treated areas.

- Prime and paint entire machine.

- Repair damaged, rusted pieces of bin.

The above “Phase 1” work could probably be done with a combination of contracted work for specific tasks and volunteers. For instance a proposal could be requested for repair of the walkway/roll system. Other work such as rust chipping and spot painting could be done by volunteers.

None of the welders contacted was able to give even a rough estimate of time needed to complete the “phase 1” type repairs. A painter indicated that once the metal was prepared, the actual painting would take about 1 day per coat of paint. Thus no cost estimate is provided for the “phase 1” items. As a very optimistic time schedule, I would guess about 1 year would be required to complete “phase 1”.

Page 3 of 4
November 25, 2020

Susan Lebo  
Archaeology Branch Chief  
State Historic Preservation Division  
Kakahuhewai Building  
601 Kamokila Blvd., Suite 555  
Kapolei, HI 96707

Subject: Doile Pineapple Harvester (SIHP #50-40-98-02001) at the Hōkūlī 201-H Housing Project in Kamoku District on the Island of Lāna‘i (TMK: [2] 4-9-002:001 (por.)) Found to be Unsalvageable, Not Deemed Possible for Preservation as Previously Recommended

Aloha Dr. Lebo,  

This letter is to inform the State Historic Preservation Division (SHPD) that the Doile Pineapple Harvester (SIHP #50-40-98-02001) currently located within the Hōkūlī 201-H Housing Project in Kamoku Ahupua‘a, Lāhainā District on the Island of Lāna‘i (TMK: [2] 4-9-002:001 (por.)) has been found to be unsalvageable and not deemed appropriate for preservation or interpretive display as had been previously recommended. The location of the harvester is shown in Figure 1.

The harvester was initially documented in 2018 during an AIS conducted by T. S. Dye & Colleagues, Archaeologists, Inc. (Dye and Maly 2018). The report noted that the Lāna‘i Culture and Heritage Center assessed the condition of the harvester and “found the main frame to be sound and the diesel engine repairable, but other components, such as the electrical system, elevator, boom, conveyors, counterweight, crown blower system, walkways, rails, ladders, platforms, operator station, and bin were in various stages of disrepair. Several pieces were noted as missing, and rust, which was widespread, threatened the structural integrity of several components” (Dye and Maly 2018:104). The harvester was assessed as eligible for the State Register under significance Criterion a “for its association with the commercial pineapple fields that for seven decades were the primary economic pursuit on the island” and it was recommended that it be moved to a sheltered location away from the project area for future restoration and interpretive display (Dye and Maly 2018:135).

In 2019, a field inspection was conducted for the Hōkūlī 201-H Housing Project by Honua Consulting and an End of Fieldwork Report was written (Thurman 2019). The harvester was confirmed to be in the same location as previously documented by Dye and Maly (2018). It was surrounded by a chain-link fenced area that was heavily overgrown and observation through the fence line found it to be in the same general rusty condition as previously described and noted that its “structural integrity [was] found to be threatened” by its apparent decay (Thurman 2019:5). At the request of Pūlama Lāna‘i, Honua Consulting conducted an updated integrity assessment for the Doile Pineapple Harvester. Honua Consulting found the machine...
possessed integrity of design as it is the last known machine to utilize this particular technology and design for its function, integrity of materials and workmanship as it contains the unique physical elements and craft of Lānaʻi’s plantation period, and integrity of feeling and association for its ability to express the historic character of the plantation period and its direct link to that historic period. The study agreed with Dye and Maly (2018) that the harvester was deemed significant under Criterion a and may be eligible for the State Register. It was recommended that the harvester be moved to a sheltered location away from the proposed Hōkiāo 201-H Residential Project prior to any construction activities and that funds for its restoration and interpretive display be pursued.

An August 14, 2020 historic preservation review letter from SHPD agreed with the recommendations provided in the Dye and Maly (2018) AIS and the Thurman (2019) End of Fieldwork Report and recommended the harvester be moved to a sheltered location prior to any ground disturbance activities and, if not possible, be protected by interim protection measures to ensure it is not impacted by the proposed project (Log No. 2020.00018, 2008IK01).

In September of 2020, Doug Stevenson, Director of Fleet Maintenance of Piliama Lānaʻi and Albert Morita, retired mechanic and former board member of Lānaʻi Culture & Heritage Center assessed the structural integrity of the harvester. The plan was initially to stabilize the machine and replace a few parts in preparation for its relocation. However, it was found that the harvester would not be able to be moved without a very considerable amount of destruction due to vast deterioration throughout the machine. It was found that the harvester had degraded to a point in which it was not recommended to be salvageable and is a safety concern. Recent photos of the harvester are attached as an appendix (See Figure 57 and Figure 58).

The harvester was found to have significance and integrity, but due to its condition it is not eligible for the State Register and has been found to not retain sufficient structural integrity to warrant preservation or interpretive display. Therefore, the landowner, Piliama Lānaʻi, plans to demolish the harvester prior to commencement of activities within the Hōkiāo 201-H project area.

We want to provide you with this notice and request your concurrence. Please let us know if you have any further recommendations, questions, or concerns.

Sincerely,

Rosanna Thurman
Principal Investigator
Honua Consulting

References

Dye, Thomas S., Ke'au Maly
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FINAL

Cultural Impact Assessment for the Lāna‘i City Expansion Project
Ahu pua‘a of Kamoku
Island of Lāna‘i

Photo 1. View of Section of Project Area.
(All photos were taken by author unless otherwise specified)
EXECUTIVE SUMMARY

This Cultural Impact Assessment (CIA) is in response to a request from T. S. Dye & Colleagues, Archaeologists, Inc. for the Līna'i City Expansion project in the ahupua'a of Kamoku, and moku of Kona, Island of Līna'i. This study is part of a larger study that includes an Archaeology Inventory Survey in compliance with federal and state requirements to identify and evaluate possible cultural impacts to cultural resources, cultural practices and access to resources and/or practices in advance of construction activities.

The purpose of a CIA is to gather information about traditional cultural practices, ethnic cultural practices and pre-historic and historic cultural resources that may be affected by the implementation of this project or undertaking in accordance with the State of Hawaii Environmental Council Guidelines for Assessing Cultural Impacts (Adopted on November 19, 1997) [Appendix B]. The level of effort for this CIA included ethnographic research (4-5 oral histories) of people who are connected to these lands in various ways and an archival cultural/historical background review of the literature (including reports by T.S. Dye & Colleagues, Archaeologists Inc., Kumu Pono and internet research).

The archival research was conducted from July through August 2016; the ethnographic research in August-September 2016 and the cultural-historical background report write-up in September-October 2016.

This report is organized into five parts or chapters. Chapter 1 describes the project area in terms of location in the context of ahupua'a (land division), moku‘ūina (district) and mokupuni (island), as well as a generalized description of the natural environment (e.g. geology, flora and fauna) and built environment (e.g. any current structural features). Chapter 2 explains the methods and constraints of this study. Chapter 3 summarizes a review of the historical and traditional (cultural) literature in the context of the ahupua'a of Kamoku. Chapter 4 presents the ethnographic analysis based on the supporting raw ethnographic data (oral history transcripts) as it pertains to land, water and cultural resources and use in the project area and vicinity. It also includes background data about the ethnographic consultants. Chapter 5 summarizes the findings of this study based on supporting data from Chapters 1 through 4 and presents a cultural impact assessment and recommendations.

Archival research in the Cultural and Historical Background Review (Chapter 3) and ethnographic research (Ethnographic Data Review and Analysis) (Chapter 4) produces the data utilized to identify and describe the cultural resources, practices and beliefs located within the potentially affected area in the Summary of Findings. There were no identified cultural resources or practices connected to the project area. Therefore, it is determined by the CIA results that the suggested actions will not create any cultural impacts.

ACKNOWLEDGEMENTS

Without the ethnographic consultants this Cultural Impact Assessment could not have been done, therefore Mahalo Nui Loa goes out to Ms. Alberta De Jetley (guide through project area), Mr. Roberto Hera (saimin treat and especially the guided tour through Kāneʻpuʻu Preserve plus), Mr. Genji Miyamoto, Mr. Albert Morita (guided tour of the Līna'i Cultural & Heritage Center, and Google search), and Mr. Warren Osako (for the t-shirt and help contacting Mr. Miyamoto); they are all so knowledgeable about Līna'i’s history and so very hospitable.

A big Mahalo also goes out to Ms. Onaona Maly for her hospitality; Mr. Kepa Maly for his suggestions and archival resources; Ms. Mikala Enfield for her kokua and patience; and a special mahalo to Mr. Ben Ka'aikala for driving for the Kāneʻpuʻu tour and for the special handcrafted wood knives.

An additional mahalo also goes to transcriber Seanna Piilani Ah Kee, Jessica Orr (IT consultant) and to Tom and Muffet (T.S.Dye & Colleagues, Archaeologists, Inc.).
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INTRODUCTION

At the request of T. S. Dye & Colleagues, Archaeologists Inc., a Cultural Impact Assessment (CIA) of the Līnā‘i City Expansion Project lands in the ahuāpua‘a of Kamoku and moku of Kona, island of Līnā‘i was conducted in two periods: the archival research from July through August 2016; the ethnographic research in August-September 2016 and the cultural-historical background report write-up in September-October 2016. This CIA is in compliance with federal and state requirements to identify and evaluate possible cultural impacts in advance of construction activities. Act 50 SLH 2000 (HB 28 H.D.1) [Appendix A] as it amends the State of Hawai‘i Environmental Impact Statement law [Chapter 343, HRS] includes “effects on the cultural practices of the community and State. [It] also amends the definition of ‘significant effect’ to include adverse /effects on cultural practices.”

The purpose of a CIA is to gather information about traditional cultural practices, ethnic cultural practices and pre-historic and historic cultural resources that may be affected by the implementation of this project or undertaking in accordance with the State of Hawai‘i Environmental Council Guidelines for Assessing Cultural Impacts (Adopted on November 19, 1997) [Appendix B]. The level of effort for this CIA included ethnographic research (4-5 oral histories) of people who are connected to these lands in various ways and an archival cultural/historical background review of the literature (including reports by T.S. Dye & Colleagues, Archaeologists Inc., Kumu Pono and internet research).

This report is organized into five parts or chapters. Chapter 1 describes the project area in terms of location in the context of ahuāpua‘a (land division), moku‘āina (district) and mokupuni (island), as well as a generalized description of the natural environment (e.g. geology, flora and fauna) and built environment (e.g. any current structural features). Chapter 2 explains the methods and constraints of this study. Chapter 3 summarizes a review of the historical and traditional (cultural) literature in the context of the general history of Hawai‘i, the island of Līnā‘i and local histories of the ahuāpua‘a of Kamoku. Chapter 4 presents the ethnographic analysis based on the supporting raw ethnographic data (oral history transcripts) as it pertains to land, water and cultural resources and use in the project area and vicinity. It also includes background data about the ethnographic consultants. Chapter 5 summarizes the findings of this study based on supporting data from Chapters 1 through 4 and presents a cultural impact assessment and recommendations.

SCOPE OF WORK (SOW)

The CIA scope-of-work (SOW) was based on the Environmental Council Guidelines for Assessing Cultural Impacts (1997) and focuses on three cultural resource areas (traditional, historical and ethnographic), conducted on two levels: archival research (literature/document review) and ethnographic data (oral history).

1. conduct historical and other culturally related documentary research;
2. identify individuals with knowledge of the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahuāpua‘a; or with knowledge of the area potentially affected by the proposed action e.g. past/current oral histories;
3. identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and
4. assess the impact of the proposed action on the cultural resources, practices and beliefs identified.

Traditional resources research entails a review of Hawaiian mo‘olelo (stories, legends or oral histories) of late 19th and early 20th century ethnographic works. Historic research focuses on the literature compiled.
The project area is located in the Ahupua’a of Kamoku, Moku of Kona on the Island of Lāna‘i.

Geology. Lāna‘i, also known as Na-na‘i (Pukui et al. 1974:128), is the sixth largest island of the eight major islands. It is of Maui County, along with Molokai and Kaho‘olawe. Lāna‘i is 13 ¾ miles long, 13 miles wide, with an area of 140 square miles. Lāna‘i is a single dome-shaped shield volcano with its highest elevation of 3,379 feet at Lāna‘ialae (Maly & Maly 2007:3). The volcano last erupted 1.3 million years ago, and Pillāwai Basin is all that remains of the caldera (Juvik & Juvik 1998:13). The name of the island may be literally translated as “day of conquest” – Lā meaning “day” and Na‘i meaning “conquest.” Through the tradition of the chief Kauihulu‘anau, Lāna‘i was named on the day that the young chief vanquished the evil ghosts from the island. An early missionary dictionary translates the island’s name as “hump,” but this translation does not fit in with traditional knowledge of the meaning or pronunciation of the name (Maly & Dye 2016: 6).

The island of Lāna‘i, Hawai‘i, lies 59 miles southeast of Honolulu, O‘ahu, and 9 miles west of Lahaina, Maui. Lāna‘i lies in the rain shadow of Maui’s West Maui mountains and annually gets only 35 inches of rain near the summit to a mere 10 inches in the southwestern part of the island. There are no permanent streams on the island, however the longest stream bed, the Maunalei-Wai‘alala Gulch, is 12.9 miles long (Morgan 1996:211).

Flora. In Hawai‘i a Natural History, Carlquist divides each island into six regions: Coast, Dry Forest, Wet Forest, Epiphytic Vegetation, Bog and Alpine. Within the 0-500’ elevation the only native tree is the hala (Pandanus odoratissimus). Humans have introduced other coastal trees in this zone (Carlquist 1980:267). (The Dry Forest Region has suffered the most impact by man. This is the area the early Polynesians modified extensively in slash and burn cultivation to expand their subsistence level, intensifying food production with complex irrigated agricultural systems of various crops (Kirch 1985:237). The early Polynesian settlers introduced all of the food or crop plants. The following crop plants were noted in Māhele Claims in the mid-1840s (Lanaichc.org):
Ipu (gourds) Six claimants listed ipu as a cultivated crop.
Ki (kī leaves) One claimant listed kī as a cultivated crop.
Ko (sugarcane) Four claimants listed ko as a cultivated crop.
Ma'ā (banana) Three claimants listed ma'ā as a cultivated crop.
Niu (coconut) One claimant listed a grove of niu as a cultivated crop.
Pulu (cotton) One claimant listed pulu as a cultivated crop.
"Uala (sweet potatoes) Native claimants cited at least fifty two land areas as 'uala mahakea, as cultivated crop.
Wauke (paper mulberry) One claimant listed wauke as a cultivated crop.

Some of the Dry Forest vegetation that may have been affected by early Hawaiian cultivation practices are the naio (Myoporum sandwicense), wiliwili (Erythrina sandwicense), ohe (Reynoldia sandwicense), 'ililihi (Santalum sp), 'ohia (Metrosideros sp), koa (Acacia koa), as well as several species of shrubs, vines and ground cover (Carlquist 1980: 275-300).

Lāna'i's ecosystem evolved in the absence of man and most other mammals, giving rise to cloud forest zones, which gave life to the land, and made the island hospitable to people when they settled Lāna'i perhaps as long as 3,000 years ago. There were two primary forest-watershed zones, the major watershed of Lāna'i Hale at the highest peak of Pālāwai and Kedlia Aupuni Ahupua'a, and what has historically been called the Kāne'pū forest zone of ka'A Ahupua'a. Untouched for countless centuries, the forest systems of Lāna'i evolved the unique ability to capture droplets of water, which in turn percolated through the ground to create water sources that were spread from mountain to shore across the island. While these precious forest regions have been radically altered by man’s activities and feral animals, evidence of the region’s water-producing capabilities are still visible on the landscape and in traditional accounts and historic literature (Maly & Dye 2016:6-7).

The following are excerpts from A Botanizing Trip to Lāna'i in 1870 'Reminiscences of an Amateur Collector' By J.M.Lydgate (In the Hawaiian Annual for the year 1921) (Maly & Maly 2007:79-81):

Lāna'i, even in those days, had been pretty well denuded of its forest cover; only on the summit of the island ridge was there a somewhat moth-eaten mantle on the left, and only on the slopes of the higher ravines and the steep hill sides was that mantle really intact and undisrupted. It was to these limited remnants that we devoted our attention (Lydgate 1921 In Maly & Maly 2007:80).

Another interesting plant which we found in the chaparral region lower down was a small tree Gardenia – Gardenia Brighami. The more common Hawaiian gardénia is a forest tree, rather sparse in flowering. This smaller one, growing in the open, flowered profusely, and filled the air with its delightful fragrance.

Botanically speaking, Lāna'i was at one time a very interesting island, with a rich and somewhat peculiar flora, confined to a very small area. It was well that we visited it when we did and were able to make a thorough an examination, for after our visit it remained unexplored for many years, while the ravages of cattle, sheep and goats, as well as forest diseases, hastened the decadence of the indigenous forest, so that a good many things that we found there were gone for good when someone else tried to get them (Lydgate 1921 In Maly & Maly 2007:81).

To the north of Lāna'i City lies the Kāne'pū'u Preserve, habitat of several native dry forest species. It is maintained by volunteers who continue to clear the alien species and allowing the native dry forest collections to thrive.
The following is a single paragraph noted by Handy & Handy (1978:520) about Lā‘i:

According to Emory (1924), except for the several localities in which taro was planted, sweet potatoes were planted in every part of the island where there were settlements: on the shore, in valleys, on the kalo, and the upland. In other words, the sweet potato was the staple, although taro, yams, and breadfruit were important supplementary items of diet. There was an abundance of good land for planting and Lā‘i’s has ample rain for sweet potatoes; but settlements and gardening were definitely limited by dearth of drinking water. Emory’s study of archaeology of the island indicates sparse and widely separated settlements.

Fauna. Terrestrial fauna in pre-colonized Hawai‘i consisted of only one endemic mammal, the hoary bat (Lasiurus cinereus), thousands of endemic insects, and about 100 species of endemic birds such as the Hawaiian honeycreeper (Drepanididae spp) (Berger, 1972:7, Kirch, 1985:28). Early Polynesian introduced animals included the Southeast Asian pig (Sus scrofa), jungle fowl (Gallus gallus), dog (Canisdae), and the Polynesian rat (Rattus exulans). Mammals on Lā‘i today include both the feral and domestic pig, various breeds of cattle, horses, dogs, cats, the mongoose (Herpestes auropunctatus), first introduced in 1883 (Berger, 1972:9), and the axis deer (chetal or spotted deer) (A. a. cey.) Marine life in Lā‘i’s waters includes a variety of mollusk, seaweed, sea urchins, octopuses, turtles, dolphins, stingray, whales and a variety of fish.

Native and introduced species were found in the dry forest in and outside of Kāne‘pū’u Preserve:

Photo 12. Alien Gulf Fritillary Butterfly


The following excerpts from Bird Life on Lanai By G.C. Munro (1930) and published in The Friend (1944) [In Malay & Maly 2007:82-84], give a good summary of the types of birds and other fauna on the island:

The plover (kolea) and the turnstone (akekeke) frequent the uplands in large flocks in the winter and with the aid of the much-abused mynah on several occasions saved the cattle from food shortage by devouring the army worm in its periodical invasions. Both of these waders should be taken under the protecting arm of the law. The owl (puu), though not in large numbers, is to be seen over the plains country, where its nest with round, white eggs or young of various sizes will sometimes be met with in a hollow in the grass. The number of mice lying dead around the nest is evidence of the usefulness of the bird. . . . The rock pigeon though present does not increase into large flocks, as on some of the other islands. The common Singapore dove is abundant everywhere. . . .

A small Australian quail is becoming common, running like rats in the grass or rising in quick flight and dropping down a short distance away into the cover. Wild chickens were brought from Kauai and are in limited numbers along the forest edge. It is doubtful if they will survive the increase of population. It is to be hoped that something can be done to preserve the original wild Hawaiian chicken. Lanai has long been famous for its pheasant shooting. It is one the pretty sights of the island to see these birds walk confidently off the road in front of an approaching car. . . . The Mexican wild turkey mixed nicely with the original bronze bird that roamed the hills. The Mexicans liked the level cactus-covered country, now rapidly becoming pineapple fields. Semi-wild turkeys have a small chance of survival in thickly populated districts. All the larger gallinaceous birds will adopt a pineapple diet and eventually be condemned. . . .

The ‘i‘iwi, one of the most beautiful of the native birds and forty years ago one of the most common on some of the larger islands, has disappeared in late years from Lā‘i’s. The ‘apapane is still a fairly common bird, also the ‘amakhuhi, the o‘o comes next and the olomaua and alauhiio. All of these with the exception of the ‘i‘iwi, were in sufficient numbers twenty years ago to keep up the species and every encouragement has been given them since. The ‘apapane can be seen flying singly or in groups across the gullies; the amakhuhi comes down to the Koele garden and seeks honey from the flowering plants; the sweet song of the o‘o can be heard in the valleys; the olomaua’s various calls are constant in some locations and the inquisitive little alauhiio works up close to the trail with its cheery little “chip chip” as the traveler passes (Munro 1930 In Malay & Maly 2007:84).

Of the other imported birds the mynah. Linnet, skylark, ricebird and sparrow are present on the island. . . . It was interesting a short time ago to watch the mynah following two tractors dragging a heavy chain between them to stir up the drying cactus. . . . A continuous stream of birds were landing just behind the chain... cockroaches and other insects were disturbed by the chain and furnished them a feast (Munro 1930 In Malay & Maly 2007:83). Photo 16. Today the introduced egrets follow the tractor cutting grass.

The following excerpt is from Lā‘i’s Culture & Heritage Center (ilanaichc.org) Land Title 3:

January 26, 1875
Ahoe & Akuma to Walter M. Gibson Bill of Sale
Conveying sheep pasturing on Ahupuaa of Kamoku

Know all men by these presents that we Ahoe and Akuma both of Kamoku in the Island of Lanai one of the Hawaiian Islands and both Chinnamen in consideration of the sum of Eight Hundred Dollars paid to us by Walter M. Gibson of Lanai aforesaid Esquire do hereby bargain, sell, assign, transfer and set over unto the said Walter M. Gibson all those certain sheep numbering about Two Thousand more or less now in our possession or under our control pasturing on or grazing upon or about the land known as “The Ahupuaa of Kamoku” on the said Island of Lanai.

The following excerpts by George Munro (1930) were published in The Friend (Sept 1930:193) as The Goat Menace of Lā‘i’s (1930) [In Malay & Maly 2007:84-85].

For more than a hundred years goats have roamed the hills of all the islands of our group. No one can ever estimate the amount of damage inflicted by these pests upon our pastures and forests. In many localities they have ruined the native woods and turned into barren wastes what should still be good forest cover. . . .

Lanai...has suffered badly from goats. The splendid forest area in the center of Lanai was encroached upon by hundreds of the destructive goats. In 1908 there were about 10,000 of these animals on the island. Not content with staying on the lowlands, they entered the dry forest lands of Kaa and did harm to the old native trees. For years they could be found in all parts of Lanai, but constant warfare resulted in the slaughter of thousands of the pests. It was a real task to get them out of the cliffs of Maunalei and Nahokai, Kahawaiwai, and Naio, but at last that part of Lā‘i’s has been freed of goats, and it is thought that only a few animals remain in the western pali region of the island (Munro 1930 In Malay & Maly 2007:84-85).
METHODS

The Cultural Impact Assessment (CIA) consisted of three phases: (1) cultural and historical archival literature review; (2) ethnographic survey (oral history interview), analysis of ethnographic data (past and current oral histories); and (3) report writing. The research, ethnographic analysis, and report writing were done July to September 2016.

Personnel. The personnel consisted of the author (ethnographer) who has a master’s degree in Anthropology, with a graduate curriculum background in the archaeology track as well as anthropology theory, cultural resource management, ethnographic research methods, and public archaeology; an undergraduate curriculum background that included Hawaiian History, Hawaiian Language, Hawaiian Archaeology, Pacific Islands Religion, Pacific Islands Archaeology, Cultural Anthropology, as well as a core archaeology track, Geology, and Tropical Plant Botany; and ethnographic field experience that includes over 400 interviews to date.

Level of Effort. The level of effort for this study included an archival research literature review and an ethnographic survey and analysis [5 current oral histories].

Theoretical Approach. This CIA is loosely based on *Grounded Theory*, a qualitative research approach in which “raw data” [transcripts and literature] are analyzed for concepts, categories, and propositions. Categories were pre-selected as part of the overall research design. However, it is not always the case that these research categories are supported by the data. Categories were generated by forming general groupings such as “Land Resources and Use,” “Water Resources and Use,” and “Cultural Resources and Use.” Conceptual labels or codes are generated by topic indicators [i.e., flora, fauna]. In the *Grounded Theory* approach, theories about the social process are developed from the data analysis and interpretation process (Haig 1995; Pandit 1996). This step was not part of this cultural impact assessment as the research sample was too small.

Archival Research. The archival research entailed reviewing previous works by Kepa Maly and reviewing other primary and secondary works and collections from various libraries and the internet.

Consultant Selection (Oral Histories). The selection of the ethnographic consultant was based on the following criteria:
- Had ties to Project Location(s)
- Known Hawaiian Cultural Resource Person
- Known Hawaiian Traditional Practitioner
- Referred by Līnā’i Culture and Heritage Center staff

Interview Processes. The formal interview process included a brief verbal overview of the study. Then the ethnographic consultant was provided with a consent or ‘agreement to participate’ form to review and sign [Appendix C]. An ethnographic research instrument [Appendix D] was designed to facilitate the interview; a semi-structured and open-ended method of questioning based on the person’s response (‘talk-story’ style). Each interview was conducted at the convenience (date, place and time) of each consultant (after August 8th at the request of the Primary Client). The interview was conducted using a digital recorder. The interviewees were allowed to choose where they wanted to have their interview conducted. Two chose to meet at the Līnā’i Culture and Heritage Center; one asked to meet in the Park; one chose his home; and one asked for a telephone interview. Notes were also taken, but more attention was given to listening intently to the consultant. A *makana* or gift was given to each consultant in keeping with traditional reciprocal protocol.

Transcribing-Editing Process. The taped interview was transcribed by a hired transcriber. After the interviews were transcribed, each transcript was edited and corrected by the principal investigator before mailing. Each ethnographic consultant was sent a *mahalo* letter that explained the transcript review process, along with hard copies of the interview transcripts, *Release of Information* forms, and a self-addressed, stamped envelope for return of a signed release form and a copy of the revised transcripts. This process allows each consultant to make corrections (i.e., spelling of names, places), as well as have a chance to delete any part of the information or to make any stipulations if desired. The consultants were also informed of the two-week time limit for their review and return of revised transcripts and signed release forms after which it will be assumed that the raw data can be selectively used.

Ethnographic Analysis Process. The analysis process followed a more traditional method, as a qualitative analysis software program (i.e., TALLY) was not necessary. Each interview was considered a separate file, and the last name was used to identify the consultant. Each transcript was electronically coded for research thematic indicators or categories (e.g., personal information; land, water, marine resources and use; site information-traditional and/or historical; and anecdotal stories). For the purpose of this CIA, it was also not necessary to go beyond the first level of content and thematic analysis, as this was a more focused study. However, sub-themes or sub-categories were developed from the content or threads of each interview [e.g., plantation, ranching or fishing].

Summary of Findings and Cultural Impact Assessment. The Summary of Findings section is based on both archival and ethnographic data: Summary of Significant People and Events (e.g. Legendary Entities, Ali‘i Nui), Summary of Historic People and Events, and Significant Practices Pre-Contact and Post-Contact. This section also includes ‘Environmental Council Guidelines Criteria in Relation to Project Lands’ and the Cultural Impact Assessment and recommendations or mitigation if any are made.

Report. The report includes the description of the project area; the explanation of methods; a review of the historical and traditional (cultural) literature; the ethnographic analysis; summary of findings and cultural impact assessment.

Site Visit. Site visits were made by the principal investigator including one with an ethnographic consultant.

Ethnographic Research Constraints. While most of the ethnographic research went very well, there were a few glitches: (1) one of the ethnographic consultants was not able to have a face-to-face interview but requested a telephone interview which proved to be less than desired as it was difficult to hear or catch everything; (2) after the transcripts were sent to each person, two interviewees could not return their revised transcripts in the two weeks requested and asked for an extension – they later sent in revisions; and (3) one revised transcript was returned with hand-written corrections, which was difficult to decipher, but he later mailed another hand-corrected original that was clearer.
CULTURAL AND HISTORICAL BACKGROUND REVIEW

The Cultural and Historical Background Review entailed a review of previous reports that included primary and secondary source literature. Examples of primary source material include maps, Land Court records, newspaper articles, genealogies, oral histories and other studies. Secondary source material includes translations of 19th and 20th century ethnographic works, historical texts, indexes, archaeological reports, internet research and Hawaiian language resources (i.e., proverbs, place names and Hawaiian language dictionary). A review of selected archival material is presented in this section.

Chronology of Human Impact, Settlement and Development in Greater Hawai‘i and the Island of Lāna‘i — an overview.

Colonization Period. First voyager dating is scanty at best, however, based on early site dates from Bellows, O‘ahu and Ka Lāe/South Point, Hawai‘i, Kirch (1985) estimated that the Colonization Period of the Hawaiian Islands by Polynesians from the south, was somewhere between AD 300-600 [this has been recently refuted with a new estimated settlement period beginning ca 1100AD (SAA 2013)]. A couple of mo‘olelo about Hawai‘i Loa the navigator, have the islands being settled much earlier than this. It is believed that the first Polynesian voyagers to Hawai‘i followed the flight paths of migratory birds, and navigated by the stars. A voyage of migration would have included sixty to a hundred persons who could exist for weeks on a large canoe, which may have been a hundred feet in length (Day 1992:3). This feat was “remarkable in that it was done in canoes carved with tools of stone, bone, and coral; lashed with handmade fiber; and navigated without instruments” (Teruia 1995: vii). The earliest date for Lāna‘i according to legend, was about 1400 A.D. (Lanaioch.org).

Reconstructing the cultural sequence for the ahupua‘a of Kamoku and other places in Lāna‘i and Hawai‘i during the colonization period would involve the “founder effect” and time necessary to adjust and adapt to a new environment. The colonizers were not able to bring all of the gene pool or crop plants from their homeland, so their new culture consisted of what survived the journey, what was remembered and what could be applied to the new environment (Kirch 1985:285-6). Although early Hawai‘i‘ans were farmers and felt spiritually tied to the ‘āina (land) in many ways (Waters, n.d.), when they first arrived they had to modify both their subsistence practices and the land. Faunal remains analyses indicate that early Hawaiian subsistence depended on fishing, gathering, bird hunting [extinct fossil remains, see Olson and James, 1982], as it took time to clear the forests, plant their crop cultivars, breed their animals, and construct suitable living quarters. Creation chants such as the Kamulipoa depict a very deep philosophical bond with the land and nature and “the respectable person was bound affectionately to the land by which he was sustained” (Charlot 1983:45, 55). Ancient sites of various ko‘a (fishing and bird shrines) also imply a spiritual respect for their sustenance.

As the founding groups grew, they fissioned into subgroups anthropologists refer to as ramages, with the senior male of the original ramage as chief of the conical clan, although hierarchical ranking was not just relegated through the patrilineal line of descent (Kirch 1985:31). Bellwood refers to these groups as tribal and related by blood (Bellwood 1978:31). Chiefly ranking probably did not occur until late in the Developmental Period.

Developmental Period. According to Fornander (1969) certain practices were universal Polynesian customs which the Polynesian-Hawai‘ians brought from their homeland; such as the major gods Kū, Kanaloa, and Lono; the kapu system of law and order; pa‘ihonua (place of refuge); ‘ainakau (ancestral guardian) concept; and the concept of manu (supernatural or divine power) (Fornander 1969:61, 113,118,127-8). The early culture evolved as the population grew, and many of the changes were related to significant socio-economic changes. The evidence indicates that the “ancestral pattern of corporate descent groups” were still in place (Kirch 1985:302-3). However, this was changing as well.

During the Developmental Period, changes occurred bringing about a uniquely Hawaiian culture, documented by the material culture found in archaeological sites. The adze (ko‘i) evolved from the typical Polynesian variations of plano-convex, trapezoidal and reverse-triangular cross section to a very standard Hawaiian quadrangular-tanged adze. A few areas in Hawai‘i produced high quality basalt for adze production. Mauna Kea on the island of Hawai‘i was a well-known adze quarry of very high quality basalt. Other areas included Maunaloa, West Molokai, Kapa‘a Quarry in windward O‘ahu, Kaho‘olawe and Honolua-Honokōhau and Haleakalā on Maui. The two-piece fish hook and the octopus lure breadloaf sinker are also Hawaiian inventions of this period, as are the ‘ulu maika stones and the lei niho palaau (whale-tooth adornment). The latter was a status item worn by those of high rank, indicating a trend toward greater stratification (Kirch 1985:184,204,306).

Expansion Period. The Expansion Period is significant in that most of the “ecologically favorable zones,” the windward and central areas of all major islands, were now settled, and the more marginal lowland areas were being developed. This was also the period of the greatest population growth, the development of large irrigation field system projects, and dryland farming. The uniquely Hawaiian invention, the loko or fishpond aquaculture, was developed in the fifteenth century or the later half of this period (Kirch 1985:303).

Between the 12th to 13th centuries another migration to Hawai‘i brought the “priest” Pā‘ao and a ruling chief, Pi'ilani, from central Polynesia (some say Tahiti, others say Samoa). This created a major shift in “religion” and socio-political patterns. Pa‘ao brought with him the Kū practice of human sacrifice, used in monumental luakini heiau or war temples. Pā‘ao started a line of ali‘i nui that would continue through the Kamehameha dynasty.” The evolution of the luakini heiau is difficult to place archaeologically, and although the arrival of Pa‘ao may have been a real event the uniqueness and complexity of heiau were most likely a local (Hawai‘ian) development (Kolb 1989:3).

Lāna‘i’s history becomes more visible in the literature during this period with mo‘olelo of Kaūlauula who was banished to Lāna‘i by his father Kaka‘alanoe for destroying his prized breadfruit trees in Lahaina, Maui. Kaka‘alanoe co-ruled Maui domain (Molokai, Lāna‘i, Kaho‘olawe) with his brother Kā‘a‘e. The brothers were part of the dynasty of Maui kings. Kaūlauula made the island of Lāna‘i habitable by defeating the harmful entities said to reside there. He became the first known ali‘i of Lāna‘i.

Monumental heiau building flourished in this Period, as “religion” became more complex and embedded in a socio-political climate of territorial competition between related ali‘i. Monumental architecture such as heiau “played a key role as visual markers of chiefly dominance” (Kirch 1990:206). Emory found that there were eleven large heiau on Lāna‘i. None of these were along the coast and two on the uplands (Munro 2006:12-13).

During the last 200 years of the Expansion Period, the concept of ahupua‘a was established, as well as class stratification, territorial groupings, powerful chiefs and “mō‘i” or king (Kirch 1985:303-6). The ali‘i and the maka‘a‘inana (those who looked after the land) were not confined to the boundaries of the ahupua‘a. Not only did the ma kai (ocean direction) and ma ūka (mountain direction) people share seafood and produce by lighting a fire when there was a need, they also shared with their neighbor ahupua‘a ‘o‘u‘au (Hono-ko-hau 1974:14, 15). The ahupua‘a was further divided into smaller sections such as the ili, mo‘o ‘āina, pa‘uki ‘āina, kīhīpā, kī ‘ele, hoku one and kuukua (Hommon 1976:15; Pogue 1978:10). The chiefs of these land units gave their allegiance to a territorial chief (ali‘i nui or mō‘i – king). One of the most famous ali‘i nui during this period was Pi’ilani (ca. Late 1500s to Early 1600s) whose ancestors made Hāna, Maui their home. As a ruler, Pi’ilani spent time at both Hāna and Lele or Lāhainā. He was well
known for his peaceful rule of Maui, Moloka‘i and Lāna‘i. While he ruled there were no wars between chiefdoms and island polities. Several mele, ‘ōlelo ma‘eau, and mo ‘olelo mention that Maui, Moloka‘i and Lāna‘i and all the bays of West Maui that begin with ‘Hono’ were in the realm of Pi‘ilani.

Mo‘olelo about events that took place in the early to mid 1600s revealed that many of the battles of this period were relatively quickly contained by the opposing ali‘i. These stories also illustrate the on-going inter-relationships between the people of the various islands. In the History of Kīālī‘i, the exploits of Kīālī‘i (great-great-grandson of Kāhikihēwah, ‘ali‘i mui of O‘ahu) take him to every island and he eventually unites all the islands “from Hawai‘i to Ni‘ihau” (Fornander 1917:vi, part II, pg906). Kīālī‘i lived in the time of Maui ali‘i nui Kama‘alualu and Kauiho‘ikali, sons of Kīa‘i-pōli‘i by each of their two wives [Kumaka and Koleamoku] and Kauihiakama, son of Kama‘alualu (Kamakau 1992:56; McKenzie 1986).

Proto-Historic Period. The Proto-Historic Period appears to be marked with both intensification and stress. However, it was during this period that theRoyal Kolowalu Statute or Kīālī‘i’s Law was enforced. Kīālī‘i’s Kūnī’a‘kea Kīkēkāna‘aukakalani lived for a very long time, was said to sometimes have supernatural powers, and was the first to “unite” all the islands. This ali‘i mui of O‘ahu died at Kalaul in Ko‘olauopoko in AD 1730, supposedly at the age of one hundred and seventy five (Kamakau 1992:369).

It (Kīālī‘i’s Law) was strict, unvarying and always just. It was for the care and preservation of life; it was for the aged men and women to lie down in the road with safety; it was to help the husbandsmen and the fishermen; to entertain (morally) strangers, and feed the hungry with food. If a man says, “I am hungry for food,” feed (him) with food, lest he hunger and claims his rights by swearing the Kolowalu law by his mouth, whereby food becomes free, so that the owner thereof cannot withhold it; it is forfeited by law. It is better to compensate… A transgressor, or one who is about to die, is, under the application of this law exonerated of his death or other penalty (Fornander 1917:vii, part II, pg 432).

Many wars took place during this time between intra-island chiefdoms and inter-island kingdoms; the majority of these ali‘i mui were related in various ways. In 1736, Maui ali‘i mui Kealakulike died. He chose his nā‘au‘ī’s son Kamaha‘ena-nui to be his heir; although Kauihi-aimoku-a-Kama was the oldest son, his mother was a slightly lower rank than Kamaha‘ena-nui’s mother [his parents were ½ siblings], making Kauhi whose parents were first cousins slightly lower rank than his younger half-brother, Kamaha‘ena-nui, who was the full brother of Kalola, Kahekili, and Ku-‘ohoeheihe-pahu. In 1737 and 1738 Kauhi-aimoku-a-Kama (Kauhi), eldest son of Ke-kau-like rebelled against his younger brother, Kamaha‘ena-nui. Many of the warriors of Kamaha‘ena-nui were slaughtered. This prompted Kamaha‘ena-nui to flee to his uncle, Hawai‘i Island ali‘i mui Alapa‘i-nui-a-ka-saana (Alapa‘i), who took him to Hawai‘i Island where they spent a year preparing for war. Alapa‘i-nui was the half-brother of Kamaha‘ena-nui’s mother (Kamakau 1992:73-74).

When Kauihi heard that Alapa‘i was heading back to Maui, Kauhi enlisted the help of his uncle, Pele-iso-holani, Kana‘i ali‘i mui who was also ruling chief of O‘ahu and the son of Kīālī‘i; Pele-iso-holani was also the first cousin of Alapa‘i and said to be the father of Ke‘auumoku (McKenzie 1986-23). Alapa‘i attacked Maui (1738), drying up the streams of Ka‘au‘ula, Kanahā and Kahoma near Lahaina Luna, destroying the taro patches. His men kept guard over the streams of Olowalu, Ukumehame, Wai‘aku and “Honokawai” (sic). “When Pele-iso-holani heard that Alapa‘i was in Lāhainā he gathered all his forces at Honokohau and at Honolua. At Honokowai (sic) an engagement took place between the two armies, and the forces of Alapa‘i were slaughtered and fled to Keawawa.” Pele-iso-holani had 640 men to Alapa‘i’s 8,440. However, the cousins once again came face to face in Pu‘unēnē and decided to once more opt for peace between the families. Kamaha‘ena-nui ruled Maui in peace; Pele-iso-holani retired to Moloka‘i for a while, and Alapa‘i went back to rule Hawai‘i Island (Kamakau 1992:74). Kauhi, nephew of Pele-iso-holani reportedly ruled east Maui before being killed in Kaupō.

The inter-relatedness of these chiefs are further expanded upon by Kamakau (1992:75):

Perhaps the reason for this friendliness on the part of the two chiefs [Alapa‘i and Pele-iso-holani] was the close relationship that existed between them. Alapa‘i’s mother belonged to Oahu. She was Ka-lani-kau-lei-ia-ia-ia-nui, a daughter of Kanc-i-kau-ia-ia-ia-nui, who was the child of Ka-akahi-Kau-lei-ia-ia-ia-ia-ia-ia-a-kau-a-nua-a-a-ka-ne, the daughter of Ka-i-ihaku-ia-ia-ia-kau. Moreover Ka-lani‘opu‘u and Keoua were own sons of Pele-iso-holani through their mother Ka-maka‘i-moku. While Kauihi was still ruling Oahu, she had come to visit her mother Umu-ia-ia-ia-ia-ia-ia-a-kau-a-nua-mane, who was living at Waikele with her younger brothers, and it was at the water of Alele just above Waiplana in Waikele, ‘Ewa, that Ka-lani‘opu‘u was begotten by Pele-iso-holani. The ruling chiefs of Oahu wore as a neck ornament an ivory whale’s tooth shaped like a bud (‘opu‘u); the royal neck ornament of Hawai‘i was a tongue-shaped hook, like a tortoise-shell fishhook. Pele-iso-holani named the child Ka-lei‘opu‘u after the bud-shaped neck ornament of his father Kauihi. Thus he begot Ka-lei‘opu‘u.* Keoua he probably begot after he became ruling chief. (* Ka Napu‘u Ka ui‘a, Nov. 3, 1866).

Between 1775 and 1779 fighting continued between Kalani‘opu‘u, son of Kalanimu‘ia‘amamo [whom the Kamulipo was composed for] and his brother-in-law, Kahekili. In 1775 Kalani‘opu‘u and his Hana forces were assisted by Pele-iso-holani, Kaua‘i, Kaho‘olawe and parts of West Maui. It was at the battle of Kamehameha, nephew and favorite warrior of Kalani‘opu‘u, was first recognized as a great warrior and the given the name of Pai‘ea (hard-shelled crab) by the Maui chiefs and warriors (Kamakau 1992:84).

In 1776 Kalani‘opu‘u’s forces returned to wage war on Maui again, but were again defeated. Kalani‘opu‘u was forced to sue for peace and sent his young son Ka-lani-kau-i-ka-saauli Kau‘ala‘o‘a and with his twin brother’s-in-law Ka-me‘e-ia-moku and Ka-manawa, who were also younger half-brothers of Kahekili. Kahekili called for a cease and sent fish and vegetables to his sister Kaloa and her husband Kalani‘opu‘u. This too was short-lived as a few years later Kalani‘opu‘u waged war on Maui again then ravaged Lāna‘i’s slaughtering the chiefs and soldiers there leaving only one survivor to tell the tale. Kalani‘opu‘u then went back to Maui to wage many battles from 1778 to 1779 (Kamakau 1992:88-91). In 1777 when very young, Ka‘ahu‘umanu’s parents took Ka‘ahu‘umanu and their whole family to Hawai‘i to get away from the war between Kalani‘opu‘u and Kahekili (Silverman, 1987:iiii, 5-6; Kamakau, 1992:310).

In January 1778 Cook landed in Waimana, Kaua‘i and the culture of old Hawai‘i began its spiraling change (see Day 1992). Cook left Hawai‘i for several months, but returned later in the year. Kalani‘opu‘u visited Cook on the return trip to the islands. Kalani‘opu‘u’s visit to theResolution, while Kahekili visited Clerke on the Discovery (Kuykendall and Day 1976:16).

The following depicts the power struggles of the ali‘i of Hawai‘i and Maui (Bucy & Asso 1989:191-193):

Five generations after Kaulula‘au there is mention in the History of Kuali‘i (Fornander 1918-19V:422) that Lānī’s chiefs wanted to be independent from Kamalawaluhu, King of Maui. This documentation confirms an early subordinate relationship between Lanai and Maui. As a tributary of Maui, Lānī was pulled into the struggle for power between Kalaniopu‘u, ruler of Hawai‘i Island and Kahekili, ruler of Maui. After an unsuccessful attempt at trying to acquire Maui, Kalaniopu‘u’s and his forces raided and pillaged the islands of Koholawe and Lanai. The battle that ensued on Lānī was described by native historian Kamakau (1961:90-91):

The War of Ka-moku-hi (1778)

Kalani‘opu‘u carried the war into Lanai and attacked the chiefs and soldiers in their stronghold called Ho‘ok‘i, makaana of Munualii, which was their place of refuge. The trouble with the place
was that when the chiefs and soldiers fled thither, their water supply was cut off and they were all slaughtered. The whole island of Lanai was ravaged by the forces of Ka-lani-ʻōpuʻu at Puamau, at Keaua close to the forest, and at Kaʻosha was the place called Kamokupea scorched by war markings of old. A certain captive who was being led to Ka-lani-ʻōpuʻu u with his hands tied, as he neared a cliff asked to have the cords loosened, pretending he was in pain. Since they were so close to the cliff the men felt no fear of his escaping, but no sooner were his hands released than he leaped over the precipice. His (91) name was Kini and he was famous for his skill in leaping cliffs. He had leaped down the rough cliff of Kukamuoku at Iao and Ohealani, and it was this skill in leaping down cliffs that saved his life in the battle on Lanai. During Ka-lani-ʻōpuʻu u's occupancy of Lanai, the food ran out, and the men had to eat the root of a wild plant called kapula. This had a loosening effect upon the bowels when eaten in quantity. The war is therefore called The-hand-of-lose-bowels (Ka-moku hi) and it is a war still talked of among the descendants on Lanai.

When Ellis visited the island (Ellis, 1971:91) 45 years after this battle, he estimated the population to be 2,000, which is not far from the pre-contact maximum estimate that Emory gives of 3,000.

During the Battle of Ka-moku hi a forty-two-year-old Kamehameha I fought alongside his Uncle Kalani-ʻōpuʻu. After the death of Kalani-ʻōpuʻu, Kamehameha eventually conquered and ruled the entire island chain, including Lānaʻi. Lānaʻi, like all the other islands, was subject to the rules and taxation of Kamehameha I, the ruling King, who did spend some of his time in residency at Kaʻaukuu.

[NOTE: According to Kenneth Emory’s research in Munro (2006:10): “The campaign was called kamoku hi after the effect of eating heavily of this root [kapula] which grew on the Kamoku lands.”]

When Cook sailed into Kealakekua Bay on January 17, 1779, Kalani-ʻōpuʻu was still fighting Kaeheki on Maui. At this time Kaeheki, cousin brother of Kaeheki was the ruling chief of Kaʻaukuu; Ka-baheka, nephew of Kaeheki was the ruling chief of Oʻahu and Molokaʻi; Kaeheki of western Maui, Lānaʻi and Kohoʻolawe; and Kalani-ʻōpuʻu of Hawaiʻi Island and Hāna (Kamakau, 1992:284-86, 92, 97-98). On January 25th Kalaniʻōpuʻu visited Cook again at Kealakekua Bay, presenting him with several feather cloaks. By February Cook’s scheme to kidnap Kalani-ʻōpuʻu as a hostage was thwarted and Cook was killed following a skirmish over a stolen cutter (Kuykendall and Day 1976:18).

When the King George passed Lānaʻi on May 10, 1786, seven years after Captain Cook, when the Hope did likewise on October 9, 1791, and when Vancouver sailed by on May 18, 1792, some canoes came out to the ships, but they had nothing in the way of foodstuff to barter. Menzies, Vancouver’s surgeon, noted the absence of ‘hamlets or plantations’ and judged the island to be ‘very thinly inhabited’ (Munro 2006:12-13).

Following a chaotic internal overthrow of the established Hawaiian religion in 1819, Hawaiians on all islands turned to Christianity. Although a newly converted Queen Kaʻahumanu visited Lanai in B29 (Bingham R5:375) and tried to influence the Hawaiians to turn to Christianity, it wasn’t until 1835, according to the records, that protestant evangelization occurred on Lanai. By 1837 there were three permanent church-affiliated schools to educate the children of Lanai (Napoka In Bucy & Asso 1989:193).

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By 1790 Kamehameha I had gained enough control of the island of Hawai’i that he could leave to join the war parties on Maui. After several battles along the East Maui coast, Kamehameha’s force reached Wailuku where the “great battle” took place. This would be the beginning of the end of independent ruling chiefs because of the inequity of battle strategy. Kamehameha had brought a cannon from the Eleonora along with her captain, Isaac Davis, and crewmember John Young, now his aikane punahene (favorites) and advisors (Kamakau 1992:147-148) [Day, 1992:24 says that Isaac Davis was the lone survivor of the Fair American].

Demographic trends during the Proto-Historic Period indicate a population reduction in some areas, yet show increases in others, with relatively little change in material culture. However, there was a continued trend in craft and status material, intensification of agriculture, aliʻi (chief/land managers) controlled aquaculture, upland residential sites, and oral records that were rich in information. Kū worship, liukini heiau, and the kapu (restriction or regulation) system were at their peak, although western influence was already altering the cultural fabric of the islands (Kirch 1985:308, Kent 1983:13). By 1794 at least eleven foreigners were living on the island of Hawaiʻi, including American, English, Irish, Portuguese, German, and Chinese (Day 1992:23-25) [may have been connected to the sandalwood trade]. When Kamehameha I conquered Oʻahu and Maui in 1795 (with western advice and technology), subsequently unifying the Island Kingdom (Kent 1983:16), it marked the end of the Proto-Historic Period.

Early Historic Period. The Early Historic Period (AD 1795-1899) is marked by very significant events. After Kamehameha I conquered Maui in 1795, he went to Molokaʻi where the sacred women of Maui (Kalola Pupuka and her daughters Kalanikauikilokalanikaukua and Keku‘iapowī Līhā and her daughter Kalanikauikilockalanikaukua) were, in hiding. Kamehameha took Keku‘iapowī Līhā and Kalanikauikilockalanikaukua to Oʻahu to witness the battle of Nu‘uanu Pali and the defeat of Oʻahu. It was during this trip that Kalanikauikilockalanikaukua was given the name Keʻōpōlani (Kleiger 1998:21).

Hawai’i’s culture and economy continued to change radically as capitalism and industry established a firm foothold. In 1810, Kaui‘i aliʻi līni Kamehameha I ceded under duress his kingdom of Kaui‘i, Nī’ihau, Lehua and Ka‘u to Kamehameha I. At this time the sandalwood trade in Hawai’i was still flourishing, the Fijian and Marquesan supply of sandalwood was exhausted, so Hawai’i became known as the “sandalwood mountains” to entrepreneurs of Southern China. Sandalwood came under the personal control of Kamehameha I, who had become “a fervent consumer of high-priced western goods.” The sandalwood industry was thriving to the point where the subsistence levels declined, as farmers and fishermen spent most of their time logging, causing famine to set in (Kent 1983:17-20).

On October 1819, Protestant missionaries set sail from Boston to Hawai’i. Earlier that year, on May 8, 1819, Kamehameha I died. Following his death, his son and heir Liholiihii banished the kapu system at the advice of his queen mother Keʻōpōlani and queen regent Ka‘ahumanu [the queens were second cousins] (Kamakau, 1992:210, 222). The missionaries arrived in Kailua-Kona on March 30, 1820, to a markedly changed culture; one with a “religious” void, and a growing appetite for western products. They quickly started missions on all of the islands (Day 1992:25).

As shown by their many heiau, kapu, and their readiness to adopt new faiths, the natives of Lānaʻi had strong religious inclinations. According to Reverend William Ellis, who passed Lānaʻi on a schooner July 1, 1825, they had a number of idols. Two were “large stone images representing the deities, who were believed to preside over the sea and were worshipped chiefly by fishermen” (Munro 2006:12-13).

In 1802 Wong Chun arrived on a sandal wood trading ship from China and resided on Lānaʻi for a short time. He is said to be the first person to process sugar in the Hawaiian Islands (Kepa 2016). Years later in 1828 two Chinese merchants established the Hungtai sugar works at Wailuku. Many of the earliest Chinese residents in Hawaiʻi were knowledgeable in sugar production (the tong see or sugar masters), and established successful plantations on Maui and Hawaiʻi (Speakman 2001:90). In 1836 the first sugar plantation was established on Kaʻauʻi (Kent 1983:23, 29). During this period, “between one hundred and two hundred foreigners lived among the Islands…” (Day 1992:25). Hardly a ship touched without leaving a deserter or two behind…. A white man automatically ranked as a chief, although he could not own land in fee simple or build a permanent house…[and] they took Hawaiian wives” (Day 1992:25). In the 1830’s other industries such as whaling, and merchandising crept into Hawaiʻi.
In the 1840s a political act of the Hawaiian Kingdom government would change forever, the land tenure system in Hawai‘i and have far-reaching effects. The historic land transformation process was an evolution of concepts brought about by fear, growing concerns of takeovers, and western influence regarding land possession. King Kamehameha III, in his mid-thirties, was persuaded by his kuhina nui and other advisors to take a course that would assure personal rights to land. One-third of all lands in the kingdom would be retained by the king; another one-third would go to ali‘i (chiefs/konomohi) as designated by the king; and the last one-third would be set aside for the maka‘ainana or the people who looked after the land. In 1846 Kamehameha III appointed a Board of Commissioners, commonly known as the Land Commissioners, to “confirm or reject all claims to land arising previously to the 10th day of December, AD 1845.” Notices were frequently posted in The Polytechnian (Moffat and Fitzpatrick, 1995). However, the Legislature did not acknowledge this act until June 7, 1848 (Chinen 1958:16; Moffat and Fitzpatrick 1995:48-49), known today as The Great Māliehe.

At that time, lands on Lanai were divided between lands claimed by Kaukauaulno (40,665 acres), which were known to be the Crown Lands, and the lands to be claimed by the chiefs and people (48,649 acres), which were called the Government Lands. The total land area of Lanai was then 99,305 acres, which included thirteen ahu‘pua‘a or traditional land divisions. In 1921 when Emory conducted his Lanai research, only 209.25 acres of land remained in native Hawaiian ownership (Napoka In Bucy & Asso 1989:194).

The 1840s also heralded other changes as well. The Hawaiian government, with the aid of the missionaries, encouraged the sugar industry as well as other enterprises such as coffee, cotton, rice, potatoes, and silk worms (Speckman 2001:93). Mālau‘u goat skins, fungus, wheat, other vegetables, sugar syrup and molasses (Maclennan 1995:35). The constitutional monarchy was established during this period and in a speech to the legislature in 1847 Kamehameha III promoted the agricultural industry:

> I recommend to your most serious consideration, to devise means to promote the agriculture of the islands, and profitable industry.... What my native subjects are greatly in want of, to become farmers, is capital, with which to buy cattle, fence in the land and cultivate it properly (In Maclennan 1995:34).

Disease had a devastating affect on the population and the landscape, killing ali‘i and maka‘ainana alike; measles epidemics in 1848 and 1849, were followed by the horrendous smallpox epidemic in 1853. John Papa ‘Ii in Fragments of Hawaiian History (1984) talks about the impact of this disease and as kaha or guardian of several young ali‘i, he had to take several of them off of O‘ahu island. They just kept sailing from island to island and usually were not allowed to land as O‘ahu was thought to be the source of the smallpox.

In 1850, the Kingdom government passed laws allowing foreigners to purchase fee simple lands (Speckman 2001:91), many were retired whaling captains or merchants. (Maclennan 1995:48, 52). By 1858 at least 2,119 foreigners lived in Hawai‘i. Many were merchants who traded with whalers, while the missionaries lived in various locations throughout the islands. “Foreigners engaged in agricultural pursuits with the idea of reaping a profit from the land, in contrast with the Hawaiians, who carried on...subsistence agriculture” (Coulter 1931/1971:11).

In 1851 Mormons arrived on Lāna‘i according to Munro (2006:25):

> In September 1851, Elder Francis Hammon went to Lāna‘i and organized a branch of the church at Manele Landing where there were Hawaiians living at the time. The Hawaiians took him for a horseback ride up the hillside to the rim of the Pillwai Basin with which he was greatly impressed as a suitable site for a Mormon colony.... On July 26, 1854 it was decided to proceed with the Mormon colony... a party of church members went to Lāna‘i to start the settlement. They selected a site for the city on the east side of the basin on a plateau about 50 feet above its lowest part. They called this the City of Joseph, and the lower part that it overlooked the Valley of Ephraim.... The Mormons went to work digging for water, building grass houses, and preparing land for crops. Lāna‘i is tricky for ordinary crops. They may have had good ones to start with, and then a series of dry years and consequent crop failures. This and the lack of water were discouraging, and they were on a lookout for more favorable location when the elders were recalled to Utah on account of trouble with the U.S. government.

The Mormons apparently had made no land transaction on Lāna‘i and acquired no holdings there. Walter Murray Gibson went to Lāna‘i near the end of 1861. He took charge of the Mormon colony but branched out from the teachings of the Mormons, and this was practically the end of it as a Mormon settlement. Gibson acquired land in his own name, and because he refused to turn it over to the Church, the Mormons commenicated him in 1864 and some of the colonists left Lāna‘i.

According to Munro (2006:27) the Lāna‘i Ranch started about 1865:

> The Lāna‘i Ranch was started by Walter Murray Gibson in about 1865 after the Mormon colony on the island had dispersed. Before Gibson went to Lāna‘i, Hawaiians had herded goats there, but it was he who consolidated most of the lands into one large sheep ranch.... In 1870 he persuaded twenty-two men with two women and six children to come from the United States to Lāna‘i ‘to ce, grains and other products upon a cooperative plan.’ These people were ‘independent immigrants’ paying their own passage.... they evidently arrived during Lāna‘i’s dry years and found conditions very different from what they were led to believe. They were soon discouraged, abandoned the project and left the island....

Gibson eventually decided that grazing was more profitable than agriculture on Lāna‘i. Goats were herded for their skins and sheep for their wool. Angora goats were imported to improve the weight of the skins and merino sheep to add fineness to the wool. With the lush natural vegetation, the sheep thrived and increased in number. On January 5, 1867, Gibson made a census report to the Education Office and gave the number of sheep as 10,000 and of goats 18,000.

Territorial History (AD 1900-1949). This period saw Native Hawaiians running for Congress (Daws 1974 297); and the lands being sold in fee simple. Lāna‘i Ranch was deteriorating after owner Walter Murray Gibson left Lāna‘i for O‘ahu to dabble in politics. George Munro first visited Lāna‘i in 1902 as the ranch purchase was being negotiated for Mr. Charles Gay; Mr. Alaka Dowsett was manager of the ranch and living at Kō‘ele. The ranch was in disrepair with evidence of severe drought (Munro 2006:28, 29). Shortly after this visit Gay gained possession of the island except for some kalu‘ena lands and made considerable improvements. However, the financial strain proved too great and the lands reverted to Mr. W. G. Irwin in 1909 as the Lāna‘i Company (Munro 2006:31). It wasn’t until 1911 when George Munro was asked to come and manage Lāna‘i Ranch because of his previous experience working for Francis Gay for seven years on Kauai and Alfred W. Carter for three years as Moloka‘i’s ranch manager (Munro 2006:32). With the help of Henry Gibson, son of Walter Murray Gibson, Munro searched the forests for scattered goats and pigs and at this time collected plants, land snails and studied the birds. Lāna‘i was soon for sale again. This time several people with pineapple interests came to visit. In 1917 Harry and Frank Baldwin bought the island for $600,000. The Lāna‘i Ranch improved and changed from sheep to cattle stock; the Lāna‘i Company did well with their pineapple, but after five years the Baldwins decided to sell the island to the Hawaiian Pineapple Company (James D. Doke) for $1,500,000. This marked years of conflict between the profitable cattle industry and the land hungry pineapple industry on Lāna‘i (Munro 2006:33).

Modern History (Post AD 1950). Post World War II brought about an influx of people and industries to Hawai‘i, allowing the tourism, offshore enterprises and military to flourish. Along with the rise of the
tourism industry, and competing sugar markets abroad, the sugar companies saw a sharpening decline in business (the Sugar Acts of 1934 and 1937, and IL&NU Strike of 1946 didn’t help). The 1950s and 1960s were the bleakest years for the sugar industry and it was becoming apparent that the sugar industry was beyond salvage (Kent 1983:107-108). More changes were soon to take place on the landscapes of Hawai‘i. On Lāna‘i a decision was made in 1950 to discontinue Lāna‘i ranch operations and dispose of the stock; 44,000 acres of ‘fair grazing country’ was now wasteland (Munro 2006:35).

Traditional Literature

The ethnographic works of the late 19th and early 20th century contribute a wealth of information that comprise the traditional literature - the mo‘olelo, oli, and mele - as well as glimpses into snippets of time, and a part of the Hawaiian culture relatively forgotten. The genealogies handed down by oral tradition and later recorded for posterity, not only give a glimpse into the depth of the Hawaiian culture of old, they provide a permanent record of the links of notable Hawaiian family lines. The mo‘olelo or legends allow ka po‘e kāhiko, the people of old, the kupuna or ancestor, to come alive, as their personalities, loves, and struggles are revealed. The oli (chants) and the mele (songs) not only give clues about the past, special people, and wahi pana or legendary places, they substantiate the magnitude of the language skills of na kupuna kāhiko (the people of old). Several excerpts of the mo‘olelo and mele have already been used as references or chronology markers in the ‘Overview of Human Impact, Settlement and Socio-economic Development’ above. The following sections give a little more detail and explanation of the traditional literature.

Genealogies. Po‘e kā‘auhou or genealogy kahanu were very important people in the days of old. They not only kept the genealogical histories of chiefs “but of kahanu, seers, land experts, diviners, and the ancestry of commoners and slaves…an expert genealogist was a favorite with a chief” (Kamakau 1992:242). During the time of Umi genealogies became kapu to commoners, which is why there “were few who understood the art; but some genealogists survived to the time of Kamehameha I and even down to the arrival of the missionaries” (ibid).

Surviving genealogies illustrate that the ruling families of each island were interrelated quite extensively. The chiefs of O‘ahu, Kaua‘i, Hawai‘i, Maui, Moloka‘i and Lāna‘i had one common ancestry. Families branched out, but conjoined several times in succeeding generations. O‘ahu and Hawai‘i’s chiefs were linked as are Hawai‘i and Maui chiefs, and Hawai‘i’s chiefs were linked to Kaua‘i’s chiefs (Kamakau, 1991:101; McKenzie, 1983:xxx). Not only were the chiefs or ali‘i related to each other, they were also related to the commoners. In Ruling Chiefs, Kamakau states that “there is no country person who did not have a chiefly ancestor” Kamakau (1992:4).

Malo (1971) wrote about the connection between the maka‘ainana and the chiefs; “Commoners and ali‘i were all descended from the same ancestor, Wākea and Papa” (Malo, 1971:52). This is evident in the genealogies. Genealogies were very important to the chiefs, because ranking was very important. The genealogies not only indicated rank, they ascertained a link to the gods. The following excerpt explains the idea and importance of rank and the role of genealogies:

Position in old Hawai‘i, both social and political, depended in the first instance upon rank, and rank upon blood descent—hence the importance of genealogy as proof of high ancestry. Grades of rank were distinguished and divine honors paid to those chiefs alone who could show such an accumulation of inherited sanctity as to class with the gods among men…a child inherited from both parents. …The stories of usurping chiefs show how a successful inferior might seek inter-marriage with a chiefess of rank in order that his heir might be in a better position to succeed his parent as ruling chief…a virgin wife must be taken in order to be sure of child’s paternity—hence the careful guarding of a hightborn girl’s virginity (Beckwith1990: 11).

One could defend and/or prove their rank by knowing or having one’s genealogist recite one’s genealogy. “To the Hawai‘ians, genealogies were the indispensable proof of personal status. Chiefs traced their genealogies through the main lines of ‘Ulu, Na‘u‘ulu, and Pili, which all converged at Wākea and Papa (Barrere, 1969:24). Two well-known genealogy chants are the Kumuhonua and the Kumulipo.

Kumuhonua. The Kumuhonua, first published by Formander in 1878, in The Polynesian Race Vol. I was based on information from Kamakau and Kepelino. Kumuhonua, the man, was of the Nanaulu line, and the older brother of Olopana and Moikeha (McKenzie 1986:14-15). However, the birth chant Kumuhonua has been a subject of controversy as noted in following Preface by Kenneth P. Emory in Barrere (1969):

We have become painfully aware that the Kumuhonua ‘legends’ are not ancient Hawaiian legends, nor is the genealogy which accompanies them a totally authentic genealogy…. In his second volume (1880) when he relates events from the period of the arrival in Hawai‘i of migrant chiefs from Tahiti to the time of Kamehameha, in these writings he is dealing with relatively untampered, authentic Hawaiian traditions and genealogies…. We must ever be on guard against the effects of this impact in what was recorded subsequently about the pre-contact period…. The world of the Polynesian began to be transformed overnight by Western influence” (Barrere, 1969).

Barrere (1969) explains that some of the Kumuhonua legends were recorded by Kamakau and Kepelino between the years 1865 and 1869, however, the ‘genealogy’ of the Kumuhonua, published by Formander, was given to him “to provide credibility to the legends…this ‘genealogy’ [was] constructed from previously existing genealogies—the Ololo (Kumuhonua) and the Paliku (Huilikoua) which are found in the Kumulipo chant (see Beckwith 1951:230-234) and interpolations of their own invention” (Barrere, 1969:1).

Kumulipo. A better example is the famous Creation Chant The Kumulipo. Feher (1969) had several notable Hawaiian scholars write passages in his Kumulipo: Hawaiian Hymns of Creation-Visional Perspectives by Joseph Feher. In the Introduction Momi Naughton states “The Kumulipo belongs to a category of sacred chants known as pule ho‘ola‘a ali‘i, ‘prayer to sanctify the chief,’ which was recited to honor a new-born chief (Feher, 1969:1). In her passage, Edith McKenzie states:

“The Kumulipo is a historical genealogical chant that was composed by the court historians of King Kauikeouhelani/kio/komoku of the island of Hawai‘i about 1700 AD in honor of his first born son Ka-lani-nui-‘I-a-mamo. This important chant honors his birth and shows the genealogical descent of both the ali‘i (chiefs) and the maka‘ainana (commoners) from the gods, in particular Wēkea…” (Feher, 1969:1).

The Kumulipo was an inoa or name chant for Ka-lani-nui-‘I-a-mamoa, first born son of Keawe, who later became the father of Kalakou‘u [Kalani'lā pu‘u], ruling chief of Hawai‘i (Beckwith, 1990:9). However, Johnson comments that “Malo remarks that the Kumulipo is important to both ali‘i (chiefs) and maka‘ainana (commoners) groups. It is also a means by which Polynesians as a whole may corroborate lineal ties to the Hawaiian people” (Feher, 1969:2).

Napoka (In Bucy & Asso 1989:185) expands on this in relation to Lāna‘i:

Genealogical chants, such as the Kumulipo, trace the descent of mankind from the gods, Wākea and Papa, the personifications of sky and earth. These early chants explain the creation of the islands of Hawai‘i as well as the creation of the gods and thus eventually mankind. The birth of the island of Lāna‘i has been recorded by several surviving traditions. Most common of these traditions was chanted by Pakui, a historian during the time of Kamehameha I (Formander B16-194/V.12). According to this chant, after the birth of Maui
Island, Papa returned to Kahiki and Wākea took Kaʻula-wahine for his wife. From this union Lānaʻi was found and adopted by a chief from Kahiki (Fornander 1866: 19-19 IV:2), while another recounts how Lānaʻi grew from a piece of coral thrown into the ocean by the famous fisherman Kapuhoʻuʻu (Fornander 1866: 19 IV:20). All of these versions of creation are ancient traditions acceptable to native Hawaiians.

Hawaiian Genealogies. In 1883 Edith McKenzie completed the first volume of Hawaiian Genealogies, translated from genealogy articles in 19th century Hawaiian newspapers; these articles were in response to a call to preserve the Hawaiian genealogy. Some of McKenzie’s genealogies were from feature articles published in Hawaiian newspapers such as Ka Nonanone and Ka Nāpepe Kuokoa in the late 19th century and early 20th century. Some of the information was also in Malo’s (1838) Hawaiian History, and in Fornander’s (1880), The Polynesian Race (Book I) (McKenzie, 1983:1).

The excerpt is from Kamakau’s article in Ka Nāpepe Kuokoa October 7, 1865, and was translated by McKenzie (1896). It illustrates some of the mid-19th century sentiment regarding genealogies:

To the commoners, a genealogy was of no value because their parents forbade (sic) it lest comparisons should occur and country children be born and rise up as chiefs. Therefore, the children of the commoners were not taught beyond father, mother, and perhaps grandparents. To us, the people of this time, there is no value of this thing of a chiefly lineage; we have no great interest in it. But in our thoughts it is of great value. We have entered into discussion of it; the chiefs valued the chiefs and ancestors; and we also value our knowledge of it. Because it was forbidden to the commoners, they were not to know this. Therefore, due to the rise of wisdom and skill of the children of the commoners, therefore, all of the ranking privileges were no longer restricted; it was only limited. What remains of the ancestors is something of value (McKenzie 1896:18-19).

Using thirty years to account for one generation, McKenzie determined that Wākea was born in AD 190; Umi-a-Līlōa in 1450; Keawekahahiailaniokamoku in 1650, Kalanāhuiikupaikaialaukani Keoua in 1710; and Kamehameha I in 1740 (McKenzie, 1983:12). Volume Two of Hawaiian Genealogies was published in 1986 and consists of information extracted from genealogical lists published in thirteen newspapers from 1858 to 1920. It compliments genealogies found in other works, such as Fornander’s (1880) An Account of the Polynesian Race... and David Malo’s Hawaiian Antiquities (McKenzie, 1986:v).

Maui Royal Genealogy. The following is an annotated genealogy of the Maui Royal Line extracted from several works. They illustrate the various family connections with all the island kingdoms or royal lines including Lānaʻi. The Maui aliʻi nui ruled over Lānaʻi until Kamehameha I. The ruling chiefs of the various islands come from combinations of genealogies or branches. Most of the Table below are in a loose chronological order, however, the multiple unions of a particular person is necessarily in a chronological order, as much of that information was not provided in most cases. Table 1 below illustrates how interconnected the royal lines were based on the works of McKenzie (1983; 1986); Kamakau (1992); Fornander (1969); Peleioholani (2012); MauiCulture (MC) (2013); and Wikipedia-Maui Kings (2013).

Table 1. Annotated Genealogy of Maui Royal Line (Many diacriticals were not used).

<table>
<thead>
<tr>
<th>Kiʻi</th>
<th>Wahine</th>
<th>Keiki</th>
</tr>
</thead>
<tbody>
<tr>
<td>Līlōa</td>
<td>Hīna-ahoula</td>
<td>Kealohāʻalua (Mokuʻula)</td>
</tr>
<tr>
<td>Kāula</td>
<td>Wāhina</td>
<td>Lōkahi</td>
</tr>
<tr>
<td>Kāula</td>
<td>Lōkahi</td>
<td>Lōkahi</td>
</tr>
<tr>
<td>Kaʻūnani</td>
<td>Lōkahi</td>
<td>Kuʻupukalii</td>
</tr>
<tr>
<td>Kāula</td>
<td>Pohinani</td>
<td>Pōhukaina</td>
</tr>
<tr>
<td>Lōkahi</td>
<td>Hīna-ahoula</td>
<td>Hīna</td>
</tr>
</tbody>
</table>

Hana: Hikōmāloa
Pau (born in Waiānae, Oahu)

Hinuakalakalai: Kapea
Paumakua (Chief of Kohʻūna/Mokapu, Oahu)

Hilo: Hōʻolōkikelikali
Hoʻokalai
Malia

Puna: Maunoikilili
Haka (born in Waiānae, Oahu)

Hana: Hikōmāloa
Paumakua

Hana: Hikōmāloa
Paumakua

Hana: Hikōmāloa
Paumakua

Hana: Hikōmāloa
Paumakua

Hana: Hikōmāloa
Paumakua

Hana: Hikōmāloa
Paumakua

Hana: Hikōmāloa
Paumakua

Hana: Hikōmāloa
Paumakua

Hana: Hikōmāloa
Paumakua

Hana: Hikōmāloa
Paumakua
Kapohauola was also wife of Ehu, who was son of Hawai‘i ‘Iloa; Kuaiwa, whose father was Kalanuuiohua and Kamanawa (Kohanikaua was also wife of Ehu, who was son of Hawai‘i Mo‘i Kuaiwa, whose father was Kalaunuiohua and Kamanawa)

Kakehili I (Kūneo-Hikili) Hawai‘i-Kula (Kahawai)

Kawasokahale (Pi‘ilani’s father)

Kekaulike I (Kūneo-Hikili) Hawai‘i-Moku (Kahawai)

Kalanauniohua the Great. They were the parents of the Peleuli (w) who married Kamehameha I and had Kahoanuku-Kinau (k), Kuamookea Kauhiiliulaapiilani (Hau-Hi‘i-ao Kauai), Ke-kau-hiwa-moku (Hawai‘i Is) Ka'eokulani (Kaua‘i Mo‘i-f-Ka‘umu Alii)

Kuahulea (Kauai) Kapalae/Kapalaka (O‘ahu)

Pi‘ilani (2nd cousin of Kalanuimakamaka of Kauai)

Kalii Pesimikapono (Maui Chief) Kekaulike (1st cousin of Kalanikauanakinilani (Hawaii is)

Kahawai Heleluhe family

Kamalalawalu (cousins) Pi‘ilaniwahine (Maui/Hilo/Oahu)

Kamehameha Nui (dau/Lonoapiilani) Ke-kua-manoha (k) father of Boki and Kamakahuikilani (w); younger brother of William Pitt Kalanimoku;

Kamalalawalu (cousins) Pi‘ilaniwahine (Maui/Hilo/Oahu)

Kamehameha Nui (Kaua‘i Mo‘i-f-Ka‘umu Alii) Piilanikapu/Piilanikapokulaniokama (w)

Kamehameha Nui (Kaua‘i Mo‘i-f-Ka‘umu Alii) Piilanikapu/Piilanikapokulaniokama (w)

Kamehameha Nui (Kaua‘i Mo‘i-f-Ka‘umu Alii) Piilanikapu/Piilanikapokulaniokama (w)

Kamehameha Nui (Kaua‘i Mo‘i-f-Ka‘umu Alii) Piilanikapu/Piilanikapokulaniokama (w)

Kamehameha Nui (Kaua‘i Mo‘i-f-Ka‘umu Alii) Piilanikapu/Piilanikapokulaniokama (w)

Kamehameha Nui (Kaua‘i Mo‘i-f-Ka‘umu Alii) Piilanikapu/Piilanikapokulaniokama (w)

Kamehameha Nui (Kaua‘i Mo‘i-f-Ka‘umu Alii) Piilanikapu/Piilanikapokulaniokama (w)

Kamehameha Nui (Kaua‘i Mo‘i-f-Ka‘umu Alii) Piilanikapu/Piilanikapokulaniokama (w)

Kamehameha Nui (Kaua‘i Mo‘i-f-Ka‘umu Alii) Piilanikapu/Piilanikapokulaniokama (w)
Dibble, Dr. John Rae, Kamakau, Naihe, S.N. Hakuole [Haleole], Kepelino, and Remy. The culmination of this effort was Fornander's (1880) *An Account of the Polynesian Race: Its Origin and Migration and the Ancient History of the Hawaiian People to the Times of Kamemeha I*. Fornander’s collection remains the most important single source of Hawaiian legends (Leib and Day 1979:5-13).

In June 1865 Kamakau began publishing in Ke Vapono Kaua‘o articles on traditions and legends. His series of articles dealing with Hawaiian history, particularly from the late eighteenth century on, and especially of Kamehameha, appeared weekly in the same publication in October 1866. When the newspaper ceased in 1869, this series continued in Ke Au O o o. For nine months. Kamakau then wrote a series on ancient Hawaiian religion, customs, and legendary history in Ke Au O o o until February 1871. All of his writings were in Hawaiian (Leib and Day 1979:8, 9).

Very little work was done in translating Hawaiian mythology into English until late in the nineteenth century. It wasn’t until 1888, over a hundred years after the discovery of the Hawaiian Islands, that the first book in English dealing exclusively with Hawaiian mythology was printed: *The Legends and Myths of Hawai’i* by King Kalākaua. However, it was more likely authored by former United States Minister to the Hawaiian Islands, R.M. Daggett (Leib and Day 1979:5, 7).

Thrum is one of the most frequently cited authorities on Hawaiian lore. He was born in Australia in 1842 and arrived in Honolulu in 1853. In 1875 he began publication of the Hawaiian Almanac and the *Hawaiian Annual*, which appeared yearly under his editorship until his death in 1932. Thrum’s contribution is as editor, compiler, and publisher of translations, not translator. By providing in his *Annual* a place for the publication of such material, and perhaps by persuading authors to provide him with translations, he was instrumental in much legendary matter appearing in printed form. Thrum wrote or rewrote a large portion of his own material (Leib and Day 1979:17).

Thrum’s first book Hawai‘ian Folk Tales was published in 1887 and consisted largely of tales that had previously been published in Thrum’s *Annual*. Only 35 of the 260 pages were translated by Thrum, the rest were credited to Rev. A.O. Forbes, Rev. C.M. Hyde, William Ellis, Mrs. E.N. Haley, Mrs. E.M. Nakaina, Walter M. Gibson, Joseph M. Peepoe, and M.K. Nakaina. His second book *More Hawaiian Folk Tales*, published in 1923 was similar. A number of translations were from Hawaiian language newspapers of half a century earlier, often with no translator cited. Translators credited were A. F. Knudsen, Henry M. Lyman, W. D. Westervelt, J. H. Hoyt and Lahilahi Webb. Some of the chapters were reprinted or abridged from the Bishop Museum translations of the *Formander Collection*, of which Thrum was editor. His greatest work, *Formander’s Collection of Hawaiian Antiquities and Folklore*, was published by Bishop Museum in 1909, in three volumes. The original editor was W. D. Alexander. Thrum supervised the work completed under his supervision. However, he died in 1913 and Thrum was appointed to complete the production. Beckwith credits John Wise with the original translation of that work. In 1920 or 1921 Thrum completed another work “Ancient Hawaiian Mythology” which was never published (Leib and Day 1979:18-19).

A great resurgence of interest in Hawaiian folklore began in the early twentieth century, in part caused by the annexation to the United States. People on the mainland wanted to know more about ‘their new island possessions.’ The funds of the Bureau of American Ethnology were made available for Hawaiian studies i.e., Emerson’s *Unwritten Literature* and Beckwith’s *Laukiakani*. The most important twentieth-century translators of Hawaiian legends have been N. B. Emerson, Thomas G. Thrum, William D. Westervelt, William Hyde Rice, Laura C. S. Green, Martha Warren Beckwith, and Mary Kawena Wiggins Pukui. Emerson’s extensive notes were a major contribution to Hawaiian scholarship. Most of them explain the meanings of Hawaiian words. In many, Emerson alludes to legends, giving a number of them briefly and relating few in some detail. Some of these probably do not exist anywhere else in print (Leib and Day 1979:14).

History of Moʻo’olelo Collecting. According to Leib and Day (1979) a substantial number of legends were collected and written in Hawaiian during the century following Cook’s arrival in Hawai‘i. A few accounts of the mythology were printed in the journals of missionaries and travelers, and a few of the Hawaiian lore were printed in languages other than English. The following synopses are excerpts from the works of Leib and Day’s (1979) and give an overview of the first collectors and compilers of Hawaiian myths and legends.

About 1836 a movement was started under the influence of Reverend Sheldon Dibble, to write down in Hawaiian some of the material dealing with the native legendary history, customs, and other lore. Results of the research were published at the Lahainaluna press in 1838. A partial translation made by Rev. Reuben Tinker was issued serially in 1839 and 1840—the first four installments appearing in *The Hawaiian Spectator* and the last four in *The Polynesian*. In 1841 the Royal Hawaiian Historical Society was formed at Lahainaluna. Some of their research and the earliest Ke Moolelo Hawai‘i were incorporated into Dibble’s *History of the Sandwich Islands* (1843). After his death in 1843 his work was carried on principally by two of his outstanding native pupils, David Malo and Samuel M. Kamakau. Malo wrote his own *Moolelo Hawai‘i* about 1840 at the request of Rev. Lorri Andrews, which was later translated by Emerson as *Hawaiian Antiquities*. In 1858 the Rev. John F. Pouge of Lahainaluna printed a third *Moolelo Hawai‘i*, based on the 1838 history, but including additional material. Kamakau did not print any of his material for thirty years (Leib and Day 1979:7, 9).

The increase in the amount of Hawaiian lore appearing in the native press in the 1860’s and thereafter was at least in part the result of an organized effort to collect and preserve such material. At Kamakau’s instigation a Hawaiian society was formed in 1863 to collect material for publication in the native press at the time, and also to aid Fornander’s research. Fornander was the greatest collector of Hawaiian lore. He credits as sources, several natives whom he sent on tours of the Hawaiian Islands to collect all available Hawaiian lore, as well as Kamakau, Lorri Andrews, Malo, Dibble, Dr. John Rae, Kamakau, Naihe, S.N. Hakuole [Haleole], Kepelino, and Remy. The culmination of this effort was Fornander’s (1880) *An Account of the Polynesian Race: Its Origin and Migration and the Ancient History of the Hawaiian People to the Times of Kamemeha I*. Fornander’s collection remains the most important single source of Hawaiian legends (Leib and Day 1979:5-13).

In June 1865 Kamakau began publishing in Ke Vapono Kaua‘o articles on traditions and legends. His series of articles dealing with Hawaiian history, particularly from the late eighteenth century on, and especially of Kamemeha, appeared weekly in the same publication in October 1866. When the newspaper ceased in 1869, this series continued in Ke Au O o o for nine months. Kamakau then wrote a series on ancient Hawaiian religion, customs, and legendary history in Ke Au O o o until February 1871. All of his writings were in Hawaiian (Leib and Day 1979:8, 9).

Very little work was done in translating Hawaiian mythology into English until late in the nineteenth century. It wasn’t until 1888, over a hundred years after the discovery of the Hawaiian Islands, that the first book in English dealing exclusively with Hawaiian mythology was printed: *The Legends and Myths of Hawai‘i* by King Kalākaua. However, it was more likely authored by former United States Minister to the Hawaiian Islands, R.M. Daggett (Leib and Day 1979:5, 7).

Thrum is one of the most frequently cited authorities on Hawaiian lore. He was born in Australia in 1842 and arrived in Honolulu in 1853. In 1875 he began publication of the Hawaiian Almanac and the *Hawaiian Annual*, which appeared yearly under his editorship until his death in 1932. Thrum’s contribution is as editor, compiler, and publisher of translations, not translator. By providing in his *Annual* a place for the publication of such material, and perhaps by persuading authors to provide him with translations, he was instrumental in much legendary matter appearing in printed form. Thrum wrote or rewrote a large portion of his own material (Leib and Day 1979:17).

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Moʻolelo of Aliʻi nui of Maui. From the legends or moʻolelo collected by Fornander, Kamakau, and others, we can get a glimpse into the lives of some of these people listed in the genealogies. To reproduce any legend completely would take too long, therefore only excerpts [paraphrases] are generally used. The Aliʻi Nui of Maui were said to rule over Lānaʻi, especially noted from the time of Kakaʻalaneo. However, some of his ancestors are referenced below.

Hua was from Lahaina, Maui. This is not the Hua whose heiau was Apahuʻa in Wainee next to Puako; this is the son of Kapuaʻimanu [Pohukaina] whose heiau was Lahaina, near to Kapoʻulu. Huaʻiokakalaʻulaʻi was born at Waihono in Honolulu (Kamakau, 1991:101). Huaʻa-Poikukana also known as Hua-a-Kapuaʻi-manaku was born at Lahaina who built heiau of Honuaʻula and Kaupualik at Kaʻauikiki...includes a chant. He was a war-loving chief. He lived at Wanaulua in Hāna...Pau-a-Hua a born, also Pau-mui-i-kea-anaina, at Waiʻanae. Huaʻs son—he ruled Ohiokolo to Keawaula on Oahu...Hua-a-Pau also known as Hua-nui-ka-la-laʻia born at Kewalo. He was known as a chief. His government was called ke aupuni iaʻi, a peaceful government. He was chief of Honolulu and Waikīkī (Kamakau, 1991:148, 149; see also Sterling, 1998:133).

Hanalaʻanui and Hanalaʻaikī. According to legends, two of Huaʻs descendants, Hanalaʻanui and Hanalaʻaikī, became the progenitors of the Hawaiʻi and Maui lines. These were two children of Hikawaiʻiu (w) and Palena-a-Haho. They were born in Kahihihinihia in Mokao, Hāmō, Hāna and certain districts of Maui were named after these children. The following excerpt is from Kamakau (1991).

Hanaʻamui and Hanalaʻaikī. Maui chief Haho, son of Paukaakua and grandson of Hua-nui-ka-laʻulaʻi [Haho was grandfather of the twins], was the traditional founder of the Hāna aliʻi or ranking body of chiefs whom were distinguished by the use of the sacred cord called ahu. They cultivated a metaphorical form of speech to conceal their words from the uninitiated...Between the periods of Hua and Piʻilani, that is, between Moikaʻu's time and that of Umi on Hawaiʻi, the twins were born at Kahihimihin in Mokao, Hāmō [sons of Palena, son of Haho]. ‘Little and big sacred one of Hāna’ called Hana-la-a-ahu and Hanala-a-aki, from who respectively the chiefs of Hawaiʻi and Maui are descended. From Haho and his wife Koleamoku are descended the great Kaupō families of Kooʻo and Kaupō. From them, Kahekiliʻi’s wife Kaupōhine, mother of Kaupōkūipō, the last rulling chief of Maui, and of a daughter, Kalikoakua, who became the wife of the Maui chief Ulunehe/Hee Hoopii and mother of Liliha, beloved wife of Boki of sandalwood fame (Beckwith, 1970:387, 389).

The following synopses consists of excerpts from Fornander’s (1880) An Account of the Polynesian Race: Its Origins and Migrations, and give an overview of the various aliʻi nui (ruling chiefs) of Maui, which Fornander refers to as “Moʻi.”

Independent Moʻi. Among the Maui chiefs from the close of the migratory period, say Laʻamaikihiki to Piʻilani, the contemporary of Umi and his father Līloa, not many names arrest the attention of the antiquarian student. The position of ‘Moʻi’ of Maui appears to have descended in the line of Haho, the son of Paumakaua-a-Haaniakalakalaki, though, judging from the tenor of the legends, East Maui, comprising the districts of Koʻolau, Hāna, Kipahulu, and Kaupō, was at times under independent Moʻi [sic]. The legends mention six by name, from Eilo to Houlea, the latter of whom was contemporary with Piʻilani, and whose daughter [Koleamoku] married Piʻilani’s son, Kaia-pilani. Their allegiance to the West Maui Mois was always precarious, even in later times (Fornander, 1880).

Kamalo-o-hua and Óhama. While Kamalohoua ruled over the greater part of Maui, a chief who was doubtless a near relation, and who was called Wakalaha, who built the latter Heiau of Waineʻe next to heiau Kiha-a-Piilani. Their allegiance to the West Maui Mois was always precarious, even in later times (Fornander, 1880). After the reign and times of Kamalohoua nothing worthy of note has been recorded of the Maui chiefs until we arrive at the time of Kakae and Kakaalaneo, the sons of Kaulehau-Kiikumukau I [Kaulaheau I], three generations after Kamaloohoua...Kakaalaneo, appears, from the tenor of the legends, to have ruled jointly with Kakae over the islands of Maui and Līhau. He was renowned for his thrift and energy. The brothers kept their court at Lāhainā, which at the time still preserved its ancient name of Lele, and that place has gracefully remembered him [Kakaʻalaneo] as the one who planted the breadfruit trees in Lāhainā, for which the place in after times became so famous (Fornander 1880:80).

The following excerpt is according to Kapa Maly in Maly & Dye (2016:7):

The earliest traditional lore of Līhau describes the arrival of the gods Kāne, Kanaloa, and their younger god-siblings and companions to the southern shores of the island. Later accounts describe the visit of the goddess Pele and members of her family to the Windward region of Līhau. Subsequent narratives describe the various people of Līhau by evil spirits and the difficulties that the early human settlers encountered in attempts to safely colonize the island. Another tradition relates that in the early 1400s, a young chief by the name of Kaualiiʻau traveled around Līhau’s vanishing evil ghosts/spirts of the island, making it safe for people to live on Līhau, and is the source of the island’s name (Līhau-a-Kaualiiʻau).

Kakaʻalaneo was a grand uncle of Piʻilani. The following synopses about Kakaʻalaneo and Kikanaloa are excerpts from Beckwith (1970). There appears to be a time-conflict with the arrival of the light-skinned foreigners. Fornander (1880) indicates they arrived during Kamalohoua’s reign, while Beckwith indicates the foreigners arrived four generations later during the time Kakaʻalaneo.
memory as late as Captain Cook’s day, arrived on Maui in Kaka’alaneo’s time. Kīkanalua and Kahekili (also Kakae) are the leaders of this group. The “last allusion” in this legend is a pun about chief Loke of O’ahu who abducted the pretty chiefess of Maui, Kelea [sister of Pi’ilani’s father], while she was out surfing and carried her away to O’ahu in the uplands of Līhu’e. She later deserted him for his cousin Kalama Ka’u, by whom she became mother of the high chiefess Lai‘eholehoho. (The drooping pandanus vine), who became the wife of her Maui cousin Pi’ilani. All these names appear in the chant linked with the coming of Kīkanalua, together with the names of a wife and son of Kaka’alaneo (Beckwith, 1970:384-385).

Legend of Kīkanalua. The strangers land first at Ke‘ei in South Kona and then come on to Waie‘e, Maui, and land at a place called Ke-ala-i-Kahiki (The road to Kahiki). They are exhausted and the natives clothe and feed them. In looks they are light with sparkling eyes. When asked after their homeland and parents they point to the uplands ‘far, far above where our parents dwell’ and show that they are familiar with bananas, breadfruit, mountain apple, and candlenut trees. The two leaders became Kaka’alaneo’s property. There is no kapu place closed to them. They married chiefesses and some of their descendants are living today. Kani-ka-wa and Kani-ka-wa they are called, “perhaps because their speech was as unintelligible as that of the lāle birds that live in the hill” (Beckwith, 1970:386).

According to Fornander (1880), Kakae was the son of Kaualaneioukamoku I, and the brother of Kaka’alaneo with whom he co-ruled Maui. He was also the father of Kahekilinuiahumanu I and Kulaheaniuomokamoku II, grandfather of Kawaoahele and Keleaniunohoa’ani’api’api and great-grandfather of Pi’ilani of Hāna and Lāhainā. The following excerpts from Fornander (1880) reveal their history.

Kakae, Kahekili I, and Kawaoahele. Kakae’s son was Kahekili I, who is known to have had two children, a son named Kaiao Kahele [Pi’ilani’s father], who succeeded him as Mo’o of Maui, and a daughter named Keleaniunohoa’ani’api’api [Pi’ilani’s wife’s mother], who was successively the wife of Lo-Lale, son of Kalono-iki, and of Kalamakua, son of Kalona-nui, of the O’ahu Maaweke line.

From the time of Mauiloa, third from Haha and contemporary with La’amaikahiki, to the time of Ka’alaneo I [father of Kakae and Kaka’alaneo] there must have been troublous times on Maui, and much social and dynastic convulsions, to judge from the confusion and interlopers occurring on the royal genealogy of this period. I have shown it to be nearly historically certain that the O’ahu and Maui Paumakua were contemporary and it will be seen in the sequel that it is absolutely certain that Kawaoahele [Pi’ilani’s father] on the Paumakua-Hahe line was contemporary with Kalamakua. Piliwale and LoLale on the Maaweke line of O’ahu chiefs, as well as on the O’ahu Paumakua line through Lali-a-La; and yet the Maui royal genealogy, as recited at the court of Kahekili II at the close of this century, counts thirteen generations between Mauiloa and Ka’alehu I, or sixteen generations between Mauiloa and Kawaoahele [Pi’ilani’s father], whereas the Maaweke and Oahu Paumakua genealogies count only seven from La’amaiakahiki to Keleaniunohoa’ani’api’api [mother of Pi’ilani’s wife Lai‘eholehoho], the sister of Kawaoahele [Pi’ilani’s father] (Fornander 1880:78-79).
for chants not to have a title, as it was the composer’s role to create the mele, which was then given away. When formal titles were not specified, the first line of verse served as the title (Pukui, 1995:xvii).

The Hawaiian word mele included all forms of poetical composition and sometimes overlapped oli or chant, the lyric utterance (Emerson, 1997:254). In regards to Hawaiian poetry or mele, “they had no exact word for a specific term as our ‘poetry.’” The English equivalent to the Hawaiian ground means a song. All meles were “sung, or rather chanted, or cantillated. This is equally true of all early poetry of whatever race…. The mele is interwoven in Hawaiian culture with the hula and the kaao—that is, poetry is interwoven with the dance and with mythology…. Hula mele, is one who arranges words into song (Plews, 1981:176).”

Pukui (1995) classifies chants into three groups: (1) chants for the gods (pule); (2) chants for the ali’i, descendants of the gods; and (3) chants of activities that involved serious things. In Pukui’s (1995) Na Mele Wele she points out that some oli are non-dance chants, but many of the mele and oli were expressed in dance or hula (Pukui, 1995:xvii). Emerson explains that the hula was a religious service, in which poetry, music, pantomime, and the dance lent themselves, under the forms of dramatic art, to the refreshment of men’s minds. Its view of life was idyllic and it gave itself to the celebration of those mythical times when gods and goddesses moved on the earth as men and women and when men and women were as gods (Emerson, 1997:11, 12). Helen Cadwell quotes Alexander, but does not name the publication, as classifying meles into 4 divisions: (1) religious chants, prayers, and prophecies; (2) nāo, or name songs, composed at the birth of a chief in his honor, recounting the heroic deeds of his ancestors; (3) kani kau, the dirges or lamentations for the dead; and (4) ipo, or love songs which includes topical mele of a more secular character, now surpassing the others in number, and have survived in better condition “on the lips of the country folk (Roberts, 1967:67, 72).”

The following is from Napoka (In Bucy & Asso 1989:188-189).

With no system of writing, traditional Hawaiian society relied on oral chants to pass their cultural memory from one generation to another. A traditional chant that was chanted and danced on the island of Lāna’i (Kahanaleo 1902) is a good record of early life on Lāna’i as told by a native Hawaiian:

A Kaohai, lae, lae At Kaohai
I ke kaka uhu lae, lae Fishing for uhu
A Kamaikai lae, lae At Kamaikai
I ka uhu ka’i i lae, lae For the Uhu ka’i
Hoohaahoe lae, lae Luring the fish
Huu a lilo lae, lae Until it is caught
O ke Ake oono le, lae The delicious liver
O ka Lauli lae, lae Of the Lauli fish
Peru kai on o le, lae Good when dipped in its gravy
O ka Uhu uala lae, lae The red Uhu fish
Kau ka miko lae, lae Good when salted
Uala Kawelo lae, lae The Kawelo sweet potato
Kahi pupu lae, lae Eaten as a pupu
Poi Lehua lae, lae The Lehua taro poi
O Mauana lei, lae From Mauana

This is an excerpt of a longer chant that, when recited, chronicles life on early Lāna’i. The ahupua’a of Kaohai mentioned in the first line is a renowned fishing ground for the uhu fish. Lāna’i was famous throughout the Hawaiian Islands for its uhu fishing. Other legendary fishing places on Lāna’i were the cliffs of Kahola famous for the malolo flying fish, Polihua for turtle catching and Pu’upepe for oio fishing…. This chant celebrates the delicious foods as well as the legends and places of Lāna’i. If all the verses were included for this chant, the “kaona,” or word meanings hidden in symbolism, would provide another level of interpretation for the same chant. This level of meaning celebrates procreation and a variety of other human emotions. The author of this chant has compressed a tremendous amount of information into a deceivingly short number of words that, when understood, reveal many aspects of traditional Hawaiian existence on Lāna’i.

‘Olelo No’eau and Place Names

‘Olelo No’eau. ‘Olelo no’eau or proverbial/traditional sayings usually had several layers of meanings. They reflected the wisdom, observations, poetry and humor of old Hawai’i. Some of them referenced people, events or places. The following ‘olelo no’eau were compiled by Mary Kawena Pukui between 1910 and 1960 with both translations and an explanation of their meaning (Williamson, et al. in Pukui, 1983:vii), which are often more kaona (hidden or double meaning) than obvious.

‘Olelo no’eau Make a new canoe at sea and his corpse wash ashore on Lāna’i.
Meaning: May probably die at sea and his corpse wash ashore on Lāna’i.
Translation: None given (p 137 #1258).

‘Olelo no’eau If you have gone around Lāna’i and have not seen Lāna’i Ka’ula and Lāna’i Hale, you have not seen all of Lāna’i.
Meaning: None given (p 137 #1258).
Translation: It is a weke, the fish that produces nightmares.

‘Olelo no’eau He weke, he i’a pahulu.
Meaning: The head of the fish is said to contain something that produces nightmares. The nearer to Lāna’i the fish is caught, the worse the effects of the nightmares. Pabulu was the chief of evil beings (kahau) who peopled the island of Lāna’i. When Kaulula’au, son of Kahao, banished his son to Lāna’i because of his mischief, he rid the island of evil beings and the spirit of Pahulu fled to the sea and entered a fish. From that time on, nightmares have been called pahulu, and a person who has had a nightmare is said to have been under the influence of Pahulu (p 105 #982).

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Translation: Moloka‘i revolves, Lāna‘i sways.

Meaning: Description of the revolving of the hips and the swaying movements in hula (p 252 #2315).

Place Names. Hawai‘ians of old generally named everything: from winds and mountains, to rocks, canoes, taro patches, fishing stations, and “the tiniest spots where miraculous or interesting events are believed to have taken place” (Elbert in Pukui et al., 1974a). They all represented a story, some known only locally, while others became legendary. The following section is from Maly & Dye (2016:22-23) with additions from Lāna‘i Culture & Heritage Center (Lāna‘i chc.org) website:

In addition to the ahupua‘a name, several place names survived the passing of time in Kamoku. The site numbers listed are from Emory’s 1924 archaeological inventory survey on Lāna‘i [13].

Anapuka Arch (Site 175). A rocky point with an arch.

Aumoku 1 & 2 ‘Ili in Kamoku (Lanaichc.org)

Hōkūao Morning Star (Site 84). A level land below Lāna‘i City.

Hulupu‘u‘unin Translation uncertain (Site 78). A level land area below Hōkūao.

Iwi‘ele No bones, or no boundary wall (Site 87). Named for a native tenant who lived on the land below Kō‘ele, in the early to mid-1800s; ‘ili in Kamoku (Lanaichc.org).

‘Ili o Lono The land section of Lono, site of an ancient he‘iau of the agricultural class, near the former house site of Papahau, and boundary point between Kalulu and Kamoku Ahupu‘a’s (Boundary Commission records). Point where the mauka-makai trail crosses out of Kalulu into Kamoku (Site 25). Now covered by the airport. Alternate spelling: Ka ‘Ilī o Lono, Iliolonono.

Kāihole The iholea banana tree (Site 89). An area above Kō‘ele, where bananas were grown formerly. A favored region of Lāna‘i, where enough water could be found to tend cultivated crops.

Kalamaikī The little torch (Site 71).

Kalamanī The big torch (Site 72).

Kamoku The district or cut off section. One of thirteen ahupua‘a that make up the island of Lāna‘i (Boundary Commission records).

Kuamalipā‘u Soot placed in the planting field (Site 73). A bay and ancient village site. The present-day harbor was first opened in 1915, and it has served as the working harbor for Lāna‘i since that time. “ili in Kamoku (Lanaichc.org).

Ke‘a‘a‘kū Interpretive, the brave or upright one. A small valley that joins Kapano Gulch on inland side of Pulehulona, Kamoku Ahupu‘a’s (Site 81) (Boundary Commission records).

Kcone The sand (Site 69).

Kī‘e‘i To peer, peep (Site 70). A small bay.

Khāmahānī Māna To sneeze and shudder (Site 85). Formerly a place associated with priestly lines, reportedly a training area of warriors. A hill with the ruins of a Protestant church and school house (construction started in 1840). Also the site of an old cemetery. Alternative spelling: Kihāmahānic.

Kōete Black or darkness drawn down (Site 88). Said to be named for the heavy, moisture laden clouds which would come down the mountain gulches. These clouds and fog were so thick that one could not see but a few feet in front of oneself. Site of the former Kō‘ele Ranch—headquarters of the Lāna‘i Ranch from 1870 to 1951.

Ku-a-nā-ihu Interpretive, upright gourds, a section of land between Pu‘u Nāmā Hawai‘i’s ‘Ili o Lono, near the Kalulu and Kamoku boundary (Boundary Commission records).

Kulelehu also known as Kuleleha – ‘ili in Kamoku (Lanaichc.org).

Lālākoo Koa (Acacia koa) tree branch (Site 83). Formerly a forested area and, in the early 1900s, site of the Charles Gay family home.

Makālilii ‘ili in Kamoku (anaihc.org)

Maka-pā‘ia Enclosed point (Site 82). Overlooking Kapano Gulch.

Molu‘a ‘ili in Kamoku (Lanaichc.org)

Naupaka The Scaveola plant (Site 67). A small perched valley.

Nininiwai Pouring water (Site 86). Formerly one of the important agricultural areas of old Lāna‘i natives. Later, the location where the first pineapples were planted on Lāna‘i.

Palihamano Literally, Cliff of Nanu. A gulch that forms a boundary between Kamoku and Kā‘a‘a.

Pako Owl. An ‘ili of land in Kamoku Ahupu‘a, near the boundary with Kalulu.

Pālēhu-loa To broil (cook) for a long time (Site 80). Hill and bank that forms a northern wall of Pālēhu Crater, near the Kalulu-Kamoku boundary. Not far from Keli‘ihanaunui’s house (Boundary Commission records).

Pu‘u‘Ka‘ila Ka‘ila tree hill (Site 74). A boundary point between Kalulu and Kamoku Ahupu‘a.

Pu‘u‘okoa Koa tree hill (Site 76). A low hill on the flat lands below Hulupu‘u‘unia.

Pu‘unānāhawa‘i Hill from which to look to Hawai‘i (Site 77), a high prominence in Kamoku Ahupu‘a’s close to the boundary with Kalulu (Boundary Commission records).

Pu‘unēnē Goose hill.

Early Historic References

History of Land Divisions. It was during the time of Ka‘a‘alaneo of Maui that the division of lands is said to have taken place under a kahuna named Kalalauhahi‘a. He portioned out the island into districts, sub-districts, and smaller divisions, each ruled over by an agent appointed by the landlord of the next larger division, and the whole under control of the ruling chief over the whole island or whatever part of it was his to govern (Beckwith, 1970:383).

Each island was divided into moku or districts that were controlled by an ali‘i ‘ai moku (Mo‘iffat and Kirkpatrick, 1995:24-25). The island of Lāna‘i was divided into thirteen sub-districts (James 2001:150) or ‘ōkano (Alexander 1891). Within each of the moku on each island, the land was further divided into ahupua‘a and controlled by land managers or konohiki.

In name, as explained by Mr. Lyons, ‘is derived from the Ahu or altar, which was erected at the point where the boundary of the land was intersected by the main road alalua, which encircled each of the islands. Upon this altar, at the annual progress of the akua makahiki (i.e. year god), Lonomakua, was deposited the tax paid by the land whose boundary it marked, and also an image of a hog, pua‘a, carved out of kukui wood and stained with red ochre” (Alexander 1891).

The boundaries of the ahupua‘a were delineated by natural features such as shoreline, ridges, streams and peaks, usually from the mountain to the sea, and ranged in size from less than ten acres to 180,000 acres (Mo‘iffat and Fitzpatrick, 1995:24-29, see also Chinen 1958:3).

Each ahupua‘a was often divided and sub-divided several times over (i.e., ‘ili, kuleleha, mo‘o, panū, kō‘ele, kīhōapi), answerable to the ali‘i where the lesser division was located. However the ‘ili kāpono or the ‘ili kī was “completely independent of the ahupua‘a in which it was situated…his tributes were paid directly to the king himself” (Chinen 1958:4). Rights to lands were mutable or revocable; a ruling chief or any “distributor” of lands could change these rights if displeased, or as favors—usually after a victorious battle, and after the death of the ali‘i unui (Chinen 1958:5).

The Great Māhele, Land Commission Awards, Royal Patents and Grants. During the period between 1839 to 1855, several legislative acts transformed the centuries-old Hawaiian traditions of ali‘i māna land stewardship to the western practice of fee simple or private land ownership. Kamehameha III formalized the division of lands among himself and 245 of the highest-ranking ali‘i and konohiki between January 27 to March 7, 1848. He acknowledged the rights of these individuals to various land divisions in what came to be known as the Buke Māhele or ‘sharing book’ or The Great Māhele.
This historic land transformation process was an evolution of concepts brought about by fear, growing concerns of takeovers, and western influence regarding land possession. King Kamehameha III, in his mid-thirties, was persuaded by his kuhina nui and other advisors to take a course that would assure personal rights to land. In 1846 he appointed a Board of Commissioners, commonly known as the Land Commissioners, to “confirm or reject all claims to land arising previously to the 16th day of December, AD 1845.” Notices were frequently posted in The Polynesian. The legislature did not acknowledge this act until June 7, 1848 (Chinen 1958:16; Moffat and Fitzpatrick, 1995:48-49).

In the first stage King Kamehameha III [Kasikaewoli] divided up his lands among the highest ranking aliʻi (chiefs), konohiki (land managers), and favored haole (foreigners) (Chinen 1958:7-14; Moffat and Fitzpatrick, 1995:11, 17). The land for the people was designated Government Lands; and “from time to time portions...were sold as a means of obtaining revenue to meet the increasing costs of the Government.” People who purchased these lands were issued documents called “Grants” or “Royal Patent Grants,” which differed from the Royal Patents issued upon Land Commission Awards (Chinen 1974:25-29). All these lands were “subject to the rights of native tenants” who were cultivating the land (Act of 1850) referred to as Kuleana Lands. They were independent of the ahupuaʻa or ili kupono within which they were situated and were free of commutation fees. However, if there were no heirs, the lands reverted back to the owner of the ahupuaʻa or ili kupono where they were located (Chinen 1974:29-30).

In all Awards of whole Ahupuaʻa(s) and ‘Ili(s) the rights of Tenants are expressly reserved, “Koo na Kuleana o Kanaka.” Besides, the Act of August 6th, 1850, confirmed and amended July 11th, 1851, protects the common people in the enjoyment of the right to take wood, thatch, ki leaf, etc., from the lands on which they live, for their own private use, but not to sell for profit. They are also guaranteed the right to water and the right of way, but not the right of pasture on the land of the Konohiki. (Hawaiian Reports, Vol. 2, p. 87, and Vol. V., p. 133.) These rights are embodied in Section 1477 of the Civil Code. Furthermore, every bona fide resident on a land has the right to fish in the sea appurtenant to the land, and to sell the fish caught by him. (Hawaiian Reports, Vol. VI., p. 334 In Alexander 1891). It may be observed here that Keawe(s) in default of heirs “revert to the owner of the Ahupua’a or Ili at which the escheated Kuleana formed a part,* by a law passed July 6th, 1866 (Alexander 1891).”

“The Māhele did not actually convey title to the various aliʻi and konohiki; it essentially gave them the right to claim the lands assigned to them. They were required to present formal claims to the Land Commission and pay a commutation fee, which could be accomplished by surrendering a portion of their land to the government.” The government could later sell these lands to the public. Upon payment of the commutation fee, the Minister of Interior issued a Royal Patent to the chief or konohiki. In 1892 the legislature authorized the Minister of Interior to issue Royal Patents to all konohiki or to their heirs or assigns where the konohiki had failed to receive awards for their lands from the Land Commission. The Act further stipulated “that these Royal Patents were to be issued on surveys approved by the Surveyor General of the kingdom...” (Chinen 1958:24; Moffat and Fitzpatrick 1995:41-43; Alexander 1891). Kamoku Government Lands: 8,291 acres on the west side from near Nānāhoa to Kaumalapu‘u bounded by Ka‘a on the north and Kalulu on the south (Munro 2006:19).

Kamoku Māhele Awards: Kamoku was considered Crown Lands in the Record of Boundary Commission (1877).

Kamoku Royal Patents: Between 1855 to 1867, thirteen (13) grant applications, covering 735.93 acres, were surveyed and patented to fourteen individuals (13 natives and one foreigner) on the island of Lānaʻi (Lanaicb.org).
joined my places together. It is as the witnesses have stated above. My claims for the other places are ended.

Helu 10630
Pali
Kamoku
Foreign Testimony 15:40

Jany. 17th, 1853.

Resolved, that the Land Commission be and is hereby authorized to award fee simple titles to Pali (Claim No. 10,630), Kalaihoa (No. 3719 B) and Malulu (No. 6846) as surveyed by Asa, containing respectively 71 14, 75 1/10 & 90 Acres.

By order of Privy Council (Sig.) Lorrin Andrews, Secretary.

Helu 10630
Pali (Konohiki)
Kamoku
Māhele Award Book 7:222

There in the ili of Kaumalapau, Mooloa, Makaliiili, Kalelelua and 2 Aumoku, in the Ahupuaa of Kamoku, Island of Lanai. One Parcel.

Beginning at the Western corner and running… [metes and bounds] … 112 Acres, 1 Rood, 23 Rods…

Helu 2686 (see also Helu 367)
Oehoua (w.)
Kaumalapau at Kamoku
Native Register Volume 6:15

Lahaina. January 8th, 1848.

Greetings to you John Ii and Kaauwai, and the Commissioners who quiet claims.

I hereby tell you of my several land claims from the King. Here are the names of my lands: Puunau in Lahaina; Kalama II [Kona]; Kaumalapau [Lanai]; and Kanoni [Kau]. I have five lands, and my residency is from the King. Therefore, I provide before you, my document to you, that you, the Commissioners who quiet claims may see. Here also is my lot at Puunau, and I give to you my document, Kolopapela Kaau [wai] and Richards to quiet by your hands. Aloha to you with peace.

Done by me, Oehoua, Widow.

Helu 6833
Kaualii
Kahului & Kamoku
Native Testimony 13:272-273

Pali (Konohiki), Sworn. I know his Parcels of land at Kahului, Lanai. 3 Parcels of land in the ili below.


Parcel 3. The boundaries are thus. Mauka and all about, land of Konohiki.

He received these Parcels of land from his parents in the year 1840, and his parents received them from Danielia Ii. He has resided there peaceably to this time. No one has objected.

Kaauwai, Sworn. All the words above are true. My knowledge is the same.

Helu 8556 Kauauwaeaina
Maunalei, Kamoku and Kalulu Native Testimony 13:265

Kawaaiki, Sworn. I know his parcels of land on Lanai. They are in the ili and Ahupuaa below. 3 parcels.

Parcel 1. 3 loi kalo (taro pond fields) in the ili of Ainaiki, Maunalei Ahupuaa. Parcel 2. 1 moku mauu (grass land/pasture section), in the ili of Kapano uka, Kalulu Ahupuaa. 

Parcel 3: 1 Pauku land in the ili of Pasco, Kamoku Ahupuaa.

Par. 1. The boundaries are thus. Mauka, my land. Kaena and all about, land of Konohiki. Par. 2. The boundaries are thus. Mauka and all about, land of Konohiki.

Par. 3. The boundaries are thus. Mauka and all about, land of Konohiki.

He received Parcel 1 from Kawaaiki in the year 1844. Par. 2 from his parents in the time of Kamehameha II. Par. 3 from his parents in the time of Kamehameha I. He has resided there peaceably to this time. No one has objected.

I. Kaliliaumoku, Sworn. All the words above are correct. My understanding is exactly like that as spoken by Kawaaiki.

Helu 8556 Kauauwaeaina Kalulu and Kamoku
Māhele Award Book 7:212

There in the Ahupuaa of Kalulu & Kamoku, Lanai.

Parcel 2. There in the ili of Kapano… [metes and bounds] … 1Acre, 0 Roods, 35 Rods.


Lāna'i Land Grants

More than half the applications made by native tenants of Lāna'i for kuleana (personal property rights) were rejected by the Land Commission (see the Māhele ‘Āina on Lāna'i). This problem was recognized while the Māhele was being undertaken, and Kamehameha III implemented the program.
that allowed native and foreign residents to apply for grants of land—in fee-simple interest—which were held in the Government Land Inventory.

.../g48/g82/g86/g87/g3 /g82/g73/g3 /g87/g75/g72/g3 /g81/g68/g87/g76/g89/g72/g3 /g70/g79/g68/g76/g80/g68/g81/g87/g86/g3 ... /g68/g3 /g83/g68/g85/g87/g3 /g82/g73/g3 /g87/g75/g72/g3 /g48/g407/g75/g72/g79/g72/g3 /g181/g406/g76/g81/g68—some grantees received awards, others did not. The land came from the Crown and Government inventory of lands in four ahupuaʻa (Lanaic.h.org).

Parapala Sila Nui Helu 3029
Nahuna & Keliihue
Parcel 2. In the ili of Kaumalapau, in the Ahupuaa of Kamoku.

Beginning at the Northeastern corner of this parcel and running to the: North
52 ¾ ° West 415 links along Government;
North 44° West 2144 links along Malulu; South 32 ½ ° West 4664 links along Malulu;
South 43° East 2320 links along Government; North 29° East 2540 links along the Ili of Pueo; North 43° East 2260 links along the Ili of Pueo; To the corner of commencement.

Containing 103 58/100 Acres.

[John Richardson]
Waikapu.
Nov. 1855. [Maly, translator]

Bureau of Conveyance Documents/Kamoku, Lānaʻi

January 26, 1875
Ahsee & Akana; to Walter M. Gibson; Bill of Sale
Conveying sheep pasturing on Ahupuaa of Kamoku
Bureau of Conveyances – Liber 41, pages 194-195

January 26, 1875
Ahsee; to Walter M. Gibson; Assignment of Lease
Conveying Government Lease on Ahupuaa of Kamoku
Bureau of Conveyances – Liber 41, pages 195-196

July 5, 1875
William L. Meehouna, Minister of Interior; to Walter M. Gibson; Lease
Conveying the Ahupuaa of Kamoku
Bureau of Conveyances – Liber 43, pages 255-258

January 1, 1878
John O. Dominis, Agent, Crown Lands Estate; to Walter M. Gibson; Lease
(Terms of 25 years)
Conveying the Ahupuaa of Kamoku and Kalulu
Bureau of Conveyances – Liber 52, pages 475-478

June 13, 1879
M. Makalaua, Guardian of Kaaukai an underage minor; to Walter M. Gibson; Lease
Covering Lands in Kamoku, Kalulu and Kaunolu
Bureau of Conveyances – Liber 59 pages 499-500

December 19, 1890
Commissioners of Crown Lands; to F.H. Hayselden Lease No. 167
Missionary Influences in Lāna'i.

From the time they landed in Hawai'i in 1820, the missionaries had a profound effect on the people and culture here. They quickly connected with the aliʻi who later provided them with lands to build their mission stations and churches. They soon had mission stations in most rural areas including isolated Lāna'i. The following excerpts are from Napoka (In Bucy & Asso 1989:195).

In 1854 the Mormon Church decided to establish a colony on the [west] side of Lāna'i at the Pāllūwai Basin, which they called the City of Joseph. Mormon missionaries were in Hawai'i since 1850 and Lāna'i was to be their first major attempt to organize an entire colony. In 1854 they received permission from Halele, a Hawaiian landowner in the Pāllūwai area, to use his property rent-free.

The early Mormon settlers developed their property independently until 1861 when a self-declared leader of the colony, Walter Murray Gibson, arrived on Lāna'i. Gibson arrived in Hawai'i on June 30, 1861 from California with the intention of helping to organize Mormon activity in Hawai'i, and envisioning himself as the leader of his own island utopia on Lāna'i. Gibson reported to the Mormon leader, Brigham Young, in Salt Lake City at the end of 1861.

I continue to abide at the Hawaiian Zion on this island (Lanai); chiefly employed in organizing the labour of the Hawaiian Saints. I have built a good meeting house here; a dwelling house; and am now engaged in a large school house; 30 by 20 feet. We have 82 children on Pāllūwai; and it is noted for being the healthiest and most prolific spot. this "Mormon den," in the entire Kingdom. (Adler and Kamits 1988:64)

By late 1863 Gibson had purchased a sizeable amount of land in the Pāllūwai area, partly from native Hawaiian citizens and partly from the Hawaiian government. In 1864 Gibson was involved with a struggle for autonomy on Lāna'i between himself and the Elders of the Mormon Church. Land that Gibson purchased on Lāna'i was purchased in his name and he was reticent to relinquish ownership to the Church. The dispute ended with Gibson's excommunication. After Gibson's dismissal from the church, most of the Mormons on Lāna'i moved to Laie, Oahu to start a new center for Mormon operations. A Mormon temple was eventually built in Laie, which is now the center for Mormon activities in the Pacific.

The Ranching Era on Lāna'i. The following is from Napoka (In Bucy & Asso. 1989:195-197):

By 1865 the Mormon colony had disappeared from the island, but Gibson remained, and during this time he established the Lāna'i Ranch. Deciding that grazing was more profitable than agriculture, he began to consolidate most of the lands into one large sheep ranch. Although Hawaiians had herded goats prior to Gibson's arrival, Gibson was the first to launch a large scale business venture using goats and sheep. In January 3, 1867, his report he counted the sheep population to be 10,000 and the goats 18,000.

The introduction of free grazing livestock in large numbers took its toll on Lāna'i. Within a brief period of time the entire dryland forest area, with a few exceptions in the Kanepu'u area, was decimated. Initially, there was an abundant land cover of grasses, especially the native pili grass that supplied the goats and sheep with their needs. During frequent drought periods the free-roaming animals would cluster on the eastern slopes of Lāna'i where there was available water. The large numbers of livestock grazing in this area eventually denuded the land and gave it the desert-like appearance that it has today.

In 1874, Gibson's daughter Talula married Frederick Hayselden. Talula and her husband eventually moved permanently to Lāna'i, where Fred took over as proprietor of ranch operations, which were shifted from the Pāllūwai Basin to Kōʻele in 1874. Kōʻele remained the center for ranching activities on Lāna'i until the closing of the Lāna'i Ranch in 1951. In 1878 a manager's house for the Hayseldens was built at Kōʻele where the first two Norport Island pines were planted in 1875 (Munro 1954:69). The ranch at Kōʻele employed 12 Japanese men and two women to carry on daily activities (Thurston:1886:30). Hawaiians were usually employed just for shearing. Although this house was destroyed, one of the two pines still stands to mark this site today.
Past Oral Histories.

Since the time of Emory's expedition [1921], only one attempt was made to collect the oral traditions of Lāna'i - a survey conducted by the Bishop Museum in 1963. At the present time there are 13 hours of indexed, but not transcribed, interviews in the sound archives at the Bishop Museum. When these recordings are transcribed and made accessible to the public they could add to our understanding of the early traditional history of Lāna'i. These recordings may provide critical information since most of Lāna'i's knowledgeable informants have passed away. Today, we have a sketchy and incomplete picture of the pre-contact occupation of Lāna'i's (Napoka In Bucky & Assco. 1989:184).

Lāna'i Ranch: The People of Kō'ele and Keomuku
Center for Oral History-UHM (2010)

“I was always a bit in awe of Mr. Munro even though I liked him and I would say he was a kind man, but he could be strict. One day I was naughty and broke off the top of a Norfolk pine so I had to go and apologize to him and that was very difficult. Because it seems that if you break off the top of Norfolk pine, it stuns the tree, the growth of the tree.” —Jean Adams

Interviewees look back on Hawaiian Pineapple Company’s purchase of Lāna'i and the subsequent establishment of its pineapple plantation. Ranch residents, particularly women and students, found jobs in the pineapple fields and worked alongside newly hired Japanese and Filipinos from other islands.

“But about 1950, when they closed, there’s only two more families up there. . . . The only two was working was (Ernest Keliikuli) and my dad (Ernest Richardson). The rest of them already all started to work for the company—truck driver—into the pineapple. They phased into the pineapple company.” —Charlotte Holsonbach

In 1961 Castle & Cooke, Inc. acquired 100 percent direct ownership of Hawaiian Pineapple Company. Castle & Cooke’s recent construction of a luxury hotel on the former site of Lāna'i Ranch generates bittersweet reactions from interviewees. Some see this as a positive step toward diversifying the island’s one-dimensional pineapple economy. Others view it as a threat to the island’s environment and its close-knit society characterized by unlocked doors and friendly greetings.

“That’s all we can hope for is the best. I hope our island is not exploited, too, you know. . . . I think of her as a person, I don’t think of her as an island. If you take care of them, they take care of you. And that’s how Lāna'i has been to me. She’s always been there for us when we really needed her.” —Elaine Kaopuiki

Herding sheep on Charles Gay’s ranch, Kō'ele, early 1900s. Gay also kept cattle, horses, mules, and goats. (Photo 16. By Violet Gay.)

In 1861 the approximately 600 native Hawaiians living on Lāna'i were joined by Walter Murray Gibson and other followers of the Mormon Church who arrived to start a settlement on land they had purchased. Three years later, Gibson was excommunicated for allegedly misusing church funds and he consolidated 26,000 acres of land to form Lāna'i's Sheep Ranch.

After Gibson’s death in 1888, the ranch was turned over to his daughter and son-in-law, Talula and Frederick Hayeselden. Charles Gay purchased the properties in 1902. He subsequently sold all but 600 acres of his lands in 1910 to a (association) of businessmen who formed Lāna'i Ranch Company.

These interviews contain detailed descriptions of the day-to-day work and lifestyles of cowboys, their spouses and children, and other Lāna'i Ranch residents.

“I came over here, I learn cowboy. I work with the cowboys. The cowboys, most, they talk Hawaiian. Then I learn from them.” —Ernest Richardson

Documented are agricultural activities, ranging from Charles Gay’s pioneering attempts to grow pineapples commercially prior to the purchase of Lāna'i by Hawaiian Pineapple Company in 1922, to the cultivation of watermelons by Keomuku families for shipment and sale to Maui, to the planting of pumpkins and sweet potatoes for home use.

Interviewees talk about fishing and hunting which enabled Lāna'i's native Hawaiians to maintain a near-subsistence lifestyle.

“The reef, coming more shallow. Way back, those days, we used to go down there, the water was kind of deep, way up, you know. . . . So get big kind fish, small kind. Way up on shore, eh. . . . You just go and they throw (net). Almost everyone take home for eat, you know, just for the house only, and for down there.” —William Kwon, Sr.

The lives and accomplishments of former ranch managers Charles Gay, George Munro, and Ernest Vredenberg, and the changes each brought about in the lives of ranch workers and residents are also recalled. Interviewees remember when Munro, who took over in 1911, sent cowboys to plant hundreds of Norfolk Island pine trees to improve the ground-water supply. The trees are now Lāna'i's landmarks.
Except for recent research at Kalaehi (Graves: 1987:UH Field School) and Manele-Hulopoee (Kasechka and Athens:1987) the only major archaeological survey of the island was conducted over a six month period in 1912 by Kenneth Emory, who was employed by the Bishop Museum. Emory's inventory was field checked and updated for the State Historic Preservation Office by Rob Hommon in 1974. Except for Niihau, Lāna'i is probably the least studied Hawaiian island from the perspective of archaeology. Future research will no doubt shed more light on life on pre-contact Lāna'i.  

The wide variety of artifacts found on Lāna'i reflect a culture almost identical to that which existed on the other Hawaiian islands. This traditional society lacked metallurgy as well as pottery. All implements for living were made from wood, coral, bone, or volcanic stone. The stone alignments and structures which are the most visible prehistoric remnants on Lāna'i today were the foundations of structures in the Hawaiian village. Houses made of grasses fastened to a wooden framework stood on these platforms.

James, Van (2001:150-161), there are many ancient sites on the island (twenty-three petroglyph sites, more than ten large heiau, numerous small shrines or ko'a, house and burial sites, several fishponds, ruins and ancient trails), but only a few are accessible. He briefly describes one ancient village, one shrine, some petroglyph sites, a cultural landscape, and a fishpond in his book. None of the sites are in the Kamoku project area. However, two miles southeast of Lāna'i City on the lower slopes of Lāna'i'ha'ele, on the edge of the Pālāwai Basin are the Luahiwa (sacred black pit) Petroglyphs – 400 images carved on twenty boulders; and a rain heiau. The site is on the boundary between Kealiauapen and Kealukukupu ahu'aua. Hawaiians once grew sweet potatoes in the Pālāwai Basin, but in the early twentieth century it was the largest pineapple plantation in the world. The petroglyphs here depict the most variety on the island from ancient triangular figures to some post-contact images.

A few miles south of Lāna'i City lies the ancient village of Kaunoli, a once-active fishing settlement abandoned over a hundred years ago. It was made famous in early historic times as a favorite recreation location for Kamehameha I. Archaeological surveys conducted in 1921 and 1991 recorded 86 house platforms, 35 rock shelters, 30 detached enclosures, a canoe house, a fishing shrine and several petroglyphs including the legendary birdman images [boulders at Kukui Point have many more of these birdman images].

There is a slight resemblance to the birdman pictograph of Moto Nui, Orongo, Rapa Nui (left), but not the graphic motif on the right, also from Orongo, Rapa Nui (Wiki-Tangata-Manu 2016).
ETHNOGRAPHIC DATA AND ANALYSIS

The Ethnographic Survey (oral history interview) is an essential part of the Cultural Impact Assessment (CIA) because the ethnographic data helps in the process of determining if an undertaking or development project will have an adverse impact on cultural properties and practices or access to cultural properties and practices. The following are initial selection criteria:

- Had ties to project location(s)
- Known Hawaiian Cultural Resource Person
- Known Hawaiian Traditional Practitioner
- Referred by Other People

The consultants for this Cultural Impact Assessment were selected because they met the following criteria:

1. (1) grew up, lives or lived in Lāna‘i; (2) consultant is familiar with the history and mo‘olelo of Lāna‘i and/or Kamoku and vicinity; (3) consultant is a cultural practitioner of the area; or a resident of the area; or knows the history of the area. Copies of signed “Consent/Release” forms are provided [Appendix E and F].

In order to comply with the scope of work for this cultural impact assessment (CIA), the ethnographic survey was designed so that information from the ethnographic consultants would facilitate in determining if any cultural resources or practices or access to them would be impacted by the Lāna‘i City Expansion Project. To this end the following basic research categories or themes were incorporated into the ethnographic instrument: Consultant Background, Land Resources and Use, Water Resources and Use, Cultural Resources and Use; Anecdotal Stories and Project Concerns. Except for the ‘Consultant Background’ category, all the other research categories have sub-categories or sub-themes that were developed based on the ethnographic raw data (oral histories) or responses of the ethnographic consultants. These responses or clusters of information then become supporting evidence for any determinations made regarding impacts on cultural resources and/or practices including access.

Each person interviewed is asked to talk about their background; where they were born and raised, where they went to school and worked, and a little about their parents and grandparents. This category helps to establish their connection to the project area, their area and extent of expertise, and how they acquired their proficiency. In other words, how they meet the selection criteria. Ethnographic consultants either have family or personal ties to the project vicinity and/or are familiar with the history of the area.

There is always a danger of not allowing the consultant’s “voice” to be heard; of making interpretations that are not theirs; and of asking leading questions. To remedy this, the “talk story” method is used and allows for a dialogue to take place, thereby allowing the consultant to talk about a general topic in their own specific way, with their own specific words. All of the excerpts used are in the exact words of each consultant or paraphrased to insert words that are “understood” or to link sentences that were brought up as connected afterthoughts or related additions spoken elsewhere in the interview.

The following Table 2 is designed to provide a demographic view of the ethnographic consultants and how they met the selection criteria. The selected categories are name, year of birth, general ethnicity, connection to project area, where they were born and raised, where they currently live, and general area of expertise.

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Year</th>
<th>Ethnicity</th>
<th>Connection to Project Area</th>
<th>Birthplace Raised</th>
<th>Residence</th>
<th>Expertise</th>
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<tr>
<td>Alberta de Jetley</td>
<td>1945</td>
<td>Pt. Hawn</td>
<td>Historian/News</td>
<td>Moloka'i/Lāna'i</td>
<td>Lāna'i</td>
<td>Island News/Farmer</td>
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<td>Roberto Hera</td>
<td>1937</td>
<td>Filipino</td>
<td>Work Cultural Practitioner</td>
<td>Kealakekua</td>
<td>Lāna'i</td>
<td>Kīhei/Hu'u Preserve</td>
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<td>Genji Miyamoto</td>
<td>1926</td>
<td>Japanese</td>
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<td>Hawai'i/Lāna'i</td>
<td>Lāna'i</td>
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<td>1950</td>
<td>Pt. Hawn</td>
<td>DLNR-FW Historian</td>
<td>Moloka'i/Lāna'i</td>
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<td>Warren Osako</td>
<td>1946</td>
<td>Japanese</td>
<td>Historian Archaeologist</td>
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Consultant Backgrounds. The following “Consultant Background” section provides an overview of the ethnographic consultant, as well as information about their families, their relationship to Kamoku and/or Lāna‘i. These vignettes are presented in alphabetical order of interviewee names.

Alberta (Morita) de Jetley. My name is Alberta de Jetley, maiden name is Morita, my family moved to Lāna‘i in 1951 when my father, Richard Morita, was hired by the Territory of Hawai‘i, Land and Natural Resources, and he became the Island’s Game Warden in 1951. My mother was Anita Morita, she was a housewife, and when we came to Lāna‘i, she, like all of the other ladies of that time and generation worked for the plantation as summer employment, as field laborers. I think she did it until she was around 60 years old.

I went to school at Lāna‘i High and Elementary school and graduated in 1963. After I graduated from high school I moved to O‘ahu to go to University of Hawai‘i for the semester and was asked to leave after the semester because I never went to class. I was too busy riding horses, gallivanting around in Mānoa Valley, where the supermarkets are now. We had horses all up into that valley. After that semester I was asked to leave and never come back. I was living with an older sister who was working at St. Francis Hospital; I had to look for a job. I was offered a job, and to this day my biggest regret of my life - Elmer Carvalho was Speaker of the House at that time, and I was offered a job in his office as a runner. This was before fax machine and e-mails, as a runner, Legislative Aide, we delivered papers and we did the copies, you were a glorified errand girl. But at the same time, I was offered a job as a dental assistant and sister told me I had to take the job as a dental assistant because the Legislative session was only for a few months and I would be jobless. And to this day I’ve regretted the opportunity to work with Elmer Carvalho. He was an amazing man. I worked as a dental assistant for about six months, until I couldn’t stand it anymore. I eventually ended up working in Waikīkī and I used to like telling people I was a street walker, because I worked for a company that passed out travel brochures to all the travel agents. So, in addition to taking reservations in our office I got to walk up and down Kalakaua Avenue delivering pamphlets to all the different travel desks so I was a street walker and it was really fun. One of our accounts was Ka‘u‘i Helicopters, that’s where I first met Kingie Kimball. (Richard King “Kingie” Kimball) who was the owner of the Halekiihi, his family. With Ka‘au‘i Helicopters I went to Ka‘au‘i and did the flying around on helicopters, I also went to Maui to look at the hotels that we represented. When I worked at Contact and met Kingie Kimball the first time, he had horses and I rode all over O‘ahu because I was, in those days, a very experienced rider. People who had horses to exercise, they wanted company so they would call me and ask if I wanted to go riding. So I started going to Lai‘e where the Kimball’s had a weekend place and where they kept the horses, and I’d go riding with Kingie every Wednesday.
afternoon. He asked my boss if it was all right to go with him up to Lai'e to go riding. He was a fabulous man, really kind, very nice man. I did a lot, mainly connected through horses. We [Tom] both knew Kingie Kimball at different times, and it was Kingie who recommended Tony for the Huna job and that's how we ended up there…1968 until 1981. After Tony died, I moved to Lai‘i because I had Hotel Lai‘i and worked there until 1984 when I sold my lease.

I have lived on the Big Island of Hawai‘i and also on Maui where I made my home from 1968 until 1996. Over the years I've come and gone from Lai‘i, beginning in 1968 when I had the lease for Hotel Lai‘i, I sold my lease in 1984 and returned to Maui, and then I returned to Lai‘i in 1986 to work for David Murdock when he became majority owner of the island. In my capacity working for Mr. Murdock, I became a community newsletter to let Lai‘i people and former Lai‘ians know what was going on with the development of the hotel. The main perspective of the newsletter was to encourage community and development and community enterprises.

NOTE: Besides being a farmer on Lai‘i and the island newspaper publisher, editor and columnist, Ms. De Jetley is also the author of Lai‘i (Images of America) (2015) and has been interviewed several times (You Tube.)

Photo 18. Ms. De Jetley leading site visit to project area and vicinity.

Roberto “Bob” Hera. My name is Roberto Hera. I came to Lai‘i in 1937, when I was a couple of years old with my parents and my brother from Kālahuku-Kona, Hawai‘i on the S.S. Hauula. My dad came over to start a new life with the pineapple industry… Florentino, my father was well respected in the Community. I don’t know if you’ve heard of the Filipino Federation of America? My dad was the branch manager and that was one of the other reasons why he came. I came here to head the branch of the Filipino Federation of America. There are Filipinos that had to have their own moral concept and believed in the United States, they are one of the organizations that sold everybody in war bonds and they handled golf tournaments for school scholarships, they were big time, all the big wigswould come from O‘ahu.

Besides working for the company…so he was well respected; respected by the community and involved with community affairs. They were involved in the building of the senior citizen program here and my mom was the one that started the ukulele group that goes to the hospital every Wednesday. Albert Motoia is in charge now and they go up and entertain. That's what my mother (Marcellina) and my father (Florentino) started when she came to this country. The ukulele group and his gang of ladies brought the ukulele group up there to entertain. Both [parents from the Philippines] naturalized. My father was from Cebu and the mother was from Pangasinan it was one of those marriages that was not [accepted], her father disowned her because she married a Visayan and in those times Japanese were very strict about intermarriage, Chinesewas the same thing.

I grew up here, graduated from high school here (1954), and I left to go to college, University of Hawai‘i, on O‘ahu. Agriculture. I did not graduate; I left college and joined the Army. That was 1955. I enlisted and got into aviation and was a mechanic in the Army-Airway section. I took my basics in Monterey, California, and from there Texas, Edward Air Force Base in San Marcos, Texas. I went to school there to learn the mechanics of the air planes. When I graduated I went to Junction City, Kansas, home of the First Infantry Division. I was an aircraft engineer on the U-1A military transport. We were in the Air Section at Marshall Air Field. There, we started on one of the new phases in the Army, Tactical Transport Aviation Company where the Army purchased 21 planes from the De Haviland Company in Canada. We converted them into Army transports. When the Company was formed we moved our planes to Mobile, Alabama, where we put them on an aircraft carrier, the SS Tripoli and we spent fourteen days through the Gulf and the Atlantic Ocean to land up in Bremerhaven located at northern part of Germany. We flew missions out of Desheim. I had an opportunity to see the World’s Fair in Brussels, Belgium, where they first displayed the Russian Spasskaya Tower where our tour was up, I flew back to New York, to Newfield, to San Francisco, the only thing I saw was where I got discharged. In 1958 I got into the building aspects of the building growth on O‘ahu. I started as a warehouse boy at the first City Mill Company on Nimtiz and I worked myself up to Division Manager and I saw the growth of and the start of the ‘58 building boom in O‘ahu and it all the high-rise, apartments and subdivisions. My last project was in Makakilo, one of Senator Hiram Fong’s projects, the home for the Second City; his vision holds today. That whole area is now developed from Makakilo down to Kapolei, ‘Ewa Plains.

In mid ’65 I decided to go back home to Lai‘i. I went through a training program as a mannequin for the Company. After the training program my first assignment was an administrative assistant to the Personnel Manager. At that time it was Yoshir Nagamine. I was involved with bringing in the seasonal workers. I spent a lot of time doing that in that area; I was handling the cafeteria and most of the indoctrination. So I got to know a lot of the people that came in and out. One familiar figure was the kicker for the Denver Broncos, he was one of the UH kickers… Elam [Jason Elam]. He was one of the seasonal supervisors at the time he was here. Teams came from St. Louis, Waianae, Hilo, and Kahuku. I replaced him as representative from the island of Lai‘i to OHA at the Native Hawaiian Historical Council for four years. My next assignment was with the Ag Engineering Department/Utilities Department as a job supervisor. I was one of those that were instrumental in putting up the log cabins at Dole Park. It was a familiar place but it’s removed now. They have senior citizen and employee housing, there’s no baseball park there anymore. My second assignment was going to the Utility Department as a Supervisor, and construction of the drip water irrigation system. During the summer I’d go on loan to the Harvesting Department. I ran the harbor at one time, and I did the supervision for the Trucking Department. So I’ve done all phases of the pineapple from ground up; one of the few people that know the pineapple operation from the bottom up. I stayed with the Utilities Department; I ended up there as a Superintendent with the Agriculture Engineering Department until my retirement (1990).

My interest during those years was hunting and fishing. My spouse and I had seven children to raise so I had to do a lot of fishing and hunting to feed them. Besides hunting and fishing, I had a lot of outdoor activities, including raising horses. I grew up with the Kauai‘i family, so I knew something about the culture. I was involved with Uncle Sol in different areas. We were involved with the Na Ala Hele; I still am. I’ve been with them for twenty-six years now. I’ve been involved as a hunter and education instructor in the ’80s with Albert Motoia. I played an active role in the community. I was the president of the Jaycee, PTA, and Chairman of the Advisory Commission to The Planning Department. I’ve been in the Grants Commission, involved in all the politics. I represented the Republican Party on the side of the political spectrum over here. On the Lai‘i Community Association - I was president for many years trying to keep the organization together. It folded up one year for lack of directors. Every year you have to look for new directors. With the help of Tamo Mizutanga - he was really involved with the committee -he and I put the Community Association together and it’s still going strong.

When I retired in the early ’90s, my interest in the native forest really developed, kind of far back with Uncle Sol. The opportunity came when the Company gave the easement to the Nature Conservancy and they were looking for someone to run it. I applied for that job and did that until 1994. I got a notice from the Company that Murdock was looking for someone; they wanted me to come back and trouble-shoot for the Facilities Department. I was familiar with some of the operations because I was with the Jaycese Department. I went back as a Facilities Director, I got through that and got everything straightened out and the Company then moved on. It was then that I wanted to give back to the community, I said you have experience as a superintendent for the water facilities and we want you to train somebody because the guy was leaving. So I did, somebody from the mainland, it took me three years, after I found the guy I was going back to retirement. So after five years of being with Castle and Cooke, and the Murdock people, I retired.

In 2005, there were some problems with the Lai‘i operation. They were laying everybody off and were going to operate from Maui. What’s going to happen to Kāne‘pū’u? Uncle Sol and I were concerned about what would happen to Kāne‘pū’u. That would put Kāne‘pū’u on the back burner. So we talked it over with ‘Iki ‘Aina president Tom Lenchanks, and try to do it ourselves. We got a contract with them under the ‘Iki ‘Aina banner. Uncle Sol and I were the two guys that started it and from there we picked up people. We got a better contract and since then we’ve done so many things over there that we can call it a success in what we started. I call our gang the Kāne‘pū’u Warriors. I had people, like Uncle Sol who is now gone, I have two other plantation people, Marco Eckaron and Ambrose Amancio that are gone and retired from working there. I have new people now working out there, it’s mostly voluntary status because mostly the contract is low budget operation, but we are proud of what we’ve done. We raised money for
expenses putting up fences, developed interpretive trails, one for Uncle Sol which is now open to the public. Our self-guided trail is open twenty-four seven, adjacent to Kealakalaka. So we have the Preserve that is very accessible, and we are proud to be able to maintain that. We’ll take you out there today or this afternoon. We’ll probably have saimin with one of my people - he’s the only full blooded Hawaiian and he’s learned a lot about the forest. You are Hawaiian and you are knowledgeable. There are a lot of people that are not aware of the native dryland forest. We have our own cultural treasure right here.

Genji Miyamoto. [NOTE: Unfortunately Mr. Miyamoto was not available for a face-to-face interview, but agreed to speak briefly on the telephone. However, due to technical difficulties the conversation was not recorded and notes were sparse because of other issues. The following are bullet points from the conversation]

- Father brought the family to Lāna‘i to work in the fields
- Genji became a Surveyor and Geneticist of pineapple
- Worked in the whole plantation...testing pineapple in 1940’s-1950’s
- Worked the Company until 70 years old.

Albert Halapē Morita. I was born Molokai, 1950, and my family moved to Lāna‘i in the early 50s, about 1951 or so. My father Richard Morita Sr. [Japanese] was a game warden at one time, the Territory of Hawai‘i, when he came here. My mother Anita Hagemann Morita [German-Hawaiian] raised the kids and like many of the other ladies worked in pineapple fields also...labor work, from picking pineapple to ohana, digging weeds, and another was stripping the plants or harvesting the slips for planting. That’s about the type of work the ladies did at the time. My grandma was from the East Side [Molokai], near Kīloha School. My grandma’s last name was Ka‘avakau. I don’t know much past my grandma. My middle name, Halapē, comes from her mother or her grandmother. Other than that I don’t know much about them. Grandma’s story is that she was born on the backside of Molokai, Wallace, Pulehu‘u side. Collette Machado is my cousin’s wife. My parents, just before they moved here, had a homestead lot near Kaunakakai, house lot and a home here. I’ve been back but I don’t remember much, because we moved when I was young [1 yr old], Lāna‘i is where I grew up, but I still have cousins and an aunty there.

On Lāna‘i we lived at various places. When we first moved here we lived in Caldwell Avenue, that was just temporary and later we moved to Kō‘ele, that’s where the Lodge is located now. About that time the Ranch just closed down and the homes were available, the Division of Fish and Games got that area for the base yard and homes for their two employees, my father and William Kwon who was the neighbor, they both worked for Fish and Game. My father was a Game Warden in charge of all the fish and game on the island. He wasn’t the one that made the rules; he was the one that enforced them. My dad was a hunter too and I grew up hunting from about 12 years old, the minimum age then was 12 years old.

I went to Lāna‘i High School, so Kindergarten to 12 (graduated 1968), and after that UH Mānoa. I was in the Agriculture Program, animal science, and animal technologies. After I graduated I came back to Lāna‘i in the Fall of ’72. Lāna‘i was starting to get together a development plan, there were two companies. Lāna‘i Company, a part of Castle and Cooke, and I think the land side was Oceanic Company, another subsidiary. Actually I worked on both sides. My first job when I came back was in a plant nursery and doing beach maintenance, Hulopo‘e Beach. Then later doing anything they had to do, eventually after that company folded up, I went to Dole for a year 1976 or so. In 1977 I got a position with Land and Natural Resources as a Conservation Officer; I retired about nine years ago from that position (2007). I have been Board President of Lāna‘i Culture & Heritage Center and a Board Member and Docent of LCHC for several years. [Photo 26. Albert checking out old Google maps of Lāna‘i City].

Warren Osako. I was born and raised in Lāna‘i City, 1946. I went to school here until eighth grade, and I went to Honolulu and attended Mid Pacific...my older brother went there too. My dad decided I should go there, at first I didn’t want to go. Pretty much after that I moved around a little bit, went to California for a short while to go to college and I didn’t like it, came back and started at UH (Anthropology major). Being that I bailed out of California I couldn’t ask my parents for assistance, so I had to work and go to school in-between so it took me kind of long… I did not do much because at that time there were very few (archaeology) jobs... I was more into Archaeology when I was going to school. I did a couple of summer projects with some of the professors. I did one summer on the Big Island with Dave Tuggle and the next summer I worked Mauna Kea with Patrick McCoy. I know some of the Bishop Museum people too. I kind of lost contact a little bit. When I actually got my degree it was pretty much Bishop Museum and by then I got married and grad school was out of the question. Anthropology and the Grad Department, the guys actually lived at the school.

I actually left for a while, was in the Army, and after I came back I started working for United Airlines, was almost a summer job and I’d go to school the rest of the year, pretty much minimum full time, twelve credits and off and on. (In the Army) I went to military language school in Monterey, but they put me in Korean, after training I spent two years in Korea until I got out of the Army. This was in the ‘60s. For making a living I worked at United Airlines as a flight attendant, mainly. That’s why it was almost like a summer job, got laid off and I went back to school and went back to work the next summer. When I actually finished I got a long layoff so I worked for them on the ground and went to school for the day, it was better because I had the GI Bill, that helped pay for expenses. I lived in Kona for about ten years and commuted, and I moved back to Lāna‘i and commuted, it got really hard commuting from here because of the airlines situation. When Island Air was a part of Aloha we had privileges and when it got sold there was a period of time we didn’t get flying privileges so I was paying full fare to commute.

My father was Yoshikazu Osako...he worked for the plantation, originally from the Big Island, that’s how they got workers; the pineapple plantation paid more than the sugar plantation. My father moved here, a couple of my uncles moved here, one on my father’s side and one on my mother’s side. My father developed a relationship with the haole managers, I remember when my dad passed away we still got Christmas cards from the mainland from retired haole managers. I guess the old days, the bank manager was with Bishop, now it’s First Hawaiian, and they had good
relations with him. The first time they (parents) went to the mainland they visited them; they had built some kind of relationship. I think he (my father) actually got a GED - high school diploma, he was the oldest son in his big family so he had to go to work when he was fairly young to help the family. They came from Honoka'a, Paauhau, that part of the island. My mother was Mitsui Yamato Osako…she was from the same area; they were married before coming here. She was a housewife, but I remember she used to work for some of the other managers like housekeeping and eventually she worked at the post office. There were four of us, I wouldn’t consider that being large but getting close to.

I’m retired now, since 2004. Since then I’ve worked with them here [LCHC]. I’ve been on the Board for five or six years. And I worked on a couple of archeological projects with Cultural Surveys, actually worked with them a couple of weeks on Maui and got tired of living out of a suitcase.

Land Resources and Use.

Did you get the Munro book too? That’s a good one. George Munro wrote “The story of Lanai,” the original is out of print already but it was privately published and it’s available for purchase, they sell it at the Four Season’s Gift Shop, everything looks the same except it’s slightly smaller. The original is beautiful, George Munro was the Ranch Manager for Lāna’i, and he was the one that planted all these trees. Everything, the island was made, it had no vegetation. [Because of] goats and sheep. He was the one who started taking care of the land and started to reforest so all the trees you see on the mountains, it’s was all his work. His son and his grandson took his field notes and compiled this book. The son and grandson are on O'ahu, RM Towill Corporation, that’s them [De Jetley].

At that time [my father was Game Warden], the main ones were game birds, feral goats and deer. Later, in that period of the early 50s, mid 50s, Mouflon Sheep were introduced, which is right now more than huntable population. Also one introduction of that period was Pronghorn Antelope - those eventually died out. Axis deer, same one from Molokai, in fact the Lāna’i herd came from Molokai originally [Morita].

Most common [game bird] was Chinese Ring-necked Pheasant, also the Blue Pheasant, it was rare. The two interbred so we called it a Hapa, it might have a faint ring. The Ring-necked has a nice white ring around the neck and the Hapa’s wouldn’t be as distinct, they have more of the blue coloring. The Blue Pheasant was prized for the feather lei, the hat lei. Another popular bird at that time was Chukkar Partridge, the doves, later the Gray Francolins, Rio Grande Turkeys, lot of them right around the City, and Erckel Francolin [Morita].

The Ranch was everything outside of the pineapple fields, prior to the pineapple plantation the whole island was the Ranch, they tried to fence off the forest area trying to protect the forest. The best grazing lands would become the [pineapple] plantation. The Pālai Basin and the North West Basin, they took the best lands and the ranch was pushed out to the surrounding areas, which were not as good and eventually decided that losing money and not doing the land any good, they decided in the ‘50s to close it down [Morita].
Just prior to Dole buying the island, was the Baldwin family, Frank and Harry Baldwin, just about 1921 when they sold to Dole. Gay was a little bit before, up until the early 1900s, 1906 or so. They lost their holdings, the major part of their holdings, in 1909. They still stayed until the '20s, with smaller portions. After Hawaiian Pine bought the major part of the island they still continued the Ranch for at least another thirty years, and the closed down about 1951. When Mr. Murdock bought into Lana’i he started cattle again but eventually that too stopped [Morita].

They still have the stables up there, they still do rides. The whole island was a ranch, pretty huge about the largest in the state about 89,000 acres. They had corrals in all the different sections, I missed all of that. This is just before we came (looking at Kōʻeʻele photo), this is circa 1951, maybe the following year we were in this area, and this was our playground. Used to camp right in this building, the milk shed and the blacksmith shop and these corrals were still up. This was the Richardson home; this was the school building, which was the one they moved down to 1st Street. At least fifteen homes, here’s the present, they kept the reservoir and this building again is one they moved. It was quite a Ranch [Morita].

We came in 1951, when I was growing up until 1963, the community was predominantly Oriental and over the years I’ve seen it go from predominantly Oriental to predominantly Filipino. It was a very close society. Everybody did the same thing, we were all supposed to be the same. How do I say it? Everybody did the same thing; if you were different you weren’t really accepted [De Jetley].

So in those days as soon as you turned 15 you went to work in the pineapple fields. If you didn’t go to work in the pineapple fields when you became of age, you were considered a lazy good for nothing. So everybody went to work in the pineapple fields. On my 15 birthday, I went to the company office and signed up and the next day I was working with an old lady gang out in the field. For the summer help, they usually kept all the teenagers together with a luna, a field supervisor, usually somebody experienced with working with teenagers, and we basically did hoo-hana, which is pull weeds or later they put us into harvesting, so we went out and picked pineapple. Because I came in July 6th, which is in the middle of the season I had to go work with a group of old ladies until the following day when I was assigned to a teenage gang. Working in the pineapple fields was really boring and everybody was expected to do the same thing, you did what the luna told you to do and as long as you were living and breathing you weren’t expected to think, so it was very, very boring [De Jetley].

[Teenagers’ Dream in Līnā’i] Get out of Dodge! Leave town, go to Honolulu [De Jetley].

We played, organized activities, Little League Baseball, Cub Scouts and Boy Scouts, hiking and camping, horses, we always had horses. As I got older I did more hunting, other sports, high school activities. One that I had in AG Program in school, caring for the animals after school hours, chickens I mostly had. We had FFA. That was a good part, I’m kind of sad, shortly after that they started to phase it out, which I think was a mistake, and now they are saying maybe we should have it again. Well you guys had it before; the feeling at the time was college prep. It’s good to be well-rounded, it handy skills to have and it was a great program. I think most of the schools had because we were so rural. Once year we would travel to the FFA convention, there was also travel for sports, basketball and baseball [Morita].

We were pretty busy; in summer time everybody of age would work the fields. The bulk of the summer labor was from outside, high school and anyone else that they could recruit. They [outsiders] were the enemy because when they come all the wahines [go for the] new guys. It was strict competition, mostly guys; if any females came it would be with family. I can’t remember any females coming, mostly high school boys coming as a group, a school. One of the schools that used to come was Kahuku, this would be a summer camp to start their training. There were fights, I didn’t. Anytime you have an influx of different groups coming there’s going to be friction [Morita].

There were several places where they would stay. I recall before they had a lot of dormitories built they stayed in school buildings. I remember that Kindergarten and First Grade Buildings, I remember they even built a bathroom for them. Later Dole started to build more dormitories around town, and they placed the boys in there. Around 1968 or so, they built where the Hale Kupuna building is and the apartments across the service station what was called the log cabin dormitories; they had the dorm and cafeteria. By then, they were recruiting in the mainland, I think the group was called Y II Enterprises, I think they were associated with the Mormon Church and they’d bring them in for the summer. Every now and then we have some come and visit the Center (Līnā’i Culture & Heritage Center), and their childhood working places [Morita].

(Growing up) I thought it was good; obviously I have a bond that’s why I came back. I think it’s different now. I think we didn’t have too much, I remember there were times our family didn’t have a car. You noticed if you drive around the old parts the streets are narrow, people didn’t have cars and a lot of them didn’t have a garage space, especially the older parts… plantation buildings were right down there so everybody just walked [Osako].
I moved back here I was just shocked at these events where nobody had coolers and Hāna everybody sits on the wall with their [beer] coolers and here, you come to these big events nobody has coolers. But we do have crime, and a lot of domestic violence [De Jetley].

In their planning commission, they did a community plan, when they started the plantation they were visionary, even though it was lower income they had parks in town, a basketball court, a little play area and now they are slowly disappearing, which I thought was good because they had open spaces here and there in town, which you really need. Where I live right on Lāna‘i Avenue, across from where those apartment buildings are and that whole area which is the senior housing, County Hale Kupuna and supposedly low income rentals things. That used to be a park, that whole area used to be a park, they see money, granted that was the previous owners. I can see that they want those things in town, they start taking up the open spaces. When I was growing up that was where the baseball games were and all kinds of things like that, people don’t realize. When they started the Pop Warner thing, they said this is the first time they had football on Lāna‘i, they don’t know they had football before, they had barefoot football [Osako].

Culturally they have the resort area homes, it’s like a separation. Down Mūnēle and up Kō‘ele, it’s more high-end stuff and there is quite a bit of separation. And there are people that mingle but a lot of them are, you know in Hawai‘i we say high maka maka. So something like this tends to concentrate the low income people in one place and you know you starting to make more of a class structure. When I was growing up, up the hill was “Haole Camp” starting right up here, above the hospital, because it was mostly the managers and stuff but as time went on, the local people [lived there too]. When we were kids that was “Haole Camp” the group of luxury resort homeowners. That’s why they call it homeowners, I’m a homeowner too. There is a little bit of class kind of thing happening; I think. I don’t know if that’s Larry Ellison, it started with the previous owner. I don’t know if Larry Ellison feels something like that or whether he’s personally involved too much with what happens here. I had friends who were really sensitive about that [plantation ethnic separation], but I wasn’t, my parents were more open in a way, my father was a lana‘i Japanese custom, New Year’s they always made food and everybody came and had a drink and ate and all the haole managers came [Osako].

I live in town. Back in 1989, Mr. Murdock did this project, he had a 350 plantation houses that he owned. He wanted to see what would happen if he sold them to people, so he did a lottery where they selected between 12 and 17 families. You had to be renting the house, you couldn’t say I want that house or that house, you had to occupy the house and it had to be a company owned house. If you qualified and your name was drawn, you could buy your house. The houses were appraised for more than the market price so it gave people a cushion. As part of the sale if you had iron [corrugated] roof fencing, it had to removed, you had to landscape your yard, and bring the building up to code, so the plumbing and electrical had to be fixed. You had to fix the post and piers under the house, tent for termites, and your house had to be painted. Because of the way it was structured, every time you finished a job you got to cash out, the funds were held in escrow for you as you completed it. You could do most of the work yourself, but you had to get a licensed plumber and electrician. That was the only thing that had to come out of pocket so that was great, I bought my house for $35,000.00 [De Jetley].

Project Area

It’s beyond the 9th Street extension. [pointing to a map] Coming down this way is the garden area, to about here. It looks like the subdivision would be above the garden area, here’s the power house and the gardens would probably be here, roughly. So the top North East and North section of the gardens is part of the proposed subdivision [Morita].

The main tree [in the project area] is Iron Wood trees, introduced. I don’t think there were any native trees in there. Other introduced weed in there is Christmas Berry, the grass was Cane Grass, I can’t recall any other trees. Oh there were bōsai trees, I remember my father going to get some, it was next to the power house; he would get some to make inamona [Morita].

Some of those buildings were originally at Keomoku, I don’t know which ones, when they started the ranch then they moved them up. Had the old school building that was falling down they moved it down there and left it. Below [the Iron Woods], sort of about the level of where the old power plant was, right off the road, it’s all bushes and everything…falling down and they weren’t doing anything so people were taking the iron roofing and stuff. I guess sometimes they don’t see any value [Osako].

Pretty much that lower area [was pineapple fields], the other thing is the old power plant is in that area too. I guess as the town grew they decided to move it away. I always thought they could rehab the building and use it for something; the tendency is to let everything [deteriorate] [Osako].

[NOTE: The following photos are of LCHC photos and of Google maps.]

Photo 38-40. Ironwood trees, Kukui nut tree, Lāna‘i’s old Power Plant and deteriorating house in project area.

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[NOTE: The following photos are of LCHC photos and of Google maps.]

Photo 38-40. Ironwood trees, Kukui nut tree, Lāna‘i’s old Power Plant and deteriorating house in project area.
inside there, might be some gardens or shack. Grass has grown really thick in there now; this was thirteen years ago in 2003 (Looking at Google Earth image from 2003) [Morita].

The rest of this area is still vacant land, and some people had gardens in there. This is 9th Street extension, right in here is where the Quonset hut is, this is vacant hill side area. One gentleman over here, he was in the police department, Celadonio Asuncion, his house is right across the street, and he raised goats in a lot down here. Some of his fence might still be there, historic properties, right alongside the road just below the church, adjacent to the parking lot. Here's the Power House, again vacant lot, some people had horses here, not many, maybe one or two [Morita].

[Below the vacant lot was] pineapple fields. Right about from this road, this is the old Power House and below is the pineapple fields. I cannot remember any of the families who may have had gardens in here, probably people from across the street. Like every other neighborhood with children, that’s the children’s playground too, kind of overgrown forested area. After you e-mailed me I went down there on a Sunday, just to go look around and try to remember what was down there and sure enough had kids in there, so I went there to talk story. They were hacking on the trees. “What you guys doing?” “We making a club house.” I was thinking that was great, many generations, that area, how many generations of kids playing there. I’m always happy to see that because today you always see kids playing computer games, kind of nice just to see them build a club house. I was thinking it’s going to be a subdivision soon and maybe one of those boys could have a chance to get a house in there [Morita].

But it’s been tough, because like some of the old houses, the theatre and three houses, they boarded them up and it got to a point where they didn’t do anything and it became too badly deteriorated to save. I keep reminding them that there are two down here and the company owns and one of them is boarded up now and no effort made to, those were some of the first houses built by the pineapple plantation [Osako].

Not familiar in detail but just in looking at the map of the [project] area, our DLNR office was right up in the corner next to the church. In fact we had two different offices; right where the Jehovah Witness Kingdom Hall is, is where my first office where I worked, that’s torn down now. That building was previously the Research and Experimental Office (for Dole), next to it was a Quonset hut type building, which we moved into, now that’s the present office. [pointing to a map] Its right here, it’s still there next to the church [Morita].

Below was semi-industrial, I think the gas company had storage there...had some other stuff where they are slowly going out of use. Down below was original pineapple field. This upper part, once you get past Fraser, then it slopes down pretty steeply. There’s not much there [Osako].

Community Gardens.

Did you see them? It’s bad, it’s really, really bad, and it’s a shambles. The majority of the people down there are raising cocks; fighting chickens is illegal. I said I’d take you down there, but everybody knows me. But if you drove down there by yourself, you’d get stink eye and you would have someone stopping you to say “What are you doing here?” “What are you looking for?” They need a real community garden where people are actually growing food for their families. They said they’d relocate it [De Jetley].

In talking with other people, had chicken fight in there too [near Ironwood tree area], cultural practice. I don’t remember chicken fights being in there but after I thought about it, they went hide right. They aren’t going to be out in the open and it was well hidden. Probably started off as a Filipino thing but a lot of ethnicities were attracted to it and it may have involved a wide range of cultures. And more recently, further down, there’s community gardens in here and there too, I understand there is chicken fights in there too [Morita].

Looks like most of this and then this much, these are all community gardens. It looks like some will be displaced, this one is vacant lot. This is the County Yard, outside of project district, County Sewage Treatment Plant [Morita].
Company Nursery

Outside the fields are organic gardens; 3-4 places. The hotel needs vegetables and herbs; I planted what they wanted 3-4 yrs [Miyamoto].

Area is good…I did garden and I built the Green House – Nursery [Miyamoto].

Photos 58-60. Company Nursery area built by Mr. Miyamoto.

Photo 61. 2003 Google Map showing Project Area: Company Nursery and Community Gardens.

Lāna‘i City Expansion Area

It’s a 150 unit project, it’s long overdue because we are in severe housing crunch. I know people who are living in garages with their families, I know of families with three generations with 9 to 12 people living in one house. I know a family camping outside of town in the bushes, there was a family of three camping for six months, there were families camping down the beach. Now you can’t camp at Hulopoe Beach Park for extended periods. For a while we had people going down there and camp all through the summer but now you have to break camp and leave - there’re all kinds of rules down there. You can’t be homeless down there now, but we’ve had homeless families go down the other side and live. I think, overall, basically the project is, I’ve written about it for Lynn, is for 150 units. Lāna‘i City Builders will be the general contractor. They will install all of the infrastructure in one swoop, but they are going to build the houses in increments, 51% will be affordable, 49% will be market. At the community meeting we had people asking if we were going to just sell to anybody, market is market and they’ll sell to whoever shows up with money, you don’t ask where they are from, and there is no way you can say Lāna‘i residence come first. I don’t believe that there will be that many buyers for it, 51% will be affordable but with the chart that they were passing around, it’s 20% down and 8% closing. If you look at the numbers, it’s between $30k and $40k to get in and with the economy on Lāna‘i right now, I doubt if any of the families that really need it can get in. Pulama is going to rent the units they don’t sell and that will be a good thing. Maybe they’ll start talking about rent to own [De Jetley].
It’s not so much cultural sites, you’ve seen the map. Of course this was all Dole Pineapple Plantation property at one time. The sewage treatment plant is right here so the Kona Winds, you’ll probably going to get the smell and this corner here, that’s where they did the chemical mixing for the plantation. The ground has changed a little bit, but then a lot of the water flow was down here; down here was the catchment basin towards the highway, the drainage was over there. I don’t know how bad contamination is…. I’m sure they did [test] but I don’t know. Well you know Mililani had heptachlor in the water for a while and that was from pineapple field chemicals, and you see right out there that the pineapple doesn’t grow really good without the chemicals [Osako].

Marine Resources and Use. The sea can be a great resource to people with access to its bounty. While Kamoku Ahupua’a was from the ocean to the uplands the interviewees did not mention any marine resources and uses. The project area is in Kamoku uplands.

Cultural Resources and Use. This category represents traditional Hawaiian cultural resources and practices and other ethnic resources and practices. The traditional Hawaiian cultural resources and practices, includes the pre-contact era, as well as cultural practices after contact. Cultural Resources can be the traditional wahi pana or sacred places, any cultural gathering place, or the tangible remains of the ancient past. One of the most significant traditional Hawaiian cultural resources is the heiau or place of worship. Other places of great significance for all cultures are the burial places of loved ones, dwelling places of deities and habitation sites of ali‘i nui. The interviewees had very little to say in regards to what they considered cultural places and practices. All of them indicated there were no traditional cultural sites; a couple mentioned “cultural practices” such as chicken fighting and gathering kukui nuts.

Power Plant area…no cultural practices [Miyamoto].

Project Concerns/Comments/Recommendations. This sub-category was created because interviewees are free to comment on the project as well as the project area.
These two buildings, they are still down there but they were moved there. This was near the school and was used for Boy Scouts. They moved it when they did the parking lot and Rec Center; this building was the old school house. In this photograph it was the school, in that photograph I understand it was near the hotel, right about in here. Those days they moved buildings all over the place, later they moved it to this location and the John Richardson family lived there, when they built the hotel they moved it to where it is now and sadly it is beyond salvage. Yes [historic] - its right off 9th Street, you can hardly see it, it’s across the baseball field. This is kind of interesting to see what’s inside there, might be some gardens or shack. Grass has grown really thick in there now; this was thirteen years ago in 2003 (Looking at Google Earth image from 2003) [Morita].

Save the Pine Trees

I think the location is going to be fine, I hope they can save the row of pine trees by the community garden. If they could save that, that would be really nice but if they can’t, the developer should plant trees [De Jetley].

Photos 65-66. Row of Cook Pine trees mauna of the Community Gardens

Native-Polynesian-Introduced Flora

The kukui is rubbish, they grow like weeds here. I have a kukui nut tree on my farm that is less than eight years and its more than 50 feet tall because it’s been left in its natural state just to grow, so it’s over 50 feet. If you go down to Central, there’s kukui nut they planted as landscaping trees, there’s rubbish all over the ground, and nobody picks the nuts. I actually, from my kukui nut tree, I sell it to this company called Lather and they make bath oil and lotion from it and package it for Four Seasons. The purpose of this Act is to: (1) Require that environmental impact statements include the disclosure of adverse effects on cultural practices and access to them, as well as share the concerns and recommendations of the interviewees.

CIA SUMMARIES and ASSESSMENT

This cultural impact assessment (CIA) is based on two guiding documents: Act 50 and Environmental Council Guidelines (1997) [see Appendices A & C]. H.B. NO. 2895 H.D.1 was passed by the 20th Legislature and approved by the Governor on April 26, 2000 as Act 50. The following excerpts illustrate the intent and mandates of this Act:

The legislature also finds that native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life and the “aloha spirit” in Hawai‘i. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups.

Moreover, the past failure to require native Hawaiian cultural impact assessments has resulted in the loss and destruction of many important cultural resources and has interfered with the exercise of native Hawaiian culture. The legislature further finds that due consideration of the effects of human activities on native Hawaiian culture and the exercise thereof is necessary to ensure the continued existence, development, and exercise of native Hawaiian culture.

The purpose of this Act is to: (1) Require that environmental impact statements include the disclosure of adverse effects on cultural practices and access to them, as well as share the concerns and recommendations of the interviewees.

Summary of Findings

The following summaries are based on the information presented in the previous sections: the traditional (cultural) and historical literature background review and the ethnographic data and analyses. References are not cited unless it is new information and not already cited in the text above. These summaries condense the information above, but also serve to focus on a few significant individuals and events in history in relation to the project lands of Kamoku. It will provide a broad overview of land, water and cultural resources and uses in the general area, as they reflect cultural resources (properties) and practices and access to them.

Native-Polynesian-Introduced Flora

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Batching Plant

I didn’t go to the meeting. I didn’t really take a good look at this map, I was concerned about one area but it’s not on the project district according to this, and its right here. This area was a batching plant for the plantation, batching fertilizer, any time you have chemicals I wonder what it does to the soil. I was just telling my wife, “would you want to live in this area knowing what we do?” What was that subdivision in the mainland, Love Canal, being built on toxic sites with residents with problems? This is the area and I’m glad it’s not in the development area. Here’s a great photograph of the area, the batching plant is this Quonset hut here, and these are outside of the project district. Right in here up to 9th Street and coming down here - here’s the power plant. This photograph is, I believe in the ‘50s [Morita].

Photos 65-66. Row of Cook Pine trees mauna of the Community Gardens

Native-Polynesian-Introduced Flora

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The following Figure 10 illustrates a typical pattern of an ancient Hawaiian lifestyle from the ocean to the mountains (Minerbi 1999, slightly modified by Mueller-Dombois 2012); however, not all activities were carried out in every ahupua’a – a lot depended on the environment and natural resources.

Cultural Impact Assessment

According to the Environmental Council Guidelines, the types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, religious and spiritual customs. The following actions were taken to meet the EC Guidelines Criteria for conducting this cultural impact assessment based on the SOW:

1) conduct historical and other culturally related documentary research;

Documentary research, particularly on identifying traditional and cultural uses of the area, was completed. Much of what is known about the traditional and cultural uses of the area comes from written records that tell of its prehistory (e.g., mo’olelo; and 19th century ethnographic works); the stories associated with early coastal and upland area uses by early Hawaiians; and scientific studies (i.e., archaeo- logical, botanical, geological, and biological).

2) identify individuals with knowledge of the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or ahupua’a; or with knowledge of the area potentially affected by the proposed action (e.g., past/current oral histories);

The project lands have been in continual use since ancient times, however, not in exclusive kanaka maoli use since Contact. The interviewees were selected because of their use and knowledge of the project area.

3) identify and describe the cultural resources, practices and beliefs located within the potentially affected area;

Archival research in the Cultural and Historical Background Review and ethnographic research (Ethnographic Data Review and Analysis) produces the data utilized to identify and describe the cultural resources, practices and beliefs located within the potentially affected area in the Summary of Findings above. There were no identified cultural resources or practices connected to the project area.

4) and assess the impact of the proposed action on the cultural resources, practices and beliefs identified.

Since there were no cultural resources, practices and beliefs identified in or connected to the proposed project area, there will not be any cultural impact. However, the following recommendations are suggested:

- Save the row of Cook Pines;
- If possible save the kukui tree.

Post-Contact/Historic Land Use:

- The project area was once part of the Līnā‘i Ranch lands;
- The project area was taken over by the pineapple industry which ended in 1992;
- The project area is currently overgrown with tall grasses, shrubs and trees;
- The now defunct Power Plant was previously operating in a section of the project area; the derelict structure is still there;
- The Company Nursery and Community Gardens will be relocated;
- A kukui tree in the project area may have been harvested by an interviewee’s father-there is an interest in preserving it;
- There are two ‘historic’ structures that were relocated to the project area, but are currently neglected and in disrepair surrounded by overgrown vegetation;
- A row of historic Cook pine trees were planted as wind break and now mauka of the Community Gardens—there is an interest in preserving them.
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It is the policy of the State of Hawai‘i under Chapter 343, HRS, to alert decision makers, through the environmental assessment process, about significant environmental effects which may result from the implementation of certain actions. An environmental assessment of cultural impacts gathers information about cultural practices and cultural features that may be affected by actions subject to Chapter 343, and promotes responsible decision making.

The Environmental Council encourages preparers of environmental assessments and environmental impact statements to analyze the impact of a proposed action on cultural practices and features associated with the project area. The Council provides the following methodology and content protocol as guidance for any assessment of a project that may significantly affect cultural resources.

II. CULTURAL IMPACT ASSESSMENT METHODOLOGY

Cultural impacts differ from other types of impacts assessed in environmental assessments or environmental impact statements. A cultural impact assessment includes information relating to the practices and beliefs of a particular cultural or ethnic group or groups.

Such information may be obtained through scoping, community meetings, ethnographic interviews and oral histories. Information provided by knowledgeable informants, including traditional cultural practitioners, can be applied to the analysis of cultural impacts in conjunction with information concerning cultural practices and features obtained through consultation and from documentary research.

In scoping the cultural portion of an environmental assessment, the geographical extent of the inquiry should, in most instances, be greater than the area over which the proposed action will take place. This is to ensure that cultural practices which may not occur within the boundaries of the project area, but which may nonetheless be affected, are included in the assessment. Thus, for example, a proposed action that may not physically alter gathering practices, but may affect access to gathering areas would be included in the assessment. An ahupua‘a is usually the appropriate geographical unit to begin an assessment of cultural impacts of a proposed action, particularly if it includes all of the types of cultural practices and features being assessed. The types of cultural practices and beliefs subject to assessment may include subsistence, commercial, residential, agricultural, access-related, recreational, and religious and spiritual customs.

The types of cultural resources subject to assessment may include traditional cultural properties or other types of historic sites, both manmade and natural, including submerged cultural resources, which support such cultural practices and beliefs.
The Environmental Council recommends that preparers of assessments analyzing cultural impacts adopt the following protocol:

1. Identify and consult with individuals and organizations with expertise concerning the types of cultural resources, practices and beliefs found within the broad geographical area, e.g., district or alii‘i a‘a;

2. Identify and consult with individuals and organizations with knowledge of the area potentially affected by the proposed action;

3. Receive information from or conduct ethnographic interviews and oral histories with persons having knowledge of the potentially affected area;

4. Conduct ethnographic, historical, anthropological, sociological, and other culturally related documentary research;

5. Identify and describe the cultural resources, practices and beliefs located within the potentially affected area; and

6. Assess the impact of the proposed action, alternatives to the proposed action, and mitigation measures, on the cultural resources, practices and beliefs identified.

Interviews and oral histories with knowledgeable individuals may be recorded, if consent is given, and field visits by preparers accompanied by informants are encouraged. Persons interviewed should be afforded an opportunity to review the record of the interview, and consent to publish the record should be obtained whenever possible. For example, the precise location of human burials are likely to be withheld from a cultural impact assessment, but it is important that the document identify the impact a project would have on the burials. At times an informant may provide information only on the condition that it remain in confidence. The wishes of the informant should be respected.

Primary source materials reviewed and analyzed may include, as appropriate: Māhele, land court, census and tax records, including testimonies; vital statistics records; family histories and genealogies; previously published or recorded ethnographic interviews and oral histories; community studies, old maps and photographs; and other archival documents, including correspondence, newspaper or almanac articles, and visitor journals. Secondary source materials such as historical, sociological, and anthropological texts, manuscripts, and similar materials, published and unpublished, should also be consulted. Other materials which should be examined include prior land use proposals, decisions, and rulings which pertain to the study area.

III. CULTURAL IMPACT ASSESSMENT CONTENTS

In addition to the content requirements for environmental assessments and environmental impact statements, which are set out in HAR §§ 11-290-10 and 16-15-17, the portion of the assessment concerning cultural impacts should address, but not necessarily be limited to, the following matters:

1. A discussion of the methods applied and results of consultation with individuals and organizations identified by the preparer as being familiar with cultural practices and features associated with the project area, including any constraints or limitations which might have affected the quality of the information obtained.

2. A description of methods adopted by the preparer to identify, locate, and select the persons interviewed, including a discussion of the level of effort undertaken.

3. Ethnographic and oral history interview procedures, including the circumstances under which the interviews were conducted, and any constraints or limitations which might have affected the quality of the information obtained.

4. Biographical information concerning the individuals and organizations consulted, their particular expertise, and their historical and genealogical relationship to the project area, as well as information concerning the persons submitting information or interviewed, their particular knowledge and cultural expertise, if any, and their historical and genealogical relationship to the project area.

5. A discussion concerning historical and cultural source materials consulted, the institutions and repositories searched, and the level of effort undertaken. This discussion should include, if appropriate, the particular perspective of the authors, any opposing views, and any other relevant constraints, limitations or biases.

6. A discussion concerning the cultural resources, practices and beliefs identified, and, for resources and practices, their location within the broad geographical area in which the proposed action is located, as well as their direct or indirect significance or connection to the project site.

7. A discussion concerning the nature of the cultural practices and beliefs, and the significance of the cultural resources within the project area, affected directly or indirectly by the proposed project.

8. An explanation of confidential information that has been withheld from public disclosure in the assessment.

9. A discussion concerning any conflicting information in regard to identified cultural resources, practices and beliefs.

10. An analysis of the potential effect of any proposed physical alteration on cultural resources, practices or beliefs; the potential of the proposed action to isolate cultural resources, practices or beliefs from their setting; and the potential of the proposed action to introduce elements which may alter the setting in which cultural practices take place.

11. A bibliography of references, and attached records of interviews which were allowed to be disclosed.

The inclusion of this information will help make environmental assessments and environmental impact statements complete and meet the requirements of Chapter 343, HRS. If you have any questions, please call 586-4185.
APPENDIX C

Agreement to Participate in Ethnographic Survey

Project Title: Lānaʻi City Expansion CIA
by Pālama Lānaʻi - Lānaʻi City, Lāhaina District, Lānaʻi

Interviewer: Maria “Kaimi” Orr, M.A.
Kaimipono Consulting Services, LLC
(808) 375-3317 kaimi@lava.net

You are being asked to participate in an ethnographic survey conducted by an independent interviewer from Kaimipono Consulting Services LLC (KCS) contracted by T.S. Dye & Colleagues Archaeologist, Inc. to prepare a Cultural Impact Assessment (CIA) as part of an environmental compliance document prepared by them. The interviewer will explain the purpose of this CIA, the procedures to be used, the potential benefits and possible risks of participating. You may ask the interviewer any question(s) in order to help you to understand the process. If you then decide to participate, please sign on the second page of this form. You will be given a copy of this form.

I. Nature and Purpose of the Study

The purpose of this ethnographic survey is to gather information about the project area through interviews with individuals who are knowledgeable about the area and/or about the history of this area. The objective of this survey is to provide ethnographic data for the CIA report.

II. Explanation of Procedures

After you have voluntarily agreed to participate and have signed the consent page, the interviewer will record your interview and have it transcribed later. The interviewer may also need to take notes and/or ask you to spell or clarify terms or names that are unclear.

III. Discomforts and Risks

Foreseeable discomforts and/or risks may include, but are not limited to the following: having to talk loudly for the recorder; being recorded and/or interviewed; providing information that may be used in a report; knowing that the information you give may conflict with information from others; your uncompensated dedication of time; possible miscommunication or misunderstanding in the transcribing of information; loss of privacy; and worry that your comment(s) may not be understood in the same way you understand them. It is not possible to identify all potential risks.

IV. Benefits

This survey will give you the opportunity to express your thoughts/knowledge (mana’o), which will be listened to and shared; your knowledge may be instrumental in the preservation of significant historic information.

V. Confidentiality

Your rights of privacy, confidentiality and/or anonymity will be protected if you so desire. You may request, for example, that your name and/or sex not be mentioned in write-ups, such as field notes, on recorder, on files (disk or folders), drafts, reports, and future works; or you may request that some of the information you provide remain “off-the-record.” In order to ensure protection of your privacy, confidentiality and/or anonymity, you should immediately advise the interviewer of your desires. The interviewer will ask you to specify the method of protection, and note it on this form below.

VI. Refusal/Withdrawal

You may, at any time during the interview process, chose to not participate any further and ask the interviewer to erase the interview. Please note that you will be given an opportunity to review your transcript, and to revise or delete any part of the interview.

VII. Waiver

Part I: Agreement to Participate

I. ________________________, understand that Maria “Kaimi” Orr, an independent interviewer contracted by T.S. Dye & Colleagues Archaeologist, Inc. will be conducting oral history interviews with individuals knowledgeable about Lānaʻi City Expansion development area. The oral history interviews are being conducted in order to collect information of the area.

I understand I will be provided the opportunity to review my interview to ensure that it accurately depicts what I meant to say. I also understand that if I don’t return the revised transcripts after two weeks from date of receipt, my signature below will indicate my release of information for the CIA report. I also understand that I will still have the opportunity to make revisions during the draft review process.

_____ I am willing to participate.

Signature Date

Print Name Phone

Address ZipCode

Email Address

MAHALO NUI LOA!
APPENDIX D

Ethnographic Basic Research Instrument for Oral History Interviews

This research instrument includes basic information as well as research categories which will be asked in the form of open primary questions which allow the individual interviewed (Consultant) to answer in the manner he/she is most comfortable. Secondary or follow-up questions are asked based on what the Consultant has said and/or to clarify what was said. The idea is to have an interview based on a “talk-story” form of sharing information. Questions will NOT be asked in an interrogation style/method, NOR will they necessarily be asked in the order presented below. This research instrument is merely a guide for the investigator and simply reflects general categories of information sought in a semi-structured format. Questions will be asked more directly when necessary.

The Consultants were selected because they met one or more of the following criteria:

- Had/has Ties to Project Area/Vicinity
- Known Hawaiian Cultural Resource Person
- Known Hawaiian Traditional Practitioner
- Referred By Other Cultural Resource People
- Referred By Other People (e.g. Staff, Client)

[NOTE: This part of the interview, #1-4 is mutual sharing and rapport building. Most of the information for research categories “Consultant Background” and “Consultant Demographics” come from this section, but not exclusively.]

1. To start please tell me about yourself... Name? Where/When you were born and raised?

   [This information can be addressed in a couple of ways. After the investigator first turns on the recorder, the following information will be recorded: Day/Date/Time/Place of Interview; Name of Consultant (if authorized by Consultant; Name of Investigator. Questions: Have you read the Agreement-To-Participate? Do you have any questions before we begin? Will you please sign the Consent Page. The investigator will explain again the purpose of the interview.

   The investigator will then ask the Consultant to “Please tell me about yourself—when/where were you born? Where did you grow up? Where did you go to school?” This general compound question allows the Consultant to share as much or as little as he/she wants without any pressure. Most of the information for #1 may already be known to the investigator.]

2. History: Your ‘ohana/family background; Hawaiian connection (if any)?

   [Much of the information for questions #2, 3, and 4 usually comes from the answer to Question #1. If it does not, then these questions will be asked. The answers in this section usually establish how the Consultant meets the criteria; how the Consultant developed his/her information base, etc.]

3. Youth: Where lived? Grew up? [This may have been answered in #1]

4. Schooling? Where? When? [This may have been answered in #1]
5. Can you tell me what you know about the lands of Project Area? Kamoku?

6. What are your recollections and/or personal experiences of this area?

7. Do you know any stories/legends/songs/chants associated with these areas?

8. Is there anyone you know who can also tell me about the project area?

9. As soon as this interview is transcribed I will send you two sets. Please review your transcripts and make any corrections and/or additions, then sign both copies of the Release Forms thereby allowing the information to be used by the investigator, T.S.Dye & Colleagues, Archaeologists Inc. and Piliana Lāna'i. Then mail one set back in the enclosed stamped-addressed envelope. [If available email is also utilized]

10. If your revised transcript is not returned within two weeks of date of receipt, it will be assumed that you are in concurrence with the transcript material and your information will then be incorporated into CIA, EA or EIS draft reports. However, you can still make changes during the draft review process.

MAHALO NUI LOA
VI. Refusal/Withdrawal

You may, at any time during the interview process, choose to not participate any further and ask the interviewer to cease the interview. Please note that you will be given an opportunity to review your transcript and to review or delete any part of the interview.

VII. Waiver

Part 1: Agreement to Participate

I understand that Maria "Kimo" Orr, an independent interviewer contracted by T.S. Day & Colleagues, Archaeologists, Inc., will be conducting oral history interviews with individuals knowledgeable about Liloa’s City Expansion development area. The oral history interviews are being conducted in order to collect information about the area.

I understand I will be provided the opportunity to review my interview to ensure that it accurately depicts what I meant to say. I also understand that if I do not return the revised transcripts after two weeks from date of receipt, my signature below will indicate my release of information for the CIA report. I also understand that I will still have the opportunity to make revisions during the draft review process.

____ I am willing to participate.

Signature: ________ Date: 8/10/2012

Print Name: Alboth de Jetley Phone: 808-649-0808

P.O. Box 430601

Liloa, HI 96763 Zip Code: __________

Email Address: jan.tody2@yahoo.com

MAHALO NUI LOA!

____ I am willing to participate.

Signature: ________ Date: 8/11/16

Print Name: Roberto Yoo Phone: 808-565-6672

P.O. Box 430607

Liloa, HI 96763 Zip Code: __________

Email Address: aretherel0@gmail.com

MAHALO NUI LOA!
Part I: Agreement to Participate

I, Albert Monroe, understand that Maria "Kanina" Oye, an independent interviewer contracted by T.S. Dye & Associates Archaeologists, Inc., will be conducting oral history interviews with individuals knowledgeable about Lānui City Expansion development area. The oral history interviews are being conducted in order to collect information on the area.

I understand I will be provided the opportunity to review my interview to ensure that it accurately depicts what I meant to say. I also understand that if I don't return the revised transcript within two weeks from date of receipt, my signature below will indicate my release of information for the CEA report. I also understand that I will still have the opportunity to make revisions during the draft review process.

I am willing to participate.

Signature: Albert Monroe
Date: 8/1/2014

Print Name: Albert Monroe
Phone: 808-444-4

Address: Lānui City, HI 96763
Zip/Code: 96763

Email Address: amonroe@gmail.com

MAHALO NUI LOA!
APPENDIX F

Release Statements

Email Release

Alberta Morita August 23, 2016
Hi Mia,

Attached is the transcript with my revisions and notes/comments highlighted in blue. Deletions are strike-through and additions are underlined.

By this email, I give Mia Orr, Kaimipono Consulting Services LLC, T.S. Dye Associates and Pulama Lanai permission to use information from the interview conducted with me on August 10, 2016 at the Lanai Culture & Heritage Center, Lanai.

Aloha, Albert

wmosako@gmail.com

Warren Osako August 31, 2016
I give Mia Orr, T.S. Dye Associates, and Pulama Lāna‘i permission to use the information in this transcript.

Kaimi I did a few minor changes in the transcript, mostly spelling. I’m not the most savvy computer person so I couldn’t get the changes to come out in blue. Sorry.

Verbal Release:

Alberta De Jetly
Roberto Hera
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Pulama Lanai is proposing the Hokuao 201H Housing Project on Lanai. The proposed project will include 200 single-family residential units, one-acre park, pavilion, comfort station and 100 parking stalls. This study examines the potential short- and long-term air quality impacts that could occur as a result of construction and use of the proposed development and suggests mitigation measures to reduce any potential air quality impacts where possible and appropriate. Potential impacts on the proposed development from a nearby wastewater treatment facility are also evaluated.

Both federal and state standards have been established to maintain ambient air quality. At the present time, seven parameters are regulated including: particulate matter, sulfur dioxide, hydrogen sulfide, nitrogen dioxide, carbon monoxide, ozone and lead. Hawaii air quality standards are generally comparable to the national standards although the state standards for carbon monoxide are more stringent than the national standards.

Regional and local climate together with the amount and type of human activity generally dictate the air quality of a given location. The climate of the project area is very much affected by its higher elevation. Good ventilation is received much of the time by the prevailing trade winds. Temperatures in the project area are generally very consistent and moderately cool for Hawaii due to the higher elevation. Average daily temperatures range from about 62°F to 75°F. Rainfall in the project area is moderately dry with an average of about 35 inches per year.
Except for occasional impacts from volcanic emissions (vog), the present air quality of the project area is believed to be relatively good. There is no air quality monitoring data from the Department of Health for the project area, but given the lack of air pollution sources nearby and the absence of much motor vehicle traffic, it is probable that any air pollution concentrations are well within state and national air quality standards (as is true at most other locations in the state).

If the proposed project is given the necessary approvals to proceed, it may be inevitable that some short- and/or long-term impacts on air quality will occur either directly or indirectly as a consequence of project construction and use. Short-term impacts from fugitive dust will likely occur during the project construction phases. To a lesser extent, exhaust emissions from stationary and mobile construction equipment, from the disruption of traffic, and from workers' vehicles may also affect air quality during the period of construction. State air pollution control regulations require that there be no visible fugitive dust emissions at the property line. Hence, an effective dust control plan must be implemented to ensure compliance with state regulations. Fugitive dust emissions can be controlled to a large extent by watering of active work areas, using wind screens, keeping adjacent paved roads clean, and by covering of open-bodied trucks. Other dust control measures could include limiting the area that can be disturbed at any given time and/or mulching or chemically stabilizing inactive areas that have been worked. Paving and landscaping of project areas early in the construction schedule will also reduce dust emissions. Exhaust emissions can be mitigated by moving construction equipment and workers to and from the project site during off-peak traffic hours.

After construction, motor vehicles coming to and from the proposed development will result in a long-term increase in air pollution emissions in the project area. To assess the impact of emissions from these vehicles, a computer modeling study was undertaken to estimate current ambient concentrations of carbon monoxide at intersections in the project vicinity and to predict future levels both with and without the proposed project. During worst-case conditions, model results indicated that present 1-hour and 8-hour carbon monoxide concentrations are well within both the state and the national ambient air quality standards. In the year 2026 without the project, carbon monoxide concentrations were predicted to remain unchanged. With the project in the year 2026 after full build-out, carbon monoxide concentrations compared to the without-project case were projected to remain nearly unchanged or increase very slightly, and worst-case concentrations should remain well within air quality standards. Project-related traffic should have no measurable impact on air quality in the project area. Implementing any mitigation measures for traffic-related air quality impacts is probably unnecessary and unwarranted.

Depending on the demand levels, long-term impacts on air quality are also possible due to indirect (offsite) emissions associated with a development's electrical power and solid waste disposal requirements. Quantitative estimates of these potential impacts were not made, but based on the estimated demand levels and emission rates involved, any significant impacts are unlikely. Nevertheless, incorporating energy conservation design features and promoting conservation and recycling programs within the proposed development could serve to further reduce any associated impacts and conserve the island's resources.
Potential impacts on the proposed development from the nearby county wastewater treatment facility were also investigated. The existing conditions indicate that offsite nuisance odor from this facility is probably not an issue. However, it may be prudent for the proposed residential development to maintain a buffer distance of at least 300 to 600 feet so as to avoid any future onsite odor nuisance.

2.0 INTRODUCTION AND PROJECT DESCRIPTION

Pulama Lanai is proposing to develop the Hokuao 201H Housing Project on the island of Lanai. The proposed development will be located adjacent to Lanai City on the west (see Figure 1). The project site is bordered by Fraser Avenue to the east, 12th Street to the south, the County Department of Public Works office and existing wastewater treatment plant to the west, and 9th Street to the north. The proposed residential development includes 200 single-family units, one-acre park, pavilion, comfort station and 100 parking stalls. Access to the project by vehicular traffic will be provided along Fraser Avenue at 9th Street and at 12th Street. It is anticipated that the project will be completed by the year 2026.

The purpose of this study was to evaluate the potential air quality impacts of the proposed project and recommend mitigative measures, if possible and appropriate, to reduce or eliminate any project-related degradation of air quality in the area. Potential impacts on the project from the nearby county wastewater treatment plant were also investigated. Before examining the potential impacts of the project, a discussion of ambient air quality standards is presented and background information concerning the regional and local climatology and the present air quality of the project area is provided.

3.0 AMBIENT AIR QUALITY STANDARDS

Ambient concentrations of air pollution are regulated by both national and state ambient air quality standards (AAQS). National AAQS are specified in Section 40, Part 50 of the Code of Federal Regulations (CFR), while State of Hawaii AAQS are defined in Chapter 11-59 of the Hawaii Administrative Rules. Table 1 summarizes both the national and the state AAQS that are specified in the cited documents. As indicated in the table, national and state AAQS have been established for particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone and lead. The state has also set a standard for hydrogen sulfide. National AAQS are stated in terms of both primary and secondary standards for most of the regulated air pollutants. National primary standards are designed to protect the public health with an "adequate margin of safety". National secondary standards, on the other hand, define levels of air quality necessary to protect the public welfare from "any known or anticipated adverse effects of a pollutant". Secondary public welfare impacts may include such effects as decreased visibility, diminished comfort levels, or other potential injury to the natural or man-made environment, e.g., soiling of materials, damage to vegetation or other economic damage. In contrast to the national AAQS, Hawaii State AAQS are given in terms of a single standard that is designed "to protect public health and welfare and to prevent the significant deterioration of air quality".

Each of the regulated air pollutants has the potential to create or exacerbate some form of adverse health effect or to produce environmental degradation when present in sufficiently high concentration for prolonged periods of time. The AAQS specify a maximum allowable concentration for a given air pollutant for one
or more averaging times to prevent harmful effects. Averaging times vary from one hour to one year depending on the pollutant and type of exposure necessary to cause adverse effects. In the case of the short-term (i.e., 1- to 24-hour) AAQS, both national and state standards allow a specified number of exceedances each year.

The Hawaii AAQS are in some cases considerably more stringent than the comparable national AAQS. In particular, the Hawaii 1-hour AAQS for carbon monoxide is four times more stringent than the comparable national limit. On the other hand, the current Hawaii AAQS for sulfur dioxide are probably less stringent than the national standards. During the early part of 2010, the national primary annual and 24-hour standards for sulfur dioxide were revoked in favor of a new national 1-hour standard which is considered to be more stringent than the Hawaii short-term standards. The Hawaii AAQS for sulfur dioxide have not yet been updated to bring them in line with the national standards.

In 1993, the state revised its particulate standards to follow those set by the federal government. During 1997, the federal government again revised its standards for particulate, but the new standards were challenged in federal court. A Supreme Court ruling was issued during February 2001, and as a result, the new standards for particulate were finally implemented during 2005. To date, the Hawaii Department of Health has not updated the state particulate standards.

In September 2001, the state vacated the state 1-hour standard for ozone and an 8-hour standard was adopted that was the same as the national standard. During recent years, the national standard for ozone has again been revised and made more stringent. The Hawaii standard for ozone has not yet been amended to follow the national standard.

During the latter part of 2008, EPA revised the standard for lead making the standard more stringent. So far, the Hawaii Department of Health has not revised the corresponding state standard for lead.

During early 2010, a national 1-hour primary standard for nitrogen dioxide was implemented. To date, Hawaii has not promulgated a 1-hour standard for nitrogen dioxide, but the Hawaii annual standard for this pollutant is more stringent than the national annual standard.

4.0 REGIONAL AND LOCAL CLIMATOLOGY

Regional and local climatology significantly affect the air quality of a given location. Wind, temperature, atmospheric turbulence, mixing height and rainfall all influence air quality. Although the climate of Hawaii is relatively moderate throughout most of the state, significant differences in these parameters may occur from one location to another. Most differences in regional and local climates within the state are caused by the mountainous topography.

Lanai is a relatively small island being about 140 square miles in size. It was formed by a single-shield volcano and has the highest elevation, 3,370 feet above mean sea level, near the east-central portion of the island. The project location is at Lanai City, which is located near the center of the island (see
Figure 1) at an elevation of about 1,600 feet above mean sea level.

All of the Hawaiian Islands, including the island of Lanai, lie well within the belt of northeasterly trade winds generated by the semi-permanent Pacific high-pressure cell to the north and east. Because the project site at Lanai City is located at a higher elevation on Lanai and with good exposure to the trade winds, it receives relatively good ventilation much of the time. To a lesser extent, local winds such as land/sea breezes and/or upslope/downslope winds also influence the wind pattern for the area when the trade winds are weak or absent. At night when the trade winds are weaker, drainage winds from the upper elevations to the east may tend to move downslope and out to sea. During winter, occasional strong winds from the south or southwest occur in association with the passage of winter storm systems. Table 2 shows mean wind speed and wind direction statistics for Lanai Airport, which is located 2.5 miles to the southwest of the project area. Wind data from the Lanai Airport are likely reasonably representative of winds at the project site. As indicated in the table, ventilation is good with wind speeds above 8 mph more than 80% of the time, and the wind direction is from the east northeast or northeast nearly 80% of the time.

Air pollution emissions from motor vehicles, the formation of photochemical smog, and smoke plume rise all depend in part on air temperature. In Hawaii, the annual and daily variation of temperature depends to a large extent on elevation above sea level, distance inland and exposure to the trade winds. Average temperatures at locations near sea level generally are warmer than those at higher elevations. Areas exposed to the trade winds tend to have the least temperature variation, while inland and leeward areas often have the most. Temperature data for Lanai City indicate that the average daily minimum and maximum temperatures for this area of Lanai are 62°F and 75°F, respectively [1]. This is cooler than many locations in the state due to the higher elevation.

Small scale, random motions in the atmosphere (turbulence) cause air pollutants to be dispersed as a function of distance or time from the point of emission. Turbulence is caused by both mechanical and thermal forces in the atmosphere. It is often measured and described in terms of Pasquill-Gifford stability class. Stability class 1 is the most turbulent and class 6 is the least. Thus, air pollution dissipates the best during stability class 1 conditions and the worst when stability class 6 prevails. In the project area, stability classes 5 or 6 typically occur during the nighttime or early morning hours when temperature inversions form due to radiation cooling or to drainage flow from the nearby higher terrain. Stability classes 1 through 4 occur during the daytime, depending mainly on the amount of cloud cover and incoming solar radiation and the trade wind flow and/or the onset and extent of sea breeze conditions.

Mixing height is defined as the height above the surface through which relatively vigorous vertical mixing occurs. Low mixing heights can result in high ground-level air pollution concentrations because contaminants emitted from or near the surface can become trapped within the mixing layer. In Hawaii, minimum mixing heights tend to be high because of mechanical mixing caused by the trade winds and because of the temperature moderating effect of the surrounding ocean. Low mixing heights may sometimes occur, however, at inland locations and even at times along coastal areas early in the morning following a clear, cool, windless night. Coastal areas also may experience low mixing levels during sea breeze conditions when cooler ocean air rushes in over warmer
land. Mixing heights in Hawaii typically are above 3,000 feet (1,000 meters).

Rainfall can have a beneficial affect on the air quality of an area in that it helps to suppress fugitive dust emissions, and it also may "washout" gaseous contaminants that are water soluble. Rainfall in Hawaii is highly variable depending on elevation and on location with respect to the trade wind. The climate of the project area is moderately dry. Historical records from Lanai City show that this area of Lanai averages about 35 inches of precipitation per year, with the summer months being the driest [1].

5.0 PRESENT AIR QUALITY

The sources of air pollution on Lanai are relatively few. Present air quality in the project area is mostly affected by air pollutants from vehicular, industrial, natural, and/or agricultural sources. Motor vehicle traffic is minimal. The largest industrial source of air pollution in the project area is the Maui Electric power plant located at Miki Basin, about 2 miles to the southwest of the project site. Diesel fuel usage at the power plant results in emissions of nitrogen oxides, sulfur dioxide, particulate, carbon monoxide, hydrocarbons and other combustion byproducts. Immediately to the southwest of the project site is the Lanai City wastewater treatment plant operated by Maui County. Any airborne emissions from this facility are probably limited to nuisance odorants. Large agricultural areas and former pineapple fields lie to the south. The air quality in the project area has likely improved in recent years with the cessation of much of the pineapple cultivation, which sometimes resulted in significant amounts of fugitive dust and smoke. Volcanic emissions from distant natural sources on the Big Island also affect the air quality at times during kona (south) wind conditions. By the time the volcanic emissions reach the project area, they consist mostly of fine particulate sulfate.

The Hawaii Department of Health operates a network of air quality monitoring stations at various locations around the state, but none are located on Lanai. However, some generalizations can probably be made about the present air quality based on data collected elsewhere in the state and on the fact that there are few air pollution sources on Lanai. Air quality data reported elsewhere in the state for the past several years, even in urban Honolulu, suggest that all state and federal ambient air quality standards are currently being met. Due to the abundance of sunshine and because of Hawaii’s rather isolated location in the middle of the Pacific, ozone concentrations are typically high but within standards. The same can be expected at Lanai City. Some coastal locations in the state sometimes report relatively high concentrations of very fine particulate (PM-2.5), which are likely caused by sea salt from high surf conditions. This would not be an issue for Lanai City due to the inland and high elevation situation. The close proximity of the Lanai City wastewater treatment plant could potentially be a source of hydrogen sulfide emissions and nuisance odor in the immediate project area. This will be investigated later in this report.

Given the limited air pollution sources in the project area, it is likely that air pollution concentrations are presently near natural background levels most of the time.
6.0 Short-Term Impacts of Project

Short-term direct and indirect impacts on air quality could potentially occur during project construction. For a project of this nature, there are two potential types of air pollution emissions that could directly result in short-term air quality impacts during construction: (1) fugitive dust from vehicle movement and soil excavation; and (2) exhaust emissions from on-site construction equipment. Indirectly, there also could be short-term impacts from slow-moving construction equipment traveling to and from the project site and from the disruption of traffic due to road construction.

Fugitive dust emissions may arise from the grading and dirt-moving activities associated with land clearing and preparation work. The emission rate for fugitive dust emissions from construction activities is difficult to estimate accurately because of its elusive nature of emission and because the potential for its generation varies greatly depending upon the type of soil at the construction site, the amount and type of dirt-disturbing activity taking place, the moisture content of exposed soil in work areas, and the wind speed. The EPA [2] has provided a rough estimate for uncontrolled fugitive dust emissions from construction activity of 1.2 tons per acre per month under conditions of "medium" activity, moderate soil silt content (30%), and precipitation/evaporation (P/E) index of 50. Uncontrolled fugitive dust emissions in the project area would likely be somewhere near this level or possibly somewhat higher due to the relatively dry climate. In any case, State of Hawaii Air Pollution Control Regulations [3] prohibit visible emissions of fugitive dust from construction activities at the project boundary, and thus an effective dust control plan for the project construction phase is essential.

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

On-site mobile and stationary construction equipment also will emit air pollutants from engine exhausts. The largest of this equipment is usually diesel-powered. Nitrogen oxides emissions from diesel engines can be relatively high compared to gasoline-powered equipment, but the annual standard for nitrogen dioxide is not likely to be violated by short-term construction equipment emissions. Also, the new short-term (1-hour) standard for nitrogen dioxide is based on a three-year average; thus it is unlikely that relatively short-term construction emissions would exceed the standard. Carbon monoxide emissions from diesel engines, on the other hand, are low and should be relatively insignificant compared to vehicular emissions on nearby roadways.

Indirectly, slow-moving construction vehicles on roadways leading to and from the project area could obstruct the normal flow of traffic to such an extent that overall vehicular emissions are
increased, but this impact can be mitigated by moving heavy construction equipment during periods of low traffic volume. Likewise, road closures during peak traffic periods should be avoided to the extent possible to minimize air pollution impacts from traffic disruption. Thus, with careful planning and attention to dust control, most potential short-term air quality impacts from project construction can be mitigated.

**7.0 LONG-TERM IMPACTS OF PROJECT**

**7.1 Roadway Traffic**

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

Federal air pollution control regulations require that new motor vehicles be equipped with emission control devices that reduce emissions significantly compared to a few years ago. In 1990, the President signed into law the Clean Air Act Amendments. This legislation required further emission reductions, which have been phased in since 1994. More recently, additional restrictions were signed into law during the Clinton administration, and these began to take effect during the next decade. The added restrictions on emissions from new motor vehicles will lower average emissions each year as older vehicles leave the state’s roadways. It is estimated that carbon monoxide emissions, for example, will go down by an average of about 40 percent per vehicle during the next 10 years due to the replacement of older vehicles with newer models.

To evaluate the potential long-term ambient air quality impact of motor vehicle traffic coming to and from the proposed new development, computerized emission and atmospheric dispersion models can be used to estimate ambient carbon monoxide concentrations along roadways within the project area. Carbon monoxide is selected for modeling because it is both the most stable and the most abundant of the pollutants generated by motor vehicles. Furthermore, carbon monoxide air pollution is generally considered to be a microscale problem that can be addressed locally to some extent, whereas nitrogen oxides air pollution most often is a regional issue that cannot be addressed by a single project.

For this project, three scenarios were selected for the carbon monoxide modeling study: (1) year 2018 with present conditions, (2) year 2026 without the project, and (3) year 2026 with the project. To begin the modeling study of the three scenarios, critical receptor areas in the vicinity of the project were identified for analysis. Generally speaking, roadway intersections are the primary concern because of traffic congestion and because of the increase in vehicular emissions associated with traffic queuing. For this study, four of the key intersections identified in the traffic study were also selected for air quality analysis. These included the following intersections:

- Fraser Avenue at 9th Street
- Fraser Avenue at 12th Street
- Fraser Avenue at Kaumalapau Highway
- Kaumalapau Highway at Manele Street.

The traffic impact report for the project [4] describes the existing and projected future traffic conditions and laneage
configurations of the study intersections in detail. All of these intersections are currently unsignalized, and all are expected to remain unsignalized in the future with or without the project. In performing the air quality impact analysis, it was assumed that all recommended traffic mitigation measures would be implemented.

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

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

Vehicular carbon monoxide emissions for each year studied were calculated using EPA’s Motor Vehicle Emission Simulator (MOVES) computer model [5]. MOVES was configured for a project-level analysis specifically for Hawaii. Assumptions included an urban, unrestricted road type, default fuel supply and fuel formulation, and default vehicle age distribution. MOVES emission factors were generated both for idling and for moving traffic. Ambient temperatures of 70 and 90°F were used for morning and afternoon peak-hour emission computations, respectively. These are conservative assumptions since morning/afternoon ambient temperatures will often be cooler than this, and carbon monoxide emission estimates given by MOVES generally increase with increasing temperature in the range of temperatures that occur at the project location.

After computing vehicular carbon monoxide emission factors through the use of MOVES, these data were then input to an atmospheric dispersion model. EPA air quality modeling guidelines [6] currently recommend that the computer model CALQHC [7] be used to assess carbon monoxide concentrations at roadway intersections. CALQHC was developed for the U.S. EPA to simulate vehicular movement, vehicle queuing and atmospheric dispersion of vehicular emissions near roadway intersections. It is designed to predict 1-hour average pollutant concentrations near roadway intersections based on input traffic and emission data, roadway/receptor geometry and meteorological conditions.

Although CALQHC is intended primarily for use in assessing atmospheric dispersion near signalized roadway intersections, it can also be used to evaluate unsignalized intersections. This is accomplished by manually estimating queue lengths and then applying the same techniques used by the model for signalized intersections. Currently, all of the study intersections are unsignalized and all were assumed to remain unsignalized for the future scenarios studied.

Input peak-hour traffic data were obtained from the traffic study cited previously. This included vehicle approach volumes, saturation capacity estimates, intersection laneage and vehicle queue length. All emission factors that were input to CALQHC for free-flow traffic on roadways were obtained from MOVES based on assumed free-flow vehicle speeds corresponding to the posted speed limits. Free-flow traffic speeds may sometimes be lower than the
posted speed limits due to disruptions downstream, and this could result in higher carbon monoxide emissions.

Model roadways were set up to reflect roadway geometry, physical dimensions and operating characteristics. Concentrations predicted by air quality models generally are not considered valid within the roadway-mixing zone. The roadway-mixing zone is usually taken to include 3 meters on either side of the traveled portion of the roadway and the turbulent area within 10 meters of a cross street. Model receptor sites were thus located at the edges of the mixing zones near all intersections that were studied for all scenarios. All receptor heights were placed at 1.8 meters above ground to simulate levels within the normal human breathing zone.

Input meteorological conditions for this study were defined to provide "worst-case" results. One of the key meteorological inputs is the atmospheric stability category. For these analyses, atmospheric stability category 6 was assumed for morning scenarios and stability category 4 was assumed for afternoon cases. These are the most conservative stability categories that are generally used for estimating pollutant dispersion at rural or suburban locations for these time periods. For all cases, a surface roughness length of 100 cm was assumed and a mixing height of 1,000 meters was used. Worst-case wind conditions were defined as a wind speed of 1 meter per second with a wind direction resulting in the highest predicted concentration. Concentration estimates were calculated at wind directions of every 5 degrees.

Existing background concentrations of carbon monoxide in the project vicinity are believed to be at relatively low levels. Hence, background contributions of carbon monoxide from sources or distant roadways not directly considered in the analysis were accounted for by adding a small background concentration of 0.5 ppm to all predicted concentrations for the existing year. The background value of 0.5 ppm was assumed to persist for the 2026 scenarios that were studied.

### Predicted Worst-Case 1-Hour Concentrations

Table 3 summarizes the final results of the modeling study in the form of the estimated worst-case 1-hour morning and afternoon ambient carbon monoxide concentrations for the existing case (2018) and for each of the two future (2026) alternatives that were studied. The locations of these estimated worst-case 1-hour concentrations all occurred at or very near the indicated intersections.

As indicated in the table, the highest estimated worst-case 1-hour concentration for the present (2018) scenario was 0.7 parts per million (ppm), and this occurred during the morning near the intersection of Fraser Avenue and 9th Street. Due to the light volume of vehicle traffic, this is only slightly above the background concentration of 0.5 ppm. The predicted concentrations are well within both the national AAQS of 35 ppm and the state standard of 9 ppm.

In the year 2026 without the proposed project, the predicted highest worst-case 1-hour concentrations remained unchanged compared to the existing case. Although future traffic volumes are expected to be somewhat higher than the existing case, this will be offset by the retirement of older motor vehicles with less efficient emission control equipment. Worst-case carbon monoxide
concentrations should remain well within the state and federal standards for this scenario.

As indicated in Table 3, predicted worst-case concentrations with the project in the year 2026 increased slightly at three of the four intersections studied, but the predicted worst-case 1-hour concentrations for the 2026 with-project alternative at all locations studied continued to remain well within both the national and state standards.

Predicted Worst-Case 8-Hour Concentrations

Worst-case 8-hour carbon monoxide concentrations were estimated by multiplying the worst-case 1-hour values by a persistence factor of 0.5. This accounts for two factors: (1) traffic volumes averaged over eight hours are lower than peak 1-hour values, and (2) meteorological conditions are more variable (and hence more favorable for dispersion) over an 8-hour period than they are for a single hour. Based on monitoring data, 1-hour to 8-hour persistence factors for most locations generally vary from 0.4 to 0.8 with 0.6 being the most typical. One recent study based on modeling [8] concluded that 1-hour to 8-hour persistence factors could typically be expected to range from about 0.4 to 0.5. EPA guidelines [9] recommend using a value of 0.6 to 0.7 unless a locally derived persistence factor is available. Recent monitoring data for Honolulu reported by the Department of Health [10] suggest that this factor may range between about 0.35 and 0.55 depending on location and traffic variability. Considering the location of the project and the traffic pattern for the area, a 1-hour to 8-hour persistence factor of 0.5 will likely yield reasonable estimates of worst-case 8-hour concentrations. However, it should be noted that the 8-hour concentration estimates are generally less reliable than the 1-hour values due to the prediction methodology involved.

The resulting estimated worst-case 8-hour concentrations are indicated in Table 4. For the 2018 scenario, the estimated worst-case 8-hour carbon monoxide concentrations for the four intersections studied ranged from 0.3 to 0.4 ppm. With or without the project in 2026, the estimated worst-case 8-hour concentrations remained nearly unchanged. Thus, the estimated worst-case concentrations for the existing case as well as for the future scenarios studied were well within both the national limit of 9 ppm and the state standard of 4.4 ppm.

Conservativeness of Estimates

The results of this study reflect several assumptions that were made concerning both traffic movement and worst-case meteorological conditions. One such assumption concerning worst-case meteorological conditions is that a wind speed of 1 meter per second with a steady direction for 1 hour will occur. A steady wind of 1 meter per second blowing from a single direction for an hour is extremely unlikely and may occur only once a year or less. With wind speeds of 2 meters per second, for example, computed carbon monoxide concentrations would be only about half the values given above. The 8-hour estimates are also conservative in that it is unlikely that anyone would occupy the assumed receptor sites (within 3 m of the roadways) for a period of 8 hours.

7.2 Electrical Demand

Providing the proposed project with electrical power also will cause indirect air pollution emissions from offsite power
generating facilities. The average electrical power usage of the project is estimated to be 575 kilowatt-hours per unit per month [11]. Thus, for the 200-unit project, the annual electrical demand of the project will reach approximately 1.4 million kilowatt-hours. Electrical power for the project will most probably be provided mainly by oil-fired generating facilities in the near term, but some of the project power may also be derived from photovoltaic systems, wind power or other alternative energy sources. If the electrical power needs of the proposed project are provided by fossil-fueled power facilities on the island, power generating facilities will likely be required to burn more fuel and hence more air pollution will be emitted at these facilities. Given in Table 5 are estimates of the indirect air pollution emissions that would result from the project electrical demand assuming all power is provided by burning more fuel oil at local power plants. Given the future plans for Lanai in particular and for the state as a whole to transition to renewable energy, in the long term, air pollution from electrical power usage on Lanai will likely be eliminated or substantially reduced.

7.3 Solid Waste Disposal

Solid waste generated by the proposed development is estimated to amount to 542 lbs per unit per month [11]. Thus, when fully completed and occupied, solid waste from the proposed project is not expected to exceed about 650 tons per year. Currently, all solid waste on the island is buried at a solid waste landfill. Thus, assuming this continues to be the method for solid waste disposal, the only associated air pollution emissions that will occur will be from trucking the waste to the landfill and from heavy equipment used to bury it. These emissions should be relatively minor.

8.0 WASTEWATER TREATMENT PLANT

Potential impacts on the project could occur from the nearby Lanai City Wastewater Treatment Plant. Wastewater treatment plants generally are not considered significant sources of air pollution, but they can result in the release of small amounts of airborne odorous compounds. The types and amounts of compounds in the air are generally not considered hazardous to human health, but when they occur at sufficiently high concentrations at offsite locations, they can be detected by smell and potentially constitute a nuisance for nearby residents and businesses. Odorous compounds commonly associated with wastewater treatment systems include hydrogen sulfide, ammonia and volatile organic compounds (VOC). These compounds are typically emitted into the atmosphere from wastewater collection, treatment and storage systems through volatilization at the liquid surface. Emissions can occur by diffusive or convective mechanisms, or both. The compounds volatilize, or diffuse into the air, in an attempt to reach equilibrium between aqueous and vapor phases. Convection occurs when air flows over the water surface, sweeping the vapors from the water surface into the air. The rate of volatilization relates directly to the speed of the air flow over the water surface. Other factors that can affect the rate of volatilization include wastewater surface area, temperature and turbulence; wastewater retention time; wastewater depth; the concentration of organic compounds in the wastewater and their physical properties; the presence of a mechanism that inhibits volatilization; and a competing mechanism, such as biodegradation.

Mathematical models are available to estimate volatilization rates at wastewater treatment facilities when very detailed information is available concerning the effluent, the plant design and the site characteristics. Such information is not currently available for this project, but even if it were, it is likely that such
estimates would be of limited usefulness for evaluating the potential odor impacts of the facility. The uncertainty of the estimates combined with the uncertainties of atmospheric dispersion estimates and human odor response would make it difficult to quantitatively and accurately evaluate the odor potential of the proposed plant. A qualitative evaluation may provide the best results.

As suggested above, temperature is a factor in the rate of volatilization. Temperatures at the project site will be relatively warm, which will tend to promote volatilization, but cooler compared to many locations in Hawaii due to the higher elevation (1,500 feet). As indicated in Section 4, the average daily temperature can be expected to range from about 62 to 85 degrees Fahrenheit. As indicated in Table 2, winds at the site can be expected to be predominantly trade winds from the northeast with speeds in the 10 to 25 mph range. The prevalent “fresh” winds could potentially promote volatilization at the plant, but they will also tend to enhance the dilution and dispersion of the emissions at downwind locations. With trade wind conditions, which occur about 80 percent of the time, emissions will be carried toward locations to the southwest. The proposed project will be situated to the northeast of the wastewater treatment facility and thus will be upwind most of the time. From an atmospheric dispersion perspective, it is probable that the worst case for offsite odor impacts will occur during nighttime situations when the trade winds are weak or absent and dispersion conditions are poor. Occasional light winds from the south or southwest, which occur less than about 1 percent of the time, will tend to carry airflow over the wastewater treatment facility and toward the proposed project.

As shown in Table 1, the Hawaii Department of Health has established an air quality standard for hydrogen sulfide set at 0.025 ppm for a one-hour average. Thus, concentrations of hydrogen sulfide cannot exceed this standard at locations offsite of the wastewater treatment facility without being in violation of state regulations. However, it should be noted that adherence to this standard will not necessarily avoid problems of offsite odor nuisance. The hydrogen sulfide odor threshold for sensitive individuals can be as low as about 0.005 ppm, and this pertains to an instantaneous concentration.

If it is assumed that the hydrogen sulfide concentration at the wastewater treatment plant fence line does not exceed the maximum allowable (0.025 ppm for a one-hour average), atmospheric dispersion calculations can be performed to estimate the maximum downwind distance where the concentration would likely fall below the odor threshold (0.005 ppm for a period of a few minutes). This is accomplished using the Gaussian dispersion equation for a ground-level source. Assuming worst-case dispersion conditions (light wind and stability class F), it is estimated that this distance could extend to about 300 to 600 feet.

On October 26, 2016, a site visit was made to the Lanai City Wastewater Treatment Plant, and the entire perimeters of both the main plant and the auxiliary facility were surveyed using a Jerome Model 631-X portable hydrogen sulfide analyzer. The Jerome Model 631-X is a is very sensitive instrument and capable of measuring ambient concentrations of hydrogen sulfide as low as 0.003 ppm. Wind conditions during the survey were typical moderate trade winds from the northeast at about 10 to 15 mph. Hydrogen sulfide measurements were collected during mid-morning all along the plant perimeters, which included both upwind and downwind locations. In summary, there were no measurable hydrogen sulfide concentrations
at any location along the plant perimeters, i.e., the Jerome analyzer continuously displayed less than 0.003 ppm. Further, there was no noticeable odor present at any location along the plant perimeters.

9.0 CONCLUSIONS AND RECOMMENDATIONS

Existing Conditions

Although there are no published ambient air quality data available for Lanai to characterize existing conditions, with only a few air pollution sources and little motor vehicle traffic, it is likely that state and federal ambient air quality standards are currently being met in the project area. It is probable that air quality conditions have improved in recent years with the cessation of pineapple-growing operations and the dust and smoke that resulted therefrom. Volcanic haze from distant sources on Hawaii Island may sometimes reach the project area with kona wind conditions, which may affect sensitive individuals.

Short-Term Impacts and Mitigation

The major potential short-term impact of the project on air quality will occur from the emission of fugitive dust during construction. Uncontrolled fugitive dust emissions from construction activities are estimated to amount to about 1.2 tons per acre per month, depending on rainfall and other factors. To control dust, active work areas and any temporary unpaved work roads should be watered at least twice daily on days without rainfall. Use of wind screens and/or limiting the area that is disturbed at any given time will also help to contain fugitive dust emissions. Wind erosion of inactive areas of the project that have been disturbed could be controlled by mulching or chemical stabilization. Dirt-hauling trucks should be covered when traveling on roadways to prevent windage. A routine road cleaning and/or tire washing program will also help to reduce fugitive dust emissions that may occur as a result of trucks tracking dirt onto paved roadways in the project area. Establishment of landscaping early in the construction schedule will also help to control dust.

During construction phases, emissions from engine exhausts (primarily consisting of carbon monoxide and nitrogen oxides) will also occur both from on-site construction equipment and from the disruption of normal traffic flow. Increased vehicular emissions due to the disruption of traffic can be alleviated by minimizing road closures during peak traffic hours.

Long-Term Impacts and Mitigation

After construction of the proposed project is completed and it is fully occupied, carbon monoxide concentrations in the project area should remain nearly unchanged with or without the project compared to the existing case, and worst-case concentrations should remain well within both the state and the national ambient air quality standards. Implementing any air quality mitigation measures for long-term traffic-related impacts is probably unnecessary and unwarranted.

Supplying the project with electric power may result in indirect (off site) emissions of air pollution at electric utility facilities, but the increased emissions will be very minimal. Nevertheless, indirect emissions from project electrical demand could likely be reduced somewhat by incorporating energy-saving features into project design requirements. This might include the use of solar water heaters; using energy-efficient lighting
systems; designing homes so that window positions maximize indoor light and ventilation; using landscaping where feasible to provide afternoon shade to cut down on the use of air conditioning; installation of insulation and double-glazed doors and windows to reduce the effects of the sun and heat; providing movable, controlled openings for ventilation at opportune times; and possibly installing automated room occupancy sensors.

Disposal of solid waste from the project could result in some offsite emissions related to landfill operations, but any air pollution emissions will likely be minimal. Promoting conservation and recycling programs within the proposed development could serve to further reduce any indirect air quality impacts and would help to conserve the island’s resources.

Impacts on the Project

Ambient air quality standards are generally designed to protect human health and do not guard against nuisance odor issues. While the State of Hawaii does have an ambient air quality standard for hydrogen sulfide as indicated in Table 1, compliance with this standard at the nearby wastewater treatment facility property line will not necessarily prevent nuisance odor complaints at offsite locations. The Hawaii standard is set at a value of 0.025 ppm a one-hour average. Sensitive individuals can detect hydrogen sulfide at concentrations as low as 0.005 ppm for periods shorter than one hour. Human odor response is nearly instantaneous. While existing conditions suggest that offsite odor nuisance is not an issue, it may be prudent for the proposed project to maintain a buffer distance of at least 300 to 600 feet from the wastewater treatment plant boundary.

REFERENCES


Table 1
SUMMARY OF STATE OF HAWAII AND NATIONAL AMBIENT AIR QUALITY STANDARDS

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Units</th>
<th>Averaging Time</th>
<th>Maximum Allowable Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>National Primary</td>
</tr>
<tr>
<td>Particulate Matter</td>
<td>μg/m³</td>
<td>Annual</td>
<td>-</td>
</tr>
<tr>
<td>(&lt;10 microns)</td>
<td></td>
<td>24 Hours</td>
<td>150a</td>
</tr>
<tr>
<td>Particulate Matter</td>
<td>μg/m³</td>
<td>Annual</td>
<td>12c</td>
</tr>
<tr>
<td>(&lt;2.5 microns)</td>
<td></td>
<td>24 Hours</td>
<td>35c</td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>ppm</td>
<td>Annual</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 Hours</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Hours</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Hour</td>
<td>0.075e</td>
</tr>
<tr>
<td>Nitrogen Dioxide</td>
<td>ppm</td>
<td>Annual</td>
<td>0.053</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Hour</td>
<td>0.100f</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>ppm</td>
<td>8 Hours</td>
<td>9b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 Hour</td>
<td>35b</td>
</tr>
<tr>
<td>Ozone</td>
<td>ppm</td>
<td>8 Hours</td>
<td>0.070g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Months</td>
<td>0.15h</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quarter</td>
<td>1.5i</td>
</tr>
<tr>
<td>Hydrogen Sulfide</td>
<td>ppm</td>
<td>1 Hour</td>
<td>-</td>
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</table>

a Not to be exceeded more than once per year on average over three years.
b Not to be exceeded more than once per year.
c Three-year average of the weighted annual arithmetic mean.
d 98th percentile value of the 24-hour concentrations averaged over three years.
e Three-year average of annual fourth-highest daily 1-hour maximum.
f 98th percentile value of the daily 1-hour maximum averaged over three years.
g Three-year average of annual fourth-highest daily 8-hour maximum.
h Rolling 3-month average.
i Quarterly average.
### Table 2

ANNUAL WIND FREQUENCY FOR LANAI AIRPORT (%)

<table>
<thead>
<tr>
<th>Wind Direction</th>
<th>Total</th>
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<tr>
<td></td>
<td>1-4</td>
</tr>
<tr>
<td>N</td>
<td>0.1</td>
</tr>
<tr>
<td>NE</td>
<td>0.2</td>
</tr>
<tr>
<td>NE</td>
<td>0.2</td>
</tr>
<tr>
<td>ENE</td>
<td>0.2</td>
</tr>
<tr>
<td>E</td>
<td>0.3</td>
</tr>
<tr>
<td>ESE</td>
<td>0.4</td>
</tr>
<tr>
<td>SE</td>
<td>0.3</td>
</tr>
<tr>
<td>SSE</td>
<td>0.2</td>
</tr>
<tr>
<td>S</td>
<td>0.2</td>
</tr>
<tr>
<td>SSW</td>
<td>0.2</td>
</tr>
<tr>
<td>SW</td>
<td>0.2</td>
</tr>
<tr>
<td>NW</td>
<td>0.1</td>
</tr>
<tr>
<td>NW</td>
<td>0.3</td>
</tr>
<tr>
<td>NWW</td>
<td>0.1</td>
</tr>
<tr>
<td>NW</td>
<td>0.1</td>
</tr>
<tr>
<td>NW</td>
<td>0.1</td>
</tr>
<tr>
<td>Calm</td>
<td>0.5</td>
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</table>

### Table 3

ESTIMATED WORST-CASE 1-HOUR CARBON MONOXIDE CONCENTRATIONS ALONG ROADWAYS NEAR HOKUAO 2018 HOUSING PROJECT
(parts per million)

<table>
<thead>
<tr>
<th>Roadway Intersection</th>
<th>2018/Present</th>
<th>2026/Without Project</th>
<th>2026/With Project</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
</tr>
<tr>
<td>Fraser Avenue at 5th Street</td>
<td>0.7</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Fraser Avenue at 12th Street</td>
<td>0.6</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Fraser Avenue at Kaumalapau Highway</td>
<td>0.6</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Kaumalapau Highway at Hanele Street</td>
<td>0.6</td>
<td>0.7</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Hawaii State AAQS: 9
National AAQS: 35

Notes: Based on data collected from June 2006 until June 2016.
Source: Desert Research Institute, Western Regional Climate Data Center.
### Table 4

**Estimated Worst-Case 8-Hour Carbon Monoxide Concentrations Along Roadways Near Hokua 201H Housing Project**

(parts per million)

<table>
<thead>
<tr>
<th>Roadway Intersection</th>
<th>Year/Scenario 2018/Present</th>
<th>2026/Without Project</th>
<th>2026/With Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraser Avenue at 9th Street</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Fraser Avenue at 12th Street</td>
<td>0.3</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Fraser Avenue at Kaumalapau Highway</td>
<td>0.3</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Kaumalapau Highway at Manele Street</td>
<td>0.3</td>
<td>0.3</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Hawaii State AAQS: 4.4
National AAQS: 9

### Table 5

**Estimated Indirect Air Pollution Emissions From Hokua 201H Housing Project Electrical Demand**

<table>
<thead>
<tr>
<th>Air Pollutant</th>
<th>Emission Rate (tons/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particulate</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>3.5</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Nitrogen Oxides</td>
<td>1.4</td>
</tr>
</tbody>
</table>

*Based on U.S. EPA emission factors for utility boilers [2]. Assumes demand of 1.4 million kw-hrs per year of electrical power use, 33% energy conversion efficiency and low-sulfur distillate oil used to generate power.*
PHASE I ENVIRONMENTAL SITE ASSESSMENT

Lanai City Expansion
200 Housing Units
Lanai City, Hawaii

June 29, 2016
TRC Project No: 258407

Prepared For:
Pulama Lanai
733 Bishop Street, Suite 2000
Pacific Guardian Center – Makai Tower
Honolulu, Hawaii 96814
(808) 728-4111

Prepared By:
TRC Environmental Corporation
1600 Kapiolani Blvd., Suite 717
Honolulu, Hawaii 96813

Ross Surrency
Senior Project Geologist
TRC Environmental Professional

Kacey Swindle
Industrial Hygienist

Phase I Environmental Site Assessment Report
Lanai City Expansion – 200 Housing Units
June 29, 2016

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EXECUTIVE SUMMARY

Subject to the qualifications and limitations stated in Section 1 of this report, TRC Environmental Corporation (TRC) was retained by Palama Lanai (PL), also referred to as Lanai Resorts, LLC (LR) (also known as “Client” or “User”) to perform a Phase I Environmental Site Assessment (ESA) of approximately 103 acres located in the western portion of Lanai City in Maui County, Hawaii. The property is approximately 4 miles east of the Pacific Ocean and 0.2 mile north of Kaumalapau Highway (herein referred to as the “Site”). TRC’s assessment was conducted in connection with the Client’s planned development of the Site to include approximately 200 residential housing units. The Phase I ESA described in this report was performed in accordance with the scope and limitations of the American Society of Testing and Materials (ASTM) Practice E 1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM E 1527-13). Limiting conditions and/or deviations from the ASTM E 1527-13 standard are described in Sections 1.3 and 7.7 of this report.

A portion of the Site appears to have been first developed in 1942 with a Quonset hut that has been utilized by the Department of Land & Natural Resources (DLNR) as an office and storage facility since 2006. In 1948, a portion of the Site was developed with a power plant building that was operated by the Dole Company for pineapple plantation activities until 1988. Maui Electrical Company (MECO) took over the facility in 1988 and operated the power plant until 1996. MECO vacated the facility in 2000 following the removal of the last of the generating units. The facility appears to have been used for storage since that time. An electrical substation located northwest of the power plant building is still in operation.

Pineapple fields, operated by the Dole Company, appear to have encompassed the remaining portions of the Site until approximately 1991. In 1992, the Lanai City Nursery and community gardens were developed in the central portion of the Site, adjacent to overgrown vegetation adjoining the Waste Water Treatment Plant. Reportedly, the Lanai City Nursery is in the process of relocating near the airport.

In the 1980s, two dilapidated wooden structures, a former school house and a former Boy Scout hall, were relocated to the Site just to the northeast of the power plant building and electrical substation.

Hawaii Gas currently operates a distribution area located on the northwest portion of the Site. Four (4) above ground storage tanks (ASTs) including two (2) 6,400-gallon capacity and two (2) 2,000-gallon capacity, along with numerous smaller capacity upright and oblong residential style tanks, were identified during Site reconnaissance. All of these ASTs are reportedly used for propane storage. Reportedly, Hawaii Gas is planning to move to a new location away from the Site.

Two sanitary sewer lines with multiple manholes trend from the north-northeast to the southeast portion of the Site. Additionally, an electrical easement runs the length of the Site from the northermost corner of the Site along the east portion of the nursery and community gardens to the south-southeast area of the Site and beyond.
The power plant facility operated one (1) AST that reportedly contained diesel fuel; however, the tank size is unknown and is no longer present at the Site. Associated piping and a secondary containment appear to still be located on the former power plant site. Additionally, records review indicated that two (2) underground storage tanks (USTs) were located at the former power plant site; a 25,000-gallon diesel tank and a 5,500-gallon diesel tank. The USTs were removed from the Site in 1989 and 2003, respectively. During UST removal activities, the USTs were determined to be leaking USTs (LUSTs). Soil was removed to the extent feasible; however, documents indicate that petroleum contaminated soil remains in the subsurface at the Site.

Multiple containers, totes and drums with unknown contents were observed within the community gardens. Additionally, an inoperable pineapple harvester, inoperable grader, multiple tires, car batteries, and debris piles containing green waste, trash and other debris were located throughout the Site. Although TRC did not visually identify any concerns associated with these containers, materials or debris piles, these materials should be removed and disposed of properly. Should any adversely impacted soils be identified following their removal or during future site development, the soil should be properly characterized and disposed of accordingly.

As a result of the Phase I ESA, including but not limited to our visual observation of the Site; review of historical information, environmental databases, and information provided by the User; interviews with current Site representative(s); and TRC’s professional judgment, the following recognized environmental conditions (RECs) and controlled recognized environmental conditions (CREC)s associated with the Site, as defined by the ASTM E 1527-13 standard were identified:

**Recognized Environmental Conditions (RECs)**

**REC No. 1:** Access into the former power plant building could not be obtained due to the deterioration of the locks. This prevented TRC from identifying possible RECs; however, the previous report that was provided to TRC (Section 4.3) indicated trace concentrations of polychlorinated biphenyls (PCBs) were identified in the soil. The potential exists for contamination to be present at the Site.

**REC No. 2:** During Site reconnaissance, a small stain was observed on the gravel under a 55-gallon drum of diesel fuel that was located in the nursery portion of the Site. The potential exists for contamination to be present at the Site.

**REC No. 3:** During Site reconnaissance, a storage shed located in the northeast corner of the Nursery portion of the Site was observed to house pesticide and other chemicals. The floor of this shed consisted of gravel which would not impede liquids from migrating into the soil below. The potential exists for contamination to be present at the Site.

**REC No. 4:** The file review and Summary Data Figure of the former Emulsion Plant (adjourning the Site) indicates that petroleum hydrocarbons, halogenated volatile organic compounds (HVOCs) and organochlorine pesticides were detected in soil, some at elevated concentrations. The file review documents and Summary Data Figure for the former Emulsion Plant are included in Appendix B. The potential exists for contamination to be present at the Site in the form of soil vapor and/or groundwater migration onto the Site.

**Controlled Recognized Environmental Conditions (CREC)s**

**CREC No. 1:** A No Further Action (NFA) letter was issued by the Hawaii Department of Health (DOH) on February 12, 2007 related to a release associated with a diesel UST that was removed from the power plant portion of the Site. The letter and associated documents are included in Appendix B. The NFA indicates a small volume of petroleum-impacted soil still remains in the subsurface at the Site (below the former power plant building), and if the soil is excavated or disturbed, precautions should be taken for worker safety. The NFA also indicates that excavated soil may be reused onsite provided that any nuisance concerns are addressed and the soil is not moved to an ecologically sensitive area.

This Executive Summary is part of this complete ESA; any findings, opinions or conclusions in this Executive Summary are made in context with the complete report. TRC recommends that the User read the entire report for all supporting information related to findings, opinions and conclusions.

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1.0 INTRODUCTION

TRC Environmental Corporation (TRC) has prepared this Phase I Environmental Site Assessment (ESA) for Pulama Lanai also referred to as Lanai Resorts, LLC (hereinafter “Client” or “User”). This report was prepared for and may be relied upon by Client for the purposes set forth herein; it may not be relied on by any party other than the Client and reliance may not be assigned without the express approval of TRC. Authorization for third party reliance on this report will be considered by TRC if requested by the Client. TRC reserves the right to deny reliance on this report by third parties.

1.1 Purpose and Scope of Services

The following Phase I ESA was performed for the reportedly 103-acre property located in the western portion of Lanai City in Maui County, Hawaii. The property is approximately 4 miles east of the Pacific Ocean and 0.2 mile north of Kaumalapau Highway (herein referred to as the “Site”). A Site location map is included as Figure 1. This Phase I ESA has been prepared by TRC in accordance with the American Society for Testing and Materials (ASTM) E 1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (ASTM E 1527-13), and is intended for the sole use of Pulama Lanai also referred to as Lanai Resorts, LLC as per the email approval dated May 16, 2016.

The purpose of this assessment is to identify Recognized Environmental Conditions (RECs) at the Site, as defined by the ASTM E 1527-13 standard. The completion of this Phase I ESA report may be used to satisfy one of the requirements for the User to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), thereby constituting all appropriate inquiries into the previous ownership and uses of the property consistent with good commercial or customary practice as defined by 42 U.S.C. §9601(35)(B) of CERCLA.

TRC understands that this assessment is not funded with a federal grant awarded under the United States Environmental Protection Agency (U.S. EPA) Brownfields Assessment and Characterization program.

The Scope of Services for this Phase I ESA included the following tasks:

- Site and vicinity reconnaissance;
- Site and vicinity description and physical setting;
- Historical source review and description of historical Site conditions;
- Interviews with owners, operators, and/or occupants of the Site, and/or local officials;
- Review of environmental databases and regulatory agency records;
- Review of previous environmental reports/documentation, as applicable;
- Review of environmental liens, if provided or authorized to obtain by the User; and
- Preparation of a report summarizing findings, opinions and conclusions.

Pursuant to the ASTM E 1527-13 standard, recommendations to conduct Phase II sampling or other assessment activities are not required to be included in this report. TRC can provide such recommendations upon request.

1.2 Additional Services

Items outside the scope of the ASTM E 1527-13 standard include, but are not limited to, the following:

- Asbestos-containing building materials
- Radon
- Lead-based paint
- Lead in drinking water
- Wetlands
- Regulatory compliance
- Cultural and historic resources
- Industrial hygiene
- Health and safety
- Ecological resources
- Endangered species
- Indoor air quality unrelated to releases of hazardous substances or petroleum products into the environment
- Biological agents
- Mold

No additional services were performed outside the scope of the ASTM E 1527-13 standard.

1.3 Deviations to ASTM E 1527-13 Standard

No significant deviations or deletions to the ASTM standard were made during this Phase I ESA.
2.0 SITE DESCRIPTION

2.1 Site Location and Legal Description

The approximately 103-acre Site is identified as encompassing portions of parcels 2-4-9-014:001, 2-4-9-014:009, and 2-4-9-002:001, and is located in the western portion of Lanai City in Maui County, Hawaii. The Site is approximately 4 miles east of the Pacific Ocean and 0.2 mile north of Kaunakakai Highway in a mixed agricultural/industrial/residential area. The Site is zoned as open space and agricultural land, and is currently owned by Lanai Resorts, LLC. A Site location map is included as Figure 1.

2.2 Site Improvements

Current onsite improvements are listed in the following table. A Site layout plan is included as Figure 2.

<table>
<thead>
<tr>
<th>Site Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings (stories)</td>
<td>One (1) Quonset shed located on the eastern portion of the Site. One (1) single story building (former power plant facility), one (1) collapsed former single story former school house and one (1) single story former Boy Scout hall located on the northeastern portion of the Site. Multiple single-story wood and metal structures to facilitate nursery operations.</td>
</tr>
<tr>
<td>Construction date(s)</td>
<td>Quonset shed – 1942; Former Power Plant Facility – 1948; Former school house and former Boy Scout hall – Relocated to the Site in 1980s (construction dates unknown).</td>
</tr>
<tr>
<td>Exterior areas</td>
<td>Nursery (process of being relocated), community gardens, Hawaii Gas distribution area, overgrown vegetation.</td>
</tr>
<tr>
<td>Onsite roads/rail lines</td>
<td>AwaHua Avenue, 9th Street, 12th Street</td>
</tr>
<tr>
<td>Other large equipment</td>
<td>Inoperable grader and pineapple harvester</td>
</tr>
<tr>
<td>Potable water supply</td>
<td>Community Water Supplier (Lanai City)</td>
</tr>
<tr>
<td>Sewage disposal system(s)</td>
<td>Municipal Sanitary Sewer System; Portable toilet facilities (used at the Nursery)</td>
</tr>
<tr>
<td>Heating/Cooling system fuel sources(s)</td>
<td>Window unit air conditioning in the nursery office</td>
</tr>
<tr>
<td>Back-up fuel source(s)</td>
<td>N/A</td>
</tr>
<tr>
<td>Electricity supplier(s)</td>
<td>Maui Electrical Company (MECO)</td>
</tr>
<tr>
<td>Storm water system</td>
<td>Municipal storm water drain system</td>
</tr>
</tbody>
</table>

2.3 Current and Historical Site Use

2.3.1 Current Site Use(s)

The Site is currently operated by DLNR; Lanai City Nursery; individuals utilizing the community garden area; and Hawaii Gas, as a distribution area. The former power plant building has reportedly not been accessed in years and is currently being used to store boxes of files. An electrical substation located northwest of the power plant building remains in operation.

Two sanitary sewer lines with multiple manholes trend from the north-northeast to the southeast portion of the Site.

2.3.2 Previous Owner and Operator Information

Based on information provided by the User (Section 3), the historical record review (Section 4), and/or interviews conducted during this Phase I (Section 6), a portion of the Site appears to have been first developed in 1942 with the Quonset shed, but it is unknown what it was used for prior to 2006 when DLNR began a lease to use it as an office and storage facility. In 1948, a portion of the Site was developed with a power plant building that was operated by the Dole Company for pineapple plantation activities until 1988. Maui Electrical Company (MECO) took over the facility and operated the power plant until 1996. MECO vacated the facility in 2000 following the removal of the last of the generating units. The facility appears to have been used for storage since that time. An electrical substation located northwest of the power plant building is still in operation. Pineapple fields, operated by the Dole Company, appear to have encompassed the remaining portions of the Site until approximately 1991.

In the 1980s two dilapidated wooden structures, a former school house and a former Boy Scout hall, were relocated to the Site just to the northeast of the power plant building and electrical substation.

Castle & Cooke appears to have taken over ownership of the Dole Company in the 1960s. Mr. David Murdock acquired Castle & Cooke in 1985. Lanai Resorts, LLC purchased the Site from Castle & Cooke in 2012.

2.4 Physical Setting

According to the United States Geological Survey (USGS) topographic map, Lanai North and Lanai South quadrangle dated 2013 Lanai (Figure 1), the Site is located approximately 4 miles east from the Pacific Ocean. The Site topographic elevation is approximately 1,545 feet above mean sea level (MSL), and local topography slopes to the south-southwest. The topographic downward slope observed at the Site during the Site reconnaissance is generally towards the south-southwest. Based on local topography and historical environmental reports provided to TRC, as applicable, the assumed direction of shallow groundwater flow is to the south-southwest, towards the Pacific Ocean. However, a subsurface investigation would be required to determine actual groundwater flow direction.

The database radius report supplied by Environmental Data Resources, Inc. (EDR) of Milford, Connecticut was reviewed to obtain information regarding the dominant soil composition in the Site vicinity. This information is summarized below:

<table>
<thead>
<tr>
<th>Hydric Status</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Surface Texture</td>
<td>Clay and silty clay</td>
</tr>
</tbody>
</table>
Soil Component Name: Waihuna and Lahaina
Deeper Soil Types: Clay and silty clay

Please refer to the Geocheck Physical Setting Source Summary of the EDR report presented in Appendix A for further information regarding the soil composition in the Site vicinity.

Per Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map 150030500F (Panel 500 of 825), dated September 19, 2012, the Site is located in Zone X (unshaded). According to FEMA's Flood Zone Designations, Zone X represents a minimal flood hazard; that is, those areas outside the Special Flood Hazard Area (SFHA) and higher than the elevation of the 0.2-percent-annual-chance flood. The FEMA Flood Insurance Rate Map is provided in Appendix B.

3.0 USER PROVIDED INFORMATION

According to the ASTM E 1527-13 standard, certain tasks that may help identify the presence of RECs associated with the Site are generally conducted by the Phase I ESA User. These tasks include providing, or authorizing the environmental professional to obtain recorded land title records for environmental liens or activity and land use limitations (AULs); providing specialized knowledge related to RECs at the Site (e.g., information about previous ownership or environmental litigation); providing commonly known or reasonably ascertainable information within the local community about the property that is material to RECs in connection with the property; and informing the environmental professional if, as believed by the User, the purchase price of the property is lower than the fair market value due to contamination. A list of requested information was included in TRC’s proposal (see Section 1.1). Information provided by the User pursuant to that request is listed in Section 8.0. A copy of the User questionnaire is included in Appendix C.

3.1 Title & Judicial Records for Environmental Liens or Activity and Use Limitations

The User did not provide any information regarding environmental concerns associated with title or judicial records, or the existence of environmental liens or activity and use limitations (AULs) for the Site. Completion of an additional title and judicial record search was beyond the scope of this Phase I ESA, was not requested by the Users, and remains a User requirement.

3.2 Specialized Knowledge

The User was not aware of specialized knowledge related to RECs at the Site.

3.3 Property Value Reduction Issues

The User was not aware of property valuation reduction issues regarding the Site.

3.4 Commonly Known or Reasonably Ascertainable Information

TRC was supplied with commonly known and/or reasonably ascertainable information regarding the Site by Mr. A.J. Vergara of Pulama Lanai. This information was used during this Phase I ESA and has been incorporated in this report as applicable.

3.5 Reason for Conducting Phase I

It is TRC’s understanding that the User requires a Phase I to qualify for Innocent Landowner defense to CERCLA liability.
## 4.0 RECORDS REVIEW

### 4.1 Historical Use Information

Information regarding Site and vicinity historical uses was obtained from various publicly available and practically reviewable sources including:

- Aerial photographs (scale: 1" = 750’) dated 1952; (scale: 1’ = 500’) dated 1965 and 1992;
- Local municipal records;
- An environmental database report; and
- Interviews with Site representative(s) and regulatory agency official(s), as necessary.

Historical research documentation is included in Appendix D.

Historical Sanborn® Fire Insurance Maps (Sanborn Maps) were originally produced for assessing fire insurance liability in urban areas in the United States. The maps provide detailed information (i.e., building construction, facility occupants, storage tank locations, and hazardous material storage areas), which can be used as a resource to document land use and structural change over time. Research concerning the availability of Sanborn Maps in the vicinity of the Site was conducted by EDR; however, EDR stated that Sanborn Map coverage does not exist for the Site or nearby surrounding area. The absence of maps for a specific area may signify the area was not significantly developed at the time at which the maps were published.

### 4.1.1 Site History

#### Operational History

<table>
<thead>
<tr>
<th>Year</th>
<th>Site History</th>
</tr>
</thead>
<tbody>
<tr>
<td>1920 - 1941</td>
<td>Lanai City was reportedly first developed in the early 1920s, which is when pineapple plantation activities most likely began on the Site.</td>
</tr>
<tr>
<td>1942 - 1947</td>
<td>The Maui County Tax Assessor indicates the Quonset shed was built on the Site in 1942. It is unknown what the shed was used for.</td>
</tr>
<tr>
<td>1948 - 1988</td>
<td>The power plant was built on the site in 1948. The power plant was reportedly operated by the Dole Company to support pineapple plantation operations until 1988. In the 1980s, the former school house and former Boy Scout hall were relocated onto the Site.</td>
</tr>
<tr>
<td>1988 - 1996</td>
<td>The Maui Electric Company (MECO) operated the power plant. As of 1992, the pineapple plantations ceased operations, and the nursery and community gardens were developed on the Site.</td>
</tr>
</tbody>
</table>

### 4.1.2 Adjoining Property History

<table>
<thead>
<tr>
<th>Year</th>
<th>Site History</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996 - 2003</td>
<td>The power plant stopped operating in 1996 and MECO vacated the premises in 2000 following the removal of the last two generating units. At this point, the facility appears to be utilized for storage. In 2003, an evaluation of the power plant was completed (Section 4.5). The evaluation report indicated petroleum-contaminated soil was present on the Site (no additional information regarding this soil contamination could be identified by TRC). Additionally, the evaluation report indicated that trace amounts of polychlorinated biphenyls (PCBs) were present in the soil on the Site.</td>
</tr>
<tr>
<td>2003 – Present</td>
<td>DLNR leases the Quonset shed from Lanai Resorts to operate as offices and storage facility in 2006. The power plant located on the Site continues to serve as storage. The nursery operates on the Site, but is in the process of moving to a new location. Residents of Lanai rent out the community garden areas, and use these areas to grow gardens or raise animals. Hawaii Gas operates a distribution area on the Site, but is also in the process of moving.</td>
</tr>
</tbody>
</table>

### Table 4.2 - Adjoining Property History

<table>
<thead>
<tr>
<th>Year</th>
<th>Site History</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>From at least 1952 until as late as 1991, the area to the northwest of the Site was utilized as pineapple fields as depicted in aerial photographs. Since 1992, this area to the northwest has been undeveloped agricultural land. The aerial photographs depict the area to the north-northeast of the Site as a mix of residential and commercial properties from at least 1952.</td>
</tr>
<tr>
<td>East</td>
<td>From at least 1952, the area east of the Site appears to be a mix of residential and commercial properties as depicted in aerial photographs. Fraser Avenue was present from at least 1984.</td>
</tr>
<tr>
<td>South</td>
<td>From at least 1952 until as late as 1991, the area south of the Site was utilized as pineapple fields as depicted in aerial photographs. The aerial photographs depict several structures located to the southeast of the site from at least 1952 through at least 1976. The 1992 aerial photograph depicts different structures located in this southeast area. Per the Maui County Tax Assessor, these structures were developed in 1998 and 1999. 12th Street appears to have been developed to the south and southeast of the Site from as early as 1992 with a light industrial development beyond.</td>
</tr>
<tr>
<td>West</td>
<td>From at least 1952 until as late as 1989, the aerial photographs depict ponds and undeveloped land to the west-southwest of the Site. The Maui County Tax Assessor indicates the waste water treatment plant facility, located to the west-southwest of the Site, was constructed to the southwest of the Site in 1990.</td>
</tr>
</tbody>
</table>
4.1.3 Surrounding Property History

Table 4.3 - Surrounding Property History

<table>
<thead>
<tr>
<th>Surrounding Property History</th>
<th>North</th>
<th>East</th>
<th>West</th>
<th>South</th>
</tr>
</thead>
<tbody>
<tr>
<td>From at least 1952 to 1991, the area to the northwest was utilized as pineapple fields; from 1991 to the present this northwest area has consisted of undeveloped agricultural land. From at least 1952 to the present, the area to the north-northeast of the Site has been developed with a mix of residential and commercial properties.</td>
<td>From at least 1952 to the present, this area has consisted of a mix of light industrial and commercial and residential development.</td>
<td>Prior to 1992, this area was a mix of pineapple fields and undeveloped agricultural; between 1992 to the present, this area was developed as county-owned waste water treatment plant land with undeveloped, agricultural land beyond.</td>
<td>The roadway known as Kaumalapau Highway is located to the south of the Site from at least 1952 with pineapple fields beyond until 1991. From 1992 to the present, the land appears to be undeveloped agricultural land.</td>
<td></td>
</tr>
</tbody>
</table>

4.2 Database Report & Environmental Record Review

A database search report that identifies properties listed on state and federal databases within the ASTM-required radii of the Site was obtained from EDR and is included in Appendix A.

The environmental database report identified 19 properties listings including adjoining properties. These properties included those that could be mapped and those that could not (i.e., orphan properties). The Site was not listed in the database search report; however, after file review, it was determined that the following listing is associated with the Site.

4.2.1 Subject Site

Site information included in the database search report is summarized in the following table:

<table>
<thead>
<tr>
<th>Site Facility Name(s) and/or Listed Address(es)</th>
<th>Dole Lanai Plantation – 750 Lanai Avenue (Power Plant), Lanai City, HI 96763</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDR Map No(s).</td>
<td>C11</td>
</tr>
<tr>
<td>Database(s)</td>
<td>Leaking Underground Storage Tank (LUST), Underground Storage Tank (UST)</td>
</tr>
<tr>
<td>Description/ID No(s).</td>
<td>EDR ID: U001256610 and Release IDs: 900013 and 030016</td>
</tr>
<tr>
<td>Database Review Summary</td>
<td>This property is listed with two (2) LUST case files which have been reported as cleaned up with NFA status issued on 09/15/2006 and 02/12/2007. The two (2) UST listings (Tank IDs R-L1 and L6) have current statuses of Permanently Out of Use. Tank R-L1 was closed on 10/01/1989 and tank L6 has no closing date documented.</td>
</tr>
</tbody>
</table>

File Review Summary

File review indicated that the two (2) USTs located at the former power plant site included a 25,000-gallon diesel tank and a 5,500-gallon diesel tank that were removed from the site in 1989 and 2003, respectively. During UST removal activities, the USTs were determined to be LUSTs, and soil was removed to the extent feasible. Some of the soil removed during the removal of the 25,000-gallon tank was stockpiled on the site, and following subsequent sampling activities, was to be used as fill material as approved by DOH.

NFA letters were issued in response to the two LUST case files dated September 5, 2006 and February 12, 2007. The February 12, 2007 letter indicates that a small amount of petroleum contaminated soil remains in the sub-surface at the Site (below the former power plant building), and if the soil is excavated or disturbed, precautions should be taken for worker safety. The NFA also indicates that excavated soil may be reused onsite provided that any nuisance concerns are addressed and the soil is not moved to an ecologically sensitive area.

4.2.2 Adjoining and Surrounding Property Record Review

TRC evaluated the following factors to determine whether additional environmental records should be reviewed with respect to the potential for contaminant migration from the adjoining and surrounding properties:

1. Whether the property is upgradient or downgradient of the Site vis-à-vis groundwater migration based on the local topography, and the assumed groundwater depth and south-southwest shallow groundwater flow direction;

2. Whether the property is upgradient or downgradient of the Site vis-à-vis vapor migration based on readily available information pursuant to the ASTM E 1527-13 standard including soil and geological characteristics; contaminant characteristics; contaminated plume migration data; and significant conduits that might provide preferential pathways for vapor migration such as major utility corridors, sanitary sewers, storm sewers, and significant natural conduits such as Karst terrain (vapor migration may also be influenced by the age and design of infrastructure features associated with these conduits);

3. Property case status (i.e., whether the Hawaii DOH or applicable regulatory authority has issued a NFA letter or other similar closure document);

4. Type of database and whether the presence of contamination is known; and

5. The distance between the listed property and the Site.

Based on this evaluation, TRC limited the review of additional environmental records to the properties listed below, since the potential for contamination to be migrating to the Site from the other properties identified by the database search is considered low.

4.2.2.1 Adjoining Properties

Adjoining property information included in the database search report is summarized in the following table:
Phase I Environmental Site Assessment Report  
Lanai City Expansion – 200 Housing Units  
June 29, 2016

Based on the above listing, TRC conducted a file review for the Emulsion Plant of available files maintained at the Hawaii DOH and a summary report provided by the Client (Section 4.3).

Based on files provided by the DOH, the Emulsion Plant facility was used by Dole as an agricultural chemical mixing and storage area. Additionally, two 10,000-gallon USTs were removed in 1989. The USTs were used for diesel fuel storage from 1947 through the late 1970s and Telone II (1,3-dichloropropene) from the late 1970s through the mid-1980s. During removal, numerous holes were observed along the base of both USTs and soil samples contained petroleum hydrocarbons and halogenated volatile organic compounds (HVOCs). Further site characterization activities identified detectable concentrations of petroleum hydrocarbons, HVOCs and organochlorine pesticides.

TRC understands that soil sampling activities are ongoing at the former Emulsion Plant location. Due to the proximity of the former Emulsion Plant to the Site and the known presence of petroleum hydrocarbons, HVOCs, and organochlorine pesticides associated with this Site, this facility is presently a concern to the Site.

4.2.2.2 Surrounding Properties

Surrounding property information included in the database search report is summarized in the following tables:

<table>
<thead>
<tr>
<th>Facility Name(s) and/or Address(es)</th>
<th>Dole Lanai Plantation – 750 Lanai Avenue (Emulsion Plant – Fraser Ave), Lanai City, HI 96763</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximate Location Relative to Site</td>
<td>File review indicated this Site adjoins the subject property, as it was located at the corner of Fraser Ave and 12th Street, to the south of the southeastern most corner of the Site.</td>
</tr>
<tr>
<td>EDR Map No(s).</td>
<td>C12</td>
</tr>
<tr>
<td>Database(s)</td>
<td>UST</td>
</tr>
<tr>
<td>Description/ID No(s).</td>
<td>EDR ID: U0012356615</td>
</tr>
<tr>
<td>Presumed Hydrogeologic Setting</td>
<td>Upgradient</td>
</tr>
<tr>
<td>Database Review Summary</td>
<td>This property is listed with two (2) UST listings (Tank IDs R-L7/A and R-L7/B) which have current statuses of Permanently Out of Use with no closing date documented.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility Name(s) and/or Address(es)</th>
<th>A2 (and B6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximate Location Relative to Site</td>
<td>0.11 miles to the northeast</td>
</tr>
<tr>
<td>EDR Map No(s).</td>
<td>A1</td>
</tr>
<tr>
<td>Database(s)</td>
<td>LUST, UST</td>
</tr>
<tr>
<td>Description/ID No(s).</td>
<td>EDR ID: U001236609 and Release ID: 960052</td>
</tr>
<tr>
<td>Presumed Hydrogeologic Setting</td>
<td>Upgradient</td>
</tr>
<tr>
<td>Database Review Summary</td>
<td>This property is listed with a UST case file which has been reported as cleaned up with NFA status issued on 01/19/2001. Two (2) UST listings (Tank IDs R-1 and R-2) have a current status of Permanently Out of Use as of 06/24/1993. In addition, Oshiro Service Station is listed in the RCRA Non-Gen database with no violations found. Based on the current regulatory status, it is not expected that this facility is presently a concern to the Site.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Facility Name(s) and/or Address(es)</th>
<th>Lanai Central Office – 423 Ninth Street, Lanai City, HI 96763</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximate Location Relative to Site</td>
<td>0.14 miles to the north</td>
</tr>
<tr>
<td>EDR Map No(s).</td>
<td>B5</td>
</tr>
<tr>
<td>Database(s)</td>
<td>State Hazardous Waste Site (SHWS)</td>
</tr>
<tr>
<td>Description/ID No(s).</td>
<td>EDR ID: S110061631</td>
</tr>
</tbody>
</table>
Phase I Environmental Site Assessment Report
Lanai City Expansion – 200 Housing Units
June 29, 2016

4.3 Previous Reports

The following environmental reports regarding the Site were provided for TRC’s review:

- January 2014, Summary Data Figure for the Former Emulsion Plant Area, Lanai City, Lanai, Hawaii prepared by EnviroServices & Training Center LLC (Appendix B).

Information provided in these reports is summarized throughout this report.

4.4 Other Environmental Record Sources

As part of the assessment, records were requested for the target property from County of Maui, Hawaii – Department of Environmental Management and State of Hawaii DOH. The requests were submitted via written correspondence. Information from these sources is discussed below:

Table 4.4 - Other Environmental Record Sources

<table>
<thead>
<tr>
<th>MUNICIPAL/STATE REGULATORY AGENCY/DEPARTMENT</th>
<th>Available Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>State of Hawaii Department of Health</td>
<td>DOH UST division provided UST and LUST records as related to the following former Dole Lanai Plantation facilities: Power Plant, Emulsion Plant, DO Farm - Field 5303 and Kaunamaluu Hwy Field 5520. Information regarding these files is discussed in Section 4.2.</td>
</tr>
<tr>
<td>County of Maui Department of Environmental Management/Wastewater Reclamation Division (WWRD)</td>
<td>The response from the WWRD indicated there are significant trunk sewer lines and manholes that are owned, operated and maintained by the County of Maui which traverse the site. The last analysis of the system condition in 2009 showed that these lines are in very good condition. WWRD does not have any records that indicate any past problems or sewer spills in the area.</td>
</tr>
<tr>
<td>County of Maui – Department of Environmental Management (DEM)</td>
<td>The response from the DEM indicated they have no comments concerning the Site.</td>
</tr>
</tbody>
</table>
5.0 SITE RECONNAISSANCE

5.1 Methodology and Limiting Conditions

Ms. Kacey Swindle, Industrial Hygienist, conducted a Site reconnaissance of accessible areas on and around the Site on June 2, 2016 for the purpose of identifying potential RECs, and was accompanied by Mr. A.J. Vergara, Engineering Coordinator; Mr. Matt Kawasaki and Mr. Elmer Agtarap of Pulama Lanai who provided access to the property and answered questions during the reconnaissance. Ms. Kacey Swindle conducted an additional Site reconnaissance visit on June 21, 2016 to assess additional areas that were not initially included within the scope of the assessment. Photographs taken during the reconnaissance are provided in Appendix E. A Site layout plan is included as Figure 2.

During the Site reconnaissance, there was limited or no access to several areas due to overgrown vegetation (i.e., thick grass approximately 8 feet tall or overgrown wooded areas). In addition, access to the interior of the former power plant building was not possible, as the doors could not be unlocked via the existing keys due to deterioration of the locks. The former Boy Scout hall and adjacent collapsed school house were not accessible due to safety concerns and overgrown vegetation. Finally, the community gardens were not individually accessed, as they are individually rented areas that were locked and many contained live animals. There was no access to the evidence storage room at the DLNR Quonset shed, as it was locked and personnel with the keys were not present at the time of the Site reconnaissance. These limiting conditions could possibly impact the results of this Phase I ESA because the ability to identify possible RECs was inhibited.

5.2 Interior and Exterior Site Observations

Unless otherwise noted, the items listed in the table below appeared in good condition with no visual evidence of staining, deterioration or discharge of hazardous materials; and there are no records of a release in these areas. Items where further description is warranted are discussed in the section(s) following the table.

Table 5.1 - Interior and Exterior Site Observations

<table>
<thead>
<tr>
<th>Item</th>
<th>Present (Current/ Historic/ No)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous material storage or handling areas</td>
<td>Yes</td>
<td>See Section 5.2.1</td>
</tr>
<tr>
<td>USTs and associated piping</td>
<td>Yes</td>
<td>(see Section 5.2.2)</td>
</tr>
<tr>
<td>USTs and associated piping</td>
<td>Historic</td>
<td>A former diesel AST was once located on the Site to the south of the former power plant building, as a secondary containment berm and associated piping were observed within this area. However, no additional information was provided regarding this.</td>
</tr>
</tbody>
</table>

Table 5.1 - Interior and Exterior Site Observations

<table>
<thead>
<tr>
<th>Item</th>
<th>Present (Current/ Historic/ No)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>USTs and associated piping</td>
<td>Historic</td>
<td>Two (2) USTs located at the former power plant site included a 25,000-gallon diesel tank and a 5,500-gallon diesel tank that were removed from the site in 1989 and 2003, respectively.</td>
</tr>
<tr>
<td>Drums and containers (&gt;5 gallons)</td>
<td>Yes</td>
<td>One 55-gallon drum of diesel was observed in good condition in the nursery. One 5-gallon drum of an unknown substance (appeared to be rainwater, as no sheens were noted) was located in the area of Hawaiian Gas. Multiple drums and containers were observed within the community garden area. It is unknown what the drums and containers contained.</td>
</tr>
</tbody>
</table>

5.2.1 Hazardous Substances

Hazardous substances including raw materials; finished products and formulations; hazardous wastes; hazardous constituents and pollutants including intermediates and byproducts that are currently present at the Site; and unidentified substance containers (when open or damaged, and...
containing unidentified substances suspected of being hazardous or petroleum products) are listed in the following table:

<table>
<thead>
<tr>
<th>Material Name</th>
<th>Approximate Quantity On Site During Reconnaissance (gallons/lbs.)</th>
<th>Storage Containers &amp; Conditions*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic Oil/Fluid</td>
<td>10 gallons</td>
<td>Two (2) 5-gallon buckets were observed in the Hawaii Gas portion of the Site in poor condition.</td>
</tr>
<tr>
<td>Paint</td>
<td>Less than 5 gallons</td>
<td>One (1) container was observed in the Hawaii Gas portion of the Site in poor condition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One (1) container was observed in an office on the DLNR portion of the Site in fair condition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>One (1) container was observed in the DLNR flammable storage cabinet in good condition.</td>
</tr>
<tr>
<td>Leaf Shine (aerosol cans)</td>
<td>5 cans</td>
<td>Retail sized cans were observed within the nursery portion of the Site in good condition.</td>
</tr>
<tr>
<td>Lubricants</td>
<td>1 gallon</td>
<td>One (1) container was observed in the flammable storage cabinet located on the nursery portion of the Site in good condition.</td>
</tr>
<tr>
<td>Oil</td>
<td>40 quarts</td>
<td>Multiple retail-sized containers were observed on the nursery portion of the Site in good condition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multiple retail-sized containers were observed in the DLNR flammable storage cabinet in fair condition.</td>
</tr>
<tr>
<td>Gasoline</td>
<td>30 gallons</td>
<td>Multiple containers ranging in size between 1 and 5 gallons were observed in the flammable cabinet located on the nursery portion of the Site in good condition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multiple containers were observed in the in the DLNR flammable cabinet in good to fair condition.</td>
</tr>
<tr>
<td>Antifreeze</td>
<td>2 gallons</td>
<td>Retail-sized containers were observed within the nursery portion of the Site in good condition.</td>
</tr>
<tr>
<td>Paint Thinner</td>
<td>1 gallon</td>
<td>One container was observed within the nursery portion of the Site in good condition.</td>
</tr>
<tr>
<td>Diesel</td>
<td>55 gallons</td>
<td>One (1) 55-gallon drum of diesel was observed within the nursery portion of the Site in fair condition. A small stain was observed on the gravel below the tank.</td>
</tr>
<tr>
<td>Liberate® Penetrant</td>
<td>24 gallons</td>
<td>23 1-gallon containers were observed within the Pesticide Storage area on the nursery portion of the Site. 20 of the containers were located in cardboard boxes that appeared to be damaged. The containers themselves were observed in good condition.</td>
</tr>
<tr>
<td>Roundup Pro Concentrate</td>
<td>2.5 gallons</td>
<td>One (1) container was observed within the Pesticide Storage area on the nursery portion of the Site in good condition.</td>
</tr>
<tr>
<td>TurfTrax® Blue HC</td>
<td>3 quarts</td>
<td>Three (3) containers were observed within the Pesticide Storage area on the nursery portion of the Site in good condition.</td>
</tr>
<tr>
<td>Spray Paint</td>
<td>26 cans</td>
<td>Retail-sized cans were observed in cardboard boxes within a storage building located on the nursery portion of the Site in good condition.</td>
</tr>
</tbody>
</table>

### Table 5.2 - Current Site Hazardous Substances

<table>
<thead>
<tr>
<th>Material Name</th>
<th>Approximate Quantity On Site During Reconnaissance (gallons/lbs.)</th>
<th>Storage Containers &amp; Conditions*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pesticide AquaCap Herbicide</td>
<td>15 gallons</td>
<td>One (1) 15-gallon container was observed on a wooden pallet on the nursery portion of the Site in good condition.</td>
</tr>
<tr>
<td>Other Chemicals</td>
<td>Unknown</td>
<td>Multiple retail-sized containers were observed in the DLNR flammable storage cabinet.</td>
</tr>
</tbody>
</table>

* * Definition of conditions:
  Compromised: Obvious holes in container or visual evidence of a release.
  Poor: Container appears dented, bulging, rusted, or visual evidence of spillage.
  Fair: Container appears intact with visual traces of rust.
  Good: No visual evidence of container damage.
  Excellent: Container appears like new.

#### 5.2.2 Aboveground Storage Tanks

Hawaii Gas currently maintains four (4) ASTs at the Site, as summarized in the table below.

### Table 5.3 - Site Aboveground Storage Tanks

<table>
<thead>
<tr>
<th>Aboveground Storage Tanks (ASTs)</th>
<th>Tank ID</th>
<th>Contents</th>
<th>Capacity (gallons)</th>
<th>Location</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown</td>
<td>Propane</td>
<td>6,400</td>
<td>Hawaii Gas</td>
<td>Located in the north-northwest portion of the Site</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>Propane</td>
<td>2,000</td>
<td>Hawaii Gas</td>
<td>Located in the north-northwest portion of the Site</td>
<td></td>
</tr>
</tbody>
</table>

In addition to the above listed tanks, approximately 39 upright, residential-sized, approximately 19 oblong, residential-sized and two 5-gallon tanks were observed on the Hawaii Gas location in the north-northwest portion of the Site. It is unknown if these tanks contained propane or were empty. No evidence of spills or releases from these ASTs was observed by TRC during the Site reconnaissance. None of the tanks were located within secondary containment, as this Site appears to be a distribution location for Hawaii Gas.
5.3 Adjoining and Surrounding Properties Reconnaissance

5.3.1 Adjoining Properties
During the Site reconnaissance, TRC viewed the adjoining properties from the Site and publicly accessible areas (e.g., public roadways, etc.).

<table>
<thead>
<tr>
<th>Direction from Site</th>
<th>Current Land Use Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>North-Northwest</td>
<td>Undeveloped county owned land</td>
</tr>
<tr>
<td>North-East</td>
<td>Football and baseball fields</td>
</tr>
<tr>
<td>East-North</td>
<td>Police station, churches, and Fraser Avenue</td>
</tr>
<tr>
<td>East-Southwest</td>
<td>Storage containers on unpaved gravel parking lot (former Emulsion Plant location) and warehouses</td>
</tr>
<tr>
<td>South-Southwest</td>
<td>Light industrial development (recycling center)</td>
</tr>
<tr>
<td>South</td>
<td>12th Street followed by undeveloped agricultural land</td>
</tr>
<tr>
<td>South-Southwest</td>
<td>Maui County Highway Department</td>
</tr>
<tr>
<td>West-Southwest</td>
<td>Waste Water Treatment Plant</td>
</tr>
</tbody>
</table>

Table 5.4 - Adjoining Properties Reconnaissance

5.3.2 Surrounding Properties
Surrounding properties generally include mixed commercial/residential to the north and east and undeveloped agricultural land to the south and west.

6.0 INTERVIEWS
The following persons were interviewed to obtain historically and/or environmentally-pertinent information regarding RECs associated with the Site.

- Mr. A.J. Vergara, Engineering Coordinator with Pulama Lanai – Key Site Manager and Representative for the Owner
- Captain Preza, Lanai Fire Department

The information provided by each is discussed and referenced in the text or provided below. Other references and sources of information are included in Appendix B.

Mr. Vergara was unaware of any hazardous materials incidents, spills, or any other potential environmental threats or conditions that may pose a past, present, or material threat of release to the Site.

Captain Preza mentioned the former power plant, but was unaware of any hazardous materials incidents, spills, or any other potential environmental threats or conditions that may pose a past, present, or material threat of release to the Site.
7.0 FINDINGS, OPINIONS AND CONCLUSIONS

Potential findings can include RECs, historical RECs (HRECs), controlled RECs (CRECs) and de minimis conditions, pursuant to the ASTM E 1527-13 standard.

RECs are defined as the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property; (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.

CRECs are defined as a REC resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

HRECs are defined as a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

De minimis conditions are defined as a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de minimis conditions are not RECs nor CRECs.

TRC has performed a Phase I ESA in conformance with the scope and limitations of ASTM E 1527-13 at the approximately 103-acre property located in the western portion of Lanai City in Maui County, Hawaii approximately 4 miles east of the Pacific Ocean and 0.2 mile north of Kaunakakai Highway (see Appendices F and G). Deviations from this standard are described in Sections 1.3 and 7.6 of this report.

7.1 RECs and CRECs

This assessment has revealed the following evidence of RECs in connection with the Site:

REC No. 1

TRC could not obtain access into the former power plant building due to the deterioration of the locks. This prevented TRC from identifying possible RECs; however, the previous report that was provided to TRC (Section 4.3) indicated trace concentrations of PCBs were identified in the soil. The potential exists for contamination to be present at the Site.

REC No. 2

During Site reconnaissance, a small stain was observed on the gravel floor under a 55-gallon drum of diesel fuel that was located in the nursery portion of the Site. The potential exists for contamination to be present at the Site.

REC No. 3

During Site reconnaissance, a storage shed located in the northeast corner of the nursery portion of the Site was observed to house pesticide and other chemicals. The floor of this shed consisted of gravel which would not impede liquids from migrating into the soil below. The potential exists for contamination to be present at the Site.

REC No. 4

The file review and Summary Data Figure of the former Emulsion Plant (adjoining the Site) indicates that petroleum hydrocarbons, HVOCs, and organochlorine pesticides were detected in soil, some at elevated concentrations. The file review documents and Summary Data Figure for the former Emulsion Plant are included in Appendix B. The potential exists for contamination to be present at the Site in the form of soil vapor and/or groundwater migration onto the Site.

CREC No. 1

A NFA letter was issued by the DOH on February 12, 2007 related to a release associated with a diesel LUST that was removed from the power plant portion of the Site. The letter and associated documents are included in Appendix B. The NFA indicates a small volume of petroleum-impacted soil still remains in the subsurface at the Site (below the former power plant building), and if the soil is excavated or disturbed, precautions should be taken for worker safety. The NFA also indicates that excavated soil may be reused onsite provided that any nuisance concerns are addressed and the soil is not moved to an ecologically sensitive area.

Opinion Regarding Additional Investigation

It is TRC’s opinion that a subsurface investigation would be necessary to confirm the presence of hazardous materials in the environmental associated with the identified RECs.

7.2 HRECs

This assessment has revealed no evidence of HRECs in connection with the Site.
7.3  De Minimis Conditions

This assessment has revealed no evidence of de minimis conditions in connection with the Site.

7.4  Data Gaps

TRC has made an appropriate inquiry into the commonly known and reasonably ascertainable resources concerning the historical ownership and use of the Site back to the first development per 40 CFR Part 312.24 (Reviews of Historical Sources of Information). Data gaps identified during this assessment include the following:

1. Failure to obtain specific information or files on the past usage or ownership of the Site.
2. The former Boy Scout hall and adjacent collapsed former school house were not accessible during Site reconnaissance due to safety concerns and overgrown vegetation.
3. The community gardens were not individually accessed during Site reconnaissance, as they are individually rented areas that were locked and many contained live animals.
4. There was no access to the evidence storage room at the DLNR Quonset shed, as it was locked and personnel with the keys were not present at the time of the Site reconnaissance.
5. There was no access to several areas of the Site during Site reconnaissance due to overgrown vegetation (i.e., thick grass approximately 8 feet tall or overgrown wooded areas).
6. Access to the interior of the former power plant building was not possible during Site reconnaissance, as the doors could not be unlocked via the existing keys due to deterioration of the locks.

Based on other historical sources reviewed, Data Gap Nos. 1 - 4 are not considered significant. However, based on historical use of the building and Site, Data Gap Nos. 5 and 6 are considered significant Data Gap.

7.5  Other Noteworthy Issues

Other noteworthy issues identified during this Phase I ESA that, while not strictly a REC, HREC, CREC, or de minimis condition, in TRC’s opinion warrant further discussion include the following:

- Multiple containers, totes and drums with unknown contents were observed within the community gardens. Additionally, an inoperable pineapple harvester, inoperable grader, multiple tires, car batteries, and debris piles containing green waste, trash and other debris were located on the Site. Although TRC did not visually identify any concerns associated with these containers, materials or debris piles, these materials should be removed and disposed of properly. Should any adversely impacted soils be identified following their removal or during future site development, the soils should be properly characterized and disposed of accordingly.

7.6  Limiting Conditions and Deviations

7.6.1  Accuracy and Completeness

The ASTM E-1527-13 standard recognizes inherent limitations for Phase I ESAs that apply to this report, including:

- Uncertainty Not Eliminated – No Phase I ESA can wholly eliminate uncertainty regarding the potential for RECs in connection with a property. Data gaps identified during this Phase I ESA are listed in Section 7.4.
- Not Exhaustive – A Phase I ESA is not an exhaustive investigation.
- Past Uses of the Property – A review of standard historical sources at intervals less than 5 years is not required.

The Client is advised that the Phase I ESA conducted at the Site is a limited inquiry into a property’s environmental status, cannot wholly eliminate uncertainty, and is not an exhaustive assessment to discover every potential source of environmental liability at the Site. Therefore, TRC does not make a statement i) of warranty or guarantee, express or implied for any specific use; ii) that the Site is free of RECs or environmental impairment; iii) that the Site is “clean”; or iv) that impairments, if any, are limited to those that were discovered while TRC was performing the Phase I ESA. This limiting statement is not meant to compromise the findings of this report; rather, it is meant as a statement of limitations within the ASTM standard and intended scope of this assessment. Specific limiting conditions identified during the Site reconnaissance are described in Section 5.1. Subsurface conditions may differ from the conditions implied by surface observations, and can be evaluated more thoroughly through intrusive techniques that are beyond the scope of this assessment. Information in this report is not intended to be used as a construction document and should not be used for demolition, renovation, or other construction purposes.

This report presents TRC’s site reconnaissance observations, findings, and conclusions as they existed at the time of the Site reconnaissance. TRC makes no representation or warranty that the past or current operations at the property are, or have been, in compliance with all applicable federal, state and local laws, regulations and codes. TRC makes no guarantees as to the accuracy or completeness of information obtained from others during the course of this Phase I ESA report. It is possible that information exists beyond the scope of this assessment, or that information was not provided to TRC. Additional information subsequently provided, discovered, or produced may alter findings or conclusions made in this Phase I ESA report. TRC is under no obligation to update this report to reflect such subsequent information. The findings presented in this report are based upon reasonably ascertainable information and observed Site conditions at the time of the assessment.

This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not assessed. Regardless of the findings stated in this report, TRC is not responsible for consequences or conditions arising from facts that were not fully disclosed to TRC during the assessment.
An independent data research company provided the government agency database referenced in this report. Information regarding surrounding area properties was requested for approximate minimum search distances and was assumed to be correct and complete unless obviously contradicted by TRC’s observations or other credible referenced sources reviewed during the assessment.

TRC is not a professional title insurance or land surveyor firm and makes no guarantee, explicit or implied, that any land title records acquired or reviewed, or any physical descriptions or depictions of the property in this report, represent a comprehensive definition or precise delineation of property ownership or boundaries.

7.6.2 Warranties and Representations
This report does not warrant against: (1) operations or conditions which were not evident from visual observations or historical information provided; (2) conditions which could only be determined by physical sampling or other intrusive investigation techniques; (3) locations other than the client-provided addresses and/or legal parcel description; or (4) information regarding off-site location(s) (with possible impact to the Site) not published in publicly available records.

7.6.3 Continued Validity/User Reliance
This report is presumed to be valid, in accordance with, and subject to, the limitations specified in the ASTM E 1527-13 standard, for a period of 180 days from completion, or until the Client obtains specific information that may materially alter a finding, opinion, or conclusion in this report, or until the Client is notified by TRC that it has obtained specific information that may materially alter a finding, opinion, or conclusion in this report. Additionally, pursuant to the ASTM E 1527-13 standard, this report is presumed valid if completed less than 180 days prior to the date of acquisition of the property or (for transactions not involving an acquisition) the date of the intended transaction.

7.6.4 Significant Assumptions
During this Phase I ESA, TRC relied on database information; interviews with Site representatives, regulatory officials, and other individuals having knowledge of Site operations; and information provided by the User as requested in our authorized Scope of Work. TRC has assumed that the information provided is true and accurate. Reliance on electronic database search reports is subject to the limitations set forth in those reports. TRC did not independently verify the information provided. TRC found no reason to question the validity of the information received unless explicitly noted elsewhere in this report. If other information is discovered and/or if previous reports exist that were not provided to TRC, our conclusions may not be valid.

8.0 REFERENCES

<table>
<thead>
<tr>
<th>Description/Title of Document(s) Received or Agency Contacted</th>
<th>Date Information Request Filled/Date of Agency Contact</th>
<th>Information Updated</th>
<th>Reference Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Data Resources</td>
<td>May 16, 2016</td>
<td>N/A</td>
<td>EDR Inquiry Number: 4620578</td>
</tr>
<tr>
<td>Federal Emergency Management Agency</td>
<td>May 18, 2016</td>
<td>N/A</td>
<td><a href="http://www.fema.gov/">http://www.fema.gov/</a></td>
</tr>
<tr>
<td>Maui County Tax Assessor</td>
<td>May 18, 2016</td>
<td>N/A</td>
<td><a href="http://www.mauitaxinfo.com/">http://www.mauitaxinfo.com/</a></td>
</tr>
<tr>
<td>Maui County Department of Environmental Management</td>
<td>June 8, 2016</td>
<td>June 14, 2016</td>
<td><a href="http://www.co.mau.hawaii.gov">http://www.co.mau.hawaii.gov</a></td>
</tr>
<tr>
<td>Personal Interview with Mr. A. J. Varga</td>
<td>June 1, 2016</td>
<td>June 23, 2016</td>
<td>Personal Interview</td>
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<td>June 21, 2016</td>
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<td>Personal Interview</td>
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9.0 ADDITIONAL SERVICES

No additional services were performed during this Phase I ESA.
Lanai City Expansion - 200 Housing Units
Awala Avenue
Lanai City, HI 96763

Inquiry Number: 4620578.2s
May 16, 2016

APPENDIX A:
DATABASE RADIUS REPORT

The EDR Radius Map™ Report with GeoCheck®
A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA’s Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS
AWALUA AVENUE
LANAI CITY, HI 96763

COORDINATES

Latitude (North): 20.8211150 - 20˚ 49' 16.01''
Longitude (West): 156.9232370 - 156˚ 55' 23.65''
Universal Transverse Mercator: Zone 4
UTM X (Meters): 716130.6
UTM Y (Meters): 2303606.8
Elevation: 1545 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map: 5946085 LANAI SOUTH, HI
Version Date: 2013

Northeast Map: 5945823 LANAI NORTH, HI
Version Date: 2013
## MAPPED SITES SUMMARY

### EXECUTIVE SUMMARY

### TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

### DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable") government records either on the target property or within the search radius around the target property for the following databases:

### STANDARD ENVIRONMENTAL RECORDS

- **Federal NPL site list**
- **Proposed NPL site list**
- **NPL LIENS**
- **Federal Delisted NPL site list**
- **Federal CERCLIS list**
- **Federal CERCLIS NFRAP site list**
- **Federal RCRA CORRACTS facilities list**
- **Federal RCRA non-CORRACTS TSD facilities list**
- **Federal RCRA generators list**
- **Federal Institutional controls / engineering controls registries**

### MAP

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<thead>
<tr>
<th>ID</th>
<th>SITE NAME</th>
<th>ADDRESS</th>
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<th>DIST (ft. &amp; mi.) DIRECTION</th>
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EXECUTIVE SUMMARY

US INST CONTROL, .......... Sites with Institutional Controls

Federal ERNS list
ERNS, ..................... Emergency Response Notification System

State and tribal landfill and/or solid waste disposal site lists
SWF/LF, .................... Permitted Landfills in the State of Hawaii

State and tribal leaking storage tank lists
INDIAN LUST, ............... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists
FEMA LUST, .................. Underground Storage Tank Listing
INDIAN LUST, ................ Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries
INST CONTROL, .............. Sites with Institutional Controls

State and tribal voluntary cleanup sites
VCP, ......................... Voluntary Response Program Sites
INDIAN VCP, ............... Voluntary Cleanup Priority Listing

State and tribal Brownfields sites
BROWNFIELDS, .............. Brownfields Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfields lists
US BROWNFIELDS, ........... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites
INDIAN CDD, ................ Report on the Status of Open Dumps on Indian Lands
CDI, ......................... Open Dump Inventory
DEBRO REGION S, .......... Torres Martinez Reservation Regal Dump Site Locations

Local Lists of Hazardous waste / Contaminated Sites
US HIST CDD, ............... Delisted National Clandestine Laboratory Register
CDL, ......................... Clandestine Drug Lab Listing
US CDD, ..................... National Clandestine Laboratory Register

Local Land Records
LIENS 2, ..................... CERCLA Lien Information

Records of Emergency Release Reports
HMINS, ........................ Hazardous Materials Information Reporting System
SPILLS, ..................... Release Notifications
SPILLS 90, .................. SPILLS 90 data from FirstSearch

Other Ascertainable Records
FUDS, ........................ Formerly Used Defense Sites
DOD, .......................... Department of Defense Sites
SCRD DRYCLEANERS, ....... State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR, ............... Financial Assurance Information
EPA WATCH LIST, ........... EPA WATCH LIST
2020 COR ACTION, .......... 2020 Corrective Action Program List
TSCA, ........................ Toxic Substances Control Act
TRIS, .......................... Toxic Chemical Release Inventory System
SSTR, .......................... Section 7 Tracking Systems
ROD, .......................... Records Of Decision
RMP, ........................... Risk Management Plans
RAAS, .......................... RCRA Administrative Action Tracking System
PRP, ........................... Potentially Responsible Parties
PADS, .......................... PCB Activity Database System
ICIS, ............................ Integrated Compliance Information System
FTTS, .......................... FIFRA/TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

Local Land Records
LIENS 2, ..................... CERCLA Lien Information

EDR Exclusive Records
EDR MGP, ..................... EDR Proprietary Manufactured Gas Plants
EDR Hist Auto, EDR Exclusive Historic Gas Stations
EDR Hist Clean, EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

RGA HWS, Recovered Government Archive State Hazardous Waste Facilities List
RGA LF, Recovered Government Archive Solid Waste Facilities List
RGA LUST, Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS
Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property. Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in **bold italics** are in multiple databases.
Unmappable (orphan) sites are not considered in the foregoing analysis.

**STANDARD ENVIRONMENTAL RECORDS**

State- and tribal - equivalent CERCLIS

SHWS: The State Hazardous Waste Sites records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. The data come from the Department of Health.

A review of the SHWS list, as provided by EDR, and dated 01/22/2016 has revealed that there are 2 SHWS sites within approximately 1 mile of the target property.

**State and tribal registered storage tank lists**

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Health’s Listing of Underground Storage Tanks.

A review of the UST list, as provided by EDR, and dated 01/13/2016 has revealed that there are 8 UST sites within approximately 1/4 mile of the target property.

---

**Equal/Higher Elevation** | **Address** | **Direction / Distance** | **Map ID** | **Page**
--- | --- | --- | --- | ---
LANAI HIGH AND ELEME | SS FRASER AVE | N 1/8 - 1/4 (0.140 mi.) | BS | 12
MECO POLE-MOUNT TRAN | 548 ILUMA ST | NNE 1/4 - 1/2 (0.288 mi.) | 14 | 20

LANAI CENTRAL OFFICE | 423 NINTH ST | NE 0 - 1/8 (0.034 mi.) | A1 | 8

OSHRO ENTREPRISES I | 850 FRASER AVE | NE 0 - 1/8 (0.056 mi.) | A2 | 9

DOLE LANAI PLANTATIO | 730 LANAI AVE /DD | E 1/8 - 1/4 (0.227 mi.) | C9 | 16

DOLE LANAI PLANTATIO | 730 LANAI AVE (KAUMA E) | E 1/8 - 1/4 (0.245 mi.) | C11 | 18

DOLE LANAI PLANTATIO | 750 LANAI AVE (POW) | E 1/8 - 1/4 (0.245 mi.) | N1 | 14

---

LANAI CENTRAL OFFICE | 423 NINTH ST | NE 0 - 1/8 (0.034 mi.) | A1 | 8

OSHRO ENTREPRISES I | 850 FRASER AVE | NE 0 - 1/8 (0.056 mi.) | A2 | 9

DOLE LANAI PLANTATIO | 730 LANAI AVE /DD | E 1/8 - 1/4 (0.227 mi.) | C9 | 16

---
EXECUTIVE SUMMARY

Tank Status: Permanently Out of Use
Facility Id: 9-402426
Date Closed: 09/03/1990
DOLE LANAI PLANTATION
730 LANAI AVE (KAUMA)
Tank Status: Permanently Out of Use
Facility Id: 9-402422
Date Closed: 10/01/1989
DOLE LANAI PLANTATION
750 LANAI AVE (POW)
Tank Status: Permanently Out of Use
Facility Id: 9-400773
Date Closed: 10/30/1989
DOLE LANAI PLANTATION
750 LANAI AVE (EMU)
Tank Status: Permanently Out of Use
Facility Id: 9-402424
Date Closed: 10/30/1989
DOLE LANAI PLANTATION
750 LANAI AVE (SHO)
Tank Status: Permanently Out of Use
Facility Id: 9-402425
Date Closed: 10/30/1989

ADDITIONAL ENVIRONMENTAL RECORDS

Other Ascertainable Records

RCRA NonGen / NLR: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA NonGen / NLR list, as provided by EDR, and dated 12/09/2015 has revealed that there are 3 RCRA NonGen / NLR sites within approximately 0.25 miles of the target property.

Due to poor or inadequate address information, the following sites were not mapped. Count: 4 records.

Site Name  Database(s)
DOLE PLANTATION  SEMS-ARCHIVE, RCRA-TSDF, RCRA NonGen / NLR
LANAI LANDFILL  SHWS
DOLE PLANTATION (PALAWAI & 5319 BA LANAI LDFL  SEMS-ARCHIVE

US MINES: Mines Master Index File. The source of this database is the Dept. of Labor, Mine Safety and Health Administration.

A review of the US MINES list, as provided by EDR, and dated 02/09/2016 has revealed that there is 1 US MINES site within approximately 0.25 miles of the target property.

Due to poor or inadequate address information, the following sites were not mapped. Count: 4 records.

Due to poor or inadequate address information, the following sites were not mapped. Count: 4 records.

Site Name  Database(s)
LASER
DAT
US MINES: Mines Master Index File. The source of this database is the Dept. of Labor, Mine Safety and Health Administration.

A review of the US MINES list, as provided by EDR, and dated 02/09/2016 has revealed that there is 1 US MINES site within approximately 0.25 miles of the target property.
## MAP FINDINGS SUMMARY

### STANDARD ENVIRONMENTAL RECORDS

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### ADDITIONAL ENVIRONMENTAL RECORDS

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### STATE AND TRIBAL ENVIRONMENTAL RECORDS

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**EDR HIGH RISK HISTORICAL RECORDS**

**EDR Exclusive Records**

- EDR MSP: 1.000 (0 NR NR NR NR 0)
- EDR Hist Auto: 0.125 (0 NR NR NR NR 0)
- EDR Hist Cleaner: 0.125 (0 NR NR NR NR 0)

**EDR RECOVERED GOVERNMENT ARCHIVES**

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- Totals: 6 12 2 0 0 20

**NOTES:**
- TP = Target Property
- NR = Not Requested at this Search Distance
- Sites may be listed in more than one database
### LANAI CENTRAL OFFICE
#### UST
**9-400557**
- **EPA ID:** HIR00005673
- **Facility Name:** LANAI CO INC
- **Location:** 1233 FRASER AVE
- **City:** LANAI CITY, HI 96763
- **Financial Assurance:** R-1
- **Tank ID:** M-2
- **Tank Status:** Currently In Use
- **Date Installed:** 07/01/1992
- **Date Closed:** 06/24/1993
- **Capacity:** 2000
- **Substance:** Gasoline
- **Proj. Officer:** Shunsheng Fu
- **Release ID:** 01/19/2001
- **Status:** Site Cleanup Completed (NFA)
- **Owner:** CASTLE & COOKE, INC
- **Address:** P.O. BOX 310
- **City:** LANAI CITY, HI 96763
- **Telephone:** (808) 565-3931
- **Contact:** PAT GABLE
- **Contact Email:** Not reported
- **Mailing Address:** P.O. BOX 310
- **Contact:** LANAI CITY, HI 96763
- **Fax:** Not reported
- **Date Form Received by Agency:** 08/18/1999
- **RCRA NonGen / NLR:** ECHO
- **EPA Region:** 09

#### LUST
**9-401388**
- **EPA ID:** HIR00005673
- **Facility Name:** LANAI CO INC
- **Location:** 1233 FRASER AVE
- **City:** LANAI CITY, HI 96763
- **Financial Assurance:** R-1
- **Tank ID:** R-2
- **Tank Status:** Permanently Out of Use
- **Date Installed:** 07/01/1992
- **Date Closed:** 06/24/1993
- **Capacity:** 2000
- **Substance:** Gasoline
- **Proj. Officer:** Shunsheng Fu
- **Release ID:** 01/19/2001
- **Status:** Site Cleanup Completed (NFA)
- **Owner:** CASTLE & COOKE, INC
- **Address:** P.O. BOX 310
- **City:** LANAI CITY, HI 96763
- **Telephone:** (808) 565-3931
- **Contact:** PAT GABLE
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- **Mailing Address:** P.O. BOX 310
- **Contact:** LANAI CITY, HI 96763
- **Fax:** Not reported
- **Date Form Received by Agency:** 08/18/1999
- **RCRA NonGen / NLR:** ECHO
- **EPA Region:** 09

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### OSHIRO ENTREPRISES INC
#### UST
**9-400557**
- **EPA ID:** HIR00005673
- **Facility Name:** LANAI CO INC
- **Location:** 1233 FRASER AVE
- **City:** LANAI CITY, HI 96763
- **Financial Assurance:** R-1
- **Tank ID:** M-2
- **Tank Status:** Currently In Use
- **Date Installed:** 07/01/1992
- **Date Closed:** 06/24/1993
- **Capacity:** 2000
- **Substance:** Gasoline
- **Proj. Officer:** Shunsheng Fu
- **Release ID:** 01/19/2001
- **Status:** Site Cleanup Completed (NFA)
- **Owner:** CASTLE & COOKE, INC
- **Address:** P.O. BOX 310
- **City:** LANAI CITY, HI 96763
- **Telephone:** (808) 565-3931
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- **Contact:** LANAI CITY, HI 96763
- **Fax:** Not reported
- **Date Form Received by Agency:** 08/18/1999
- **RCRA NonGen / NLR:** ECHO
- **EPA Region:** 09

#### LUST
**9-401388**
- **EPA ID:** HIR00005673
- **Facility Name:** LANAI CO INC
- **Location:** 1233 FRASER AVE
- **City:** LANAI CITY, HI 96763
- **Financial Assurance:** R-1
- **Tank ID:** R-2
- **Tank Status:** Permanently Out of Use
- **Date Installed:** 07/01/1992
- **Date Closed:** 06/24/1993
- **Capacity:** 2000
- **Substance:** Gasoline
- **Proj. Officer:** Shunsheng Fu
- **Release ID:** 01/19/2001
- **Status:** Site Cleanup Completed (NFA)
- **Owner:** CASTLE & COOKE, INC
- **Address:** P.O. BOX 310
- **City:** LANAI CITY, HI 96763
- **Telephone:** (808) 565-3931
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- **Contact:** LANAI CITY, HI 96763
- **Fax:** Not reported
- **Date Form Received by Agency:** 08/18/1999
- **RCRA NonGen / NLR:** ECHO
- **EPA Region:** 09
### LANAI CO INC (Continued)

**Classification:** Non-Generator  
**Description:** Handler: Non-Generators do not presently generate hazardous waste  

**Owner/Operator Summary:**  
- **Name:** LANAI CO INC  
- **Address:** P O BOX 310, LANAI CITY, HI 96763  
- **Telephone:** (808) 565-3931  
- **Legal Status:** Private  
- **Type:** Owner  
- **Start Date:** Not reported  
- **End Date:** Not reported  

**Handler Activities Summary:**  
- U.S. importer of hazardous waste: No  
- Mixed waste (haz. and radioactive): No  
- Recycler of hazardous waste: No  
- Transporter of hazardous waste: Yes  
- Treater, storer or disposer of HW: No  
- Underground injection activity: No  
- On-site burner exemption: No  
- Furnace exemption: No  
- Used oil fuel burner: No  
- Used oil processor: No  
- Used oil refinier: No  
- Used oil fuel marketer to burner: No  
- Used oil Specification marketer: No  
- Used oil transfer facility: No  
- Used oil transporter: No  

**Violation Status:** No violations found  

**FINDS:**  
- Registry ID: 110005730548

**Environmental Interest/Information System:**  
RCAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

**STATE MASTER**

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**CASTLE & COOKE RESORTS LLC**

**Relative to:**  
- **US MINES:** N/A  
- **Lower Relative:**  
- **Actual:**  
- **104(a) Action Type:** Citations  
- **Status Date:** Abandoned  
- **Mine Status:**  
- **Status Date:** N/A  
- **Operation Class:** non-Coal Mining  
- **Number of shops:** 0  
- **Number of plants:** 0  
- **Latitude:** 20 49 08  
- **Longitude:** 156 55 10  

**Violations Details:**  
- **Violation Number:** 6367346  
- **Date Issued:** 12/20/2004  
- **Status Date:** 12/22/2004  
- **Citation/Order:** Citations  
- **Proposed Penalty:** Not reported  
- **Paid Penalty:** Not reported  
- **Assessment Amount:** Not reported  
- **Year:** 2004

---

**CASTLE & COOKE RESORTS LLC**

**Relative to:**  
- **US MINES:** 5100047  
- **Lower Relative:**  
- **Actual:**  
- **104(a) Action Type:** Citations  
- **Status Date:** Abandoned  
- **Mine Status:**  
- **Status Date:** N/A  
- **Operation Class:** non-Coal Mining  
- **Number of shops:** 0  
- **Number of plants:** 0  
- **Latitude:** 20 49 08  
- **Longitude:** 156 55 10  

**Violations Details:**  
- **Violation Number:** 6367346  
- **Date Issued:** 12/20/2004  
- **Status Date:** 12/22/2004  
- **Citation/Order:** Citations  
- **Proposed Penalty:** Not reported  
- **Paid Penalty:** Not reported  
- **Assessment Amount:** Not reported  
- **Year:** 2004
CASTLE & COOKE RESORTS LLC (Continued)

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LANAI HIGH AND ELEMENTARY SCHOOL (Continued)

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**B5**
LANAI HIGH AND ELEMENTARY SCHOOL
North
555 FRASER AVE
LANAI CITY, HI
6.142 mi.
792 ft.
Site 1 of 2 in cluster B

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**B6**
OSHIRO SERVICE STATION
North
850 FRASER AVE
LANAI CITY, HI 96783
1.61 mi.
0.142 mi.
792 ft.
Site 2 of 2 in cluster B

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### OSHIRO SERVICE STATION (Continued)

**Handler Activities Summary:**

- **Used Oil:**
  - Substance: Not reported
  - Tank Capacity: Not reported
  - Date Closed: Permanently Out of Use
  - Tank Status: Not reported
  - Tank ID: R-L5
  - Horizontal Collection Method Name: Not reported
  - Horizontal Reference Datum Name: Not reported
  - Owner/Op end date: Not reported
  - Owner/Op start date: Not reported

**Evaluation Action Summary:**

- **Evaluation:** COMPLIANCE EVALUATION INSPECTION ON-SITE
- **Area of violation:** Not reported
- **Date achieved compliance:** Not reported
- **Evaluation lead agency:** State

**Registry ID:** 110005729015

**Environmental Interest/Information System**

- RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

**ECHO:**

- Email: 1000860479
- Registry ID: 110005729015
- DFR URL: http://echo.epa.gov/detailed_facility_report?id=110005729015

### DOLE LANAI PLANTATION (Continued)

**Handler Activities Summary:**

- **Used Oil:**
  - Substance: Not reported
  - Tank Capacity: Not reported
  - Date Closed: Permanently Out of Use
  - Tank Status: Not reported
  - Tank ID: R-L5
  - Horizontal Collection Method Name: Not reported
  - Horizontal Reference Datum Name: Not reported
  - Owner/Op end date: Not reported
  - Owner/Op start date: Not reported

**Evaluation Action Summary:**

- **Evaluation:** COMPLIANCE EVALUATION INSPECTION ON-SITE
- **Area of violation:** Not reported
- **Date achieved compliance:** Not reported
- **Evaluation lead agency:** State

**Registry ID:** 110005729015

**Environmental Interest/Information System**

- RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

**ECHO:**

- Email: 1000860479
- Registry ID: 110005729015
- DFR URL: http://echo.epa.gov/detailed_facility_report?id=110005729015
**Map Findings**

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**DOLE PACKAGED FOODS CO (Continued)**

- **Handler Activities Summary:**
  - U.S. importer of hazardous waste: No
  - Mixed waste (haz. and radioactive): No
  - Recycler of hazardous waste: No
  - Transporter of hazardous waste: No
  - Theater, storer or disposer of HW: No
  - Underground injection activity: No
  - On-site burner exemption: No
  - Furnace exemption: No
  - Used oil fuel burner: No
  - Used oil processor: No
  - User oil re-user: No
  - Used oil fuel marketer to burner: No
  - Used oil Specification marketer: No
  - Used oil transfer facility: No
  - Used oil transporter: No

- **Historical Generators:**
  - Date form received by agency: 06/25/1986
  - Site name: DOLE PACKAGED FOODS CO
  - Site address: 1116 WHITMORE AVE
  - Owner: DOLE FOOD COMPANY HAWAII, INC
  - Facility ID: 9-402426
  - Project Officer: Shunsheng Fu

- **UST:**
  - Facility ID: 9-402426
  - Owner: DOLE FOOD COMPANY HAWAII, INC
  - Owner Address: 1116 WHITMORE AVE
  - Owner City,St,Zip: Lanai City, HI 96763
  - Latitude: 20.826150
  - Longitude: -156.918532
  - Horizontal Reference Datum Name: NAD83
  - Horizontal Collection Method Name: Address Matching
  - Tank ID: R-L2
  - Date Installed: 05/07/1989
  - Tank Status: Permanently Out of Use
  - Tank Capacity: 10390
  - Substance: Diesel

- **LUST:**
  - Facility ID: 9-402426
  - Owner: DOLE FOOD COMPANY HAWAII, INC
  - Owner Address: 1116 WHITMORE AVE
  - Owner City,St,Zip: Lanai City, HI 96763
  - Latitude: 20.826150
  - Longitude: -156.918615
  - Horizontal Reference Datum Name: NAD83
  - Horizontal Collection Method Name: Address Matching
  - Tank ID: R-L3
  - Date Installed: 05/07/1989
  - Tank Status: Permanently Out of Use
  - Tank Capacity: 7050
  - Substance: Gasoline

**DOLE LANAI PLANTATION (Continued)**

- **Release ID:** 900129

- **C10**
  - **DOLE LANAI PLANTATION**
  - **UST:**
    - Facility ID: 9-402422
    - Owner: DOLE FOOD COMPANY HAWAII, INC
    - Owner Address: 1116 WHITMORE AVE
    - Owner City,St,Zip: Lanai City, HI 96763
    - Latitude: 20.826150
    - Longitude: -156.918615
    - Horizontal Reference Datum Name: NAD83
    - Horizontal Collection Method Name: Address Matching
    - Tank ID: R-L2
    - Date Installed: 05/07/1989
    - Tank Status: Permanently Out of Use
    - Tank Capacity: 10390
    - Substance: Diesel

- **LUST:**
  - Facility ID: 9-402422
  - Owner: DOLE FOOD COMPANY HAWAII, INC
  - Owner Address: 1116 WHITMORE AVE
  - Owner City,St,Zip: Lanai City, HI 96763
  - Latitude: 20.826150
  - Longitude: -156.918615
  - Horizontal Reference Datum Name: NAD83
  - Horizontal Collection Method Name: Address Matching
  - Tank ID: R-L3
  - Date Installed: 05/07/1989
  - Tank Status: Permanently Out of Use
  - Tank Capacity: 7050
  - Substance: Gasoline
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**Notes:**
- UST: Underground Storage Tank
- Relative: Higher, Actual: Higher
- All evaluations are as of the latest update date provided.
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<td>Amelia Hicks</td>
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<td>HID Number</td>
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<td>Nature of Residual Contamination</td>
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<td>No Further Action Letter - Unrestricted Residential Use</td>
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<td>No Further Action Determination for MECO Transformer No. 0012, No. 8338, No. 8656, No. 8894, No. 11543 and Pad-Mount Transformer at Pole 6</td>
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<td>Project Manager</td>
<td>Amelia Hicks</td>
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<td></td>
<td>Contact Information</td>
<td>(808) 586-4249 919 Ala Moana Blvd, Honolulu, HI 96814</td>
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To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

**Number of Days to Update:** Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

### STANDARD ENVIRONMENTAL RECORDS

#### Federal NPL site list

NPL: National Priorities List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA’s Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

- **Date of Government Version:** 03/07/2016
- **Date Data Arrived at EDR:** 04/05/2016
- **Date Made Active in Reports:** 04/15/2016
- **Number of Days to Update:** 10

Sources:

- EPA’s Environmental Photographic Interpretation Center (EPIC)
- Telephone: 202-564-7333
- EPA Region 1: Telephone 617-918-1143
- EPA Region 6: Telephone: 214-655-6659
- EPA Region 3: Telephone: 215-814-5418
- EPA Region 7: Telephone: 913-551-7247
- EPA Region 4: Telephone: 404-562-8033
- EPA Region 8: Telephone: 303-312-6774
- EPA Region 5: Telephone: 312-886-6686
- EPA Region 9: Telephone: 415-947-4246
- EPA Region 10: Telephone: 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

- **Date of Government Version:** 03/07/2016
- **Date Data Arrived at EDR:** 04/05/2016
- **Date Made Active in Reports:** 04/15/2016
- **Number of Days to Update:** 10

**NPL LIENS:** Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

- **Date of Government Version:** 10/15/1991
- **Date Data Arrived at EDR:** 02/10/1994
- **Date Made Active in Reports:** 03/30/1994
- **Number of Days to Update:** 56

Data Release Frequency: Quarterly

### GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Page 22
Federal Delisted NPL site list

Delisted NPL - National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 03/07/2016
Data Arrived at EDR: 04/05/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 10
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY - Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 03/07/2016
Data Arrived at EDR: 03/08/2016
Date Made Active in Reports: 03/10/2016
Number of Days to Update: 64
Data Release Frequency: Quarterly

SEMS - Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA’s Superfund Program across the United States. The list was formerly known as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 03/07/2016
Data Arrived at EDR: 04/05/2016
Date Made Active in Reports: 04/15/2016
Number of Days to Update: 10
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE - Superfund Enterprise Management System Archive
RCRA-SQG: RCRA - Small Quantity Generators
RCRA/SQG is EPA’s comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 12/09/2015
Date Data Arrived at EDR: 03/02/2016
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 34
Data Release Frequency: Quarterly

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/30/2016
Next Scheduled EDR Contact: 07/11/2016
Number of Days to Update: 82

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators
RCRA/CESQG is EPA’s comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 12/09/2015
Date Data Arrived at EDR: 03/02/2016
Date Made Active in Reports: 04/05/2016
Number of Days to Update: 34
Data Release Frequency: Quarterly

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/30/2016
Next Scheduled EDR Contact: 07/11/2016
Number of Days to Update: 36

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System
LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13
Data Release Frequency: Monthly

Source: Department of the Navy
Telephone: 843-620-7526
Last EDR Contact: 06/16/2016
Next Scheduled EDR Contact: 09/05/2016

US ENG CONTROLS: Engineering Controls Sites List
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 09/10/2015
Date Data Arrived at EDR: 09/11/2015
Date Made Active in Reports: 11/03/2015
Number of Days to Update: 53
Data Release Frequency: Varies

Source: Environmental Protection Agency
Telephone: 703-603-0665
Last EDR Contact: 02/29/2016
Next Scheduled EDR Contact: 06/13/2016

US INST CONTROL: Sites with Institutional Controls
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post-remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 09/10/2015
Date Data Arrived at EDR: 09/11/2015
Date Made Active in Reports: 11/03/2015
Number of Days to Update: 53
Data Release Frequency: Varies

Source: Environmental Protection Agency
Telephone: 703-603-0665
Last EDR Contact: 02/29/2016
Next Scheduled EDR Contact: 06/13/2016

Federal ERNS list

ERNS: Emergency Response Notification System
ERNS is the EPA’s comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA). ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/22/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 82
Data Release Frequency: Semi-Annually

Source: National Response Center, United States Coast Guard
Telephone: 808-586-4249
Last EDR Contact: 02/26/2016
Next Scheduled EDR Contact: 06/06/2016

State and tribal landfill and/or solid waste disposal site lists

SWFL/F: Permitted Landfills in the State of Hawaii
Solid Waste Facilities/Landfill Sites. SWFL/F type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 09/17/2012
Date Data Arrived at EDR: 04/03/2013
Date Made Active in Reports: 05/10/2013
Number of Days to Update: 37
Data Release Frequency: Semi-Annually

Source: Department of Health
Telephone: 808-586-4245
Last EDR Contact: 04/01/2016
Next Scheduled EDR Contact: 07/11/2016

LUST: Leaking Underground Storage Tank Database
LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 01/05/2016
Date Data Arrived at EDR: 01/15/2016
Date Made Active in Reports: 03/02/2016
Number of Days to Update: 47
Data Release Frequency: Semi-Annually

Source: Department of Health
Telephone: 808-586-4228
Last EDR Contact: 03/04/2016
Next Scheduled EDR Contact: 06/13/2016

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 01/06/2015
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32
Data Release Frequency: Quarterly

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 04/27/2016
Next Scheduled EDR Contact: 08/08/2016
INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.
Date of Government Version: 10/13/2015
Source: EPA Region 8
Telephone: 303-312-6271
Date Data Arrived at EDR: 10/23/2015
Date Data Made Available in Reports: 02/18/2016
Number of Days to Update: 118
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska.
Date of Government Version: 03/30/2015
Source: EPA Region 7
Telephone: 913-551-7003
Date Data Arrived at EDR: 04/28/2015
Date Data Made Available in Reports: 06/20/2015
Number of Days to Update: 55
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.
Date of Government Version: 06/20/2015
Source: EPA Region 6
Telephone: 214-485-6597
Date Data Arrived at EDR: 07/30/2015
Date Data Made Available in Reports: 02/18/2016
Number of Days to Update: 111
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Michigan, Minnesota and Wisconsin.
Date of Government Version: 11/04/2015
Source: EPA Region 5
Telephone: 312-886-7439
Date Data Arrived at EDR: 11/13/2015
Date Data Made Available in Reports: 01/04/2016
Number of Days to Update: 34
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Semi-Annually

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.
Date of Government Version: 11/24/2015
Source: EPA Region 4
Telephone: 404-562-8677
Date Data Arrived at EDR: 12/01/2015
Date Data Made Available in Reports: 01/04/2016
Number of Days to Update: 34
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Semi-Annually

INDIAN LUST R3: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.
Date of Government Version: 12/14/2014
Source: EPA Region 3
Telephone: 808-586-4228
Date Data Arrived at EDR: 02/13/2015
Date Data Made Available in Reports: 03/13/2015
Number of Days to Update: 28
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Quarterly

INDIAN LUST R2: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.
Date of Government Version: 11/05/2015
Source: EPA Region 2
Telephone: 312-886-8136
Date Data Arrived at EDR: 11/11/2015
Date Data Made Available in Reports: 01/04/2016
Number of Days to Update: 52
Next Scheduled EDR Contact: 04/27/2016
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of all EPA owned underground storage tanks.
Date of Government Version: 10/27/2015
Source: EPA Region 1
Telephone: 913-551-7003
Date Data Arrived at EDR: 10/29/2015
Date Data Made Available in Reports: 01/04/2016
Number of Days to Update: 67
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).
Date of Government Version: 12/14/2014
Source: EPA Region 9
Telephone: 415-972-3368
Date Data Arrived at EDR: 02/13/2015
Date Data Made Available in Reports: 03/13/2015
Number of Days to Update: 28
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Alaska, Idaho, Oregon and Washington).
Date of Government Version: 02/23/2014
Source: EPA Region 8
Telephone: 913-551-7003
Date Data Arrived at EDR: 11/25/2014
Date Data Made Available in Reports: 01/28/2015
Number of Days to Update: 65
Next Scheduled EDR Contact: 08/08/2016
Data Release Frequency: Varies
### INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

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<tr>
<th>Date of Government Version</th>
<th>Source</th>
<th>Telephone</th>
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<td>118</td>
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### INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

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<th>Number of Days to Update</th>
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### INDIAN UST R10: Underground Storage Tanks on Indian Land


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<td>02/18/2016</td>
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<td>08/08/2016</td>
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### INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

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<th>Date of Government Version</th>
<th>Source</th>
<th>Telephone</th>
<th>Last EDR Contact</th>
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<td>214-665-7591</td>
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<td>08/08/2016</td>
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### State and tribal institutional control / engineering control registries

**ENG CONTROLS: Engineering Control Sites**

A listing of sites with engineering controls in place.

<table>
<thead>
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<th>Date of Government Version</th>
<th>Source</th>
<th>Telephone</th>
<th>Last EDR Contact</th>
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<td>Various</td>
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**INST CONTROLS: Sites with Institutional Controls**

A listing of sites with institutional controls in place.

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### State and tribal voluntary cleanup sites

**INDIAN VCP R7: Voluntary Cleanup Priority Listing**

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

<table>
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<tr>
<th>Date of Government Version</th>
<th>Source</th>
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<th>Last EDR Contact</th>
<th>Date Made Active in Reports</th>
<th>Number of Days to Update</th>
<th>Next Scheduled EDR Contact</th>
<th>Data Release Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/29/2015</td>
<td>EPA Region 7</td>
<td>617-918-1102</td>
<td>04/01/2016</td>
<td>01/02/2016</td>
<td>142</td>
<td>07/11/2016</td>
<td>Various</td>
</tr>
</tbody>
</table>

**INDIAN VCP R1: Voluntary Cleanup Priority Listing**

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

<table>
<thead>
<tr>
<th>Date of Government Version</th>
<th>Source</th>
<th>Telephone</th>
<th>Last EDR Contact</th>
<th>Date Made Active in Reports</th>
<th>Number of Days to Update</th>
<th>Next Scheduled EDR Contact</th>
<th>Data Release Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>02/26/2015</td>
<td>Department of Health</td>
<td>808-586-4249</td>
<td>06/06/2016</td>
<td>01/02/2016</td>
<td>36</td>
<td>06/06/2016</td>
<td>Various</td>
</tr>
</tbody>
</table>

**BROWNFIELDS: Brownfields Sites**

With certain legal exclusions and additions, the term 'brownfield site' means real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant.

<table>
<thead>
<tr>
<th>Date of Government Version</th>
<th>Source</th>
<th>Telephone</th>
<th>Last EDR Contact</th>
<th>Date Made Active in Reports</th>
<th>Number of Days to Update</th>
<th>Next Scheduled EDR Contact</th>
<th>Data Release Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/22/2016</td>
<td>Department of Health</td>
<td>808-586-4249</td>
<td>06/06/2016</td>
<td>01/02/2016</td>
<td>36</td>
<td>06/06/2016</td>
<td>Various</td>
</tr>
</tbody>
</table>

**US BROWNFIELDS: A Listing of Brownfields Sites**

<table>
<thead>
<tr>
<th>Date of Government Version</th>
<th>Source</th>
<th>Telephone</th>
<th>Last EDR Contact</th>
<th>Date Made Active in Reports</th>
<th>Number of Days to Update</th>
<th>Next Scheduled EDR Contact</th>
<th>Data Release Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/12/2015</td>
<td>Environmental Protection Agency</td>
<td>202-586-2777</td>
<td>07/04/2016</td>
<td>12/12/2015</td>
<td>57</td>
<td>07/04/2016</td>
<td>Semi-Annually</td>
</tr>
</tbody>
</table>
### Local Lists of Landfill / Solid Waste Disposal Sites

**INDIAN ODI: Report on the Status of Open Dumps on Indian Lands**
- Location of open dumps on Indian land.
- **Source:** Drug Enforcement Administration
- **Date of Government Version:** 09/17/2015
- **Date Data Arrived at EDR:** 12/04/2015
- **Date Made Active in Reports:** 02/18/2016
- **Number of Days to Update:** 76
- **Data Release Frequency:** Quarterly

**LOCAL LAND RECORDS**

**ODI: Open Dump Inventory**
- An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.
- **Source:** Environmental Protection Agency
- **Date of Government Version:** 06/30/1985
- **Date Data Arrived at EDR:** 12/04/2015
- **Date Made Active in Reports:** 09/17/2004
- **Number of Days to Update:** 39
- **Data Release Frequency:** No Update Planned

**DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations**
- A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.
- **Source:** EPA, Region 9
- **Date of Government Version:** 01/12/2009
- **Date Data Arrived at EDR:** 05/07/2009
- **Date Made Active in Reports:** 09/21/2009
- **Number of Days to Update:** 137
- **Data Release Frequency:** No Update Planned

**US HIST CDL: National Clandestine Laboratory Register**
- A listing of clandestine drug lab locations that have been removed from the DEA's National Clandestine Laboratory Register.
- **Source:** Drug Enforcement Administration
- **Date of Government Version:** 08/04/2010
- **Date Data Arrived at EDR:** 10/10/2010
- **Date Made Active in Reports:** 10/22/2010
- **Number of Days to Update:** 42
- **Data Release Frequency:** Varies

**US CDL: Clandestine Drug Labs**
- A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsters. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.
- **Source:** Drug Enforcement Administration
- **Date of Government Version:** 08/04/2010
- **Date Data Arrived at EDR:** 12/04/2010
- **Date Made Active in Reports:** 02/18/2016
- **Number of Days to Update:** 78
- **Data Release Frequency:** No Update Planned

**US HIST CDL: National Clandestine Laboratory Register**
- **Source:** Drug Enforcement Administration
- **Date of Government Version:** 08/04/2010
- **Date Data Arrived at EDR:** 12/04/2010
- **Date Made Active in Reports:** 02/18/2016
- **Number of Days to Update:** 78
- **Data Release Frequency:** No Update Planned

**CDL: Clandestine Drug Lab Listing**
- A listing of clandestine drug lab site locations.
- **Source:** Drug Enforcement Administration
- **Date of Government Version:** 12/31/1998
- **Date Data Arrived at EDR:** 12/03/2007
- **Date Made Active in Reports:** 01/24/2008
- **Number of Days to Update:** 52
- **Data Release Frequency:** Varies

**LOCAL LAND RECORDS**

**LIENS 2: CERCLA Lien Information**
- CERCLA lien information can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination.
- **Source:** Environmental Protection Agency
- **Date of Government Version:** 02/18/2014
- **Date Data Arrived at EDR:** 03/18/2014
- **Date Made Active in Reports:** 04/24/2014
- **Number of Days to Update:** 37
- **Data Release Frequency:** Annually

**SPILLS 90: SPILLS90 data from FirstSearch**
- Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills reported after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.
- **Source:** FirstSearch
- **Date of Government Version:** 03/10/2012
- **Date Data Arrived at EDR:** 01/03/2013
- **Date Made Active in Reports:** 10/21/2013
- **Number of Days to Update:** 39
- **Data Release Frequency:** No Update Planned

**Other Ascertainable Records**

**RCRA NonGen / NLR: RCRA Non-Generators / No Longer Regulated**
- RCRA != RCRA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generates, transports, stores, and/or disposes of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.
- **Source:** Drug Enforcement Administration
- **Date of Government Version:** 09/17/2015
- **Date Data Arrived at EDR:** 12/04/2015
- **Date Made Active in Reports:** 02/18/2016
- **Number of Days to Update:** 76
- **Data Release Frequency:** Quarterly

**Local Land Records**

**LIENS 2: CERCLA Lien Information**
- A Federal CERCLA (Superfund) lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination.
- **Source:** Environmental Protection Agency
- **Date of Government Version:** 09/17/2015
- **Date Data Arrived at EDR:** 03/01/2016
- **Next Scheduled EDR Contact:** 06/13/2016
- **Data Release Frequency:** Quarterly

**SPILLS: Release Notifications**
- Releases of hazardous substances to the environment reported to the Office of Hazard Evaluation and Emergency Response since 1988.
- **Source:** U.S. Department of Transportation
- **Date of Government Version:** 06/24/2015
- **Date Data Arrived at EDR:** 06/26/2015
- **Next Scheduled EDR Contact:** 06/13/2016
- **Data Release Frequency:** Annually

**CDL: Clandestine Drug Labs**
- A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsters. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.
- **Source:** Drug Enforcement Administration
- **Date of Government Version:** 08/04/2010
- **Date Data Arrived at EDR:** 09/10/2010
- **Date Made Active in Reports:** 10/22/2010
- **Number of Days to Update:** 42
- **Data Release Frequency:** Varies
EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions. This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands. The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

The Federal and Indian Lands (FEDLAND) data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands. These lands include lands administered by the U.S. Army Corps of Engineers, Bureau of Reclamation, National Park Service, and other federal agencies. The Federal and Indian Lands (FEDLAND) data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System (TRIS) identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313. All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.
### ROD: Records Of Decision

**ROD: Records Of Decision** mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

<table>
<thead>
<tr>
<th>Date of Government Version</th>
<th>Source</th>
<th>Date Data Arrived at EDR</th>
<th>Date Made Active in Reports</th>
<th>Number of Days to Update</th>
<th>Last EDR Contact</th>
<th>Next Scheduled EDR Contact</th>
<th>Data Release Frequency</th>
<th>FTTS - RIFRA TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, &amp; Rodenticide Act)/TSCA (Toxic Substances Control Act)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/25/2013</td>
<td>EPA</td>
<td>12/13/2013</td>
<td>02/24/2014</td>
<td>74</td>
<td>03/08/2016</td>
<td>06/20/2016</td>
<td>Annually</td>
<td>FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.</td>
</tr>
</tbody>
</table>

### RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(q) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes quadrennial hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases. Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g. the fire department) should an accident occur.

<table>
<thead>
<tr>
<th>Date of Government Version</th>
<th>Source</th>
<th>Date Data Arrived at EDR</th>
<th>Date Made Active in Reports</th>
<th>Number of Days to Update</th>
<th>Last EDR Contact</th>
<th>Next Scheduled EDR Contact</th>
<th>Data Release Frequency</th>
<th>FTTS - RIFRA TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, &amp; Rodenticide Act)/TSCA (Toxic Substances Control Act)</th>
</tr>
</thead>
<tbody>
<tr>
<td>08/01/2015</td>
<td>EPA</td>
<td>08/26/2015</td>
<td>11/03/2015</td>
<td>69</td>
<td>04/25/2016</td>
<td>08/08/2016</td>
<td>Varies</td>
<td>FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.</td>
</tr>
</tbody>
</table>

### RAATS: RCRA Administrative Action Tracking System

RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For enforcement actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because there are currently no active programs responsible for maintaining the database.

<table>
<thead>
<tr>
<th>Date of Government Version</th>
<th>Source</th>
<th>Date Data Arrived at EDR</th>
<th>Date Made Active in Reports</th>
<th>Number of Days to Update</th>
<th>Last EDR Contact</th>
<th>Next Scheduled EDR Contact</th>
<th>Data Release Frequency</th>
<th>FTTS - RIFRA TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, &amp; Rodenticide Act)/TSCA (Toxic Substances Control Act)</th>
</tr>
</thead>
<tbody>
<tr>
<td>04/17/1995</td>
<td>EPA</td>
<td>07/03/1995</td>
<td>06/02/2008</td>
<td>35</td>
<td>09/01/2008</td>
<td>No Update Planned</td>
<td>Varies</td>
<td>FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.</td>
</tr>
</tbody>
</table>

### PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

<table>
<thead>
<tr>
<th>Date of Government Version</th>
<th>Source</th>
<th>Date Data Arrived at EDR</th>
<th>Date Made Active in Reports</th>
<th>Number of Days to Update</th>
<th>Last EDR Contact</th>
<th>Next Scheduled EDR Contact</th>
<th>Data Release Frequency</th>
<th>FTTS - RIFRA TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, &amp; Rodenticide Act)/TSCA (Toxic Substances Control Act)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/25/2013</td>
<td>EPA</td>
<td>10/17/2014</td>
<td>10/20/2014</td>
<td>3</td>
<td>09/22/2016</td>
<td>Quarterly</td>
<td>Varies</td>
<td>FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.</td>
</tr>
</tbody>
</table>

### PADS: PCB Activity Database System

PCB Activity Database. PADS identifies generators, transporters, commercial storers and/or brokers and disposers of PCB’s who are required to notify the EPA of such activities.

<table>
<thead>
<tr>
<th>Date of Government Version</th>
<th>Source</th>
<th>Date Data Arrived at EDR</th>
<th>Date Made Active in Reports</th>
<th>Number of Days to Update</th>
<th>Last EDR Contact</th>
<th>Next Scheduled EDR Contact</th>
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<th>FTTS - RIFRA TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, &amp; Rodenticide Act)/TSCA (Toxic Substances Control Act)</th>
</tr>
</thead>
<tbody>
<tr>
<td>07/01/2014</td>
<td>EPA</td>
<td>10/15/2014</td>
<td>11/17/2014</td>
<td>33</td>
<td>04/12/2016</td>
<td>07/26/2016</td>
<td>Annually</td>
<td>FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.</td>
</tr>
</tbody>
</table>
PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.
Date of Government Version: 03/01/2011
Date Data Arrived at EDR: 10/19/2011
Number of Days to Update: 83
Data Release Frequency: Varies

RADIINFO: Radiation Information Database
The Radiation Information Database (RADIINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.
Date of Government Version: 07/07/2015
Date Data Arrived at EDR: 07/09/2015
Number of Days to Update: 69
Data Release Frequency: Quarterly

HST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.
Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Number of Days to Update: 40
Data Release Frequency: No Update Planned

HST FTTS INSPE: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.
Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Number of Days to Update: 40
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transportation, Office of Pipeline Safety Incident and Accident data.
Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Number of Days to Update: 42
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.
Date of Government Version: 03/16/2011
Date Data Arrived at EDR: 08/07/2012
Number of Days to Update: 42
Data Release Frequency: Varies

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.
Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 12/08/2006
Number of Days to Update: 34
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program
DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.
Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Number of Days to Update: 146
Data Release Frequency: Varies

CMC: Uranium Mill Tailings Sites
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.
Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Number of Days to Update: 64
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites
A listing of former lead smelter site locations.
Date of Government Version: 11/20/2011
Date Data Arrived at EDR: 11/26/2014
Next Scheduled EDR Contact: 04/07/2016
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites
A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931 and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust.
Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/01/2015
Number of Days to Update: 54
Data Release Frequency: Varies
| Source                           | Phone                        | Last EDR Contact   | Next Scheduled EDR Contact | Data Release Frequency | Date Data Arrived at EDR: | Date Made Active in Reports: | Number of Days to Update: | US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AFS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants. |
|----------------------------------|------------------------------|--------------------|-----------------------------|------------------------|---------------------------|-----------------------------|-----------------------------| Date of Government Version: 10/20/2015 Date Data Arrived at EDR: 10/27/2015 Date Made Active in Reports: 01/04/2016 Number of Days to Update: 69 Data Release Frequency: Annually Source: EPA Telephone: 202-564-2496 Last EDR Contact: 03/24/2016 Next Scheduled EDR Contact: 07/11/2016 |
| US MINES: Mines Master Index File Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information. | Date of Government Version: 02/09/2016 Date Data Arrived at EDR: 03/02/2016 Date Made Active in Reports: 04/15/2016 Number of Days to Update: 44 Data Release Frequency: Semi-Annually Source: Department of Labor, Mine Safety and Health Administration Telephone: 303-231-5959 Last EDR Contact: 03/24/2016 Next Scheduled EDR Contact: 06/13/2016 |
| US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molten/semi-liquid iron) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States. | Date of Government Version: 12/05/2005 Date Data Arrived at EDR: 02/29/2008 Date Made Active in Reports: 04/18/2008 Number of Days to Update: 49 Data Release Frequency: Varies Source: USGS Telephone: 703-648-7709 Last EDR Contact: 03/04/2016 Next Scheduled EDR Contact: 06/13/2016 |
| USGS | Telephone: 703-305-6459 | Date of Government Version: 09/09/2015 Date Data Arrived at EDR: 11/03/2015 Date Made Active in Reports: 04/05/2016 Number of Days to Update: 55 Source: EPA Data Release Frequency: Quarterly Date Data Arrived at EDR: 03/03/2016 Date Made Active in Reports: 04/15/2016 Number of Days to Update: 44 |
| USGS | Telephone: 808-586-4200 | Date of Government Version: 02/09/2016 Date Data Arrived at EDR: 03/02/2016 Date Made Active in Reports: 04/05/2016 Number of Days to Update: 55 Source: Department of Health Data Release Frequency: Varies Date Data Arrived at EDR: 01/29/2016 Date Made Active in Reports: 04/05/2016 Number of Days to Update: 67 |
| USGS | Telephone: 571-373-0407 | Date of Government Version: 10/05/2015 Date Data Arrived at EDR: 10/08/2015 Date Made Active in Reports: 11/16/2015 Number of Days to Update: 39 Source: Department of Health Data Release Frequency: Varies Date Data Arrived at EDR: 03/24/2016 Date Made Active in Reports: 04/05/2016 Number of Days to Update: 54 |
| USGS | Telephone: 806-586-4200 | Date of Government Version: 04/14/2011 Date Data Arrived at EDR: 06/09/2011 Date Made Active in Reports: 09/13/2011 Number of Days to Update: 97 Source: USGS Telephone: 703-648-7709 Date Data Arrived at EDR: 12/09/2015 Date Made Active in Reports: 03/02/2016 Number of Days to Update: 64 |

**GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING**

**FINDS: Facility Index System/Facility Registry System**
Facility Index System: FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-SOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

- **Date of Government Version:** 07/20/2015
- **Date Data Arrived at EDR:** 09/09/2015
- **Date Made Active in Reports:** 11/01/2015
- **Number of Days to Update:** 59
- **Source:** EPA
- **Telephone:** (415) 947-8000
- **Last EDR Contact:** 03/09/2016
- **Next Scheduled EDR Contact:** 06/20/2016
- **Data Release Frequency:** Quarterly

**DOCKET HWC: Hazardous Waste Compliance Docket Listing**
A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

- **Date of Government Version:** 03/01/2016
- **Date Data Arrived at EDR:** 03/03/2016
- **Date Made Active in Reports:** 04/05/2016
- **Number of Days to Update:** 59
- **Source:** Environmental Protection Agency
- **Telephone:** 202-544-0527
- **Last EDR Contact:** 02/24/2016
- **Next Scheduled EDR Contact:** 06/13/2016
- **Data Release Frequency:** Varies

**UXO: Unexploded Ordnance Sites**
A listing of unexploded ordnance site locations.

- **Date of Government Version:** 10/20/2015
- **Date Data Arrived at EDR:** 01/09/2016
- **Date Made Active in Reports:** 04/05/2016
- **Number of Days to Update:** 67
- **Source:** Department of Defense
- **Telephone:** 571-373-0407
- **Last EDR Contact:** 04/18/2016
- **Next Scheduled EDR Contact:** 07/18/2016
- **Data Release Frequency:** Varies

**AIRS: List of Permitted Facilities**
A listing of permitted facilities in the state.

- **Date of Government Version:** 12/20/2015
- **Date Data Arrived at EDR:** 01/05/2016
- **Date Made Active in Reports:** 03/02/2016
- **Number of Days to Update:** 57
- **Source:** Department of Health
- **Telephone:** 806-586-4200
- **Last EDR Contact:** 04/04/2016
- **Next Scheduled EDR Contact:** 07/18/2016
- **Data Release Frequency:** Varies

**DRYCLEANERS: Permitted Drycleaner Facility Listing**
A listing of permitted drycleaner facilities in the state.

- **Date of Government Version:** 10/10/2015
- **Date Data Arrived at EDR:** 10/08/2015
- **Date Made Active in Reports:** 04/05/2016
- **Number of Days to Update:** 67
- **Source:** Department of Health
- **Telephone:** 806-586-4200
- **Last EDR Contact:** 04/04/2016
- **Next Scheduled EDR Contact:** 07/18/2016
- **Data Release Frequency:** Varies

**Financial Assurance: Financial Assurance Information Listings**
A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

- **Date of Government Version:** 12/23/2015
- **Date Data Arrived at EDR:** 12/09/2015
- **Date Made Active in Reports:** 03/14/2016
- **Number of Days to Update:** 59
- **Source:** Department of Health
- **Telephone:** 806-586-4200
- **Last EDR Contact:** 03/14/2016
- **Next Scheduled EDR Contact:** 06/27/2016
- **Data Release Frequency:** Varies
EDR has searched selected national collections of business directories and has collected listings of potential dry cleaning establishments that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, launderette, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records," or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

EDR Hist Auto: EDR Exclusive Historic Gas Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records," or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

EDR Hi: EDR Exclusive Historic Dry Cleaners
EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, launderette, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records," or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

EDR Recovered Government Archives
RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List
The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

RGA LF: Recovered Government Archive Landfill Facilities List
The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank
The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List
The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

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The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Health in Hawaii.

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.
Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association’s annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics’ primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics’ primary database on private school locations in the United States.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory: This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Office of Planning
Telephone: 808-587-2895

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey
Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

**GROUNDWATER FLOW DIRECTION INFORMATION**

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

**TOPOGRAPHIC INFORMATION**

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

**TARGET PROPERTY TOPOGRAPHY**

General Topographic Gradient: General SSW

**SURROUNDING TOPOGRAPHY: ELEVATION PROFILES**

Source: Topography has been determined from the USGS 7.5’ Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.
Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring. Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture’s (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1
Soil Component Name: Waihuna
Soil Surface Texture: clay
Hydrologic Group: Class D - Very slow infiltration rates. Soils are clayey, have a high water table, or are shallow to an impervious layer.
Soil Drainage Class: Well drained
Hydric Status: Unknown
Corrosion Potential - Uncoated Steel: Moderate
Depth to Bedrock Min: > 0 inches
Depth to Watertable Min: > 183 inches

<table>
<thead>
<tr>
<th>Soil Layer Information</th>
<th>Boundary</th>
<th>Classification</th>
<th>Saturated hydraulic conductivity (µm/sec)</th>
<th>Soil Reaction (pH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layer</td>
<td>Upper</td>
<td>Lower</td>
<td>Soil Texture Class</td>
<td>AASHTO Group</td>
</tr>
<tr>
<td>1</td>
<td>1 inches</td>
<td>5 inches</td>
<td>clay</td>
<td>SR-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
</tr>
<tr>
<td>2</td>
<td>53 inches</td>
<td>64 inches</td>
<td>clay</td>
<td>SR-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
</tr>
<tr>
<td>3</td>
<td>0 inches</td>
<td>1 inches</td>
<td>clay</td>
<td>SR-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
</tr>
<tr>
<td>4</td>
<td>11 inches</td>
<td>18 inches</td>
<td>clay</td>
<td>SR-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
</tr>
</tbody>
</table>

Hydric Status: Unknown
Corrosion Potential - Uncoated Steel: Moderate
Depth to Bedrock Min: > 0 inches
Depth to Watertable Min: > 183 inches
### Soil Layer Information

<table>
<thead>
<tr>
<th>Layer</th>
<th>Boundary</th>
<th>Soil Texture Class</th>
<th>Classification</th>
<th>Saturated hydraulic conductivity (μm/sec)</th>
<th>Soil Reaction (pH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5 inches</td>
<td>11 inches</td>
<td>clay Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
<td>Max: 1.41 Min: 0.42</td>
<td>Max: 5.5 Min: 4.5</td>
</tr>
<tr>
<td>6</td>
<td>40 inches</td>
<td>53 inches</td>
<td>clay Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
<td>Max: 1 Min: 0.01</td>
<td>Max: 6.5 Min: 4.5</td>
</tr>
<tr>
<td>7</td>
<td>25 inches</td>
<td>40 inches</td>
<td>clay Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
<td>Max: 1 Min: 0.01</td>
<td>Max: 7.3 Min: 5.6</td>
</tr>
</tbody>
</table>

**Soil Map ID: 2**

**Soil Component Name:** Lahaina  
**Soil Surface Texture:** silty clay  
**Hydrologic Group:** Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.  
**Soil Drainage Class:** Well drained  
**Hydric Status:** Unknown  
**Corrosion Potential - Uncoated Steel:** Moderate  
**Depth to Bedrock Min:** > 0 inches  
**Depth to Watertable Min:** > 0 inches

### Soil Layer Information

<table>
<thead>
<tr>
<th>Layer</th>
<th>Boundary</th>
<th>Soil Texture Class</th>
<th>Classification</th>
<th>Saturated hydraulic conductivity (μm/sec)</th>
<th>Soil Reaction (pH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 inches</td>
<td>14 inches</td>
<td>silty clay Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
<td>Max: 14 Min: 4.23</td>
<td>Max: 6 Min: 5.1</td>
</tr>
<tr>
<td>2</td>
<td>14 inches</td>
<td>31 inches</td>
<td>silty clay Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
<td>Max: 14 Min: 4.23</td>
<td>Max: 7.3 Min: 5.6</td>
</tr>
<tr>
<td>3</td>
<td>31 inches</td>
<td>59 inches</td>
<td>silty clay Silt-Clay Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
<td>Max: 14 Min: 4.23</td>
<td>Max: 7.3 Min: 5.6</td>
</tr>
</tbody>
</table>

**Soil Map ID: 3**

**Soil Component Name:** Lahaina  
**Soil Surface Texture:** silty clay  
**Hydrologic Group:** Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.  
**Soil Drainage Class:** Well drained  
**Hydric Status:** Unknown  
**Corrosion Potential - Uncoated Steel:** Moderate  
**Depth to Bedrock Min:** > 0 inches  
**Depth to Watertable Min:** > 0 inches
### Soil Layer Information

<table>
<thead>
<tr>
<th>Layer</th>
<th>Boundary</th>
<th>Soil Texture Class</th>
<th>AASHTO Group</th>
<th>Unified Soil</th>
<th>Saturated hydraulic conductivity (µm/sec)</th>
<th>Soil Reaction (pH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0 inches</td>
<td>14 inches</td>
<td>silt clay</td>
<td>Silt-Clay</td>
<td>FINE-GRAINED SOILS, Silt and Clays (限50% or more), Fat Clay.</td>
<td>Max: 14 Min: 5.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
<td></td>
<td></td>
<td>Max: 6 Min: 5.1</td>
</tr>
<tr>
<td>2</td>
<td>14 inches</td>
<td>31 inches</td>
<td>silt clay</td>
<td>Silt-Clay</td>
<td>FINE-GRAINED SOILS, Silt and Clays (限50% or more), Fat Clay.</td>
<td>Max: 14 Min: 5.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
<td></td>
<td></td>
<td>Max: 7.3 Min: 5.6</td>
</tr>
<tr>
<td>3</td>
<td>31 inches</td>
<td>59 inches</td>
<td>silt clay</td>
<td>Silt-Clay</td>
<td>FINE-GRAINED SOILS, Silt and Clays (限50% or more), Fat Clay.</td>
<td>Max: 14 Min: 5.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Materials (more than 35 pct. passing No. 200), Clayey Soils.</td>
<td></td>
<td></td>
<td>Max: 7.3 Min: 5.6</td>
</tr>
</tbody>
</table>

**Soil Map ID: 4**

**Soil Component Name:** Lahaina

**Soil Surface Texture:** silt clay

**Hydrologic Group:** Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.

**Soil Drainage Class:** Well drained

**Hydric Status:** Unknown

**Corrosion Potential - Uncoated Steel:** Moderate

**Depth to Bedrock Min:** > 0 inches

**Depth to Watertable Min:** > 0 inches

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**LOCAL / REGIONAL WATER AGENCY RECORDS**

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

**WELL SEARCH DISTANCE INFORMATION**

<table>
<thead>
<tr>
<th>DATABASE</th>
<th>SEARCH DISTANCE (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal USGS</td>
<td>1.000</td>
</tr>
<tr>
<td>Federal FRDS PWS</td>
<td>Nearest PWS within 0.001 miles</td>
</tr>
<tr>
<td>State Database</td>
<td>1.000</td>
</tr>
</tbody>
</table>

**FEDERAL USGS WELL INFORMATION**

<table>
<thead>
<tr>
<th>MAP ID</th>
<th>WELL ID</th>
<th>LOCATION FROM TP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION**

<table>
<thead>
<tr>
<th>MAP ID</th>
<th>WELL ID</th>
<th>LOCATION FROM TP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: PWS System location is not always the same as well location.
<table>
<thead>
<tr>
<th>Map ID</th>
<th>Direction</th>
<th>Distance</th>
<th>Elevation</th>
<th>Database</th>
<th>EDR ID Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S/E</td>
<td>1/2 - 1 Mile</td>
<td>Lower</td>
<td>HI WELLS</td>
<td>H90000000002886</td>
</tr>
</tbody>
</table>

### GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

**Location:** Lanai Id: 5-4854-001

**Well name:** Lanai 9

**Old name:** Not Reported

**Driller:** Water Resources International, Inc.

**Quad map:** 4

**Long/333dd:** -156.914048

**Lat/333dd:** 20.81082

**Gps:** -1

**Utm:** 0

**Owner user:** Lanai Holdings, Inc.

**Land owner:** Lanai Resorts LLC

**Pump insta:** Not Reported

**Old number:** Not Reported

**Casing dia:** 14

**Well type:** ROT

**Well depth:** 1411

**Solit case:** 510

**Perf case:** 766

**Use:** IRR - Golf Course

**Use year:** Not Reported

**Init head:** 808

**Init head2:** Not Reported

**Init cl:** 0

**Test date:** 7/30/1990

**Test gw:** 336

**Test gmt:** 105.1

**Test chl:** Not Reported

**Test temp:** Not Reported

**Test unit:** Not Reported

**Pump gmt:** 300

**Draft mgt:** Not Reported

**Head feat:** Not Reported

**Max chl:** Not Reported

**Min chl:** Not Reported

**Geology:** OI

**Pump yr:** 0

**Draft yr:** Not Reported

**Bot solid:** 901

**Bot perf:** 645

**Spec capac:** 3

**Pump mgt:** 432

**Draft mgt:** Not Reported

**Pump depth:** 951

**Trnk:** (2) 4-9-002,001

**Aqu code:** 50102

**Lest hd:** Not Reported

**Wcr:** 01-JAN-90

**Pir:** Not Reported

**Surveyor:** Not Reported

**T:** 2670

**Site id:** H90000000002886

### AREA RADON INFORMATION

Federal EPA Radon Zone for MAUI County: 3

- Zone 1 indoor average level > 4 pCi/L.
- Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
- Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for MAUI COUNTY, HI

Number of sites tested: 70

<table>
<thead>
<tr>
<th>Area</th>
<th>Average Activity</th>
<th>% &lt;4 pCi/L</th>
<th>% 4-20 pCi/L</th>
<th>% &gt;20 pCi/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living Area - 1st Floor</td>
<td>0.057 pCi/L</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Living Area - 2nd Floor</td>
<td>0.000 pCi/L</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Basement</td>
<td>0.150 pCi/L</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
TOPOGRAPHIC INFORMATION

USGS 7.5’ Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5’ Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetlands Inventory
Source: Office of Planning
Telephone: 808-587-2995

HYDROGEOLOGIC INFORMATION

AQUIFLOW Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS
PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Well Index Database
Source: Commission on Water Resource Management
Telephone: 808-587-0214
CWRM maintains a Well Index Database to track specific information pertaining to the construction and installation of production wells in Hawaii.

OTHER STATE DATABASE INFORMATION

RADON
Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

OTHER
Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Earthquake Fault Lines: The fault lines displayed on EDR’s Topographic map are digitized quadrangle faultlines, prepared in 1975 by the United State Geological Survey.
APPENDIX B:
OTHER REFERENCE INFORMATION

PHYSICAL SETTING SOURCE RECORDS SEARCHED
Owner and Parcel Information

Owner Name: LANAI RESORTS LLC
Debt of Land & Natural Resources Forestry & Wildlife Division
Other-Exemption
Show All Owners and Addresses

Today’s Date: May 10, 2016

Mailing Address:
ATTN: RHONDA MIKAMI OR L KANESHIRO
733 BISHOP ST, SUITE 2000
HONOLULU HI 96813

Parcel Number: 490140010000

Location Address:
0 FRASER AVE

Parcel Map:
Show Parcel Map

Parcel Note:

Legal Information:

Assessment Information

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<th>Market Land Value</th>
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No Tax Information available on this parcel.

Improvement Information

No improvement information available for this parcel.

Accessory Information

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Recent Sales in Neighborhood
Recent Sales in Area

Owner and Parcel Information

Owner Name  
LANAI RESORTS LLC  
LANAI SUSTAINABILITY RESEARCH, LLC  
Tenant

Today’s Date  
May 18, 2016

Mailing Address  
ATTN: RHONDA MIKAMI/L KANESHIRO  
733 BISHOP ST., SUITE 2000  
HONOLULU HI 96813

Parcel Number  
490020610000

Location Address  
0 KAUMALAPAU HWY

Neighborhood Code  
4962-5

Parcel Map  
Show Parcel Map

Legal Information  
Parcel Note

Assessment Information

<table>
<thead>
<tr>
<th>Year</th>
<th>Tax Class</th>
<th>Market Land Value</th>
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Agricultural Assessment Information

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This parcel has land in agricultural usage and therefore agricultural usage assessments have been made.

Current Tax Bill Information

No Tax Information available on this parcel.

Improvement Information

No accessory information available for this parcel.

Accessory Information

No accessory information associated with this parcel.

Sales Information

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Permit Information

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Return to Main Search Page
Maui Home
Parcel: 490020610000  Acres: 16124.19

Name: LANAI RESORTS LLC

Land Value $3,213,700.00

Site: 0 KAUMALAPAU HWY

Building Value $0.00

Sale: Misc Value $0.00

Mail: ATTN: RHONDA MIKAMI/L KANESHIRO
733 BISHOP ST., SUITE 2000
HONOLULU HI 96813

Just Value $0.00

Assessed Value $3,213,700.00

Exempt Value $0.00

Taxable Value $3,213,700.00

The Maui County Assessor's Office makes every effort to produce the most accurate information possible. No warranties, express ed or implied, are provided for the data herein, its use or interpretation. The assessment information is from the last certified taxroll. All data is subject to change before the next certified taxroll. PLEASE NOTE THAT THE PROPERTY APPRAISER MAPS ARE FOR ASSESSMENT PURPOSES ONLY NEITHER MAUI COUNTY NOR ITS EMPLOYEES ASSUME RESPONSIBILITY FOR ERRORS OR OMISSIONS ---THIS IS NOT A SURVEY---

Date printed: 05/18/16 : 15:06:23

Improvement Information

Building Number Style Year Built Eff Year Built Percent Complete Living Area Construction Type

Building Number Style Year Built Eff Year Built Percent Complete Living Area Construction Type

Building Number Style Year Built Eff Year Built Percent Complete Living Area Construction Type

Commercial Improvement Information

Building Number Building Type Structure Area Perimeter Usage Wall Height Exterior Wall Construction

1 POWER PLANT CONNER MASONRY C3 1048 100 % 0,016 $523,300

Accessory Information

Building Number Description Dimensions/Units Year Built Percent Complete Value

No accessory information associated with this parcel.

Sales Information

Sale Date Price Instrument # Instrument Type Valid Sale or Other Reason Document Type Record Date Land Court # Land Court Cert

06/26/2015 $0 Land Court Order (all types) Land Court Order (all types) 07/08/2015 T9312234
An Evaluation of the
Old Lanai Electrical Plant
for
Lanai Company
MAY 2003

INDEX

I General Background
Location, Existing Use, and Intended Use

II Facility Description
Site Easements, Buildings General Description

III Regulatory Overview
Zoning, State Land Use, Community Plan, Building Occupancy,
Construction Type, Exiting Requirements, Accessibility

IV Facility Analysis
Civil, Architectural, Structural, Plumbing, ventilation, and Electrical.

V Appendices
A. Facility Reports
Civil Report, including Site Drainage, Water Systems, Fire

Structural Report, including Structural Review of building compo­

nenents and recommendations.

Mechanical Report including air conditioning and ventilation re­

quirements, plumbing requirements and fire protection.

Electrical Report, including General Electrical Systems, Tele­

phone, and Fire Alarm Systems.
I. General Background

LOCATION

The following report is a feasibility study of the Old Lanai Electric Plant, previously called Koele Substation No. 301 & 301-B. The site is located on an off shoot of Awalua Road in the vicinity of 9th Street and Fraser Ave., Lanai City, Lanai, Hawaii, TMK (2) - 4-9-014: 009. The project site of approximately 26 acres has 3 buildings, the main 8,000 +/- Sq. Ft. structure, and two much smaller free-standing structures. Additionally, the site contains an active Electric sub-station. The property is mostly covered in natural vegetation.

EXISTING USE

The site, zoned P-1, was until 1988 operated as a power plant by Dole Company. In 1988, Maui Electric Company, Ltd. (MECO) took over the facility and operated the power plant until 1996. MECO vacated the premises in the year 2000. Existing site structures are of an unknown age. The total square feet of the remaining main structure is 8,000 +/- . Additionally there exists two small ancillary storage sheds, and a fenced sub-station.

INTENDED USE

Lanai Company's goal is to revitalize this facility as a storage facility, with possible office space. This facility would provide storage for low hazard materials. The following feasibility study is offered to assist Lanai Company in planning for its future goals.
II. Facility Description

Site Easements

EASEMENT A-1 SUBSTATION EASEMENT:
The substation holds an easement increasing the original 22'-6" x 46'-0" substation to 40'-0" x 60'-0". In addition to the substation site, a 7'-0" x 16'-0" easement is in effect to accommodate overhead utility lines. Easement A-1 contains 2,576 sq.ft. (See attached letter dated 8/31/03 by MECO re: Exhibit B) (Fig 008, 131)

EASEMENT A-2 A B & C ACCESS EASEMENTS:
A-2 a. and b address access to the site and constitute .199 acres, and 1.234 acres respectively. The easements align to provide a roadway for 9th Street to the power plant site. A-3 c. an easement of approximately 7,600 sq. ft. provides for a 15' wide path for power lines. (See Exhibit B)

Buildings General Description

There are three separate structures on the property varying from the main, one story, concrete masonry and metal frame building (Fig 016), and two small metal roofed, metal framed shed structures (Fig 091, 022).

III. Regulatory Overview

ZONING: The parcel of land on which the buildings are located TMK: 2-4-9-014: 009 is currently zoned P-1, Public/Quasi-Public (See attached Maui County Code 19.31.010). Because this property has P-1 designation and an M-1 designation is probably desired, certain use permits would have to be obtained. The exact Use permitting requirements should be clarified with the Departments of Public Works and Planning.

A classification of the intended use must be made by the Maui County Planning Department. An application for a use variance from the County Planning Department as well as the Board of Variance Appeals could then be made. A successful application could result in a permanent use variance.

An application to request a change the zoning could also be made to the Maui County Council. As a temporary solution, a conditional use permit could be requested from the Maui County Council.
STATE LAND USE: TMK: 2-4-9-014: 009 is designated as Urban use. State Land Use Commission designation of Urban is compatible with the intended use as Storage.

COMMUNITY PLAN: TMK: 2-4-9-014: 009 is, in the location of the facility, designated as Open Space. The Community Plan designation will have to be changed to match the final zoning. This process requires approval from the County Council. The Community Plan designation of Open Space is inconsistent with both the current and future zoning. A request to the Lanai Community Planning Commission for an amendment would be required. Such a request may trigger an Environmental Impact Statement assessment.

BUILDING OCCUPANCY: Prior to the occupancy or use of this facility as a storage facility, a Certificate of Occupancy from the Maui County Land Use and Codes is required. The award of a Certificate of Occupancy is contingent upon successful compliance with the recommendations of various County departments.

The proposed S storage occupancy is defined in the UBC as follows:
Group S occupancies shall include the use of a building or structure, or a portion thereof, for storage not classified as a hazardous occupancy. Storage occupancy shall include the following:
Division 1 Moderate hazard includes storage of combustible materials.
Division 2 Low hazard occupancies shall include storage on non-combustible materials, including but not limited to: metal furniture, cold storage, beer or wine, dairy products, food, fresh fruit, frozen foods, meats in designated packaging types, etc.

CONSTRUCTION TYPE: The building construction type as defined by the UBC would be Type VN (V-nom rated). The maximum allowable floor area would be 12,000 square feet for S-2 occupancy, and 8,000 square feet for S-1 occupancy. Existing main building equals 8,000 +/- square feet. A fire sprinkler system would be required for high stack storage use.

EXITING REQUIREMENTS: The 1997 UBC Table 1OA states that buildings used for storage have a minimum area of 300 sq. ft. per occupant. An area of 8,000 sq. ft. would have an occupant load of 30 persons. Given the intended use as a storage facility with some area dedicated as office space, two exits would be required, one at each end of the building.

ACCESSIBILITY: The workplace environment must comply with Title III of the Americans with Disabilities Act of 1990. Generally speaking, the act provides for the accessibility by employees to the workplace. This requires that individuals with disabilities are able to approach, enter, and exit work areas, common use areas, and public areas.

There must be an accessible route from paved handicap parking and van stalls to an accessible building entrance per occupant load requirements. Such a route shall be a minimum of 36" wide and should include sidewalk curb cuts and ramps as required. Doors shall provide a minimum clear opening of no less than 32" (at the 90 degree opened position) with lever hardware, closers, and thresholds that comply with ADA requirements. At least one bathroom facility should comply with ADA requirements. Refer to Department of Justice 28 CFR Part 36, Chapter 4, Appendix A "Standards of Accessible Design", for more complete information.
IV. FACILITY ANALYSIS
SITE: (SEE CIVIL REPORT)

All newly graded areas should be grassed to stop erosion. New paved parking, loading zone, and access will be required. Given intended use as storage facility with some area dedicated as office space, new paved parking stalls would be required, to include one Accessible parking stall. Additionally, a 12' x 35' loading zone should be provided. Currently, a fire hydrant is on site. (Fig 008, 116)

STRUCTURAL: (SEE STRUCTURAL REPORT)

In general the building recommended for renovation requires only minimal structural upgrades. Cracks in masonry walls must be repaired. (Fig 066, 107) Former floor openings seem to have been improperly filled and capped with concrete slabs. These improper repairs should be refilled with properly compacted fill, then resurfaced with concrete slabs. In general, the floors contain areas that have cracks and irregularities which need to be filled or removed. A flowable, cementitious floor self-leveling material is suggested. (Fig 067, 034)

PLUMBING & VENTILATION: (SEE MECHANICAL REPORT)

Plumbing fixtures need replacement to meet current code and accessibility requirements. There is no existing air conditioning or ventilation systems. Sprinkler system would be required for a high stack storage facility.

ELECTRICAL: (SEE ELECTRICAL REPORT)

There is no existing fire alarm system. A system would be required in order to meet current code. Interior lighting is generally operational but rearrangements and additions will be required. The facility needs exterior site and building lighting. Communications require upgrading.

ARCHITECTURAL REPORT

DEMOlITION:

Demolish existing free standing out building. (Fig. 022, 087, 103) Remove existing site refuse. (Fig. 006)
ENVIRONMENTAL EVALUATION:

A building Materials Survey should be performed in order to determine the extent of any existing environmental contaminants which may be present. (See attached Vuich Services Proposal) It is suspected the wall cladding has a high asbestos content which will require special procedures in order to comply with OSHA. (Fig 020, 057) MECO tested soil at the former transformer storage area at the site for the presence of PCBs. MECO indicates the lab results show only trace amounts of PCBs, below the level at which a clean up would be warranted by the State Department of Health. (See attached letter dated 2/26/03 by MECO re: Form I PCB)

PAINTING:
Contain/Repaint all paint able surfaces: 
(Per Survey recommendations) All interior paint able surfaces need repainting. Follow recommended procedures and requirements. Patch, prep and paint in accordace to acceptable asbestos containmennt protocol. (Fig. 073)

TERMITE REPAIR: Repair/replace or remove termite damage as required.

ROOF REPAIR: Existing built-up roof systems seem adequate, however, a more thorough evaluation should be undertaken to determine expected life cycle. (Fig. 119)

GUTTERS & DOWNSPOUTS: Flashing and gutters generally appear to be in poor condition. Gutters and downspouts should be cleaned, inspected and repaired or replaced as required (Fig. 137,124)

VENT REPAIR: Provide new vents and bug screening for roof ventilation. (Fig. 106)

DOORS & WINDOWS: Most exterior doors are in poor condition and need replacement. Doors require new hardware including requirements for handicap. (Fig. 023, 021) Replace all exterior doors and windows and frames with new. Metal frame windows or glass block may be used for added security. Provide new fire rated interior doors at all corridors and area separations. Replace all remaining non-rated doors with solid core wood doors. Provide new frames as necessary. Hardware shall comply with handicap requirements. (Fig. 074)
PROPERTY DESCRIPTION

The project site is designated as Tax Map Key (2) 4-9-14: 09, Lanai City, Island of Lanai, District of Lahaina, Maui, Hawaii. The area of the parcel is 25.98 acres and is zoned P-1 Public / Quasi-Public. The State land use designation is Urban.

The property is located on Fraser Avenue between 9th Street and 12th Street in Lanai City. There are several easements that traverse the property. The existing site has several vacant buildings that previously housed electrical generators and other equipment for Maui Electric Company, Ltd.

TOPOGRAPHY

The subject parcel is located on the western edge of Lanai City. The large parcel is mostly undeveloped. There are many large trees on the property but not in the vicinity of the existing building. Electrical power lines traverse the property in a northwest–southeast direction. The ground slopes in a southwesterly direction from Fraser Avenue to the back of the lot.

FLOOD HAZARD

The project site is located in Zone C therefore is not subject to the requirements of the Flood Hazard District Ordinance, Chapter 19.62 of the Maui County Code.

ACCESS

Vehicular access to the project site is available from Fraser Avenue by way of 9th Street. Ninth Street west (makai) of Fraser Avenue has varying right-of-way widths and is a dirt road. There is also an access easement that traverses the property from 9th Street to 12th Street.

WATER

There is an existing fire hydrant adjacent to the subject building, which suggests that there is sufficient water available at the site for fire protection. This needs to be confirmed by Lanai’s water department.

WASTEWATER

There is an existing 12-inch sewer main that traverses the property within a sewer and access easement. Wastewater is treated by the County reclamation facility and the reclaimed water is used for irrigation purposes at the Koele Resort.

DRAINAGE

Lanai City has very limited drainage facilities to collect and direct the runoff to the ocean. Any new development would be expected to retain additional runoff onsite or develop new drainage infrastructure. There is sufficient area on the subject property to locate retention basins or dry wells to contain, at minimum, the additional runoff generated by the development.
An Evaluation of the Old Lanai Electrical Plant for Lanai Company February 6, 2003

OVERVIEW

This brief report addresses the general structural condition of the Old Lanai Electrical Plant located makai of Fraser Avenue in Lanai City. The building is currently unoccupied as all electrical equipment has been removed.

An on-site inspection was made on Tuesday, February 4th, 2003. The inspection was limited to what was visibly apparent. The purpose of the inspection was to assess the condition of the primary structural system which in turn, may be useful in determining the economic feasibility of rehabilitation. No effort has been made at this time to demonstrate that the structure complies with the provisions of the current building code.

GENERAL DESCRIPTION

The building is comprised of a main section and two adjacent wings at one end. The wings have equal floor area and are located on both sides of the main structure thereby forming a "T" shaped footprint. The main structure which had housed the electrical generators is single-story, approximately 20 feet in height. The wings, also single-story, have a height of approximately 12 feet. The main section is 48x142 feet in plan. The wings are each 42x15 feet in plan. The total enclosed floor area is approximately 8000 square feet. The floor plan may be seen in Figure 1.

The building is a structural steel frame on a poured concrete foundation. The site is flat with deep soil, and in relatively open terrain. The age of the building is unknown and no construction documents are known to exist.

FOUNDATION

The nature of the below grade foundation elements was not determined. It may be expected that perimeter walls would have been constructed on a continuous strip footing. A visual inspection of the exterior showed no signs of significant settlement or cracking in the perimeter foundation. Because the roof spans between exterior walls, no interior column footings were required. There are, however, numerous foundation elements which were needed to support the electrical equipment. Pits were constructed below grade to provide further access to the equipment. The exact nature of these pits could not be determined as some of the pits have been filled and concrete slabs placed over them. The access stairs, situated between the overhead doors, and a single corridor which runs the entire length of the building are all that appear to remain. Further investigation was not possible as the corridor was partially flooded.

Settlement and accompanying cracking in at least one filled-pit location would indicate that consolidation of the fill was not properly done. Rehabilitation would most likely require removing all "new" slabs, consolidation of suitable fill material, and slab replacement. Several housekeeping slabs (which have been or can be removed), equipment anchor bolts which have been cut off, and the generally irregular slab surface would suggest the use of a flowable, cementitious, floor leveling material. The topping could be hardened if light vehicular or fork-lift traffic is to be expected.

STRUCTURAL STEEL FRAME (MAIN SECTION)

The structural steel frame of the main building consists of wide-flange columns and (6-panel) Pratt roof trusses. The roof trusses are fabricated from double-angle members and are approximately 4 feet deep. The top chord is slightly pitched to provide roof drainage. The columns extend to the eave height and form a moment-frame with the first panel of the trusses. The condition at the column base is unknown as it is enclosed within the floor slab.

Maui Architectural Group, Inc.
STRUCTURAL STEEL FRAME (cont.)

These frames span the 48-foot building direction. Additional roof framing members (purlin trusses) are placed at each of the truss panel points and provide not only out-of-plane stability to the roof trusses but also support for the light-gauge metal roofing. (040) Horizontal x-bracing comprises the roof diaphragm. (069) Without selective demolition of the built-up roof, it cannot be determined if the light-gauge roofing contributes to the roof diaphragm. The building is braced in the longitudinal direction by x-configuration rod bracing (043).

WALLS

The lower portion of the walls appear to be fabricated from concrete bricks. These walls extend to approximately 5 feet above grade for most of the structure with the exception of the two wings and the 48-foot gable-end wall opposite the overhead doors. At these locations the bricks extend full height. For the three walls of the main section (for which the bricks extend to the 5 foot elevation), the upper portion is clad in rigid, corrugated panels, apparently of asbestos. (080) The panels are through-bolted to 4" (vertical) x 3" (horizontal) angle girts. The girts attach to the columns. Gable-end walls have two intermediate wind columns. (044, 085)

STRUCTURAL SYSTEM (WINGS)

The wings are framed for gravity loads with W-shaped columns and roof beams. (064) Shear-only framing connections, and the lack of bracing members, would imply the lateral resistance would depend upon the exterior walls. However, due to the large window penetrations, it is more likely that these small wing structures rely upon the main building for their lateral strength.

LIGHT-GAUGE METAL ROOFING AND A BUILT-UP ROOF, SIMILAR TO THE HIGH ROOF, WAS USED. HOWEVER, UNLIKE THE MAIN ROOF, THE LIGHT-GAUGE DECK COMPRISSES THE ENTIRE ROOF DIAPHRAGM.

GENERAL CONDITION

(i) Foundation/Slabs: The foundation appears to be generally sound and shows no visible signs of distress. Those portions of the slab that are showing signs of settlement (filled pits) should have the existing slab removed, receive proper compaction of the sub-grade, and a new slab placed. The access stairs and corridor would probably also be filled. The entire floor would benefit from a finish topping to provide a uniform, level surface.

(ii) Walls: The walls appear to play no part in the structural system but rather form the building envelope. However, the corrugated panels would need to be addressed. The existence of numerous penetrations from earlier equipment ducting, as well as, the issue of asbestos fibers will necessitate rehabilitation. (002) Shear cracks initiated at the corners of the window openings in the brick walls of the wings would also need to be repaired.

(iii) Structural Frame: The steel frame appears to be in very good condition and should require minimal effort to restore to original condition. An as-built survey should be performed and a determination made as to compliance with current building code provisions.

(iv) Roofing: From the underside, the metal decking appears to be in generally good condition.
GENERAL CONDITION (cont.)

Minimal surface corrosion was noted. The condition of the built-up roofing would need to be further examined. (124,135)

SUMMARY

It is apparent that the building was designed as an industrial facility. The structural system is stout and in generally good condition. The foundation, owing to heavy equipment mounting requirements in addition to superstructure loads, may be expected to be substantial. The problems with the slab floor, siding, and roofing will need to be addressed.

MECHANICAL REPORT

The facility consists of an 8,000 s.f. building and two small shed structures which were formerly occupied by the Lanai Electric plant. The building is a one story metal framed building with partial concrete masonry walls. The main building is 20 ft. high and the wings are 12 ft. high. The building is to be renovated as a storage facility for Lanai Company.

AIR CONDITIONING AND VENTILATION SYSTEMS:

There are no air conditioning or ventilation systems for the existing building. To air condition or mechanical ventilate is dependent on the items that are stored. For dry storage mechanical ventilation may be sufficient. If controlled temperatures and environment are required a separate area should be designated and only that area should be air conditioned.

If air conditioning is required, the system should be designed for 78 degF to minimize overcooling and mold growth. Depending on the total area to be air conditioned, the system would be a ducted split system. Window units may be used but it is not as energy efficient as a central system.

PLUMBING SYSTEM:

The existing building is serviced by cesspools. The new facility would have to be serviced by County sewer and water systems. If the distance to the point of connection prohibits the hook-up to the county system then a septic tank with leaching field should be considered.

The existing cold water piping is galvanized piping. The new domestic piping shall be new and shall be minimum Type L hard drawn copper.
Because of the age of the building, new sewer pipes shall be Sch 40 PVC with drainage fittings.

Plumbing fixtures and faucets shall be low flow fixtures and shall meet ADA requirements. Fixtures shall be commercial grade and not residential type.

**FIRE SPRINKLER SYSTEM:**
The existing building does not have a fire sprinkler system. A fire sprinkler system shall be provided for the high piled and rack storage. System shall be designed in accordance to NFPA A13. Because of the 20 ft. height, the system shall be designed for storage up to the underside of the roof with the allowed clearance from the roof. The design of the system will be dependent of the type and class of the commodities stored.

The fire sprinkler system shall be hydraulically calculated. Because of the higher demand of water for high piled and rack storage, the County water system shall be checked for the capacity for the required fire flow.

Fire sprinkler piping shall be Sch 40 black steel piping with threaded or grooved fittings. Exposed pipes outside of building shall be painted. Piping within the building shall remain as a factory coated black steel piping. Fire sprinkler heads shall be waxed coated corrosion heads.

Fire extinguishers, 4A: 60B: C shall be provided within the building at 150 feet apart.

The Fire Code will require smoke vents for the high piled and rack storage areas. The smoke vents shall consist of automatic vent doors on the roof in each of the compartmentalized ceiling. The ceiling compartments shall be constructed of gypsum board that is extended down 4 ft. from roof. The area of each compartment shall be in accordance to the Fire Code.

---

**ELECTRICAL SURVEY**

**FORMER MECO POWER PLANT**

**LANAI CITY, LANAI**

A cursory review of the electrical system was conducted on February 4, 2003 by Clayton Pang of Electech Hawaii, Inc. Original electrical drawings for the building were not available.

The building is a single story building with large high ceiling room where the generators were placed. There is also a few small offices, restrooms and a work room adjacent to the large generator space. The building was not energized.

**EXISTING CONDITION**

Electric service to the building was disconnected. Since the building was used by Maui Electric for its own purposes, there is no meter loop installed.

Lighting in the generator space consist of two lamps, 8 foot long, industrial fluorescent light fixtures, two fixtures per bay. These light fixtures are covered with soot from the generator exhaust. Lighting in the offices and workroom area are fluorescent luminaires. Restrooms have bare lamp incandescent luminaires. All fixtures in the workroom, offices and restrooms are in various states of disrepair.

There are a few floodlights also located on the exterior on the building. Convenience outlets are located sporadically in the building but could not be tested since the building is not energized.

An overhead service drop for telephone service is located on the Southwest corner of the building.

---

Report by:
Arnaldo E. Prepose, P.E.
Prepose Engineering Systems, Inc.
SUMMARY:

In general the electrical system is in poor condition and should be replaced entirely. Some areas of the building appear to have water leaks and it cannot be determined if water has penetrated the wiring system.

MECO has overhead primary lines on both the West and East side of the building. Transformers can be mounted on the poles and an overhead service drop to a new meter loop can be installed for the building. It is estimated that the entire electrical system for the building can be upgraded for approximately $80,000.00.
Chapter 19.31
PUBLIC/QUASI-PUBLIC DISTRICTS

Sections:
19.31.010 Purpose and intent.
19.31.020 P-1 public/quasi-public district.

19.31.010 Purpose and intent.
Public/quasi-public districts provide for public, nonprofit or quasi-public uses. (Ord. 1597 § 1 (part), 1986)

19.31.020 P-1 public/quasi-public district.
A. Permitted Uses. The following permitted uses are allowed in the P-1 public/quasi-public district:
   1. Principal uses:
      a. Churches;
      b. Community centers;
      c. Fire and police stations;
      d. Government buildings and facilities;
      e. Hospitals;
      f. Kindergartens, elementary schools, high schools, colleges, and libraries;
      g. Nursery schools and day care centers;
      h. Offices for nonprofit charitable organizations;
      i. Private parking lots or structures serving public purposes;
      j. Public parking lots or structures; and
      k. Public utility substations, which will not be hazardous or a nuisance to the surrounding area.
   2. Accessory Uses and Structures.
   A. Development Standards. The following development standards shall apply:
      1. Minimum lot area, fifteen thousand square feet;
      2. Minimum lot width, one hundred feet;
      3. Minimum building setback:
         a. Front yard, fifteen feet,
         b. Side yard, ten feet,
         c. Rear yard, fifteen feet;
      4. Maximum height, two stories not to exceed thirty-five feet. (Ord. 1597 § 1 (part), 1986)
February 26, 2003

Mr. David Lundquist

Maui Architectural Group, Inc.
2331 W. Main Street
Wailuku, Hawaii 96793

Re: Former Lanai Power Plant Site

Dear Mr. Lundquist:

This is in response to your request to me for information MECO has regarding polychlorinated biphenyls (PCBs) at the former Lanai Power Plant site. Our understanding is that Maui Architectural Group is working with the Lanai Company, the owner of the site, to design a records storage operation facility at the site.

By way of background, until 1988, Dole Company operated the power plant. In 1988, Maui Electric Company, Ltd. (MECO) took over the facility and operated the power plant utilizing existing equipment from 1988 until 1996. After removing the last two generating units in 2000, MECO vacated the premises.

During the period MECO leased the premises, it did not use or store any equipment at the site that contained PCBs. Furthermore, transformers were not used within the power plant structure itself. Based on our operations at the site, MECO believes that any PCBs (if any) that might be present resulted from earlier operations than MECO’s.

Nonetheless, as a precaution, before vacating the facility, we tested the soil at the former transformer storage area at the site for the presence of PCBs. We are pleased to report that the laboratory results show that only trace amounts of PCBs (89 parts per billion or 0.089 parts per million) were detected in the sample.

As you may be aware, this is well below the Hawaii Department of Health cleanup level for PCBs in soil of 1000 parts per billion (1 part per million.) A copy of the laboratory results is enclosed.

Sincerely,

An HEI Company
# POLYCHLORINATED BIPHENYLS (PCB)
by SW846 Method 8080

Client: Ceimic-SD-Harding Lawson  
Client Sample ID: 97515002  
Date Sampled: 12/18/97  
Date Sample Received: 12/24/97  
Matrix: Soil  
Percent Solids: 85

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<tr>
<td>Aroclor-1260</td>
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ND = Not detected  
+ Dry weight basis.

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<th>Recovery(%)</th>
<th>QC Limit(%)*</th>
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<td>Tetrachloro-m-xylene</td>
<td>63</td>
<td>25 - 143</td>
</tr>
<tr>
<td>Decachlorobiphenyl</td>
<td>85</td>
<td>35 - 135</td>
</tr>
</tbody>
</table>

* These limits are provided for advisory purposes.

Laboratory ID: 971190-02  
Date Sample Extracted: 12/29/97  
Date Sample Analyzed: 12/31/97  
Associated Method Blank: P1229-B3  
Final Extract Volume (mL): 10.0  
Dilution Factor: 1  
Concentration in: ug/Kg (ppb)+

I trust you will find this information helpful. If you have any questions, please do not hesitate to call me.

Very truly yours,  
Maui Electric Company, Ltd.  

Rodney Jung  
Cc: S. Kiyonaga  
E. Oyama  
S. Oppenheimer  
D. Fukuda

Enclosure
August 31, 2000

Vince Bagoyo
Vice President
Governmental Affairs
Lana'i Company, Inc.
P.O. Box 63031
Lanai City, Hawaii 96763

Subject: Request for Perpetual Easement

Dear Mr. Bagoyo:

The purpose of this letter is to request the grant of a perpetual easement over a portion of Tax Map Key: (2) 4-9-014:009 (portion) for Expansion of Koele Substation, Lanai City, Lanai, Hawaii.

As per your telephone request this date, transmitted herewith are copies of the following documents:


If the foregoing meets with your approval, we respectfully request that you sign and return this letter to our office; a copy of this letter is enclosed for your records.

Thank you for your consideration in this matter. If you should have any questions regarding this request, please contact me at 871-23157 to discuss.

Sincerely,

Ralph Kubota
Land Agent

Enclosures

C: Mr. Clifton Kurasaki, Castle & Cooke Land Company

Ralph Kubota

Date: 12-00
Grantee, its successors and assigns, forever, subject, however, to the condition that if the Grantee shall abandon or cease to use all or any portion of the easements on which the substation is now existing for a period of two years, then all rights granted herein shall cease as to the portion or portions of the easements so abandoned or unused and further provided that right of entry over any or all of easement access dedicated as a public road to a government agency shall terminate.

RESERVING, HOWEVER, unto the Grantor, its successors, assigns and tenants, full use of the land within easement A-2, such reserved right to be used in such manner as will not interfere unreasonably with the access of Grantee to the facility.

AND THE GRANTEE does hereby covenant and agree that:

1. Taxes. It will pay when and as the same become due all taxes and assessments levied and assessed against and upon the substation, any improvements and equipment, whether assessed or payable by either the Grantor or its tenants or the Grantee, but this covenant shall not require the payment of taxes or assessments levied against the land over which the access easement passes;

2. Due Care and Diligence. It will use due care and diligence in the construction and operation of the substation, equipment and appurtenances and in the exercise of its rights hereunder and will also and at all times exercise its rights hereunder in such manner as will cause the least possible interference with the use of the access easement area by the owners, lessees and occupants thereof and will not occasion any damage or injury to any premises or to any lessees, agents, servants or employees of the Grantor;

3. Reimbursement for Damages. It will reimburse Grantor, its tenants and any other permitted occupants of the Grantor's lands for any and all damage or injury to their property caused by, sustained or resulting from the construction, maintenance, operation or removal of the substation, equipment and appurtenances or other exercise of the Grantee's rights hereunder;

4. Indemnity. It will indemnify and hold harmless the Grantor and all persons using the Access Easement or land immediately adjacent thereto, either under lease from or by permission of the Grantor, from any and all claims and demands against them for loss of or damage to property or injury or death to persons, caused by or resulting from or arising out of the exercise of the Grantee's rights hereunder, provided such loss,
damage, injury or death is not caused by the negligence of the party or parties to be indemnified. The Grantee will also indemnify the Grantor from and against all costs, counsel fees, and expenses incurred in or resulting from any such claim or demand or any action or proceeding brought thereon.

5. Abandonment. Termination or Removal. Upon the abandonment or termination of use of all or any portion of the easements hereby granted, the Grantee will remove its substation and equipment at its expense, if not already removed, and restore the easement area as nearly as is reasonably possible to its condition existing immediately prior to such work being initiated, and will prepare, execute and record appropriate instruments terminating its interests and removing the encumbrance caused by this instrument with respect to all or such portions of the easement areas; it being understood that any such abandonment, termination or removal will not affect or release any liability of the grantee existing at such time by reason of the breach of any of the terms hereof.

6. Relocation. The Grantor reserves the right to relocate all or portion of the Access Easement from time to time, and the Grantee shall cooperate by execution of any necessary documents, to such substitute easement area or areas within the Grantor’s property or to public roadways.

AND IT IS MUTUALLY AGREED:

A. Survey Description. If at any time the Grantor or the Grantee shall desire to designate easements or create Land Court lots on Land Court maps of the easement areas granted hereunder, or is required pursuant to Paragraph B below, the Grantor agrees to grant, without payment of additional sums, an easement over the easements or lots designated and approved by the Land Court. The Grantee will be responsible for all costs of surveying the location of the specific easement, of improvements required to obtain subdivision approval, and of obtaining governmental approvals, and relocating or constructing the facilities and equipment of the Grantee, if required. The parties agree to join in all applications for permits or other governmental approvals that may be necessary or desirable and to cooperate with the other party to accomplish the foregoing.

B. Subdivision Condition. Anything herein to the contrary notwithstanding, it is understood that said Substation Easement area is not designated as an easement or a separate lot on a subdivision approved by the Department of Land Utilization of the County of Maui and the Land Court of the State of Hawaii. In the event this grant of easements is deemed in violation of County ordinances or any law, this grant of easements shall terminate in the event Grantor or the Grantee is not able to secure such approvals after each party has cooperated and made good faith efforts to secure such approvals; it being understood that Grantor may have said easement area so designated pursuant to Paragraph A above, provided nothing herein shall be deemed to require Grantor to expend more than usual and normal expenses ordinarily involved in obtaining such subdivision approvals excluding any improvements in or outside of the easement areas required to obtain such approval.

C. Access Easement Width. Easements for access over Access Easement A-2 shall be twenty feet wide.

D. Condemnation. If at any time the land or any substitute land then subject to the easement hereby granted, or any part thereof or interest therein, shall be taken or condemned by any authority having the power of eminent domain, then and in every such case all compensation and damages payable for or on account of such land and any adjoining property of the Grantor, including any part of the easement so taken or condemned, shall be paid to and be the property of the Grantor without any apportionment thereof to the Grantee, provided that the Grantee shall be entitled to recover only from the condemning authority full compensation for its Substation Easement, substation, equipment and appurtenances and any severance damages to its rights of way, including the cost of obtaining and relocating to a substitute right of way.

E. Definitions. The term “Grantor” in these presents shall include the Grantor, its successors and assigns, and all subsequent owners of the easement area or portion or portions thereof, and the term “Grantee” shall include the Grantee and its successors and assigns, and that this instrument shall be binding upon and shall inure to the benefit of the parties hereto and their respective successors and assigns.

IN WITNESS WHEREOF, the undersigned have executed this instrument as of the day and year first above mentioned.

MAUI ELECTRIC COMPANY, LTD

By

Thomas C. Leppert

Its Vice President

By

Tomo Komata

Its Assistant Secretary

Grantor

APPROVED

Contents:

Form: STANDARD

MAUI ELECTRIC COMPANY, LTD

By

Leppert

Its President

By

Komata

Its Assistant Secretary

APPROVED

Contents:

Form: STANDARD

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STATE OF HAWAII
CITY AND COUNTY OF HONOLULU

On this 11th day of January, 1992, before me appeared THOMAS L. LEE and TOSHIO ITOHAYAMA, to me personally known, who, being by me duly sworn, did say that they are the VICE PRESIDENT and TREASURER, respectively, of DOLE FOOD COMPANY, INC., a Hawaii corporation; that the seal affixed to the foregoing instrument is the corporate seal of said corporation, that the instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and the officers acknowledged the instrument to be the free act and deed of the corporation.

STATE OF HAWAII
COUNTY OF MAUI

On this 4th day of December, 1991, before me appeared THOMAS L. LEE and JABEE A. ABRAHAMS, to me personally known, who, being by me duly sworn, did say that they are the PRESIDENT and TREASURER, respectively, of MAUI ELECTRIC COMPANY, LIMITED, a Hawaii corporation; that the seal affixed to the foregoing instrument is the corporate seal of the corporation, that the instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors, and the officers acknowledged said instrument to be the free act and deed of said corporation.

EXHIBIT A

Easement A-1 - Substation Easement

Being a portion of Lot 1013 as shown on Map 82, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii with Land Court Application No. 862, and being a portion of the land described in Transfer Certificate of Title No. 332,446, containing an area of 2,576 square feet.

Easement A-2 - Access Easement

a) Being all of Lot 19-C as shown on Map 23, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii with Land Court Application No. 862, and being a portion of the land described in Transfer Certificate of Title No. 96,990, containing an area of .199 acres.

b) Being a portion of Lot 1016 as shown on Map 82, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii with Land Court Application No. 862, and being a portion of the land described in Transfer Certificate of Title No. 332,446, containing an area of 1.234 acres.

c) Being a portion of Lot 1013 as shown on Map 82, filed in the Office of the Assistant Registrar of the Land Court of the State of Hawaii with Land Court Application No. 862, and being a portion of the land described in Transfer Certificate of Title No. 332,446, containing an area of approximately 7,600 square feet and being a distance of approximately 380 feet.

END OF EXHIBIT A
Additional Security Mortgage and Financing Statement

This document is a legal document related to a mortgage and financing statement. It contains detailed information about the mortgage, including the property being mortgaged, the terms of the mortgage, and the rights and obligations of the parties involved. The document is written in a formal legal style and includes specific dates and references to legal documents. The content is too detailed to summarize accurately without proper legal training.
The following is a cost estimate of recommended improvements. The cost of building renovation and upgrades is approximately $70.00 per square foot excluding general contractor's profit and overhead. See appendix for detailed cost summary along with reports from all consultants involved with this study.

RENOVATION COST SUMMARY

**Site Work**
- Clear, grub and grade site: $15,000
- Sewer System: $0
- Fire Protection: 000,000
- Builders Work in connection with above items: 00,000
- Items: Landscaping (grassing) and paved areas: 104,950

Subtotal: $0

**Buildings**
- Demolition Work: $12,000
- Alterations and Renovations to existing buildings: 13,500
- Structural Repair: 46,800
- Staircases: 8,500
- Roof, Fascia and Gutters Repair: 290,838
- External Wall Repair: 43,180
- Window Replacement: 109,515
- External Door Replacement: 17,450
- Internal Wall Repair including rated corridors and fire separation walls: 56,990
- Internal Doors: 72,130
- Internal Wall Finishes/Painting: 40,570
- Floor Finishes Replacement: 64,638
- Kitchen, Laundry & Bathroom Fit-Out: 95,000
- Sanitary Fixtures: 112,820
- Air conditioning (window units): 16,800
- Electric, telephone & fire alarm: 47,500
- Tennite repair: 60,000
- Lead paint abatement: 61,650
- Asbestos abatement: 49,000
- Builders Work in connection with above items: 35,000

Subtotal: $0

Additional Site Improvements

Net Cost Total: $2,325,100
- General Contractor's Profit & Overhead (17.1%): 410,700
- Bonding & Insurance (1.50%): 41,000
- Contingency (12%): 333,200

TOTAL COST: $3,110,000
Mr. Richard K. Mirikitani  
Vice President & Corporate Counsel  
Castle & Cooke Resorts, LLC  
100 Kahelu Avenue  
Mililani, Hawaii 99879

February 12, 2007

Dear Mr. Mirikitani:

SUBJECT: Lanai City Power Plant  
Facility ID No. 9-400773 / Release ID No. 030016

The Department of Health (DOH) has reviewed the report, Former Lanai Power Plant – Additional Release Response Report, dated September 2006, and prepared by EnviroServices & Training Center, LLC. Please note the report has been placed with the public record.

Based on the information submitted, we conclude that no further action is necessary for this release.

However, please note that state law requires any detectable level of petroleum contamination discovered in the sub-surface of current or former UST facilities to be reported to this office within 24 hours, including de minimis contamination, contamination found at concentrations lower than DOH Tier 1 action levels, and contamination found after receiving a status of No Further Action from DOH. Generally, further work will not be required if contaminant concentrations are lower than DOH action levels, but notification of DOH is required within 24 hours.

As noted in the report, a small volume of petroleum contaminated soil remains in the sub-surface at the site. If this soil is excavated or disturbed precautions should be taken for worker safety. Excavated soil may be reused on-site provided that any nuisance concerns are addressed and the soil is not moved to an ecologically sensitive area of the property such as wetlands, marshes, surface water bodies, etc. Please note that if the soil is excavated and transported off-site, you are required to contact our Office of Solid Waste Management to discuss proper management of the soil.

If you have any questions regarding this letter, please contact Dr. Darren Park of our Underground Storage Tank Section at (808) 586-4226 or e-mail at darren.park@doh.hawaii.gov.

Sincerely,

[Signature]

STEVEN Y.K. CHANG, R.E., CHIEF  
Solid and Hazardous Waste Branch
September 5, 2006

Mr. Richard K. Mirikitani
Vice President & Corporate Counsel
Castle & Cooke Resorts, LLC
100 Kahelu Avenue
Mililani, Hawaii 96879

Dear Mr. Mirikitani:

SUBJECT: Lanai City Power Plant
Facility ID 9-400773 / Release IDs 900013 / 030016

The Department of Health (DOH) has reviewed the following reports:

2. UST Checklist For Final Release Response Reports (Release ID 900013), dated July 26, 2005, and prepared by BES.

Please note these reports have been placed with the public record.

The DOH has the following concern regarding the work plan for release ID 030016:

Figure 2 does not show approximate locations of the proposed sites for the three soil borings adjacent to the Power Plant structure. Please submit a revised map that includes locations for the three proposed soil borings. DOH appreciates your prompt action and attention to this detail.

The June 28, 1993 and January 18, 1994 laboratory analyses of soil samples obtained from the underground storage tank excavation following removal were non-detectable for petroleum contaminants. Based on the information submitted, we conclude that no further action is necessary for the confirmed underground storage tank release ID 900013.

However, please note that state law requires any detectable level of petroleum contamination discovered in the sub-surface of current or former UST facilities to be reported to this office within 24 hours, including de minimis contamination, contamination found at concentrations lower than DOH Tier 1 action levels, and contamination found after receiving a status of No Further Action from DOH. If concentrations are lower than DOH action levels, then further work may not be required.

If you have any questions regarding this letter, please contact Dr. Darren Park of our Underground Storage Tank Section at (808) 586-4226 or e-mail at: darren.park@doh.hawaii.gov.

Sincerely,

STEVEN Y. K. CHANG, R.E., CHIEF
Solid and Hazardous Waste Branch
ADDITIONAL RELEASE RESPONSE REPORT

Lanai Power Plant
750 Fraser Avenue
Lanai City, Lanai, Hawaii
Facility ID No. 9-400773
Release ID No. 030016

Prepared For:
CASTLE & COOKE RESORTS, LLC
P.O. Box 898990
Mililani, Hawaii 96789-8900

Prepared By:
ENVIROSERVICES & TRAINING CENTER, LLC
2850 Paa Street, Suite 150
Honolulu, Hawaii 96819
tel: (808) 839-7222

ETC Project No. 02-6011
September 2006
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1.0 CERTIFICATIONS AND LIMITATIONS

EnviroServices & Training Center (ETC), LLC has completed this Additional Release Response (ARR) Report for the project site. ETC’s findings and conclusions presented in this report are professional opinions based solely upon visual observations of the project site, government regulations, and upon interpretation of the laboratory data and field measurements gathered at the time and location of the study.

This report is intended for the sole use of ETC’s Client, Castle & Cooke Resorts, LLC (C&C), exclusively for the project site indicated. The scope of services performed in execution of this project may not be appropriate for satisfying the needs of other users, and any use or reuse of this report or the findings and conclusions presented herein is unauthorized and at the sole risk of said user.

ETC makes no guarantee or warranty; either expressed or implied, except that our services are consistent with good commercial or customary practices designed to conform to acceptable industry standards and governmental regulations. No warranty or representation, expressed or implied, is included or intended in its proposal, contracts, or reports. Opinions stated in this report apply only to the site as outlined and apply to the conditions present at the time of project activities. Moreover, these opinions do not apply to site changes that occur after the project activities.

Prepared By:  
Tim Tybuszewski  
Environmental Scientist  
EnviroServices & Training Center, LLC

Reviewed By:  
Damon Hamura  
Environmental Engineer  
EnviroServices & Training Center, LLC

Date:  
9/27/06
2.0 EXECUTIVE SUMMARY

EnviroServices & Training Center (ETC), LLC was contracted by Castle & Cooke Resorts, LLC (C&C) to perform additional release response activities at 750 Fraser Avenue, Lanai City, Lanai, Hawaii hereinafter referred to as the Property.

ETC’s investigation included the identification of potential areas of contamination based on a previous Underground Storage Tank Closure and Release Response Report performed for the Property. A work plan was then prepared by ETC describing additional delineation and sampling activities. Based on the information obtained for the work plan, boring locations were selected. Field screening of subsurface soils and laboratory analysis of soil samples for the presence of petroleum hydrocarbons was also included in the investigation.

ETC utilized the Hawaii One Call service to identify potential underground utilities in the vicinity of the proposed boring location. ETC contracted Environmental Services Network – Pacific (ESN) to utilize a direct push method to advance three soil borings. Boring B-1 was located along the northern portion of the Power Plant structure approximately 9.5 feet from the northwest corner of the structure. Boring B-2 was located adjacent to the east of the Power Plant structure approximately fifteen (15) feet south of the limit of the previous excavation. Boring B-3 was located adjacent to the west of the Power Plant structure directly across from the previous excavation (Appendix I, Figure II). ESN collected continuous soil cores with 4-foot long core samplers with acetate sleeve from ground surface to twenty (20) feet below ground surface (bgs). ETC personnel screened the soil for visual and olfactory indications of hydrocarbon contamination. Soil headspace readings were collected with the PID at various depths, typically every 2-feet. Following screening of the soil, a soil sample was collected from ten and twenty feet bgs.

Five (5) discrete samples were collected from the soil stockpile generated during initial release response activities to quantify residual petroleum concentrations. A total of eleven (11) soil samples were collected from the Property.

Analytical data from the subsurface soil samples indicated that petroleum hydrocarbons and related constituents were not detected above method detection limits. Therefore, ETC believes that the contamination observed during UST closure has been fully delineated to an area directly beneath the Power Plant structure. Furthermore, analytical data for soil samples collected from the petroleum contaminated soil stockpile generated during initial release response activities indicated that residual constituent concentrations were well below DOH Tier I Action Levels. Based on the analytical data, ETC recommends that no further action be required to address the release since 1) petroleum-impacted soil has been completely delineated, 2) petroleum-impacted soil is located beneath a structure that is currently used for storage only, and 3) TPH-D was the only constituent detected during initial release response activities at a concentration exceeding its DOH Tier I Action Level.

ETC also recommends that the soil stockpile can be used for backfill material at the facility or other locations.

3.0 INTRODUCTION/PURPOSE

This report presents the results of ETC’s findings during additional release response activities for the former Lanai Power Plant (hereinafter referred to as the Property) located at 750 Fraser Avenue, Lanai City, Lanai, Hawaii.

The purpose of this investigation was to delineate subsurface diesel contamination identified during closure of the 5,500-gallon UST and determine diesel and related constituent concentrations existing in the contaminated soil stockpile. The activities were performed in general accordance with the Technical Guidance Manual for UST Closure and Release Response, 2nd Edition, DOH, March 2000.

Specifically, ETC completed the following tasks:

- Contacted the Hawaii One Call Center to identify potential underground utilities.
- Obtained the services of a subcontractor to utilize a direct-push technology rig to collect subsurface soil samples.
- Advanced three soil borings (approximate locations shown in Figure 2) adjacent to the Power Plant structure to determine the extent of diesel fuel contamination in subsurface soil.
- Field screened subsurface soil, using visual/olfactory observations and by analyzing volatile organic compound concentrations in soil headspace using a photoionization detector (PID).
- Collected two soil samples from each boring at approximate depths of 10 feet bgs and 20 feet bgs, since there were no indications of petroleum-impacted soil observed.
- Manually probed the contaminated soil stockpile and collected five discrete soil samples from areas where PID readings were the highest and/or soil appeared stained. Samples were collected at depths of at least 18 inches below the stockpile surface.
- Submitted the soil samples to a local laboratory for analysis of TPH-D via EPA Method 8015 Modified, benzene/toluene/ethylbenzene/xylenes (BTEX) via EPA Method 8021b, and polynuclear aromatic hydrocarbons (PAHs) via EPA Method 8100.
- Prepared this report documenting field activities, sampling procedures, analytical results, and associated figures and photographs.
4.0 SITE BACKGROUND

4.1 Site Description and Land Area

The project site is the Lanai Power Plant, located at 750 Fraser Avenue, Lanai City, Hawaii (Figure 1). The site is located inland of the underground injection control line and is situated at an elevation of approximately 1,550 feet above mean sea level (msl). In the past, the facility and adjacent areas were used for industrial purposes. Currently, however, the Power Plant facility and adjacent areas appear unused and generally overgrown with vegetation. The Power Plant structure is used for storage of equipment and supplies. The Property appeared relatively flat. The Site Location Map is included in Appendix I, Figure 1.

4.2 Geology and Hydrogeology

4.2.1 Regional Geology

The island of Lanai is a shield volcano formed by eruptions at the summit and along three rift zones. The primary rift zone is a broad ridge that trends in the northwest direction and the two minor rift zones trend in the southwest and south-southeast directions. The Palawai Basin, located in the southern portion of Lanai, is the remnant of the caldera formed by the collapse of the shield summit. All lavas of Lanai are tholeiitic basalts, ranging from olivine-free tholeiites through olivine-tholeiites to very olivine-rich oceanites. Lava flows range from 0.3 to 30 meters thick, averaging 6 meters, with very little evidence of erosion or weathering between successive flows. In general, pahoehoe flows predominate near vents and a’a flows are abundant on the lower slopes (Macdonald, et al., 1983).

Since Lanai lies in the rain shadow of West Maui and East Molokai, the island is very dry, with an average annual rainfall at the summit of approximately 100 centimeters per year. For this same reason, the northeast portion of the island is sheltered from wave erosion, with broad expanses of alluvium and beaches. Conversely, the southwest portion of the island is fully exposed to waves generated by southwestern storms, creating the phenomenon of high sea cliffs. A zone of transition between the fresh groundwater and the ocean salt water occurs due to the constant movement of the interface as a result of tidal fluctuations, seasonal fluctuations in recharge and discharge and aquifer development (Macdonald, et al., 1983).

Wind erosion on Lanai is significant, exhibited by slightly consolidated to completely unconsolidated dune ridges formed by wind blown sand along the southeast portion of the island and deposition of soil from weathered basaltic rocks that form yellowish to reddish brown unconsolidated dunes on the north and northeast portion of the island (Macdonald, et al., 1983).

4.2.2 Site Geology

The site is situated at an elevation of approximately 1,550 feet above mean sea level (msl). The soil at the site is classified as Lahaina silty clay, 3 to 7 percent slopes (LaB). The Lahaina series consists of well-drained soils developed in material weathered from basic igneous rock. In a representative profile, the surface layer consists of reddish brown silty clay; the subsoil consists of a dusky red and dark reddish brown subangular blocky silty clay and silty clay loam. The substratum is soft, weathered basic igneous rock. Permeability is moderate, runoff is slow, and the erosion hazard is slight (USDA, 1972). The soil in the excavation consisted of a reddish brown silty clay and light brown weathered basalt.

4.2.3 Regional Hydrogeology

Basal groundwater is formed by rainwater percolating down through the residual soils and permeable volcanic rock. All of the island situated below sea level, except within rift zones of the volcanoes, is saturated with ocean salt water and thus forms a basal lens called the “Ghyben-Herzberg” lens. A zone of transition between the fresh groundwater and the ocean salt water occurs due to the constant movement of the interface as a result of tidal fluctuations, seasonal fluctuations in recharge and discharge and aquifer development (Macdonald, et al., 1983).

Downward percolation of rainwater may be stopped by impermeable layers such as dense lava flows, alluvial clay layers and volcanic ash. The groundwater then forms a perched or high level aquifer, which is not in contact with salt water. Recharge of the aquifer occurs in areas of high rainfall, which are the interior mountainous areas. The groundwater flows from the recharge areas to the areas of discharge along the shoreline. Frictional resistance to groundwater flow causes it to pile up within the island until it attains sufficient hydraulic head to overcome friction. Thus, basal groundwater tends to slope toward the shoreline.

4.2.4 Site Hydrogeology

The site is underlain by the Leeward Aquifer System, which is part of the Central Aquifer Sector on the island of Lanai. The aquifer is classified by Mink and Lau, 1993, with the system identification number 5010221 (1111). This system includes an unconfined high level aquifer in dike compartments. The groundwater in this aquifer is described as being currently in use and containing groundwater with a fresh salinity (<250 mg/L Cl). The groundwater is an irreplaceable drinking water source with a high level of vulnerability to contamination (Mink and Lau, 1993).
5.0 FIELD INVESTIGATION

5.1 Preparation and Mobilization Efforts

5.1.1 Site Access and Subcontractor Coordination

Site access was coordinated with Mr. Angel Allas of C & C. ETC contracted ESN to perform DPT subsurface soil sampling activities and laboratory analyses of soil samples.

5.1.2 Initial Site Reconnaissance and Utilities Clearance

Prior to soil boring activities, ETC personnel contacted the Hawaii One Call Center to obtain underground utilities clearance from various utility companies. The project number for the Hawaii One Call Center was 580 and the ticket identification number given to ETC was 6003261. All appropriate utility companies were contacted and identified their respective underground utility lines in the area.

5.2 Sampling Methodology

5.2.1 Field Sampling Objectives

The purpose of the project was to fully delineate the extent of diesel-impacted soil. ETC selected three (3) boring locations based on their proximity to the diesel impacted soil area and accessibility for the DPT drill rig. Boring B-1 was located along the northern portion of the Power Plant structure, approximately 9.5 feet from the northwest corner of the structure. Boring B-2 was located adjacent to the east of the Power Plant structure approximately fifteen (15) feet south of the limit of the previous excavation. Boring B-3 was located adjacent to the west of the Power Plant structure, directly across from the previous excavation (Appendix I, Figure II).

Soil samples were collected and analyzed for TPH-D, BTEX, and PAHs. The analytical results were compared to Hawaii Department of Health (DOH) Tier 1 Soil Action Levels (SALs) for soil in areas where a drinking water source is threatened and rainfall amounts to less than 200 cm/year.

5.2.2 Field Screening Procedures

Based on the UST Closure and Release Response Report, boring locations were predetermined based on their proximity to the known area of contamination. Direct-push technology (DPT) sampling was selected since it offers rapid screening and collection of soil samples while minimizing investigation derived waste (IDW). In addition to using visual and olfactory observations to screen for petroleum impacts, a RAE Systems MiniRAE 2000 Portable VOC Monitor (Model PGM-7600) photionization detector (PID) was used to field screen soil samples for volatile organic compounds (VOCs) in the soil vapor headspace.

5.2.3 Field Equipment Calibration

All field instruments were calibrated at the beginning of the work day or as recommended by the manufacturer. Calibration served as a quality assurance (QA) check on the equipment. Instruments that failed calibration standards were not used. Calibration procedures for the field equipment were performed according to specifications provided in the equipment operation manuals.

ETC used the following field equipment for this investigation:

- RAE Systems MiniRAE 2000 Portable VOC Monitor (Model PGM-7600) photionization detector calibrated using 100-ppm isobutylene standard.

5.3 Soil Sampling Activities

Three (3) soil borings were advanced at the Property. The boring locations were selected based on their proximity to the known area of contamination. The boring locations are shown in Figure 2, Appendix I.

ESN collected continuous soil cores with 4-foot long core samplers with acetate sleeve from ground surface to 20 feet bgs. ETC personnel screened the soil for visual and olfactory indications of hydrocarbon contamination. Soil headspace readings were collected with the PID at various depths, typically every 2 feet. Since field screening did not indicate the presence of petroleum hydrocarbons soil samples were collected from ten and twenty feet bgs.

The soil samples were collected directly from the 4-foot long core samplers with acetate sleeve and placed into 4-ounce glass jars. The glass jars were sealed with plastic caps. The glass jars were then labeled with the client name, sample ID number, date/time of sampling and analysis. The samples were placed in a designated sample cooler with chemical ice pending delivery to the laboratory.

Soil stockpile samples were collected at a depth of at least 18 inches below the stockpile surface. ETC personnel collected five discrete soil samples from areas where PID readings were the highest and soil appeared stained. The soil samples were placed into 4-ounce glass jars and sealed with plastic caps. The glass jars were then labeled with the client name, sample ID number, date/time of sampling and analysis. The samples were placed in a designated sample cooler with chemical ice pending delivery to the laboratory.

Each sample was submitted to ESN for laboratory analysis of TPH-D via EPA Method 8015 Modified, BTEX via EPA Method 8021 b, and PAHs via EPA Method 8100 on a 5 day turn around time.

Each sample was extracted and analyzed within the recommended maximum allowable holding time. The chain-of-custody together with the corresponding laboratory reports are presented in Appendix III.

Soil was analyzed for VOCs in the soil vapor headspace using a PID during boring advancement. In addition, visual and olfactory observations were made to determine the...
presence or absence of petroleum hydrocarbons in the subsurface soils. Table 1 presents the results of field screening data. The boring log(s) are presented in Appendix II.

### Table 1: Field Screening Results - Soil

<table>
<thead>
<tr>
<th>Sample Location</th>
<th>Depth (feet)</th>
<th>PID (ppm)</th>
<th>Visual Observation</th>
<th>Olfactory Observation</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1</td>
<td>2.0</td>
<td>16.5</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B1</td>
<td>4.0</td>
<td>19.2</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B1</td>
<td>6.0</td>
<td>15.6</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B1</td>
<td>8.0</td>
<td>16.8</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B1</td>
<td>10.0</td>
<td>16.7</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B1</td>
<td>12.0</td>
<td>16.4</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B1</td>
<td>14.0</td>
<td>2.4</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B1</td>
<td>16.0</td>
<td>3.4</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B1</td>
<td>18.0</td>
<td>15.7</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B1</td>
<td>20.0</td>
<td>5.5</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B2</td>
<td>2.0</td>
<td>8.8</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B2</td>
<td>4.0</td>
<td>9.5</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B2</td>
<td>6.0</td>
<td>19.5</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B2</td>
<td>8.0</td>
<td>19.9</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B2</td>
<td>10.0</td>
<td>9.5</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B2</td>
<td>12.0</td>
<td>2.0</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B2</td>
<td>14.0</td>
<td>0.0</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B2</td>
<td>16.0</td>
<td>0.0</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B2</td>
<td>18.0</td>
<td>0.0</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B2</td>
<td>20.0</td>
<td>0.0</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B3</td>
<td>2.0</td>
<td>8.5</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B3</td>
<td>4.0</td>
<td>9.1</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B3</td>
<td>6.0</td>
<td>17.3</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B3</td>
<td>8.0</td>
<td>18.3</td>
<td>no staining</td>
<td>no odor</td>
<td>Reddish Brown Silty Clay</td>
</tr>
<tr>
<td>B3</td>
<td>10.0</td>
<td>18.0</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B3</td>
<td>12.0</td>
<td>18.6</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B3</td>
<td>14.0</td>
<td>16.2</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
<tr>
<td>B3</td>
<td>16.0</td>
<td>19.3</td>
<td>no staining</td>
<td>no odor</td>
<td>90% Reddish Brown Silty Clay 10% weathered basalt</td>
</tr>
</tbody>
</table>

5.4 Decontamination

All sample collection equipment (i.e., 4-foot sampler) were decontaminated between samples by washing with a brush and Alconox™ solution and triple rinsing with potable water. Sample containers were new or precleaned by the laboratory, and were kept in their original packaging to avoid contamination prior to use.

5.5 Investigation-Derived Waste (IDW)

IDW included soil excavated during direct push sampling, disposable personal protective equipment (PPE), disposable sampling equipment, decontamination fluids, and any other material that may have come in contact with potentially contaminated materials. IDW generated on-site were handled as follows:

- Used PPE and disposable sampling equipment (i.e., latex gloves) were disposed as solid waste.
- Soils from borings were returned to the source after sampling.
- Decontamination fluids were left to evaporate on-site.

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Additional Release Response Report  
ETC Project No.02-6011  
Lanai Power Plant  
September 2006

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Additional Release Response Report  
ETC Project No.02-6011  
Lanai Power Plant  
September 2006
6.0 FINDINGS AND CONCLUSIONS

6.1 Analytical Data – Soil

Eleven (11) soil samples were analyzed for TPH-D, BTEX, and PAHs on a 5 day turnaround time.

Analytical results indicated that TPH-D, BTEX, and PAHs were not detected above reporting limits in the six subsurface soil samples collected from the borings. Furthermore, soil samples collected from the soil stockpile had constituent concentrations below DOH Tier 1 SALs. Results are presented in Table 4.

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Depth (feet)</th>
<th>TPH-D</th>
<th>Benzene</th>
<th>Toluene</th>
<th>Ethylbenzene</th>
<th>Xylenes</th>
<th>PAHs</th>
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</thead>
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<tr>
<td>02.6011.110</td>
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<td>02.6011.220</td>
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<td>ND</td>
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<td>02.6011.320</td>
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<td>ND</td>
<td>ND</td>
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<td>ND</td>
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<tr>
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<td>1.5</td>
<td>1.5</td>
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<td>PQL</td>
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<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
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<td>Method Detection Limit</td>
<td></td>
<td>20</td>
<td>0.02</td>
<td>0.05</td>
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<td>Tier 1 SAL</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
</tr>
</tbody>
</table>

Notes: Results reported in mg/kg
ND= not detected
NA= not applicable
PQL= practical quantitation limit
Tier 1 SAL = DOH Tier 1 Action Level for soil in areas where a drinking water source is threatened and rainfall amounts to less than 200 cm/year.

6.2 Conclusions

Analytical data from the subsurface soil samples collected from the three borings indicated that TPH-D, BTEX, and PAH concentrations were below laboratory reporting limits and DOH Tier 1 SALs. Therefore, ETC believes that the extent of contamination originating from the UST release has been sufficiently delineated.

In addition, analytical data from the soil stockpile samples indicated that TPH-D, BTEX, and PAH concentrations were below DOH Tier 1 SALs. Therefore, ETC believes that the petroleum contaminated soil stockpile has been sufficiently remediated through aeration and natural attenuation.

Based on the analytical data, ETC recommends that no further action be required to address the release since: 1) The lateral and vertical extents of contamination have been delineated; 2) TPH-D was the only constituent detected at concentrations exceeding its DOH Tier 1 SAL; and 3) Residual petroleum-impacted soil exists beneath a structure used exclusively for storage.

ETC also recommends that the stockpiled soil be deemed acceptable for use as fill material either on-site or at an alternative location.
7.0 REFERENCES

- US Department of Interior Geological Survey. 1983. *Lanai City Quadrangle, Island of Lanai, 7.5 Minute Series (Topographic Map).*

APPENDIX I

FIGURES
# APPENDIX II
## BORING LOGS

<table>
<thead>
<tr>
<th>Time</th>
<th>Sample ID</th>
<th>PHD (mm)</th>
<th>Sample Location</th>
<th>Boring Completion (B1)</th>
<th>Depth (feet)</th>
<th>Lithological Description</th>
<th>Observations and Remarks</th>
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<tr>
<td>02.601</td>
<td>1.1.10</td>
<td>16.8</td>
<td>2</td>
<td></td>
<td></td>
<td>Reddish Brown Silty Clay</td>
<td></td>
</tr>
<tr>
<td>19.2</td>
<td>4</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>16.8</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>90% Reddish Brown Silty Clay 10% Weathered Basalt</td>
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</tr>
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<td>No visual/olfactory indications of petroleum</td>
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Location: 750 Fraser Avenue
ETC Project Number: 02-6011
Drilled by: ESN
Date: 8/11/06
<table>
<thead>
<tr>
<th>Time</th>
<th>Sample ID</th>
<th>PID (ft/sec)</th>
<th>Sample Location</th>
<th>Depth (ft)</th>
<th>Lithological Description</th>
<th>Observations and Remarks</th>
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<td>8.8</td>
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<td>Reddish Brown Silty Clay</td>
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<td>8</td>
<td>90% Reddish Brown Silty Clay 10% Weathered Basalt</td>
<td>Location of Soil Sample</td>
</tr>
<tr>
<td>02.601</td>
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<td></td>
<td>No visual/olfactory indications of petroleum</td>
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<td></td>
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Location: 750 Fraser Avenue
ETC Project Number: 02-6011
Drilled by: ESN
Date: 8/11/06
## APPENDIX III

### LABORATORY REPORTS

**ESN PACIFIC**

ETC - EnviroServices Training Center PROJECT #02-6011

 Lanai Power Plant

<table>
<thead>
<tr>
<th>SAMPLE NUMBER</th>
<th>DATE SAMPLED</th>
<th>DATE EXTRACTED</th>
<th>DATE ANALYZED</th>
<th>TPH (ppm) C12-C24</th>
<th>[% RECOVERY]</th>
<th>FLAGS</th>
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<tr>
<td>Method Blank</td>
<td>B/1/2006</td>
<td>B/1/2006</td>
<td>8/16/2006</td>
<td>NT</td>
<td>115%</td>
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<tr>
<td>Stock 1</td>
<td>B/1/2006</td>
<td>B/1/2006</td>
<td>8/16/2006</td>
<td>42</td>
<td>91%</td>
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<td>Stock 1 DRA</td>
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<td>B/1/2006</td>
<td>8/16/2006</td>
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**QA/QC DATA - LABORATORY CONTROL SPIKE ANALYSES**

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<thead>
<tr>
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<th>Spike Added</th>
<th>Measured Conc.</th>
<th>% Recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>500</td>
<td>474</td>
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**QA/QC DATA - MATRIX SPIKE ANALYSES**

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</tr>
</thead>
<tbody>
<tr>
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<td>500</td>
<td>471</td>
<td>94.2%</td>
</tr>
</tbody>
</table>

**RPO LIMIT: 20%**

**% Recovery LIMITS: 85% TO 115%**

**DATA REVIEWED BY: K. Combs**

---

Environmental Services Network
### QA/QC Data - Laboratory Control Spike Analyses

**Sample Name:**
- Sample 1
- Sample 2
- Sample 3
- Sample 4
- Sample 5
- Sample 6
- Sample 7
- Sample 8
- Sample 9
- Sample 10
- Sample 11
- Sample 12
- Sample 13
- Sample 14
- Sample 15

#### Fluoranthene

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<th>Raw</th>
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</tr>
<tr>
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</tr>
<tr>
<td>Sample 4</td>
<td>10.0</td>
<td>10.0</td>
<td>100%</td>
</tr>
<tr>
<td>Sample 5</td>
<td>10.0</td>
<td>10.0</td>
<td>100%</td>
</tr>
<tr>
<td>Sample 6</td>
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<td>100%</td>
</tr>
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</tr>
<tr>
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<tr>
<td>Sample 12</td>
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<td>100%</td>
</tr>
<tr>
<td>Sample 13</td>
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<td>100%</td>
</tr>
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<td>100%</td>
</tr>
<tr>
<td>Sample 15</td>
<td>10.0</td>
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#### Benzo(a)pyrene

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<tr>
<td>Sample 15</td>
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<td>10.0</td>
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</tr>
</tbody>
</table>

#### Analysis

- Any blanks are reported as 0.
- Quality control samples are submitted before and after each concentration.
- Samples are re-analyzed to confirm the results.
- Reported concentrations are based on the spikes.
- Analysis was performed by the laboratory.

**Environmental Services Network**
APPENDIX IV

PHOTOGRAPHIC DOCUMENTATION

Photograph #1: View of former UST excavation area and soil stockpile area.

Photograph #2: View of soil stockpile.

Photograph #3: ESN personnel using direct push technology to advance soil borings.

EnviroServices & Training Center, LLC

Photographic Documentation
Additional Subsurface Investigation
750 Fraser Avenue
Lanai City, Lanai, Hawaii

Project No. 02-6011
September 2006
WORK PLAN
Additional Subsurface Investigation
Lanai Power Plant
750 Fraser Avenue
Facility ID No. 9-490773
Release ID No. 030016

Prepared For:
CASTLE & COOKE RESORTS, LLC
P.O. Box 898900
Mililani, Hawaii 96789-8900

Prepared By:
ENVIROSERVICES & TRAINING CENTER, LLC
2850 Pa‘a Street, Suite 150
Honolulu, Hawaii 96819
tel: (808) 839-7222

ETC Project No. 02-6011
July 2005
1.0 GENERAL INFORMATION

1.1 Name and Address of Facility

The project site is the former Lanai Power Plant, located at 750 Fraser Avenue, Lanai City, Hawaii (Figure 1). The Hawaii Department of Health (DOH) Solid and Hazardous Waste Branch (SHWB) assigned the subject property the Facility Identification Number 9-400773 and assigned the Release Identification Number 030016.

1.2 Area Map

See Figure 1: Site Location Map

1.3 Site Map

See Figure 2: Site Layout

1.4 Site Description

The project site is located inland of the underground injection control line and is situated at an elevation of approximately 1,550 feet above mean sea level (m.s.l.). In the past, the facility and adjacent areas were used for industrial purposes. Currently, the Power Plant facility and adjacent areas are unused and generally overgrown with vegetation. The Power Plant structure is used for storage of equipment and supplies.

1.4.1 Regional and Site Geology

The island of Lanai is a shield volcano formed by eruptions at the summit and along three rift zones. The primary rift zone is a broad ridge that trends in the northwest direction and the two minor rift zones trend in the southwest and south-southeast directions. The Palawai Basin, located in the southern portion of Lanai, is the remnant of the caldera formed by the collapse of the shield summit. All lavas of Lanai are tholeiitic basalts, ranging from olivine-free tholeiites through olivine tholeiites to very olivine-rich oceanites. Lava flows range from 0.3 to 30 meters thick, averaging 6 meters, with very little evidence of erosion or weathering between successive flows. In general, pahoehoe flows predominate near vents and a'a flows are abundant on the lower slopes (MacDonald, et al., 1983).

Since Lanai lies in the rain shadow of West Maui and East Molokai, the island is very dry, with an average annual rainfall at the summit of approximately 100 centimeters per year. For this same reason, the northeast portion of the island is sheltered from wave erosion, with broad expanses of alluvium and beaches. Conversely, the southwest portion of the island is fully exposed to waves generated by southwestern storms, creating the phenomenon of high sea cliffs along the leeward portion of the island (Macdonald, et al., 1983).
Basal groundwater is formed by rainwater percolating down through soil and permeable volcanic lava flows, alluvial clay layers and volcanic ash. The groundwater then forms a perched or high recharge areas to the areas of discharge along the shoreline. Frictional resistance to groundwater rock. All of the island situated below sea level, except within rift zones of the volcanoes, is reddish brown silty clay and light brown weathered basalt.

1.4.2 Regional and Site Hydrogeology

The primary drinking water in the Hawaiian Islands is drawn from basal groundwater. Basal groundwater is formed by rainwater percolating down through soil and permeable volcanic rock. All of the island situated below sea level, except within rift zones of the volcanoes, is saturated with ocean salt water and thus forms a basalt lens called the "Ghyben-Herzberg" lens. A zone of transition between the fresh groundwater and the ocean salt water occurs due to the constant movement of the interface as a result of tidal fluctuations, aquifer development and seasonal fluctuations in recharge and discharge (Macdonald, et al., 1983).

Downward percolation of rainwater may be stopped by impermeable layers such as dense lava flows, alluvial clay layers and volcanic ash. The groundwater then forms a perched or high level aquifer, which is not in contact with salt water. Recharge of the aquifer occurs in areas of high rainfall, which are the interior mountainous areas. The groundwater flows from the recharge areas to the areas of discharge along the shoreline. Frictional resistance to groundwater flow causes it to pile up within the island until it attains sufficient hydraulic head to overcome friction. Thus, basal groundwater tends to slope toward the shoreline.

The site is underlain by the Leeward Aquifer System, which is part of the Central Aquifer Sector on the island of Lanai. The aquifer is classified by Mink and Lau, 1993, with the system identification number 50102212 (L1111). This system includes an unconfined high level aquifer in dike compartments. The groundwater in this aquifer is described as being currently in use and containing groundwater with a fresh salinity (<250 mg/l Cl). The groundwater is an irreplaceable drinking water source with a high level of vulnerability to contamination (Mink and Lau, 1993).

1.5 Site Background

Originally, the Power Plant facility reportedly had two USTs, a 12,000-gallon diesel UST and a 25,000-gallon diesel UST. In October 1989, Unitek Environmental Consultants (UEC) removed the 25,000-gallon UST. One of the soil samples collected beneath the UST had a TPH-D concentration that exceeded the DOH recommended cleanup goal in effect at that time. Therefore, soil borings were advanced in 1991 (UEC) and 1992 (UEC and Brewer Environmental Services) to determine the extent of petroleum-impacted soil.

Findings of the 1991 and 1992 subsurface investigations prompted Brewer Environmental Services (BES) to excavate an estimated 90 cubic yards of soil from the southeastern portion of the former UST excavation in 1993. Confirmation samples collected after removal of suspect petroleum-impacted soil indicated that a sufficient quantity of soil was removed. Subsequent stockpile sampling activities indicated that the excavated soil was suitable for use as fill material.

In a letter dated November 15, 2000, the DOH SHWB concurred with BES' conclusion that excavated soil could be used as fill material. However, the DOH expressed its concern with a reported 12,000-gallon diesel UST still existing at the facility.

On January 13, 2003, ETC mobilized to the project site with its subcontractors, M. Nakai Repair Service, Ltd. (M. Nakai) and Unitek Solvent Services, Inc. (USSI). A 5,500-gallon capacity diesel fuel UST was excavated and removed from the ground by M. Nakai. ETC believes that the 5,500-gallon diesel fuel UST is the 12,000-gallon UST referred to by UEC, BES, and the DOH SHWB in previous investigations and correspondence. USSI personnel then decommissioned the UST, removing approximately 70 gallons of residual product and sludge, which were placed into 55-gallon drums. USSI shipped the drums of residual product and sludge to their Resource Recovery facility in Campbell Industrial Park on Oahu. The empty tank shell was left on-site pending future scrap metal disposal activities. Associated UST piping did not appear to contain any residual product and was therefore cut at the limits of the excavation and left in-place.

During UST closure activities, petroleum-impacted soil was encountered in the excavation. Therefore, M. Nakai proceeded to remove stained soil to the extent feasible. All visually-stained soil was removed with the exception of stained soil within the west excavation wall, which could not be removed due to the proximity of the Power Plant structure. Stained soil in the west excavation wall was observed at a depth of approximately 4 feet below ground surface (bgs) to 15 feet bgs. An estimated 170 cubic yards of petroleum-impacted soil was removed and placed on and covered with polyethylene sheeting.
Two soil samples were collected from the bottom of the UST excavation at a depth of approximately 13 feet bgs. One soil sample was collected from the bottom of the overexcavation (approximately 22 feet bgs at that location) near the west wall to confirm that the vertical extent of contamination had been delineated. One soil sample was collected along the west portion of the north wall at the bottom of the excavation (approximately 23 feet bgs) to confirm that the lateral extent of contamination had been delineated to the north. One soil sample was collected from the west excavation wall (approximately 8 feet bgs) from the area that appeared to have the heaviest petroleum staining to determine the mass concentrations that would be left in the subsurface.

Analytical results indicated that, with the exception of the sample collected from the west sidewall of the overexcavation with the heaviest visual staining, all samples had constituent concentrations below applicable Hawaii Department of Health (DOH) Tier 1 Action Levels for soil in an area where a drinking water source is threatened and where rainfall amounts to less than 200 centimeters per year (Tier 1 Action Levels). The sample collected from the west sidewall of the overexcavation had total petroleum hydrocarbons as diesel (TPH-D) concentrations of 7,800 milligrams per kilogram (mg/kg), exceeding its respective DOH Tier 1 Action Level of 5,000 mg/kg. All other constituents in the sample were below DOH Tier 1 Action Levels. No groundwater was encountered within the excavation at any time.

Based on physical observations and analytical data, ETC recommended that an additional subsurface investigation be performed to delineate the extent of petroleum-impacted soil. Furthermore, ETC recommended that the petroleum contaminated soil stockpile be tilled twice a month and sampled after six months to one year to determine whether the soil could be reused on-site as fill material.

Castle & Cooke Resorts, LLC (CCR) received a letter from the DOH Solid and Hazardous Waste Branch (SHWB) dated May 10, 2004. The DOH requested that CCR 1) sample the approximate 170 cubic yard stockpile of petroleum contaminated soil at a rate of one sample per 20 cubic meters for the first 100 cubic meters of contaminated soil and at a rate of one sample per additional 100 cubic meters of contaminated soil; 2) prepare a work plan describing additional delineation and sampling activities; and 3) complete work plan activities. This work plan and the activities described herein will be performed to satisfy the DOH SHWB's request.
3.0 SCHEDULE OF PROPOSED ACTIVITIES

The following conceptual schedule is based on DOH approval of this work plan. Note that this schedule is contingent upon the scope of work described herein and is an estimate only.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
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<td>Utilities Tuning</td>
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<td>Prepare Report</td>
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The schedule shown above is only a conceptual model. Actual time frames to perform various activities may or may not require the time periods described. Efforts will be made to expedite the process to the extent feasible.

4.0 STATEMENT OF INTENDED DATA USAGE

The objective of site activities is to delineate the extent of petroleum hydrocarbon contamination stemming from the UST system that previously existed at the subject property and to determine diesel and related constituent concentrations in the contaminated soil stockpile. Soil sample data shall be compared to DOH Tier 1 Action Levels for sites located over drinking water aquifers and where rainfall amounts to less than or equal to 200 centimeters per year.
5.0 DESCRIPTION OF PROPOSED ACTIVITIES

Based on previous work at the facility, ETC is proposing the following scope of work:

1. Prepare this work plan to describe activities proposed at the facility.
2. Obtain the services of a subcontractor to conduct underground utilities toning.
3. Obtain the services of a subcontractor to utilize a direct-push technology rig to collect subsurface soil samples.
4. Advance three soil borings (approximate locations shown in Figure 2) adjacent to the Power Plant structure to determine the extent of diesel fuel contamination in subsurface soil.
5. Field screen subsurface soil using visual/olfactory observations and by analyzing volatile organic compound concentrations in soil headspace using a photoionization detector (PID).
6. Collect up to two soil samples from each boring where visual/olfactory observations indicate the potential presence of petroleum contamination stemming from the UST or at approximate depths of 10 feet bgs and 20 feet bgs.
7. Manually probe the contaminated soil stockpile and collect up to five soil grab samples from areas where PID readings are the highest and/or soil appears stained. Samples shall be collected at depths of at least 18 inches below the stockpile surface.
8. Submit the soil samples to a local laboratory for analysis of TPH-D via EPA Method 8015 Modified, benzene/toluene/ethylbenzene/xylenes (BTEX) via EPA Method 8021b, and polynuclear aromatic hydrocarbons (PAHs) via EPA Method 8100.
9. Prepare a report documenting field activities, sampling procedures, analytical results, and associated figures and photographs.

6.0 DOCUMENTATION AND REPORTING

6.1 Field Documentation

Complete and accurate documentation of field activities is critical to the technical defensibility of work. Such documentation includes logbooks, field data sheets, requests for analyses, chain of custody records, and photographs.

When more than one person is present for field activities, one member of the sampling team will be designated to take all field notes and records. All pertinent information will be recorded in these logbooks from the time each individual arrives at the jobsite to the time each individual departs from the jobsite. Logbook entries must be dated, legible, and contain accurate and inclusive documentation of investigation activities. Logbook entries will be made in indelible ink.

6.2 Written Report

A report describing the above mentioned subsurface investigation activities, including data and findings, written and photographic documentation, and conclusions will be submitted to CCR for subsequent submittal to the DOH.
7.0 QUALIFICATIONS OF ENVIRONMENTAL PERSONNEL

Mr. Damon Hamura (ETC, 839-7222) will be the Project Manager and responsible for carrying out and modifying this Plan. ETC will be responsible for providing overall site operations including coordination with subcontractors, collecting soil samples, documenting site activities, and preparing the written report.

ETC anticipates subcontracting Hawaii Geophysical Services to perform underground utilities toning and Environmental Services Network - Pacific (ESN-Pacific) to perform boring advancement and laboratory analysis of soil samples.

8.0 REFERENCES

Table 1 - Analytical Results July 1993

All results in milligrams per kilogram (mg/kg)

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**Significant Findings (ETC 2003 and 2007)**

TPH-D = 560 mg/kg to 3,200 mg/kg
1,2-Dichloropropane = 0.054 mg/kg to 2.03 mg/kg

**Source:** ETC, April 16, 2003 and ETC, December 11, 2007

**Significant Findings (ETC 2008)**

Multi-Increment Surface Soil Samples

- **DDD:** 1.39 mg/kg to 2.88 mg/kg (OUs 1, 14)
- **DDT:** 0.812 mg/kg to 1.72 mg/kg (OUs 7, 8, 10, OU13, OU14, OU15)
- **DDE:** 0.095 mg/kg to 0.25 mg/kg (OUs 7, 8, 10, OU13, OU14)
- **Chlordane:** 5.17 mg/kg to 5.84 mg/kg (OUs 14, OU15)
- **Heptachlor:** 0.0359 mg/kg (C1)

**Pentachlorophenol:** 4.7 mg/kg (C1)
**Dioxins/Furans (TEQ):** 31.94 ng/kg to 2097.20 ng/kg (OUs 1, 4, OU15, C1)

**Source:** ETC, July 2008

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**Summary Data Figure**

**Former Emulsion Plant Area**

*Lanai City, Lanai, Oahu, Hawaii*

*January 2014*
### Table 2: Analytical Results - ETC 2003 and 2007

*All results in milligrams per kilogram (mg/kg)*

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<th>Acenaphthene</th>
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<th>1,2-dichloropropane</th>
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**Average RSD:** 1.44%

**Lead:** 51.27%

**Mercury:** 13.09%

**Notes:**

- **EPA Method 6000s/7000s**

**DOH EAL:** 24

---

### Table 3: Analytical Results - ETC 2008 - Metals (As/Pb/Hg)

**EPA Method 6000s/7000s**

*All results in milligrams per kilogram (mg/kg)*

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<td>10</td>
<td>57.5</td>
<td>0.437</td>
<td></td>
</tr>
<tr>
<td>2008.OU19</td>
<td>10</td>
<td>20</td>
<td>0.145</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

- **DOH EAL:** 24

---

**Italicized values = not detected at the MDL, MDL value listed**

**Adjusted concentrations = reported concentration plus the appropriate RSD value.**

- For triplicate samples, the appropriate RSD was added to the mean of the three reported values.
- Adjusted concentrations were used to assess the site for environmental hazards.

---

**DDH EAL = Current Default (Lowest) EAL for unrestricted land use (i.e. residential) in areas where potential drinking water is threatened, nearest surface water is greater than 150m.**

**Italicized values = not detected at the MDL, MDL value listed**

**Adjusted concentrations = reported concentration plus the appropriate RSD value.**

- For triplicate samples, the appropriate RSD was added to the mean of the three reported values.
- Adjusted concentrations were used to assess the site for environmental hazards.
**Table 5: Analytical Results - ETC 2008 - Dioxin/Furan TEQs**

EPA Method 8290 Modified

All results in picograms per gram (pg/g) = nanograms per kilogram (ng/kg) = parts per trillion (ppt)

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Total TEQ</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008 OU1</td>
<td>505.77</td>
<td></td>
</tr>
<tr>
<td>2008 OU2</td>
<td>133.69</td>
<td></td>
</tr>
<tr>
<td>2008 OU3</td>
<td>425.52</td>
<td></td>
</tr>
<tr>
<td>2008 OU4</td>
<td>322.36</td>
<td></td>
</tr>
<tr>
<td>2008 OU5</td>
<td>579.41</td>
<td></td>
</tr>
<tr>
<td>2008 OU6</td>
<td>252.04</td>
<td></td>
</tr>
<tr>
<td>2008 OU7</td>
<td>411.84</td>
<td></td>
</tr>
<tr>
<td>2008 OU8</td>
<td>945.38</td>
<td></td>
</tr>
<tr>
<td>2008 OU9</td>
<td>657.15</td>
<td></td>
</tr>
<tr>
<td>2008 OU10</td>
<td>1470.70</td>
<td></td>
</tr>
<tr>
<td>2008 OU11</td>
<td>305.93</td>
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<tr>
<td>2008 OU12</td>
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<td>897.94</td>
<td></td>
</tr>
<tr>
<td>2008 OU14</td>
<td>1173.13</td>
<td></td>
</tr>
<tr>
<td>2008 OU15</td>
<td>799.86</td>
<td></td>
</tr>
<tr>
<td>2008 C1</td>
<td>2097.20</td>
<td></td>
</tr>
</tbody>
</table>

DOH EAL = Current Default (Lowest) EAL for unrestricted land use (i.e. residential) in areas where potential drinking water is threatened, nearest surface water is greater than 150m

The World Health Organizations’ 2005 Toxic Equivalency Factor (TEF) scheme was used to weight each compound according to its relative toxicity for cancer risk evaluations. Toxic Equivalencies (TEQs) were calculated using the TEFs. When a specific compound was not detected, the Reportable Detection Limit (RDL) was used to calculate the TEQ.

Adjusted concentrations = reported concentration plus the appropriate RSD value.

For triplicate samples, the appropriate RSD was added to the mean of the three reported values.

All analytes were not detected above method detection limits.

Italicized values = not detected at the MDL, MDL value listed

Boldfaced, shaded values = value exceeds EAL

Average RSD = average RSDs from the three sets of triplicate samples.

For triplicate samples, the appropriate RSD was added to the mean of the three reported values.

Adjusted concentrations = reported concentration plus the appropriate RSD value.

NS = No applicable standard

DOH EAL = Current Default (Lowest) EAL for unrestricted land use (i.e. residential) in areas where potential drinking water is threatened, nearest surface water is greater than 150m

The World Health Organizations’ 2005 Toxic Equivalency Factor (TEF) scheme was used to weight each compound according to its relative toxicity for cancer risk evaluations. Toxic Equivalencies (TEQs) were calculated using the TEFs. When a specific compound was not detected, the Reportable Detection Limit (RDL) was used to calculate the TEQ.

Adjusted concentrations = reported concentration plus the appropriate RSD value.

For triplicate samples, the appropriate RSD was added to the mean of the three reported values.
Surface soils suitable for restricted land use.

Surface soils are classified as Category A (very minimally impacted) soils (TEQ dioxins between 0 ng/kg and 20 ng/kg). No significant risks to human health under restricted (e.g. residential) land use. No additional risk considerations are required.

Surface soils suitable for unrestricted land use.

Surface soils are classified as Category B (minimally impacted) soils (TEQ dioxins between 20 ng/kg and 240 ng/kg). No significant risks to human health under commercial/industrial land use. Site-specific risk management and controls may be required for surface soils, depending on the specific circumstance.

Surface soils suitable for commercial/industrial land use with minimal controls.

Surface soils are classified as Category C (moderately impacted) soils (TEQ dioxins between 240 ng/kg and 1,500 ng/kg). No significant risk to human health under commercial/industrial land use. Site-specific risk management and controls may be required for surface soils, depending on the specific circumstance.

Surface soils suitable for commercial/industrial land use with minimal controls.

Surface soils are classified as Category D (heavily impacted) soils (TEQ dioxins greater than 1,500 ng/kg). Remedial actions are required under any land use scenario to reduce exposure. Remedial actions include treatment, disposal, or containment. Note that the DOH typically recommends that the same remedy be implemented for the full area and volume of soil that is clearly above background for the surrounding area to the extent practicable.

Surface soils suitable for any land use and remedial action required.

Surface soils are classified as Category E (heavily impacted) soils (TEQ dioxins greater than 1,500 ng/kg). Remedial actions are required under any land use scenario to reduce exposure. Remedial actions include treatment, disposal, or containment. Note that the DOH typically recommends that the same remedy be implemented for the full area and volume of soil that is clearly above background for the surrounding area to the extent practicable.

Surface soils moderately/heavily impacted AND subsurface soils impacted.

Surface soils are classified as Category C and/or D. Specifically, remedial actions should be implemented for the surface soil within 2008.C1; and long-term management controls should be implemented for the remaining areas west of the existing concrete slab. Note that the surface soils east of 2008.C1 have not been investigated. In addition, subsurface soil impacts may prohibit the construction of enclosed building structures in the area without further investigation (e.g. soil vapor assessment).

**Additional Notes:** Based on ETC’s review of the data, additional investigation to delineate the lateral and vertical impacts may be required within the 3.0-acre lot and the adjacent areas regardless of land use considerations. Additional investigation is recommended to determine if the area is suitable for unrestricted land use.
EnviroServices & Training Center, LLC

December 11, 2007
Castle & Cooke Resorts, LLC
P.O. Box 630310
Lanai City, Hawaii 96763-0310

Attention: Mr. Angel Alias

Reference: Subsurface Soil Sampling Report
Former Emulsion Plant
Lanai City, Hawaii
Facility ID 9-402424, Release ID 900128

EnviroServices & Training Center, LLC (ETC) has completed subsurface soil sampling activities at the above referenced facility to determine vertical delineation of 1,2-dichloropropane (DCP) in support of the June 2005 Exposure Prevention Management Plan (EPMP). Sampling activities described herein were requested by the Hawaii Department of Health (DOH), Solid & Hazardous Waste Branch (SHWB) in a May 11, 2007 letter to Castle & Cooke Resorts, LLC.

1.0 BACKGROUND

As described in a July 13, 1993 “Further Phase II Site Characterization Report, Dole Packaged Foods Company Emulsion Plant Facility, 750 Fraser Avenue” prepared by Brewer Environmental Services (BES), Unitek Environmental Consultants (UEC) removed two 10,000-gallon underground storage tanks (USTs) from the facility in 1989. The USTs were used to store diesel fuel from 1947 through 1978 or 1979 and Telone II (1,2-dichloropropane) from 1978 or 1979 through the mid-1980s. During removal, UEC observed numerous holes along the base of both USTs. Soil samples collected from beneath the USTs contained total petroleum hydrocarbons as gasoline (TPH-G), total petroleum hydrocarbons as diesel (TPH-D), benzene, and ethylbenzene concentrations that exceeded Hawaii Department of Health (DOH) Cleanup Goals at the time. In addition, DCP and 1,3-dichloropropene were detected. These results suggested a release occurred from the USTs and therefore UEC recommended that additional site characterization be performed.

UEC advanced two borings near the south end of the former USTs to depths of approximately 45.5 feet below ground surface (bgs). Eight soil samples were collected from each boring. Laboratory analysis of the soil samples indicated that TPH-D, benzene, toluene, and ethylbenzene concentrations exceeded DOH Cleanup Goals at the time. In addition, DCP was detected at concentrations ranging from 0.0222 mg/kg to 1.6 mg/kg and 1,3-dichloropropene concentrations were below method detection limits. Various organochlorine pesticides and HOCs were also detected, suggesting either the chemicals were there through application or due to a release. UEC subsequently recommended further investigation.

Between December 1991 and March 1992, BES advanced nine borings surrounding the former USTs, up to depths of 140 feet bgs. Soil encountered from 6 to 55 feet bgs was classified as silty clay and unweathered, unfractured basalt rock was encountered from 55 to 60 feet bgs and deeper. Soil samples collected from these borings had detectable concentrations of TPH-D, benzene, toluene, and ethylbenzene. Concentrations of 1,3-dichloropropene were below method detection limits in all samples and DCP concentrations, detected in four borings (B9-B12), ranged from 0.005 mg/kg to 0.04 mg/kg.
Based on site characterization activities performed by both UEC and BES, BES recommended that:

- An exposure prevention management and monitoring program be prepared to address residual petroleum and 1,3-dichloropropene impacted soil associated with the UST systems, and
- No further action be required for constituents unrelated to the former contents of the USTs (pesticides and HOCs), since a reportable quantity release of these constituents had not occurred.

Subsequently, the DOH SHWB sent a letter dated September 17, 2001 to Dole Food Company Hawaii. The letter stated that the DOH SHWB reviewed BES’ Further Site Characterization Report, Dole Packaged Foods Company Emulsion Plant Facility, 750 Fraser Avenue, Kailua City, Honolulu, Hawaii dated July 13, 1994. The DOH indicated that, since petroleum contaminated soil still exists at the property, the DOH could not issue a letter requiring no further action and that additional work should be performed.

In December 2002, ETC excavated test pits and collected subsurface soil samples to determine existing concentrations of former UST contents in the subsurface soil. A total of six soil samples were collected and analyzed for TPH-D, benzene, toluene, ethylbenzene, xylenes, polynuclear aromatic hydrocarbons (PAHs), DCP, and 1,3-dichloropropene. With the exception of DCP, all constituent concentrations were either below practical quantitation limits or below DOH Tier I Action Levels. DCP concentrations were compared to its EPA Region 9 Preliminary Remediation Goal (PRG) for industrial soil of 0.74 mg/kg. The soil sample collected from test pit 6 at a depth of 13 feet bgs (TP6:13) had a DCP concentration of 230 mg/kg.

Based on data from previous environmental investigations and from recent test pit soil sampling activities, ETC concluded that all residual contaminants (TPH-D, DCP, 4,4-DDT, heptachlor, and toxaphene) existing in the subsurface soil at concentrations exceeding DOH Tier 1 Action Levels or EPA Region 9 PRGs for industrial soil should be cumulatively managed through an exposure prevention management program. ETC recommended that an Exposure Prevention Management Plan be prepared to address long-term management for future use of the property and potential exposure risks associated with construction activities.

In June 2005, ETC completed the Exposure Prevention Management Plan (EPMP). On September 7, 2006, the DOH sent a letter to Castle Cooke Resorts, LLC (Castle Cooke) with concerns regarding the EPMP. The DOH requested that an Exposure Pathway Assessment Report be prepared for the release and a site-specific Tier 2 risk assessment be prepared for the elevated concentration of DCP in a soil sample collected at a depth of 15 feet from Test Pit 6 (documented in ETC’s April 16, 2003 Soil Sampling Report – Former Emulsion Plant).

On March 19, 2007, ETC sent a Response and Clarification Letter to the DOH in regards to the September 7, 2006 letter. ETC provided the DOH with additional information and requested a finding of “no further action” for the site.

On May 11, 2007, the DOH sent a letter to Castle & Cooke requesting vertical delineation of soil contaminated by DCP by advancing two soil borings within the former location of Test Pit 6 to a minimum depth of 60 to 80 feet bgs, where the basalt layer was encountered during previous subsurface investigations. The DOH requested that soil samples be taken from the borings at consistent intervals of 5 feet and analyzed for DCP. Based on the DOH SHWB recommendations, ETC performed subsurface soil sampling activities at the project site. Specifically, ETC completed the following tasks:

- Notified the Hawaii One Call Center (HOCC) to locate underground facilities at boring locations
- Contracted Hirata & Associates, Inc. (Hirata) to assist with the collection of subsurface soil samples;
- Observed and documented the advancement of two (2) soil borings at the site;
- Examined soil samples for visual or olfactory signs of contamination;
- Selectively monitored the organic vapor concentration in the soil headspace using a photoionization detector (PID);
- Collected four samples from each boring at depths ranging from 30 feet bgs to 60 feet bgs;

Subsurface Soil Sampling Report
Former Emulsion Plant
December 11, 2007
ETC Project No. 02-6011

### Table 1: Field Screening Results

<table>
<thead>
<tr>
<th>Location</th>
<th>Depth</th>
<th>PID</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP6.1</td>
<td>30'</td>
<td>10.9</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>35'</td>
<td>22.3</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>40'</td>
<td>13.6</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>45'</td>
<td>19.7</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>50'</td>
<td>20.1</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>55'</td>
<td>17.7</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>60'</td>
<td>23.5</td>
<td>No staining, very slight odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>30'</td>
<td>16.8</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>35'</td>
<td>18.5</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>40'</td>
<td>18.9</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>45'</td>
<td>24.2</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>50'</td>
<td>21.1</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>55'</td>
<td>22.5</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>59'</td>
<td>22.2</td>
<td>No staining, very slight odor</td>
</tr>
</tbody>
</table>

Soil samples were collected between 30 feet bgs, at 10 foot intervals, until the basalt layer was encountered at approximately 60 feet bgs. Four samples were collected from each boring location. Soil samples were collected directly from the 3-foot split spoon sampler into laboratory provided glass jars. The sample containers were then sealed with a Teflon-lined plastic screw cap and labeled with the sample name, date, time, and analyses. Samples were then placed into a designated sample cooler with ice pending delivery to TestAmerica-Honolulu (TA-H) in Honolulu, Hawaii. ETC requested that the samples be analyzed for DCP on a 10-15 working day turn around time. Following sample collection, the borings were backfilled using the excavated soil to prevent accident and/or injury.

Results were received from the laboratory on November 26, 2007 via electronic mail. Table 2 summarizes the analytical results. As shown, the U.S. Environmental Protection Agency (EPA) Region 9 Preliminary Remediation Goals (PRG) for industrial soil was used as a comparison.

### Table 2: Analytical Results

<table>
<thead>
<tr>
<th>Location</th>
<th>Depth</th>
<th>PID</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP6.1</td>
<td>30'</td>
<td>10.9</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>35'</td>
<td>22.3</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>40'</td>
<td>13.6</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>45'</td>
<td>19.7</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>50'</td>
<td>20.1</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>55'</td>
<td>17.7</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.1</td>
<td>60'</td>
<td>23.5</td>
<td>No staining, very slight odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>30'</td>
<td>16.8</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>35'</td>
<td>18.5</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>40'</td>
<td>18.9</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>45'</td>
<td>24.2</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>50'</td>
<td>21.1</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>55'</td>
<td>22.5</td>
<td>No staining, no odor</td>
</tr>
<tr>
<td>TP6.2</td>
<td>59'</td>
<td>22.2</td>
<td>No staining, very slight odor</td>
</tr>
</tbody>
</table>

Preserved, labeled, and submitted eight (8) soil samples to TestAmerica-Honolulu (TA-H) in Honolulu, Hawaii for analysis of DCP via EPA Method 8260 on a 10-15 working day turn around; and Prepared this letter report documenting the field activities and the results of the investigation including maps and analytical results.

### 2.0 FIELD ACTIVITIES

On October 18, 2007, ETC notified the HOCC to locate underground facilities at the boring locations and subsequently received clearance of underground facilities on October 23, 2007. On October 25, 2007 ETC met Hirata personnel at the project site. Hirata personnel commenced subsurface soil sampling activities at the direction of ETC within the former Test Pit 6. Hirata personnel drilled down directly to 30 feet bgs in each of the two borings (TP6.1 and TP6.2), using a Foremost Model B-80 mobile drill rig. ETC screened soil at depths between 30 and 60 feet bgs using visual/olfactory observations and RAE Systems MiniRAE 200 Portable VOC Monitor (Model PGM-7600) photoionization detector (PID). Field screening results are presented in Table 1.

On October 27, 2007, ETC completed the following tasks:

- Drilled the two borings (TP6.1 and TP6.2) to a total depth of 60 feet bgs
- Hand-picked the soil samples
- Collected four samples from each boring at depths ranging from 30 feet bgs to 60 feet bgs
- Collected undisturbed soil samples
-保存化验
- Prepared this letter report documenting the field activities and the results of the investigation including maps and analytical results.

ETC subsequently completed the following tasks:

- Notified the Hawaii One Call Center (HOCC) to locate underground facilities at the boring locations
- Contracted Hirata & Associates, Inc. (Hirata) to assist with the collection of subsurface soil samples;
- Observed and documented the advancement of two (2) soil borings at the site;
- Examined soil samples for visual or olfactory signs of contamination;
- Selectively monitored the organic vapor concentration in the soil headspace using a photoionization detector (PID);
- Collected four samples from each boring at depths ranging from 30 feet bgs to 60 feet bgs.

Subsurface Soil Sampling Report
Former Emulsion Plant
December 11, 2007
ETC Project No. 02-6011
I believe that the soil pore space would originate from a broken direct exposure pathway. Any future use of the property should comply with the June 2005 Exposure Prevention Management Plan prepared for this site.

If there are any questions, please contact me at 839-7222.

Respectfully,

ENVIROSERVICES & TRAINING CENTER, LLC

Kylee Law
Environmental Scientist

Attachments: Figure 1: Site Location Map
Figure 2: Site Layout
Laboratory Report
DAF Sheet
DETIER2 Sheet
QUIKSOIL Sheet

Subsurface Soil Sampling Report
Former Emulsion Plant
December 11, 2007
ETC Project No. 02-6011

Table 2: Analytical Results (mg/kg)

<table>
<thead>
<tr>
<th>Constituent</th>
<th>1,2-Dichloropropane</th>
<th>Practical Quantiitation Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP6.1.30</td>
<td>nd</td>
<td>0.0096</td>
</tr>
<tr>
<td>TP6.1.40</td>
<td>nd</td>
<td>0.0100</td>
</tr>
<tr>
<td>TP6.1.50</td>
<td>0.0446</td>
<td>0.0100</td>
</tr>
<tr>
<td>TP6.1.60</td>
<td>0.260</td>
<td>0.0100</td>
</tr>
<tr>
<td>TP6.2.30</td>
<td>nd</td>
<td>0.00977</td>
</tr>
<tr>
<td>TP6.2.40</td>
<td>nd</td>
<td>0.00977</td>
</tr>
<tr>
<td>TP6.2.50</td>
<td>0.0108</td>
<td>0.00967</td>
</tr>
<tr>
<td>TP6.2.59</td>
<td>0.0109</td>
<td>0.0100</td>
</tr>
</tbody>
</table>

Notes: nd = not detected above practical quantitation limit

3.0 CONCLUSIONS

Analytical results indicate DCP concentrations within the former Test Pit 6 (between 30 feet bgs and the basalt layer) are either below the laboratory method detection limits or EPA Region 9 PRG for industrial soil.

Regarding the DOH SHWB's request to prepare a site-specific Tier II risk-based assessment, various sheets were completed, including a Tier II Site-Specific Leachate Dilution Ammonium Factor (DAF) sheet, a Tier II Direct Exposure Risk Assessment Model sheet (DETIER2), and a Tier II Simplified Model for Groundwater Protection Soil Action Levels sheet (QUIKSOIL). These sheets are attached to this letter report.

For the DAF sheet, the default DAF of 1.0 was produced since the aquifer beneath the site is a high-level aquifer. This DAF is contrary to the US EPA's default DAF of 20 described in the May 2001 Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites and used as the default DAF by the DOH HEER Office.

The DETIER2 sheet appears to be inappropriate for this site since 1) it assumes residential exposure; and 2) it assumes impacted soil is or could potentially be exposed at the surface. Use of the DOH HEER Office's August 2006 Tier II Direct Exposure Risk Assessment Model sheet produces a Tier II Direct Exposure Screening Level of 240 mg/kg for contaminants in deep soils (depth greater than 1 meter for commercial/industrial sites) specific to commercial/industrial sites.

The QUIKSOIL sheet appears to be inappropriate for the contaminants of concern and the site since it is stated on the top of the sheet that the ESOIL computer application should be used for highly volatile or biodegradable contaminants or for sites where the base of the impacted soil is more than 10 meters from the groundwater.

As stated in previous correspondence, ETC does not believe the site-specific Tier II risk-based assessment approach is applicable to this project given the anticipated commercial/industrial use. The direct exposure model assumes that a reasonable exposure pathway to the contaminants of concern exists. In this specific case, ETC believes that the direct exposure pathway is broken, since there was only one sample with DCP concentrations exceeding the default industrial PRG and this sample was collected at a depth of 15 feet bgs (Test Pit 6). A sample collected immediately above this sample at a depth of 12 feet bgs (Test Pit 6) indicates DCP concentrations at an order of magnitude below the industrial PRG. All other samples collected in the vicinity indicate DCP concentrations well below the industrial PRG. Therefore, any potential transport of DCP in the vapor phase through the soil pore space would originate from a very limited area. Since there are no structures on the soil that could collect such vapor (and since there are no plans to build such structures), ETC considers the upward migration of DCP in the vapor phase a broken direct exposure pathway.

The leaching (QUIKSOIL) model does not seem appropriate for this particular site since 1) basalt was encountered at depths of approximately 60 to 75 feet in previous investigations; 2) the DAF does not take into account the basalt layer or the depth to groundwater (only the elevation of the groundwater); and 3) the model is considered inappropriate for sites where the base of impacted soils are greater than 10 meters to groundwater.

Although leaching of DCP to the underlying groundwater formation is a possibility, such occurrence would be improbable based on the basalt layer situated at depths most recently encountered at 60 feet bgs. Furthermore, recent data shows that DCP concentrations drop off significantly (three orders of magnitude) in soil at depths ranging from 30 to 60 feet bgs.

Of all the data gathered to-date, which includes 47 soil samples submitted to a laboratory for analysis, there is only one instance where DCP concentrations exceeded the EPA Region 9 industrial PRG. All surrounding samples (both laterally and vertically) indicate DCP concentrations below the Industrial PRG. In essence, the data indicates that there is a hot spot of DCP existing at a depth of approximately 15 feet bgs. Conservative estimates indicate that the lateral area impacted by this hot spot would be approximately 10 feet by 25 feet. Impacted depths range from 15 feet to no deeper than 30 feet bgs. The total volume of impacted soil is estimated at 140 cubic yards.

Based on the data obtained from this site, ETC recommends that no further action be performed at this site due to a lack of complete exposure pathways. Any future use of the property should comply with the June 2005 Exposure Prevention Management Plan prepared for this site.

Soil Action Levels sheet (QUIKSOIL). These sheets are attached to this letter report.

Regardless of the DOH SHWB's request to prepare a site-specific Tier II risk-based assessment, various sheets were completed, including a Tier II Site-Specific Leachate Dilution Ammonium Factor (DAF) sheet, a Tier II Direct Exposure Risk Assessment Model sheet (DETIER2), and a Tier II Simplified Model for Groundwater Protection Soil Action Levels sheet (QUIKSOIL). These sheets are attached to this letter report.

The QUIKSOIL sheet appears to be inappropriate for this particular site since 1) basalt was encountered at depths of approximately 60 to 75 feet in previous investigations; 2) the DAF does not take into account the basalt layer or the depth to groundwater (only the elevation of the groundwater); and 3) the model is considered inappropriate for sites where the base of impacted soils are greater than 10 meters to groundwater.

Although leaching of DCP to the underlying groundwater formation is a possibility, such occurrence would be improbable based on the basalt layer situated at depths most recently encountered at 60 feet bgs. Furthermore, recent data shows that DCP concentrations drop off significantly (three orders of magnitude) in soil at depths ranging from 30 to 60 feet bgs.

Of all the data gathered to-date, which includes 47 soil samples submitted to a laboratory for analysis, there is only one instance where DCP concentrations exceeded the EPA Region 9 industrial PRG. All surrounding samples (both laterally and vertically) indicate DCP concentrations below the Industrial PRG. In essence, the data indicates that there is a hot spot of DCP existing at a depth of approximately 15 feet bgs. Conservative estimates indicate that the lateral area impacted by this hot spot would be approximately 10 feet by 25 feet. Impacted depths range from 15 feet to no deeper than 30 feet bgs. The total volume of impacted soil is estimated at 140 cubic yards.

Based on the data obtained from this site, ETC recommends that no further action be performed at this site due to a lack of complete exposure pathways. Any future use of the property should comply with the June 2005 Exposure Prevention Management Plan prepared for this site.

If there are any questions, please contact me at 839-7222.

Respectfully,

ENVIROSERVICES & TRAINING CENTER, LLC

Kylee Law
Environmental Scientist

Attachments: Figure 1: Site Location Map
Figure 2: Site Layout
Laboratory Report
DAF Sheet
DETIER2 Sheet
QUIKSOIL Sheet

Subsurface Soil Sampling Report
Former Emulsion Plant
December 11, 2007
ETC Project No. 02-6011
November 08, 2007

LABORATORY REPORT

Client: EnviroServices & Training Center
505 Ward Avenue, Suite 202
Honolulu, HI 96814
Attn: Kylie Luke

Work Order: HQJ0155
Project: Emulsion Plant
Project Number: 02-6011

The results listed within this Laboratory Report pertain only to the samples tested in the laboratory. The analyses performed in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the sole use of TestAmerica and its client. This report shall not be reproduced, except in full, without written permission from TestAmerica.

TestAmerica Analytical Testing Corporation certifies that the analytical results contained herein apply only to the specific samples analyzed.

The Chain of Custody, 1 page, is included and is an integral part of this report. This report was reviewed and approved for release.

If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-(808) 466-5227.

Samples were received into laboratory at a temperature of -1 °C.

NELAC states that samples which require thermal preservation shall be considered acceptable if the arrival temperature is within 2 degrees of the required temperature for the method specified range. For samples with a temperature requirement of 4 degrees C, an arrival temperature from 0 degrees C to 6 degrees C meets specifications. Samples that are delivered to the laboratory on the same day that they are collected may not meet these criteria. In these cases, the samples are considered acceptable if there is evidence that the chilling process has begun, such as arrival on ice.

The reported results were obtained in compliance with the 2003 NELAC standards unless otherwise noted.
ANALYTICAL REPORT

Sample ID: HQ01155-01 (TPG-130 - Solid/Soil)

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Volatile Organic Compounds by EPA 8260B

- ND 1 mg/kg 0.00996 1 10/23/07 15:00 10/23/07 15:00

- 1,2-Dichloropropane
- 1,2-Dichlorobenzene (75.6-130%) 69% 1
- 1,2,4-Trimethylbenzene (85.2-120%) 11% 1
- 1,2,4-Tribromobenzene (85.1-120%) 86% 1
- 1,3,5-Trimethylbenzene (85.1-120%) 11% 1
- Toluene-d8 (85.2-120%) 16% 1
- Xylene-d8 (85.2-120%) 11% 1

Di-lution Analyzed Date Batch Method

Sampled: 10/25/07 12:45 | Received: 10/26/07 12:00

Volatile Organic Compounds by EPA 8260B

- ND 1 mg/kg 0.0100 1 10/23/07 12:39 10/23/07 12:39

- 1,2-Dichloropropane
- 1,2-Dichlorobenzene (75.6-130%) 92% 1
- 1,2,4-Trimethylbenzene (85.2-120%) 127% 127%
- 1,2,4-Tribromobenzene (85.1-120%) 87% 1
- 1,3,5-Trimethylbenzene (85.1-120%) 11% 1
- Toluene-d8 (85.2-120%) 11% 1
### ANALYTICAL REPORT

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### LABORATORY BLANK QC DATA

**Volatile Organic Compounds by EPA 8260B**

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### Laboratory Results Table

#### Volatile Organic Compounds by EPA 8260B

<table>
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<tr>
<th>Source / Spike Level</th>
<th>Units</th>
<th>MRL</th>
<th>MRL Result</th>
<th>Dep Result</th>
<th>% REC</th>
<th>% SEE</th>
<th>Limits</th>
<th>RPD Limit</th>
<th>O</th>
</tr>
</thead>
</table>

#### Project Information

- **Project:** Emulsion Paint
- **Work Order:** HQ.10155
- **Received:** 10/26/07
- **Work Location:** 99-193 Altga Heights Drive, Suite 121
- **Area:** Aiea, HI 96701-806-46&-5227 · Fax 808-486-2456

#### Contact Information

- **Kylie Luke**
- **505 Ward Avenue, Suite 202**
- **Honolulu, HI 96814**

---

**Note:** Table contains detailed measurements and results for various volatile organic compounds, with specific units and limits provided for each measurement. The data is presented in a tabular format, with columns for source/spike level, units, MRL, MRL result, dep result, % REC, % SEE, limits, RPD limit, and O.
### TestAmerica

**THE LEADER IN ENVIRONMENTAL TESTING**

500 Ward Avenue, Suite 202
Honolulu, HI 96814

**Enviroserv & Training Center**

500 Ward Avenue, Suite 302
Honolulu, HI 96814

**Project:** Enviroserv Plant

**Project Number:** 02-0631

---

**MATRIX SPIKE/MATRIX SPIKE DUPLICATE QC DATA**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Source Spike</th>
<th>Result</th>
<th>MRL</th>
<th>Result</th>
<th>% Rec</th>
<th>% REC</th>
<th>Limits</th>
<th>RPD</th>
<th>Unit</th>
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<tbody>
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<td>ND</td>
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**Source Spike Analysis**

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<th>Analyte</th>
<th>Source Spike</th>
<th>Result</th>
<th>MRL</th>
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<th>% Rec</th>
<th>% REC</th>
<th>Limits</th>
<th>RPD</th>
<th>Unit</th>
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<tbody>
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**ND**

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**MTL**

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**MDL**

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**MRL**

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**Result**

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**REC**

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**%REC**

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**Limits**

---

**RPD**

---

**Unit**

---
DATA QUALIFIERS AND DEFINITIONS

1. L3
   Internal Standard recovery was outside of method limits. Matrix interference was confirmed by reanalysis.

2. M1
   Analyte recovery outside of specified criteria. Individual analyte recovery exceedances allowed for multi-component analyses without disqualification of data per NELAC Standard, DOD QSM and/or AFCEE QAPP.

3. N1
   The MS and/or MS/MS were outside the acceptance limits due to sample matrix interference. See Blank Spike (LCS).

4. X1
   The RPD exceeded the acceptance limit.

5. Z1
   Due to sample matrix effects, the surrogate recovery was outside the acceptance limits.

6. ND
   Not detected at the reporting limit (or method detection limit if shown)

ADDITIONAL COMMENTS
November 08, 2007

LABORATORY REPORT

Client: EnviroServices & Training Center
365 Ward Avenue, Suite 302
Honolulu, HI 96814

Attn: Kyle Luke

Work Order: HQJ0156

Project Name: Emulsion Plant

Date Received: 10/26/07

The results listed within this Laboratory Report pertain only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable specifications as noted. All results are reported on a wet weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the sole use of TestAmerica and its clients. This report shall not be reproduced, except in full, without written permission from TestAmerica.

TestAmerica Analytical Testing Corporation certifies that the analytical results contained herein apply only to the specific samples analyzed.

The Chain of Custody page, is included and is an integral part of this report. This entire report was reviewed and approved for release.

If you have any questions relating to this analytical report, please contact your Laboratory Project Manager at 1-(808)486-5227.

Samples were received into laboratory at a temperature of 4 °C.

NELAC states that samples which require formal preservation shall be considered acceptable if the arrival temperature is within 2 degrees °C of the required temperature or the method specified range. For samples with a temperature requirement of 4 degrees °C, an arrival temperature from 0 degrees °C to 6 degrees °C meets specifications. Samples that are delivered to the laboratory on the same day that they are collected may not meet these criteria. In these cases, the samples are considered acceptable if there is evidence that the chilling process has begun, such as arrival on ice.

The reported results were obtained in compliance with the 2003 NELAC standards unless otherwise noted.

Approved By:

Aidan Scott
Laboratory Director

NELAC Certification # R87907

Page 1 of 13
<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Data</th>
<th>Qualifiers</th>
<th>Units</th>
<th>Dilution</th>
<th>Date Analyzed</th>
<th>Prep Date</th>
<th>Seq/</th>
<th>Batch</th>
<th>Method</th>
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<tbody>
<tr>
<td>HQJ0156-01</td>
<td>Sample: 1/2-Dichloropropane</td>
<td>mg/kg</td>
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<td>10/31/07 15:17</td>
<td>10/31/07 7K01002</td>
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**Volatile Organic Compounds by EPA 8260B**

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<th>Data</th>
<th>Qualifiers</th>
<th>Units</th>
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<th>Prep Date</th>
<th>Seq/</th>
<th>Batch</th>
<th>Method</th>
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## ANALYTICAL REPORT

**Sample ID:** HQJ0156-03 (TP6.2.50 - Solids/Soil)

### Volatile Organic Compounds by EPA 8260B

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<th>Data Qualifiers</th>
<th>Units</th>
<th>Dilution</th>
<th>Date Analyzed</th>
<th>Prep Date</th>
<th>Seq/ Batch</th>
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<tbody>
<tr>
<td>1,2-Dichloropropane</td>
<td>1,2-Dichloropropane-d-1 (75.6-128%)</td>
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<td>Surr: 1,1-Dichloroethylene (81-121%)</td>
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<td>Surr: Dibromochloromethane (88.2-117%)</td>
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<td>Surr: Toluene-d (8.3-117%)</td>
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**Sample:** 10/26/07 09:51  
**Recvd:** 10/26/07 17:00  

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**Sample ID:** HQJ0156-04 (TP6.2.59 - Solid/Soil)

### Volatile Organic Compounds by EPA 8260B

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**Sample:** 10/26/07 11:31  
**Recvd:** 10/26/07 17:00  

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<th>% REC</th>
<th>Limits</th>
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**Volatile Organic Compounds by EPA 8260**

Blank Analysis: 10/23/2007 (N010801-BL01)

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**Vehicle Organic Compounds by EPA 8240**

Blank Analysis: 10/23/2007 (N010801-BL01)

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<th>% REC</th>
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Page 7 of 13
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<tr>
<td>Analyte</td>
<td>Source</td>
<td>Spike</td>
<td>Result</td>
<td>Units</td>
<td>MRL</td>
<td>MRL Result</td>
<td>REC</td>
<td>N/REC</td>
<td>Limits</td>
<td>RPD</td>
<td>Limit %</td>
<td>O</td>
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<tr>
<td>MATRIXT SPIKE/MATRIX SPIKE DUPLICATE QC DATA</td>
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</table>

**Valuable Organic Compounds by EPA 8260**

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Source</th>
<th>Spike</th>
<th>Result</th>
<th>Units</th>
<th>MRL</th>
<th>MRL Result</th>
<th>REC</th>
<th>N/REC</th>
<th>Limits</th>
<th>RPD</th>
<th>Limit %</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphthalene</td>
<td>ND</td>
<td>0.0986</td>
<td>mg/kg</td>
<td>0.0986</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Acenaphthene</td>
<td>ND</td>
<td>0.0986</td>
<td>mg/kg</td>
<td>0.0986</td>
<td></td>
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<tr>
<td>Acenaphthylene</td>
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<td>mg/kg</td>
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<tr>
<td>Fluorene</td>
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<tr>
<td>Benzo[a]anthracene</td>
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<td>mg/kg</td>
<td>0.0986</td>
<td></td>
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<tr>
<td>Benzo[b]fluoranthene</td>
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<td>mg/kg</td>
<td>0.0986</td>
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<tr>
<td>Benzo[k]fluoranthene</td>
<td>ND</td>
<td>0.0986</td>
<td>mg/kg</td>
<td>0.0986</td>
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<tr>
<td>Benzo[a]pyrene</td>
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<td>mg/kg</td>
<td>0.0986</td>
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<tr>
<td>Benzo[b]pyrene</td>
<td>ND</td>
<td>0.0986</td>
<td>mg/kg</td>
<td>0.0986</td>
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<tr>
<td>Benzo[fluoranthene</td>
<td>ND</td>
<td>0.0986</td>
<td>mg/kg</td>
<td>0.0986</td>
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</tr>
<tr>
<td>Chrysene</td>
<td>ND</td>
<td>0.0986</td>
<td>mg/kg</td>
<td>0.0986</td>
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<tr>
<td>Benzo[ghi]perylene</td>
<td>ND</td>
<td>0.0986</td>
<td>mg/kg</td>
<td>0.0986</td>
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<tr>
<td>dibutyl phthalate</td>
<td>ND</td>
<td>0.0986</td>
<td>mg/kg</td>
<td>0.0986</td>
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<tr>
<td>2,6-Dinitrotoluene</td>
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<td>mg/kg</td>
<td>0.0986</td>
<td></td>
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</table>
TABLE II: SITE-SPECIFIC LEACHATE DILUTION ATTENUATION FACTOR (DAF)

<table>
<thead>
<tr>
<th>SITE VARIABLES</th>
<th>DEFAULT</th>
<th>INPUT</th>
<th>Default hydraulic conductivity (m/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydraulic Conductivity</td>
<td>10</td>
<td>10</td>
<td>high (all types)</td>
</tr>
<tr>
<td>Aquifer Thickness (m)</td>
<td>10</td>
<td>10</td>
<td>unconsolidated and urban</td>
</tr>
<tr>
<td>Effective Porosity (fraction)</td>
<td>0.20</td>
<td>0.20</td>
<td>sand or gravel or old</td>
</tr>
<tr>
<td>Average soil groundwater elevation (m)</td>
<td>0.36</td>
<td>0.36</td>
<td>N/A</td>
</tr>
<tr>
<td>Distance to sea (m)</td>
<td>0.30</td>
<td>0.30</td>
<td>N/A</td>
</tr>
<tr>
<td>Groundwater elevation (m)</td>
<td>0.36</td>
<td>0.36</td>
<td>N/A</td>
</tr>
</tbody>
</table>

CALCULATIONS:
1. Predicted Rate (m/d)
2. Regional Hydraulic Conductivity (m/d)
3. Diffusion Rate (m/d)
4. Mixing Zone Depth (m)

FOR HIGH-LEVEL AQUIFERS, INPUT A GROUNDWATER GRADE OF 0.001 UNLESS AVAILABLE DATA SUGGEST OTHERWISE.

STEPS:
1. Check with DOH to ensure that this is an up-to-date version of the spreadsheet.
2. Input the site data. Use default values where site-specific data are not available.
3. Complete the investigation report section of site.
4. Complete the spreadsheet section of site.

*Site-specific input data must be supported by site investigation report(s).

NOTE:
1. Hydraulic conductivity of limestone-containing geology.
2. Approximate average groundwater elevation in the site. Input 10 if high-level groundwater systems or if no information is available (see notes 8 and 10).
3. Distance from release site to coastline as measured from a point representative of the average groundwater elevation for the release site. Input 10 if high-level groundwater systems or if NIA was input for groundwater elevation (see notes 9).
4. Length of exfiltration path as measured parallel to groundwater flow.
5. Refer to annual rainfall map included in Tier 2 report, input rainfall in inches per year. Reference map used to input.
6. Default recharge is 36% of total rainfall (average for Oahu). Input average groundwater elevation at release site.
7. Use regional gradient based in input average groundwater elevation at site and drainage to ocean. For high-level groundwater systems or if NIA input for groundwater elevation, input a gradient of 0.001 unless demonstrated by other data.
8. Groundwater gradient at site. Use approximate regional gradient unless otherwise directed or approved by DOH (Spreadsheet generates default regional gradient based on input average groundwater elevation at site and drainage to ocean. For high-level groundwater systems or if NIA input for groundwater elevation, input a gradient of 0.001 unless demonstrated by other data).
9. Groundwater gradient at site. Use approximate regional gradient unless otherwise directed or approved by DOH (Spreadsheet generates default regional gradient based on input average groundwater elevation at site and drainage to ocean. For high-level groundwater systems or if NIA input for groundwater elevation, input a gradient of 0.001 unless demonstrated by other data).
11. Mixing zone depth. Spreadsheet limits maximum mixing depth to input aquifer thickness.
12. DAF = ratio of contaminant concentration in soil leachate to concentration after mixing of leachate in groundwater. To generate a Tier 2 soil action level for groundwater impact concerns, multiply the Tier 1 or Tier 2, SESOIL-generated soil action level by the DAF calculated for the site. DAF must be sensitive to hydraulic conductivity, hydraulic gradient, and rainfall/infiltration rate.

REFERENCES:
TIER II DIRECT-EXPOSURE RISK ASSESSMENT MODEL

Assumes residential exposure by ingestion, inhalation, & dermal contact.
Assumes impacted soil is or could potentially be exposed at the surface.
Does not address potential groundwater impact or indoor air concerns.

**STEPS:**
1. Check with DOH to ensure this is an up-to-date version of the spreadsheet.
2. Check with DOH to ensure default toxicity data provided is up-to-date.
3. *Input site data:* Use default values where site-specific data are not available.
4. Input default physico-chemical data (copy & paste from end of spreadsheet).
5. Spreadsheet generates direct-exposure SALs for site (see accompanying document).

**Determine input soil mass-balance:**

<table>
<thead>
<tr>
<th>CONTAMINANT</th>
<th>LAND</th>
<th>VOLATILE CONTAMINANT</th>
<th>MODEL</th>
<th>LAND</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Address: 750 Fraser Avenue, Lanai City, Hawaii</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date: 12/4/2007</td>
<td></td>
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<td></td>
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<tr>
<td>Supports Site Investigation Report(s):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SITE NAME:** Former Emulsion Plant

**SPREADSHEET PREPARED BY:** D. Ikuma

**SIGNATURE:**

**DOH ID NO:** 94062434

**INPUT DATA**

<table>
<thead>
<tr>
<th>Element</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>SF 12 DCP</td>
<td>1.50</td>
</tr>
<tr>
<td>BF 2.65</td>
<td>0.10</td>
</tr>
<tr>
<td>CF 0.002</td>
<td>0.50</td>
</tr>
</tbody>
</table>

**SUPPORTING SITE INVESTIGATION REPORT(S):**

- April 16, 2003, Soil Sampling Report, Former Emulsion Plant, prepared by EnviroServices & Training Center, LLC.
- December 5, 2007, Subsurface Soil Sampling Report, Former Emulsion Plant, prepared by EnviroServices & Training Center, LLC.
### Notes

1. Use default physio-chemical and toxicity data provided in EPA Region IX PRGs (from TRS data base), First Half, 1995, or at otherwise deemed or approved by DOE.

2. Total areal extent of soil contaminated above Tier 1 soil action levels.

3. Use with contaminant-specific or estimates of concentrations (e.g., petroleum), assume a default soil of 0.002 or a maximum of 10% of the required soil use. For soils contaminated with rare products, assume a default soil of 0.02 or the required soil use.

4. Calculations based on modified equations presented in EPA Region IX PRGs (USEPA, 1995, see text).

5. ER (or "dispersion factor") is the default air exchange rate assuming ER = LS x V x DH (Refer to California Preliminary Remediation Assessment Guidance Manual, pg. B-3, ER term incorporated into California Preliminary Remediation Assessment Guideline Manual, Table 3-2.) Air exchange rates used in 1994 PRGs replaced with default "QC" value in 1995 PRG model. See also note 6.

6. Volatilization factor calculated using modified equations presented in 4-9 in EPA Region IX PRGs, First Half, 1995. PRG equation is equivalent to "air dispersion term/emission rate/soil concentration" as can be generated using equations presented in 5-7 (emission rate in pg. 4-9) and 4-9 (includes air exchange rate) in California Preliminary Remediation Assessment Guidance Manual. (See also notes 4 & 5.)

7. Volatilization factor calculated using modified equation 4-9 from EPA Region IX PRGs, First Half, 1995.

8. Calculated using equation 4-9 from EPA Region IX PRGs, First Half, 1995.


REFERENCES:


TIER II SIMPLIFIED MODEL FOR GROUNDWATER-PROTECTION SOIL ACTION LEVELS

QUIKSOIL Version: October 1996
State of Hawai'i
Department of Health
Environmental Management Division

Calculates Tier 2 soil action level (SAL) for protection against adverse leachate impact on groundwater. Does not incorporate vadose-zone fate and transport of leachate. (QESOIL computer application should be used for highly volatile or biodegradable contaminants or for sites where the base of the impacted soils is more than 10 meters from groundwater. See text.)

Does not address dilution of leachate on mixing with groundwater. SALs generated using this spreadsheet should be multiplied by the site dilution attenuation factor to calculate the final Tier 2 groundwater-protection SAL for the site (refer to DAF spreadsheet).

**STEPS:**
1. Check with DOH to ensure that this is an up-to-date version of the spreadsheet.
2. Input site data. Use default values where site-specific data are not available.
3. Input default physio-chemical data. (Copy & paste from end of spreadsheet.)
4. Spreadsheet generates leachate-impact SAL for site (see accompanying document).
5. Complete information at bottom of this page. Submit printout of spreadsheet with appropriate documents.

*Site-specific input data must be supported in text of site investigation report(s).*

<table>
<thead>
<tr>
<th>CONTAMINANT:</th>
<th>1,2-DCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater-Protection SAL (mg/kg)</td>
<td>0.020</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Date</th>
<th>DEFAULT</th>
<th>INPUT</th>
<th>Nominal Data (see below)</th>
<th>1,2-DCP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Leachate Conc. (mg/l)</td>
<td>0.06</td>
<td>0.12</td>
<td></td>
<td>0.0028</td>
</tr>
<tr>
<td>Soil density (g/cm³)</td>
<td>1.10</td>
<td>1.50</td>
<td>Kg/m³</td>
<td>0.1145</td>
</tr>
<tr>
<td>Particle size (µm³)</td>
<td>2.65</td>
<td>2.65</td>
<td>µm³</td>
<td>44</td>
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<tr>
<td>Fraction air-filled porosity</td>
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<td>0.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fraction organic carbon in soil</td>
<td>0.001</td>
<td>0.001</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>SITE NAME:</th>
<th>DOH ID NO.</th>
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</thead>
<tbody>
<tr>
<td>SITE ADDRESS:</td>
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<tr>
<td>SPREADSHEET PREPARED BY:</td>
<td>DATE:</td>
</tr>
<tr>
<td>SIGNATURE:</td>
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</table>

SUPPORTING SITE INVESTIGATION REPORT(S) (Note report title, date, and preparer's name and address):

Calculations:

<table>
<thead>
<tr>
<th>Soil porosity - total</th>
<th>0.43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil porosity - air-filled</td>
<td>0.28</td>
</tr>
<tr>
<td>Soil porosity - water-filled</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Notes:
2. Target concentration of contaminant in leachate at the point the leachate passes into groundwater. Target leachate concentration should equal contaminant MCL or surface water standard, as determined by the location of the site (refer to Determination of Groundwater Utility at Leaking Underground Storage Tank Sites (September 19, 1995): Hawai'i Department of Health, Environmental Management Division).
3. For soils with mixtures of contaminants, assume that no more than 10% of the total organic carbon (TOC) is available for sorption of any one contaminant.

Reference:
Mr. Richard K. Mirikitani  
May 11, 2007
Page 2

assessment for the non-basalt vadose zone to be completed following the requested  
soil boring and analyses of soil samples. DOH's Technical Guidance Manual and the  
companion Risk-Based Corrective Action document contain guidance for preparing a  
site-specific Tier 2 or Tier 3 risk-based assessment. Both documents are available for  
download from our website at  

If you have any questions regarding this letter, please contact Dr. Darren Park of our  
Underground Storage Tank Section at (808) 586-4375 or e-mail at  
darren.park@doh.hawaii.gov.  

Sincerely,  

/steven yk chang, p.e., chief  
Solid and Hazardous Waste Branch

The Department of Health (DOH) has reviewed the document, Response and  
Clarification Letter, dated March 19, 2007, and prepared by EnviroServices & Training  
Center, LLC. Please note the letter has been placed with the public record.  

Please note that the groundwater at the subject site is irreplaceable and a currently  
used drinking water source. Gross contaminated soil containing 1,2-dichloropropane  
(1,2-DCP) remains in place at the subject facility. A soil sample collected from the  
bottom of Test Pit 6 (15 feet) contained 230 mg/kg of 1,2-DCP, exceeding the 2006  
DOH Groundwater Protection Action Level of 0.12 mg/kg by 2,000 times.  

Vertical delineation of soil contaminated by 1,2-DCP to concentrations lower than the  
DOH Tier 1 action level has not been performed. DOH requires two soil borings within  
the former location of Test Pit 6. Borings should attain a minimum depth of 60 to 80  
feet below ground surface where the basalt layer was encountered during previous  
subsurface investigations. Soil samples should be taken from the borings at consistent  
intervals of 5 feet and analyzed for 1,2-DCP.  

An Exposure Prevention Management Plan (EPMP) is not a valid cleanup option for  
confirmed UST release sites, but can be used in conjunction with other remedial  
options. In addition, an EPMP is not valid unless complete vertical and horizontal  
delineation of soil and groundwater contamination has been achieved.  

As already requested in the DOH letter dated September 7, 2006, DOH requests that  
Castle & Cooke Resorts prepare and submit a site-specific Tier 2 risk-based
EnviroServices & Training Center, LLC

March 19, 2007

Hawaii Department of Health
Solid and Hazardous Waste Branch, UST Section
919 Ala Moana Boulevard, Suite 212
Honolulu, Hawaii 96814

Attention: Dr. Darren Park

Reference: Response and Clarification Letter

EnviroServices & Training Center, LLC (ETC) has prepared this letter on behalf of our Client, Castle & Cooke Resorts, LLC (CCR) in response to the September 7, 2006 letter from Dr. Steven Y.K. Chang of the Hawaii Department of Health (DOH) Solid and Hazardous Waste Branch (SHWB) to Richard K. Markowitz, Esq., of CCR. ETC has reviewed the DOH letter. Basically, the DOH is requesting that two (2) issues be addressed: 1) An Exposure Pathway Assessment Report be prepared for the release; and 2) A site-specific Tier 2 risk-based assessment be prepared for the elevated concentration of 1,2-dichloropropane (DCP) in a soil sample collected at a depth of 15 feet from Test Pit 6 (documented in ETC’s April 16, 2003 Soil Sampling Report – Former Emulsion Plant).

ETC respectfully requests that the DOH SHWB reconsider its position based in part on the additional information provided herein, particularly, the site’s future use as an employee parking area for nearby warehouses and offices; as well as the fact that 1) the data indicates elevated DCP concentrations are contained to a limited quantity of soil; 2) the site is underlain by hard basalt; and 3) the depth to groundwater at the site is estimated to be, at least 600 feet below ground surface. On behalf of our client, CCR, ETC is requesting that a finding of "no further action" be made for the site at this time.

Exposure Pathway Assessment Report

An Exposure Pathway Assessment Report (EPAR) as described in Appendix 5-1 of the DOH’s Technical Guidance Manual (TGM), 2nd Edition should include: 1) preparing an executive summary and an introduction/purpose to establish the site background (Section 2.0); 2) providing a description of the contaminants released (Sections 2.4, 2.5, 3.1 and Appendix I); 3) providing a description of the exposure setting (Sections 2.2, 3.2, and Appendix I); 4) identifying exposure pathways (Section 3.2 and Appendix I); 5) identifying uncertainties and major assumptions (Appendix I); 6) providing a summary (Section 3.2 and Appendix I); and 7) preparing worksheets for the EPAR (Appendix I).

ETC believes that the essential elements of the EPAR have been presented in the June 2005 Exposure Prevention Management Plan (EPMP) previously provided to the DOH. The information is located in the corresponding sections of the EPMP that are described in parentheses after each item listed above. Since ETC believes that an EPAR would not satisfy the DOH and that an EPMP would be inevitable, ETC elected to include, the elements of the EPAR within the EPMP based on efficiency and value to our Client.

Site-Specific Tier 2 Risk-Based Assessment

Available data for the site gathered from past investigation reports and physical features at the site are presented below:

1) Analytical data documented in the April 16, 2003 Soil Sampling Report – Former Emulsion Plant prepared by ETC indicate that in Test Pit 6, a soil sample collected at 12 feet below ground surface (bgs) had DCP concentrations of 0.054 mg/kg and that a soil sample collected at 15 feet bgs had DCP concentrations of 0.037 mg/kg.

2) Boring logs from the July 13, 1993 Further Phase II Site Characterization Report prepared by Brewer Environmental Services (BES) indicate that basalt layers were encountered in these of the boring nearest to and surrounding the area where the sample with elevated DCP concentrations was encountered. Boring logs for B-9 and B-10 indicate a silty clay-silty clayey silt grading to weathered basalt lithology, underlain by a basalt layer encountered at 60 to 75 feet below ground surface (bgs). The boring log for B-11 indicates a silty clay-silty clayey silt grading to weathered basalt lithology, underlain by a basalt layer at approximately 40 feet bgs. Furthermore, all soil samples collected and analyzed for DCP indicated DCP concentrations well below the EPA Region 9 Preliminary Remediation Goal (PRG) for industrial soils (referred to herein as the "industrial PRG") of 0.74 mg/kg.

3) The estimated depth to groundwater is at least 600 feet bgs, and may be in the range of 800 to 900 feet bgs, based on the estimated mean sea level elevations of 1500 feet and the static head elevations of nearby wells documented in the August 26, 1993 Hawaii Groundwater Index and Summary prepared by the State of Hawaii Department of Land and Natural Resources, Division of Water Resource Management.

ETC does not believe the site-specific Tier 2 risk-based assessment approach is applicable to this project given the proposed future use of the site as an employee parking area for nearby warehouses and offices. The direct exposure model assumes that a reasonable exposure pathway to the contaminate of concern exists. In this specific case, ETC believes that the direct exposure pathway is broken, since there was only one sample with DCP concentrations exceeding the default industrial PRG and this sample was collected at a depth of 15 feet bgs (Test Pit 6). A sample collected immediately above this sample at a depth of 12 feet bgs (Test Pit 6) indicates DCP concentrations at an order of magnitude below the industrial PRG. All other samples collected in the vicinity indicate DCP concentrations well below the industrial PRG. Therefore, any potential transport of DCP in the vapor phase through the soil pore space would originate from a very limited area. Since there are no structures on site that could collect such vapor (and since there are no plans to build such structures), ETC considered the upward migration of DCP in the vapor phase a broken direct exposure pathway.

The leaching (QUICKSOL) model does not seem appropriate for this particular site since 1) baseline was encountered at depths of approximately 60 feet in previous investigations; 2) the dilution-attenuation factor (DAF) does not seem to take into account the depth to groundwater; and 3) the model is considered inappropriate for sites where the base of impacted soils are greater than 10 meters to groundwater. Although leaching of DCP to the underlying groundwater formation is a possibility, such occurrence would be improbable based on the basalt layer situated at depths ranging from 60 to 75 feet bgs. Furthermore, even if it were assumed that the DCP could leach to groundwater, the mass of potentially impacted soil is limited and the effects of such leaching would be minimal.

Overall, the general conclusion (based on one elevated sample concentration) is that a "hot spot" exists at a depth of approximately 15 feet bgs. Based on an area between class sampling points, a conservative estimate of the lateral extent of impacted soil would be an approximate 10-foot by 25-foot area. Similarly, an estimate of the depths impacted would be 15 feet bgs to 60 feet bgs. The resulting volume of soil potentially-impacted with elevated DCP concentrations would be conservatively calculated to be 450 cubic yards.

Response and Clarification Letter

ETC Project No. 02.4011

Foster Emulsion Plant

ETC Project No. 02.4011

March 19, 2007; Page 2 of 3
Since a decision is being rendered on the environmental impacts from the site as a whole, the average DCP concentrations across the site should be considered rather than the highest concentration detected in a single discrete sample. Other data obtained (visual/olfactory, volatile organic compounds in soil vapor headspace, and laboratory data from previous investigations), coupled with site specific conditions, also indicate that potentially-impacted soil is limited to a very small portion of the overall site.

Based on the information presented herein, ETC believes that adherence to the EPM prepared for the site would serve as a sufficient control assuming the continuation of its current use as an open parking area. Therefore, on behalf of our Client, ETC requests that a finding of "no further action" be made for the site at this time.

If there are any questions regarding the site and/or the information presented in this letter, please contact me at 839-7222.

Respectfully,

ENVIROSERVICES & TRAINING CENTER, LLC

Damon Hamura
Principal

Enclosures: Site Layout
Summary of Historic Data

CC: R. Mirikitani, Esq., Castle & Cooke Resorts, LLC

Figure 2

Fraser Avenue

Dirt Road
The DOH review of the subject file discovered that requested action and documentation for the site has not been submitted to DOH. On May 13, 2005, DOH wrote a letter to Castle & Cooke Resorts, LLC requesting an Exposure Pathway Assessment Report (EPAR) for this release. To date, DOH has not received the EPAR. Please submit the EPAR within forty-five (45) days of your receipt of the letter. DOH’s Technical Guidance Manual (TGM), 2nd Edition, Appendix 5-I, contains guidance for preparing an EPAR.

DOH also has the following concern:

1. Soil sampling results indicate that the level of 1,2-Dichloropropane exceeds EPA Region 9 Preliminary Remediation Goals (PRG) for industrial soil by 300X.

Mr. Richard K. Mirikitani
Vice President & Corporate Counsel
Castle & Cooke Resorts, LLC
100 Kahelu Avenue
Mililani, Hawaii 96789

Dear Mr. Mirikitani:

SUBJECT: Dole Lanai Plantation, Former Emulsion Plant
Facility ID 9-402424 / Release ID 900128

The Department of Health (DOH) has reviewed the report, Exposure Prevention Management Plan (EPMP), dated June 2005, and prepared by EnviroServices & Training Center, LLC (ETC). Please note the report has been placed with the public record.

The DOH review of the subject file discovered that requested action and documentation for the site has not been submitted to DOH. On May 13, 2005, DOH wrote a letter to Castle & Cooke Resorts, LLC requesting an Exposure Pathway Assessment Report (EPAR) for this release. To date, DOH has not received the EPAR. Please submit the EPAR within forty-five (45) days of your receipt of the letter. DOH’s Technical Guidance Manual (TGM), 2nd Edition, Appendix 5-I, contains guidance for preparing an EPAR.

DOH also has the following concern:

1. Soil sampling results indicate that the level of 1,2-Dichloropropane exceeds EPA Region 9 Preliminary Remediation Goals (PRG) for industrial soil by 300X.

If you have any questions regarding this letter, please contact Dr. Darren Park of our Underground Storage Tank Section at (808) 586-4375 or e-mail at darren.park@doh.hawaii.gov.

Sincerely,

STEVEN Y.K. CHANG, P.E., CHIEF
Solid and Hazardous Waste Branch

EXPOSURE PREVENTION MANAGEMENT PLAN

Former Emulsion Plant
Lanai City, Lanai, Hawaii

Facility ID: 9402424
Release ID: 900128

Prepared For:
CASTLE & COOKE RESORTS, LLC
P.O. Box 630310
Lanai City, Hawaii 96763-0310

Prepared By:
ENVIROSERVICES & TRAINING CENTER, LLC
2850 Paia Street, Suite 150
Kihei, Maui, Hawaii 96753
Tel: 839-7222

ETC Project No: 02-6011

June 2005
1.0 CERTIFICATION AND LIMITATIONS

EnviroServices & Training Center (ETC), LLC has completed this Exposure Prevention Management Plan (EPMP) for the project site. ETC's findings and conclusions presented in this EPMP are professional opinions based solely upon visual observations of the project site, government regulations, and upon interpretation of the laboratory data and field measurements gathered at the time and location of the study.

This report is intended for the sole use of ETC's Client, Castle & Cooke Resorts, LLC exclusively for the project site indicated. The scope of services performed in execution of this EPMP may not be appropriate for satisfying the needs of other users, and any use or reuse of this EPMP or the findings and conclusions presented herein is unauthorized and at the sole risk of said user.

ETC makes no guarantee or warranty; either expressed or implied, except that our services are consistent with good commercial or customary practices designed to conform to acceptable industry standards and governmental regulations. No warranty or representation, expressed or implied, is included or intended in its proposal, contracts, or reports. Opinions stated in this EPMP apply only to the site as outlined and apply to the conditions present at the time the activities were performed. Moreover, these opinions do not apply to site changes that occur after the activities were performed.

Prepared By:   Damon Hamura
Enviromnental Engineer

Date:  6/16/05

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APPENDIX
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2.0 INTRODUCTION

2.1 Purpose

The project site is the former Emulsion Plant facility, previously used by Dole Packaged Foods Company (Dole), located at 750 Fraser Avenue in Lanai City, Hawaii. Dole used the site as an agricultural chemical mixing and storage area from 1947 to the late 1980s. Included as part of the facility were two, 10,000-gallon capacity, single-wall, steel-construction underground storage tanks (USTs). Both tanks were used to store diesel fuel from 1947 through approximately 1978-1979. From 1978-1979 until the USTs were taken out of service in the late 1980s, the tanks were used to store Telone II, a soil fumigant primarily comprised of 1,3-dichloropropene.

During UST closure activities in 1989, petroleum constituents, as well as halogenated volatile compounds (HVOCs) were detected in soil samples. In addition, further site characterization activities identified detectable concentrations of petroleum constituents, HVOCs, and organochlorine pesticides.

Based on findings of previous environmental investigations, this EPMP was prepared to provide guidance and assistance in managing potential risks associated with residual contamination in the soil to facility personnel and future construction workers.

2.2 Site Description

The elevation of the project site is approximately 1,550 feet above mean sea level (msl). The site and surrounding areas exhibit a gradient towards the southwest. There are no perennial streams in the vicinity of the project site and the nearest surface water body is the Pacific Ocean, located nearly 2 miles west of the site. The nearest water well is an irrigation well located approximately 0.9 miles east-northeast and upgradient of the site. Depth to groundwater near the site is estimated at 800 to 900 feet below ground surface (bgs).

The project site is bounded by Fraser Avenue to the east, 12th Street to the south, and undeveloped agricultural land to the north and west. Residential properties are located upgradient and directly across Fraser Avenue from the project site. Warehouses and offices used by Castle & Cooke Resorts, LLC (CCR) personnel are located crossgradient and directly across 12th Street from the project site.

Currently, there are no structures within the project site. The property is used as parking for heavy equipment and for CCR employee vehicles. CCR has no plans for development at the project site and anticipates that use of the site as a parking area will continue indefinitely.
2.3 Geology and Hydrogeology

2.3.1 Regional Geology

The island of Lanai is a shield volcano formed by eruptions at the summit and along three rift zones. The primary rift zone is a broad ridge that trends in the northwest direction and the two minor rift zones trend in the southwest and south-southeast directions. The Palawai Basin, located in the southern portion of Lanai, is the remnant of the caldera formed by the collapse of the shield summit. All lavas of Lanai are tholeiitic basalts, ranging from olivine-free tholeiites through olivine tholeiites to very olivine-rich oceanites. Lava flows range from 0.3 to 30 meters thick, averaging 6 meters, with very little evidence of erosion or weathering between successive flows. In general, pahoehoe flows predominate near vents and a'a flows are abundant on the lower slopes (MacDonald, et al., 1983).

Since Lanai lies in the rain shadow of West Maui and East Molokai, the island is very dry, with an average annual rainfall at the summit of approximately 100 centimeters per year. For this same reason, the northeast portion of the island is sheltered from wave erosion, with broad expanses of alluvium and beaches. Conversely, the southwest portion of the island is fully exposed to waves generated by southwestern storms, creating the phenomenon of high sea cliffs along the leeward portion of the island (Macdonald, et al., 1983).

Wind erosion on Lanai is significant, exhibited by slightly consolidated to completely unconsolidated dune ridges formed by wind blown sand along the southeast portion of the island and deposition of soil from weathered basaltic rocks that form yellowish to reddish brown unconsolidated dunes on the north and northeast portion of the island (Macdonald, et al., 1983).

2.3.2 Site Geology

The site is situated at an elevation of approximately 1,550 feet above mean sea level (msl). The soil at the site is classified as Lahaina silty clay, 3 to 7 percent slopes (LaB). The Lahaina series consists of well-drained soils developed in material weathered from basic igneous rock. In a representative profile, the surface layer consists of a reddish brown silty clay, the subsoil consists of a dusky red and dark reddish brown subangular blocky silty clay and silty clay loam. The substratum is soft, weathered basic igneous rock. Permeability is moderate, runoff is slow, and the erosion hazard is slight (USDA, 1972).

The soil encountered during site characterization activities included reddish brown silty clay grading to weathered basalt. Less weathered basalt was encountered at depths ranging from 50 to 75 feet bgs.
2.3.3 Regional Hydrogeology

Basal groundwater is formed by rainwater percolating down through the residual soils and permeable volcanic rock. All of the island situated below sea level, except within rift zones of the volcanoes, is saturated with ocean salt water and thus forms a basal lens called the “Ghyben-Herzberg” lens. A zone of transition between the fresh groundwater and the ocean salt water occurs due to the constant movement of the interface as a result of tidal fluctuations, seasonal fluctuations in recharge and discharge and aquifer development (Macdonald, et al., 1983).

Downward percolation of rainwater may be stopped by impermeable layers such as dense lava flows, alluvial clay layers and volcanic ash. The groundwater then forms a perched or high level aquifer, which is not in contact with salt water. Recharge of the aquifer occurs in areas of high rainfall, which are the interior mountainous areas. The groundwater flows from the recharge areas to the areas of discharge along the shoreline. Frictional resistance to groundwater flow causes it to pile up within the island until it attains sufficient hydraulic head to overcome friction. Thus, basal groundwater tends to slope toward the shoreline.

2.3.4 Site Hydrogeology

The site is underlain by the Leeward Aquifer System, which is part of the Central Aquifer Sector on the island of Lanai. The aquifer is classified by Mink and Lau, 1993, with the system identification number 50102212 (11111). This system includes an unconfined high level aquifer in dike compartments. The groundwater in this aquifer is described as being a currently in use and containing groundwater with a fresh salinity (~250 mg/l Cl\(^-\)). The groundwater is an irreplaceable drinking water source with a high level of vulnerability to contamination (Mink and Lau, 1993). The direction of groundwater flow is assumed to follow the topographic gradient, southwest towards the Pacific Ocean.

2.4 Contaminant Background

ETC reviewed the July 13, 1993 “Further Phase II Site Characterization Report, Dole Packaged Foods Company Emulsion Plant Facility, 750 Fraser Avenue” prepared by Brewer Environmental Services (BES). According to the BES report, Unitek Environmental Consultants (UEC) removed two 10,000-gallon USTs from the facility in 1989. The USTs were used to store diesel fuel from 1947 through 1978 or 1979 and Telone II (1,3-dichloropropene) from 1978 or 1979 through the mid-1980s. During removal, UEC observed numerous holes along the base of both USTs. Soil samples collected from beneath the USTs contained total petroleum hydrocarbons as gasoline (TPH-G), total petroleum hydrocarbons as diesel (TPH-D), benzene, and ethylbenzene concentrations that exceeded Hawaii Department of Health (DOH) Cleanup Goals at the time. In addition, 1,2-dichloropropane was detected at concentrations ranging from 0.0222 mg/kg to 1.6 mg/kg and 1,3-dichloropropene concentrations were below method detection limits. Various organochlorine pesticides and HVOCs were also detected, suggesting either the chemicals were there through application or due to a release. UEC subsequently recommended further investigation.

Between December 1991 and March 1992, BES advanced nine borings surrounding the former USTs, up to depths of 140 feet bgs. Soil encountered from 0 to 55 feet bgs was classified as silty clay and unweathered, unfractured basalt rock was encountered from 55 to 60 feet bgs and deeper. Soil samples collected from these borings had detectable concentrations of TPH-D, benzene, toluene, ethylbenzene, HVOCs, and organochlorine pesticides. At the time, there was no DOH recommended cleanup criteria for TPH-D; and benzene, toluene, and ethylbenzene concentrations were below their respective DOH recommended cleanup criteria. Concentrations of 1,3-dichloropropene were below method detection limits in all samples and 1,2-dichloropropane concentrations, detected in four borings (B9-B12), ranged from 0.005 mg/kg to 0.18 mg/kg.

Based on site characterization activities performed by both UEC and BES, BES recommended that:

- An exposure prevention management and monitoring program be prepared to address residual petroleum and 1,3-dichloropropene impacted soil associated with the UST systems, and
- No further action be required for constituents unrelated to the former contents of the USTs (pesticides and HVOCs), since a reportable quantity release of these constituents had not occurred.

Subsequently, the DOH SHWB sent a letter dated September 17, 2001 to Dole Food Company Hawaii. The letter stated that the DOH SHWB reviewed BES’ Further Site Characterization Report, Dole Packaged Foods Company Emulsion Plant Facility, 750 Fraser Avenue, Lanai City, Lanai, Hawaii dated July 13, 1994. The DOH indicated that, since petroleum contaminated soil still exists at the property, the DOH could not issue a letter requiring no further action and that additional work should be performed.

ETC’s review of the BES report indicated that there are two separate issues: 1) constituents related to contents of the former USTs and 2) constituents detected by BES that are not related to the former USTs.
Based on ETC's review of the BES report, petroleum (specifically diesel) and Telone II were the two contaminants of concern related to the UST release. TPH-D concentrations (5.100 mg/kg) at a depth of 41.5 feet bgs in one boring (B9) exceeds its current DOH Tier 1 Action Level for soil in areas where a drinking water source is threatened of 5,000 mg/kg. However, Telone II (1,3-dichloropropene) concentrations in all soil samples were below method detection limits and 1,2-dichloropropane concentrations, detected in four borings (B9-B12) ranging from 0.005 mg/kg to 0.18 mg/kg, were below the applicable EPA Region 9 Preliminary Remediation Goal (PRG) for industrial soil.

Organochlorine pesticides and HVOCs other than 1,3-dichloropropene and 1,2-dichloropropane are contaminants of concern at the site that are not related to the former UST release. Specifically, heptachlor concentrations (1.8 mg/kg) at a depth of 41.5 feet bgs in B9 exceeded the applicable EPA Region 9 PRG for industrial soil, 4,4-DDT concentrations (ranging from 0.9 mg/kg to 6.1 mg/kg) at depths of 26.5 feet bgs to 56.5 feet bgs in B9 exceeded its DOH Tier 1 Action Level (but were below its EPA Region 9 PRG for industrial soil), and toxaphene concentrations (2.4 mg/kg) at a depth of 66.5 feet bgs in B10 exceeded its EPA Region 9 PRG for industrial soil.

ETC was therefore contracted by CCR to conduct soil sampling activities at the property to assess current UST related constituent concentrations within the former UST excavation. In December 2002, ETC observed the excavation of six test pits to depths of 12 to 15 feet bgs in the vicinity of the former USTs. Soil samples were collected from the test pits to determine TPH-D, BTEX, and PAH concentrations, as well as 1,3-dichloropropene and 1,2-dichloropropane concentrations. The constituents were selected based on previous contents of the USTs. Analytical results indicated that constituent concentrations were below applicable DOH Tier 1 Action Levels for soil in areas where a groundwater source is threatened and where rainfall amounts to less than 200 centimeters per year. However, 1,2-dichloropropane concentrations of 230 mg/kg at a depth of 15 feet bgs exceeded its DOH Tier 1 Action Level (but were below its EPA Region 9 PRG for industrial soil, 4,4-DDT concentrations exceeding DOH Tier 1 Action Levels exists in the subsurface soil. Furthermore, 1,2-dichloropropane (which may be associated with the Telone II contents stored in the USTs), heptachlor, and toxaphene also exist in the subsurface soil at concentrations exceeding EPA Region 9 PRGs for industrial soil.

ETC Project No. 02-6011

3.0 EXPOSURE MONITORING AND REPORTING PLAN

3.1 Site Assessment

Based on the data collected during previous activities performed at the site, TPH-D and 4,4-DDT concentrations exceeding DOH Tier 1 Action Levels exists in the subsurface soil. Furthermore, 1,2-dichloropropane (which may be associated with the Telone II contents stored in the USTs), heptachlor, and toxaphene also exist in the subsurface soil at concentrations exceeding EPA Region 9 PRGs for industrial soil.

Total petroleum hydrocarbons, or TPH, is an overall term used to describe a large family of chemical compounds that originate from crude oil and consists mainly of hydrogen and carbon. TPH-D is considered an indicator compound used to grossly quantify semi-volatile and non-volatile petroleum constituents.

Dichlorodiphenyltrichloroethane (DDT) is a pesticide that was once used extensively as an agricultural pesticide and was banned from use in the U.S. in 1972. DDT generally exists as a solid, white powder that strongly attaches to soil and is relatively insoluble in water. Routes of exposure to DDT include inhalation of particles, ingestion, and absorption through the skin and eyes. Target organs include the eyes, skin, central nervous system, kidneys, liver, and peripheral nervous system. The EPA has determined that DDT is a probable human carcinogen.

1,2-dichloropropane, sometimes referred to as propylene dichloride, is a colorless, flammable liquid. It was used in the past as a soil fumigant, chemical intermediate, and industrial solvent that was found in paint strippers, varnishes, and furniture finish removers. Currently, 1,2-dichloropropane is almost exclusively used as a chemical intermediate to produce chlorinated chemicals. When released to soil, 1,2-dichloropropane is not easily broken down by bacteria, but readily volatilizes to the air. Routes of exposure to 1,2-dichloropropane include inhalation of vapors, ingestion, and absorption through the skin and eyes. Target organs include the eyes, skin, respiratory system, liver, kidneys, and central nervous system. It is not known whether 1,2-dichloropropane is a human carcinogen.

Heptachlor is a crystalline solid used extensively in the past as an insecticide in homes, buildings, and on food crops. Use of heptachlor was slowed in the 1970s and stopped in 1988. Heptachlor is relatively persistent in the environment - it strongly attaches to soil, is relatively insoluble in water, and does not readily volatilize to air. Routes of exposure to heptachlor include inhalation of particles, ingestion, and absorption through the skin and eyes. Target organs include the central nervous system and liver. It is not known whether heptachlor is a human carcinogen.
Toxaphene, sometimes referred to as chlorinated camphene, is an insecticide mixture consisting of at least 670 chemicals (polychlorinated bicyclic terpenes) and is typically found as a waxy solid or a gas. Toxaphene was used extensively in the past to control insects found in crops and livestock up until it was banned from use in 1990. Toxaphene breaks down slowly in the environment and is typically found in soil and sediment since it is relatively insoluble in water. Routes of exposure to toxaphene include inhalation of particles, ingestion, and absorption through the skin and eyes. The US Department of Health and Human Services has determined that toxaphene may reasonably be anticipated as a human carcinogen.

The DOH Tier 1 Action Levels established for TPH-D and 4,4-DDT are 5,000 mg/kg and 0.82 mg/kg, respectively. The Tier 1 Action Levels were generated by the DOH as conservative, default soil action levels that can be used at any impacted site. The DOH believes that soils above these action levels are unlikely to pose a threat to groundwater, but they may pose a threat to human health due to direct exposure. Toxaphene concentrations exceeding either DOH Tier 1 Action Levels or EPA Region 9 industrial PRGs was 15 feet bgs in TP6, where 1,2-dichloropropane was encountered at a concentration of 230 mg/kg. Therefore, the minimum thickness of the natural soil barrier controlling COCs is approximately 15 feet.

In order for personnel at the facility to be exposed to the COCs, subsurface soil must be disturbed to depths of at least 15 feet bgs. CCR's current plans for the facility do not require such disturbance and CCR does not anticipate construction activities requiring excavation in the future. However, in the event that construction activities are performed, Section 4.3 describes controls to protect construction personnel.

Based on the approximate depth to groundwater at the facility and the relatively low hydraulic conductivity of the silty clay soil native to the area, ETC believes that risks associated with migration of contaminants to the groundwater are minimal. As described in Appendix I, the estimated depth to groundwater at the facility is approximately 800 to 900 feet bgs, and the maximum depth at which COC were detected is 113 feet bgs. Therefore, residual COC must leach an additional 687 to 787 feet bgs through a natural barrier of silty clay soil with a relatively low hydraulic conductivity and weathered basalt before reaching groundwater.

Due to the depths at which the COC exist, the native silty clay existing above the contaminated area, and the current and future projected use of the site as a parking area for employee and commercial vehicles, ETC believes that engineered controls are not warranted at this time. If future use of the site changes, the effect of subsurface contamination will be evaluated at that time.

### 3.3 Contaminant Detection and Monitoring

A contaminant detection and monitoring system is not feasible since there are no significant routes of migration. If future use of the site changes, the effect of subsurface contamination will be evaluated at that time.

### 3.4 Preventive Maintenance

There will be no routine preventative maintenance measures as long as ground surface remains intact as an unimproved parking area. If future use of the site changes, the effect of subsurface contamination will be evaluated at that time.
4.0 EXPOSURE CONTINGENCY PLAN

This Exposure Contingency Plan addresses various scenarios where the working population at the facility may be exposed to the contaminants of concern.

4.1 Breach of Natural Barriers/Failure of Engineered Controls

The native soil above the contaminated area and the anticipated depth to groundwater are the only natural barriers at the site. A breach of the natural barriers would require the installation of a conduit through the subsurface contamination. Such a breach would create a direct exposure pathway to users of the site. If such a conduit were deep enough (i.e., monitoring well installed to access groundwater), there would be a breach of the natural barrier protecting groundwater below the site.

A conduit to the contaminated soil would only occur during construction activities, or if a well were installed within the contaminated area. If such activities are planned, the measures described in Section 4.3 would be used to minimize exposure risks.

4.2 Exacerbation of Residual Contamination

Exacerbation of residual contamination is not anticipated at the facility since the suspected source of contamination has been removed.

4.3 Construction Management

Although construction activities are not anticipated, the controls described in this subsection should be implemented in the event that subsurface soils are disturbed. Specifically, if construction activities impact soil at depths of 15 feet bgs, controls will need to be implemented to protect site workers from direct exposure to COC.

The management of potential risks to construction workers consists of two primary elements: 1) education/communication, and 2) implementation of exposure management measures. Workers should be aware of the potential risks present at the site. Workers should also have an understanding of activities that could increase their potential risks and alternatives that could minimize potential exposure to contaminants.

4.3.1 Education and Communication

All construction workers who have contact with subsurface soil should be educated on the site conditions and potential risks associated with contaminants found at the site. In particular, workers should be aware that TPH-D, 1,2-dichloropropane, 4,4-DDT, heptachlor, and toxaphene exist in the subsurface soil. In addition, workers should be aware that routes of exposure to the COC are typically via inhalation of vapors, inhalation of airborne particulates, ingestion of soil, and absorption through the skin and eyes.

The most common method of informing construction personnel of potential exposure risks is to prepare a Site Safety and Health Plan (SSHP). The SSHP should describe the contaminants of concern, routes of exposure, and potential symptoms of exposure. The plan should also describe personal protection measures, controls, and work practices to minimize the risk of exposure. Construction personnel should be required to review the SSHP and certify that they have reviewed the plan and understand the risks involved with the project.

4.3.2 Exposure Prevention

Although CCR has no current plans to further develop the facility, measures provided herein should be utilized in the event that construction activities disturb contaminated soil.

Workers who handle contaminated soil or are required to be near contaminated soil during excavation activities should wear personal protective equipment, specifically a full or half-face respirator with combination organic vapor/HEPA filter cartridges, eye protection, gloves, and protective clothing (i.e., Tyvek suit). Immediately after leaving the work area, workers should remove personal protective equipment and wash hands and face with soap and water. At no time should workers be allowed to smoke, drink, or eat within the work zone and/or near contaminated soil.

Soil removed from the subsurface in the vicinity of the contaminated area should be segregated, with the suspect contaminated soil placed on and covered with polyethylene sheeting. Placing contaminated soil on and covering contaminated soil with polyethylene sheeting should be performed to prevent the generation of fugitive dust and prevent run-on/run-off of storm water.

If feasible, contaminated soil should be treated on-site via aeration/natural attenuation and soil samples should be collected from the excavation to determine residual contaminant concentrations. If 4,4-DDT, heptachlor, or toxaphene concentrations in the excavated soil exceed their respective DOH Tier 1 Action Levels or EPA Region 9 PRGs for industrial soil, an evaluation of soil management will need to be made since these COC do not rapidly break down (i.e., non-volatile, not easily degraded by naturally-occurring microorganisms, etc.).

4.3.3 Dust Control

All standard procedures to minimize dusty conditions, such as dust barriers and spraying water on the soil, should be utilized at the site by the contractor. Dust barriers should be constructed along the perimeter of the site. Controlled spraying of the area with water to suppress dust migration should also be conducted.

4.4 Future Use of Property

The property is currently used by CCR employees as an undeveloped parking area for employee vehicles and CCR-owned heavy equipment. A change in land use is not anticipated.
4.5 High Water Tables and Flooding Events

Due to the depth of contamination and the depth of groundwater at the site, exposure to contaminants due to high water tables and/or flooding is not anticipated.

5.0 OPERATION AND MAINTENANCE

CCR has no impending plans to change operations at the facility. Therefore, management of contaminated soil will be minimal due to the depth at which affected soil exists and since ETC does not anticipate impacts to groundwater based on the depth to groundwater and subsurface lithology.

If disturbance of subsurface soil is required, exposure prevention measures described in Section 4.3 above will be implemented to protect construction workers and future users of the property. Upon completion of construction activities, the ground surface should be completed as asphalt pavement or concrete to act as a cap.
6.0 REFERENCES


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Appendix 1: Exposure Pathway Assessment Data

**Former Emulsion Plant**
Lanai City, Hawaii

**Contaminants of Concern:** TPH-D, 1,2-dichloropropane, 4,4-DDT, heptachlor, and toxaphene

- Estimated surface elevation of facility = 1550 feet nsm
- Estimated depth to groundwater = 800 to 900 feet bgs
- Net precipitation > 30 inches per year
- Depth to Aquifer > 250 feet
- Soil type: Lahaina Silty Clay, 3 to 7 percent slopes, available water capacity 1.3-1.4 in/ft
- Hydraulic conductivity: 10^(-6) cm/sec (standard silt classification)
- Thickness of lowest hydraulic conductivity layer: Greater than 500 feet, 10^(-6) cm/sec (silt)

Estimated Water Paths

<table>
<thead>
<tr>
<th>Description</th>
<th>TPH-D</th>
<th>1,2-Dichloropropane</th>
<th>4,4-DDT</th>
<th>Heptachlor</th>
<th>Toxaphene</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum concentration (mg/kg)</td>
<td>5.100</td>
<td>230</td>
<td>6.1</td>
<td>1.8</td>
<td>2.4</td>
</tr>
<tr>
<td>Location &amp; depth</td>
<td>B9, 41.5'</td>
<td>TP6, 17'</td>
<td>B9, 41.5'</td>
<td>B10, 66.6'</td>
<td></td>
</tr>
<tr>
<td>Maximum depth detected</td>
<td>11'</td>
<td>22.5</td>
<td>82.5</td>
<td>1.0</td>
<td>0.6</td>
</tr>
<tr>
<td>Location &amp; concentration at max depth</td>
<td>B9, 10 mg/kg</td>
<td>B11, 0.13 mg/kg</td>
<td>B9, 0.005 mg/kg</td>
<td>B9, 0.005 mg/kg</td>
<td>B10, 2.4 mg/kg</td>
</tr>
<tr>
<td>Minimum depth exceeding Tier 1 ALs or PRGs</td>
<td>41.5'</td>
<td>16'</td>
<td>26.5'</td>
<td>41.5'</td>
<td></td>
</tr>
<tr>
<td>Location &amp; concentration at min depth</td>
<td>B9, 0.10 mg/kg</td>
<td>TP6, 230 mg/kg</td>
<td>B9, 0.9 mg/kg</td>
<td>B9, 1.8 mg/kg</td>
<td>B10, 2.4 mg/kg</td>
</tr>
</tbody>
</table>

**DOH Tier 1 Action Level (mg/kg)**

- TPH-D: 5.000
- 1,2-Dichloropropane: 0.82
- 4,4-DDT: 0.34
- Heptachlor: 0.11
- Toxaphene: 0.44

**EPA Region 9 PRG (residential soil, mg/kg)**

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<thead>
<tr>
<th>Description</th>
<th>TPH-D</th>
<th>1,2-Dichloropropane</th>
<th>4,4-DDT</th>
<th>Heptachlor</th>
<th>Toxaphene</th>
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</thead>
<tbody>
<tr>
<td>Vapor pressure (mm Hg @ 25°C)</td>
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<td>2 x 10^3</td>
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<tr>
<td>Henry's Law Constant (mm Hg-m3/mol @ 24°C)</td>
<td>2.07 x 10^3</td>
<td>9.3 x 10^7</td>
<td>1.49 x 10^9</td>
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<tr>
<td>Density (g/cc)</td>
<td>1.18</td>
<td>0.96</td>
<td>1.68</td>
<td>1.05</td>
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<tr>
<td>Log Kow</td>
<td>1.67</td>
<td>6.51</td>
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Potentially Exposed Populations:
- Residents and workers within 1/4 mile
- Drinking water wells approximately 3 miles
- Surface waters approximately 2 miles
- Sensitive ecological receptors not anticipated.
INFORMATION REQUEST

The County of Maui, Department of Environmental Management, Wastewater Reclamation Division (WWRD) received the following email in June 2016

>>> "Swindle, Kacey" <KSwindle@trcsolutions.com> 6/8/2016 9:53 AM >>>

We are conducting an Environmental Site Assessment at the property outlined in white on the attached map located in Lanai City, Lanai. This property encompasses portions of the following TMKs: 2-4-9-014:001, 2-4-9-014:009 and 2-4-9-002:001. In accordance with our requirements in conducting this assessment we need to confirm whether or not the County of Maui, Department of Environmental Management has any records for the property related to hazardous material contamination, underground storage tanks or other environmental issues.

TRC appreciates your assistance with this requirement of our assessment. If you have any questions or need further clarification regarding this request, please do not hesitate to contact us at (808) 927-5032, or you can email us at kswindle@trcsolutions.com.

Thank you,

Kacey Swindle
Industrial Hygienist

1600 Kapiolani Boulevard, Suite 717, Honolulu, Hawaii 96814
T: 808.728.4111 | F: 808.638.5649 | C: 808.927.5032

The following pages reply to this inquiry.
In response to the TRC request WWRD offers the following:

The property in question is in the County of Maui, Island of Lanai, Lanai City. It encompasses portions of the following TMKs: (2)4-9-014:001, (2)4-9-014:009 and (2)4-9-002:001.

As can be seen in the above map, the property is just north of the Lanai Wastewater Reclamation Facility. There are significant trunk sewer lines and manholes that are owned, operated and maintained by the County of Maui which traverse the site. The last analysis of the system condition in 2009 showed that these lines are in very good condition. WWRD does not have any records that indicate any past problems or sewer spills in the area. However, there is always the possibility of these problems occurring in the future. The following pages are the excerpts from the last CCTV project verifying the condition of the lines. Please contact the Wastewater Reclamation Division (808-270-7417) should you have any additional questions.
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Number of Defects: 0

Pipe Rating: 0000 0000 0000

ID Number: LN00XA0400

Total Distance: 342.9

**PO Number: 10B**

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Total Distance: 342.5

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Street: LANAI WWRF ACCESS RD  
Length Surveyed: 301  
PO Number: 12  
Height (Diameter): 15  

**PO Number: 11**

Date: 10/23/2009 8:44:00 AM  
Street: LANAI WWRF ACCESS RD  
Length Surveyed: 174  
PO Number: 11  
Height (Diameter): 15

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**PO Number: 11**

Date: 10/23/2009 8:44:00 AM  
Street: LANAI WWRF ACCESS RD  
Length Surveyed: 174  
PO Number: 11  
Height (Diameter): 15

### Grade Distribution

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**PO Number: 21**

- **Date:** 10/21/2009 9:45:00 AM
- **Street:** EASEMENT/NINTH ST
- **Length Surveyed:** 355.3
- **PO Number:** 21
- **Height (Diameter):** 12

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- **Number of Defects:** 0
- **Pipe Rating:** 0

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**PO Number: 20**

- **Date:** 10/21/2009 9:45:00 AM
- **Street:** EASEMENT
- **Length Surveyed:** 215.9
- **PO Number:** 20
- **Height (Diameter):** 12

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### PO Number: 19

**Date:** 10/21/2009 10:12:00 AM  
**Street:** EASEMENT  
**Length Surveyed:** 176.7  
**PO Number:** 19  
**Height (Diameter):** 12

**Pipe Segment Reference:**  
- LN000X0000.LN000X00300  
- LN000X0400.KN000X00300  
- LN000X0000.LN000X00300

**Severity:** High  
- Green  
- Yellow  
- Red  

**Grade** | **Structural** | **O&M** | **Overall**
--- | --- | --- | ---
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4 | 0 | 0 | 0
3 | 0 | 0 | 0
2 | 0 | 0 | 0
1 | 0 | 0 | 0
**Overall** | 0 | 0 | 0

**Pipe Rating:** 0000 0000 0000

**Number of Defects:** 0 0 0

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<th>Cont Defect</th>
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<th>Head</th>
<th>Joint</th>
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### PO Number: 18

**Date:** 10/21/2009 10:22:00 AM  
**Street:** EASEMENT/AWALIA AVE  
**Length Surveyed:** 355  
**PO Number:** 18  
**Height (Diameter):** 12

**Pipe Segment Reference:**  
- LN000X0000.LN000X00200  
- LN000X0000.LN000X00300  
- LN000X0000.LN000X00300

**Severity:** High  
- Green  
- Yellow  
- Red  

**Grade** | **Structural** | **O&M** | **Overall**
--- | --- | --- | ---
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4 | 0 | 0 | 0
3 | 0 | 0 | 0
2 | 0 | 0 | 0
1 | 0 | 0 | 0
**Overall** | 0 | 0 | 0

**Pipe Rating:** 0000

**Number of Defects:** 0 0 0

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**Total Distance:** 176.7  
**ID Number:** LN000X00400

**Total Distance:** 355  
**ID Number:** LN000X00300
**PO Number: 17**

Date: 10/21/2000 10:22:00 AM  
Street: EASEMENT/AWALUA AVE  
Length Surveyed: 191  
PO Number: 17  
Height (Diameter): 12  
Material: Polyvinyl Chloride

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Pipe Rating: 0000  
Total Distance: 191  
ID Number: LN00X002000

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**PO Number: 16**

Date: 10/23/2000 8:20:00 AM  
Street: EASEMENT/AWALUA AVE  
Length Surveyed: 168  
PO Number: 16  
Height (Diameter): 12  
Material: Polyvinyl Chloride

<table>
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<tr>
<th>Grade</th>
<th>Structural</th>
<th>O&amp;M</th>
<th>Overall</th>
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<td>5</td>
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<td>0</td>
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<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>2</td>
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<td>0</td>
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<tr>
<td>Number of Defects</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
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Pipe Rating: 0000  
Total Distance: 168  
ID Number: LN00X001000

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<th>Distance</th>
<th>Video Ref</th>
<th>Code</th>
<th>Cont Defect</th>
<th>Value</th>
<th>Joint</th>
<th>Circumferential Location</th>
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<tr>
<td>0</td>
<td>27</td>
<td>AMH</td>
<td>Manhole</td>
<td></td>
<td></td>
<td></td>
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<td>335</td>
<td>AMH</td>
<td>Manhole</td>
<td></td>
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</tbody>
</table>
APPENDIX C: USER QUESTIONNAIRE
Proposal for Professional Consulting Services at:
200 Unit Lana'i City Expansion - Lana'i City, HI
May 13, 2016

ASTM E-1527 PHASE I ENVIRONMENTAL SITE ASSESSMENT
PRE-SURVEY QUESTIONNAIRE AND DISCLOSURE STATEMENT

Borrower: Please complete this questionnaire before the Consultant’s site visit. For those questions that are not applicable to the subject please respond with an “N/A”. This document must be signed by the Owner or his/her representative (Item No. 2). If you have any questions about how to answer any of the questions please call. If additional pages for response are necessary please attach them to this form. Clearly mark all references to the appropriate question number(s). This document and your written response to same will be an exhibit in our report.

1. PROPERTY INFORMATION:

Property Name: 200 units west of Lana'i City

Property Address: TMK: 2-4-09-014:001, TMK: 2-4-09-014:009, TMK 2-4-9-002:001

City: Lana'i City State: Hawaii Zip: 96763

Assessor’s Parcel Number: LC App. 862 Lot 1209

2. COMPLETED BY

Signature
Date 06-02-16
Printed Name Title
AJ Vergara Engineering Coordinator

3. ASTM-REQUIRED INQUIRIES

Property Owner: Pulama Lana'i
Phone: 808-565-3000 Fax: 808-565-3887

Key Site Manager (site contact): AJ Vergara
Phone: 808-565-3670 Fax: 808-565-3887

If not residential Property, please provide list of tenants, including contact names and phone numbers.

Can you provide a Current Title Abstract for the Property, including a chain of Title? If so, please send documents along with completed questionnaire.

If you have knowledge of any environmental liens recorded against the Property, or environmentally related Activity and Use Limitations of the Property?

Do you have any specialized knowledge that would be material in identifying recognized environmental conditions in connection with the Property?

Are you aware of a reduction in the property value due to environmental issues?

Please attach explanation of all affirmative answers.

4. PLEASE PROVIDE A GENERAL SITE DESCRIPTION BY COMPLETING THE FOLLOWING TABLE:

<table>
<thead>
<tr>
<th>Legal description/ boundary survey/ plat available for inspector:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Property Size</th>
<th>103 acres</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total number of buildings</th>
<th>1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total square footage of buildings</th>
<th>7886 sf</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date of construction</th>
<th></th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Dates of significant renovation</th>
<th></th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Waste water discharge</th>
<th>Municipal Sanitary Sewer</th>
<th>On-site septic system</th>
<th>Other</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Potable water source</th>
<th>Community Water Supplier</th>
<th>On-site well</th>
<th>Other</th>
</tr>
</thead>
</table>

Please provide prior use of property, if known:

Zoned as Open Space and Agricultural

5. PREVIOUS INVESTIGATIONS:

Have any previous environmental investigations been performed at the site? Yes No

<table>
<thead>
<tr>
<th>INVESTIGATION TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1 ESA</td>
</tr>
<tr>
<td>Phase 2 ESA</td>
</tr>
<tr>
<td>Tank Tightness Testing</td>
</tr>
<tr>
<td>Asbestos Survey/ O&amp;M</td>
</tr>
<tr>
<td>Radon</td>
</tr>
<tr>
<td>Lead-based Paint</td>
</tr>
<tr>
<td>Lead in Water</td>
</tr>
<tr>
<td>Operations &amp; Maintenance Plan(s)</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

Please state reason for procuring this Phase 1 ESA:

- Qualify for Innocent Landowner defense to CERCLA Liability.
- Other (state below)
6. ON SITE OPERATIONS

<table>
<thead>
<tr>
<th>Condition</th>
<th>Response</th>
<th>If yes, please describe</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Stored Chemicals</td>
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<td>□ No</td>
</tr>
<tr>
<td>2. Underground Storage Tanks</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>3. Aboveground Storage Tanks</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>4. Spills or Releases</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>5. Dump Areas/ Landfills</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>6. Waste Treatment Systems</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>7. Clarifiers/ Separators</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>8. Air stacks/ Vent/ Odors</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>9. Floor Drains/Sumps</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>10. Stained Soil/ Impacted Vegetation</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>11. On-site OWNED Electrical Transformers</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>12. Hydraulic lift/ Elevators</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>13. Dry Cleaning Operations</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>14. Wellfield/ Feeding</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>15. Oil/Gas/ Water Monitoring Wells</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>16. Environmental Cleanups</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>17. Environmental Permits</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>a) Industrial Discharge</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>b) P&amp;TW (MOSES)</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>c) Hazardous Waste Generator</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>d) Air Quality</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>e) Flammable Materials</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>f) AR/UST</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>g) Waste Manifest(s)</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
<tr>
<td>h) other</td>
<td>□ Yes</td>
<td>□ No</td>
</tr>
</tbody>
</table>

If yes, please describe and ATTACH ALL COPIES of permits. Please attach last three waste manifests.
Lanai City Expansion - 200 Housing Units
Awalua Avenue
Lanai City, HI 96763

Inquiry Number: 4620578.9
May 17, 2016

4620578.9

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EDR Aerial Photo Decade Package

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<th>Scale</th>
<th>Details</th>
<th>Source</th>
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<td>1962</td>
<td>1&quot;=600'</td>
<td>Flight Date: September, 23 1992</td>
<td>USGS</td>
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<td>1976</td>
<td>1&quot;=1000'</td>
<td>Flight Date: December, 17 1976</td>
<td>USGS</td>
</tr>
<tr>
<td>1965</td>
<td>1&quot;=600'</td>
<td>Flight Date: January, 20 1965</td>
<td>USGS</td>
</tr>
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<td>1952</td>
<td>1&quot;=750'</td>
<td>Flight Date: January, 26 1952</td>
<td>USGS</td>
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</table>

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4620578 - 9 page 2
EDR Historical Topo Map Report

Site Name: Lanai City Expansion - 200 Hox
Awalua Avenue
Lanai City, HI 96763
EDR Inquiry #: 4620578.4

Client Name: TRC
7600 N. 16th Street
Phoenix, AZ 85020
Contact: Kacey Swindle

EDR Topographic Map Library has been searched by EDR and maps covering the target property location as provided by TRC were identified for the years listed below. EDR’s Historical Topo Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDR’s Historical Topo Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the late 1800s.

Search Results:

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<th>P.O.#</th>
<th>Latitude</th>
<th>Longitude</th>
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<tr>
<td>Project: 258407</td>
<td>20°21'11.5” N</td>
<td>156°55'24” W</td>
</tr>
<tr>
<td>UTM Zone: Zone 4 North</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UTM X Meters: 716127.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UTM Y Meters: 2303742.85</td>
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<td></td>
</tr>
<tr>
<td>Elevation: 1548.94’ above sea level</td>
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</table>

Maps Provided:

2013
1992
1984
1925
1923

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6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

5/16/16
This EDR Topo Map Report is based upon the following USGS topographic map sheets:

**2013 Source Sheets**
- Lanai North: 7.5-minute, 24000
- Lanai South: 7.5-minute, 24000

**1992 Source Sheets**
- Haalelepaakai: 7.5-minute, 24000
- Lanai City: 7.5-minute, 24000
- Island of Lanai: 15-minute, 62500

**1984 Source Sheets**
- Lanai North: 7.5-minute, 25000
- Lanai South: 7.5-minute, 25000

**1925 Source Sheets**
- Island of Lanai: 15-minute, 62500
- Island of Lanai: 15-minute, 62500

**1923 Source Sheets**
- Island of Lanai: 15-minute, 62500

This EDR Topo Map Report is based upon the following USGS topographic map sheets.
This report includes information from the following map sheet(s).

**SITE NAME:** Lanai City Expansion - 200 Housing Units

**ADDRESS:** Lanai City, Hi 96763

**CLIENT:** TRC

TP, Lanai South, 1984, 7.5-minute
N, Lanai North, 1984, 7.5-minute

1984

0 Miles 0.25 0.5 1 1.5

This report includes information from the following map sheet(s).

**SITE NAME:** Lanai City Expansion - 200 Housing Units

**ADDRESS:** Lanai City, Hi 96763

**CLIENT:** TRC

TP, Island of Lanai, 1925, 15-minute

1925

0 Miles 0.25 0.5 1 1.5
This report includes information from the following map sheet(s).

SITE NAME: Lanai City Expansion - 200 Housing Units
ADDRESS: Awalua Avenue
CLIENT: TRC

Inquiry Number: 4620578.3
May 16, 2016

Certified Sanborn® Map Report
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- The Sanborn Library LLC
- University Publications of America
- EDR Private Collection

UNMAPPED PROPERTY
This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

Certification # 7F79-4427-BBB0
PO # 258407
Project

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### FINDINGS

**TARGET PROPERTY STREET**

Awala Avenue  
Lanai City, HI 96763

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<th>Year</th>
<th>CD Image</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AWALUA AVE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013 -</td>
<td>Cole Information Services</td>
<td>Street not listed in Source</td>
</tr>
<tr>
<td>2008 -</td>
<td>Cole Information Services</td>
<td>Street not listed in Source</td>
</tr>
<tr>
<td>2003 -</td>
<td>Cole Information Services</td>
<td>Street not listed in Source</td>
</tr>
<tr>
<td>1999 -</td>
<td>Cole Information Services</td>
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<td>1995 -</td>
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<td>Street not listed in Source</td>
</tr>
<tr>
<td>1992 -</td>
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### FINDINGS

**CROSS STREETS**

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<td><strong>9 ST</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013 -</td>
<td>pg. A1</td>
<td>Cole Information Services</td>
</tr>
<tr>
<td>2008 -</td>
<td>-</td>
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<td>Cole Information Services</td>
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## FINDINGS

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### City Directory Images
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<tbody>
<tr>
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<td>LANAI SEVENTH DAY ADVENTIST CHURCH</td>
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<tr>
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<tr>
<td>328</td>
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338 SERIGO AGUILA
789 PATRICIA FISHER
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- 328 IWAO KURASHIGE
- 335 MARIANITO ATOK

- 439 CAMILO BALISACAN
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<tbody>
<tr>
<td>1</td>
<td>06/01/2016</td>
<td>North corner of the power plant</td>
</tr>
<tr>
<td>2</td>
<td>06/01/2016</td>
<td>North corner of the power plant looking east; overgrown vegetation</td>
</tr>
</tbody>
</table>

**Client Name:** Pulama Lanai  
**Site Location:** Lanai City Expansion - 200 Housing Units  
**Project No.:** 258407
### Photographic Log

<table>
<thead>
<tr>
<th>Photo No.</th>
<th>Date</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>3</td>
<td>06/01/2016</td>
<td>South corner of the power plant looking east; overgrown vegetation</td>
</tr>
<tr>
<td>4</td>
<td>06/01/2016</td>
<td>Drain inlet for Site runoff located at the south side of the power plant</td>
</tr>
<tr>
<td>5</td>
<td>06/01/2016</td>
<td>Equipment located at the south side of the power plant</td>
</tr>
<tr>
<td>6</td>
<td>06/01/2016</td>
<td>Former AST secondary containment located adjacent to the south corner of the power plant</td>
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**Photographic Log**

<table>
<thead>
<tr>
<th>Photo No.</th>
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<th>Description</th>
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<tbody>
<tr>
<td>7</td>
<td>06/01/2016</td>
<td>Items stored inside the power plant building (as viewed through a hole in the side of the building)</td>
</tr>
<tr>
<td>8</td>
<td>06/01/2016</td>
<td>East of the power plant looking east across the Site; overgrown vegetation</td>
</tr>
<tr>
<td>9</td>
<td>06/01/2016</td>
<td>Debris pile located southeast of the power plant (Typical throughout the Site)</td>
</tr>
<tr>
<td>10</td>
<td>06/01/2016</td>
<td>Northeast corner of the Site looking southeast to the adjoining site – Church leased from Pulama Lanai</td>
</tr>
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### Photographic Log

<table>
<thead>
<tr>
<th>Photo No.</th>
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<th>Description</th>
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<tbody>
<tr>
<td>11</td>
<td>06/01/2016</td>
<td>Northeast corner of the Site looking north to the adjoining site – Police Station</td>
</tr>
<tr>
<td>12</td>
<td>06/01/2016</td>
<td>Northeast corner of the Site looking west down 9th Street to the adjoining property – Baseball field</td>
</tr>
<tr>
<td>13</td>
<td>06/01/2016</td>
<td>Sewer manhole located on 9th Street (one of two sewer lines that run from the north portion of the Site to the southeast corner of the Site)</td>
</tr>
<tr>
<td>14</td>
<td>06/01/2016</td>
<td>Former school house located north of the power plant – collapsed with overgrown vegetation</td>
</tr>
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Photographic Log

Client Name: Pulama Lanai
Site Location: Lanai City Expansion – 200 Housing Units
Project No.: 258407

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<tbody>
<tr>
<td>15</td>
<td>06/01/2016</td>
<td>MECO substation located north of the power plant – currently operational</td>
</tr>
<tr>
<td>16</td>
<td>06/01/2016</td>
<td>Former Boy Scout Hall located north of the power plant – View of the structure from 9th Street looking south across the Site; overgrown vegetation</td>
</tr>
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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>17</td>
<td>06/01/2016</td>
<td>Hawaii Gas ASTs located in the northwest portion of the Site – Reportedly a temporary location for Hawaii Gas and will be moved to a new location off of the Site</td>
</tr>
<tr>
<td>18</td>
<td>06/01/2016</td>
<td>Hawaii Gas upright, residential propane tanks located in the northwest portion of the Site</td>
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Photographic Log

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<tr>
<td>19</td>
<td>06/01/2016</td>
<td>Photograph of Hawaii Gas oblong, residential propane tanks with storage container beyond located in the northwest portion of the Site</td>
</tr>
<tr>
<td>20</td>
<td>06/01/2016</td>
<td>Photograph of 5-gallon bucket of hydraulic fluid, 1-gallon bucket of paint in poor condition, located in the northwest portion of the Site</td>
</tr>
<tr>
<td>21</td>
<td>06/01/2016</td>
<td>Photograph of 5-gallon bucket of hydraulic oil and 1-gallon bucket of paint in poor condition, located in the northwest portion of the Site</td>
</tr>
</tbody>
</table>
| 22        | 06/01/2016 | Photograph of 5-gallon bucket of unknown substance and aboveground PVC pipe over foam, reportedly used as a boundary marker, located in the northwest portion of the Site
<table>
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<tr>
<td>23</td>
<td>06/01/2016</td>
<td>Tires dumped on the Site (typical throughout the Site)</td>
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<td>24</td>
<td>06/01/2016</td>
<td>Broken down grader located in the northwest portion of the Site currently occupied by Hawaii Gas</td>
</tr>
<tr>
<td>25</td>
<td>06/01/2016</td>
<td>Broken down pineapple harvester located in the northwest portion of the Site</td>
</tr>
<tr>
<td>26</td>
<td>06/01/2016</td>
<td>Reported former location of a water standpipe used to fill water trucks to water the pineapple fields</td>
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<td>Photo No.</td>
<td>Date</td>
<td>Description</td>
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<tr>
<td>27</td>
<td>06/01/16</td>
<td>North Site boundary looking north across gated. County owned property</td>
</tr>
<tr>
<td>28</td>
<td>06/01/16</td>
<td>North Site boundary looking south across the site; overgrown vegetation</td>
</tr>
<tr>
<td>29</td>
<td>06/21/16</td>
<td>Northwest Site boundary looking south across the site; overgrown vegetation</td>
</tr>
<tr>
<td>30</td>
<td>06/21/16</td>
<td>Northwest Site boundary looking west to adjoining property – Undeveloped, agricultural land (The roadway in the photo is reportedly going to be 9th Street once it is extended.)</td>
</tr>
<tr>
<td>Photo No.</td>
<td>Date</td>
<td>Description</td>
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<tr>
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<tr>
<td>31</td>
<td>06/01/2016</td>
<td>West Site boundary looking east across the Nursery</td>
</tr>
<tr>
<td>32</td>
<td>06/01/2016</td>
<td>Leafshine aerosol located in the Nursery portion of the Site</td>
</tr>
<tr>
<td>33</td>
<td>06/01/2016</td>
<td>Three (3) empty totes of Roundup located along the southeast boundary of the Nursery</td>
</tr>
<tr>
<td>34</td>
<td>06/01/2016</td>
<td>Pallets of fertilizer located in the east portion of Nursery</td>
</tr>
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</table>
Photographic Log

Client Name: Pulama Lanai
Site Location: Lanai City Expansion – 200 Housing Units
Project No.: 258407

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<tbody>
<tr>
<td>35</td>
<td>06/01/2016</td>
<td>Flammable cabinet located on the east portion of the Nursery</td>
</tr>
<tr>
<td>36</td>
<td>06/01/2016</td>
<td>55-gallon drum of diesel with staining on the gravel below located in the east portion of the Nursery</td>
</tr>
<tr>
<td>37</td>
<td>06/01/2016</td>
<td>Nursery office located in the northeast portion of the Nursery</td>
</tr>
<tr>
<td>38</td>
<td>06/01/2016</td>
<td>Pesticide and chemical storage shed located in the northeast corner of the Nursery</td>
</tr>
<tr>
<td>Photo No.</td>
<td>Date</td>
<td>Description</td>
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<tr>
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</tr>
<tr>
<td>39</td>
<td>06/01/2016</td>
<td>Gravel floor of the pesticide and chemical storage shed located in the northeast corner of the Nursery</td>
</tr>
<tr>
<td>40</td>
<td>06/01/2016</td>
<td>Liberat® Penetrant (Drift Control Agent) in the pesticide and chemical storage shed located in the northeast corner of the Nursery</td>
</tr>
<tr>
<td>41</td>
<td>06/01/2016</td>
<td>Water pipes located behind the Nursery office in the northeast portion of the Nursery</td>
</tr>
<tr>
<td>42</td>
<td>06/01/2016</td>
<td>Porta Potties servicing the Nursery</td>
</tr>
<tr>
<td>Photo No.</td>
<td>Date</td>
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<tr>
<td>43</td>
<td>06/01/2016</td>
<td>Fertilizer on pallets and a 15-gallon container of Pendulum Aquacap Herbicide located near the entrance of the Nursery</td>
</tr>
<tr>
<td>44</td>
<td>06/01/2016</td>
<td>Green waste pile with compost piles beyond located to the northwest of the Nursery</td>
</tr>
<tr>
<td>45</td>
<td>06/01/2016</td>
<td>Water hose located just north of the green waste pile</td>
</tr>
<tr>
<td>46</td>
<td>06/01/2016</td>
<td>North end of the community gardens looking southeast across the Site</td>
</tr>
<tr>
<td>Photo No.</td>
<td>Date</td>
<td>Description</td>
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<td>--------------------------------------------------</td>
</tr>
<tr>
<td>47</td>
<td>06/01/2016</td>
<td>Community garden plot with chickens</td>
</tr>
<tr>
<td>48</td>
<td>06/01/2016</td>
<td>Community garden plot with a garden</td>
</tr>
<tr>
<td>49</td>
<td>06/01/2016</td>
<td>Community garden plot with containers of unknown contents</td>
</tr>
<tr>
<td>50</td>
<td>06/01/2016</td>
<td>Community garden plot with chickens</td>
</tr>
<tr>
<td>Photo No.</td>
<td>Date</td>
<td>Description</td>
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<tr>
<td>----------</td>
<td>------------</td>
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</tr>
<tr>
<td>51</td>
<td>06/01/2016</td>
<td>Community garden plot with goats</td>
</tr>
<tr>
<td>52</td>
<td>06/01/2016</td>
<td>Marked sewer manhole located in the southeast portion of the Site; overgrown vegetation</td>
</tr>
<tr>
<td>53</td>
<td>06/01/2016</td>
<td>County Highway Department located southwest of the Site</td>
</tr>
<tr>
<td>54</td>
<td>06/21/2016</td>
<td>Waste Water Treatment Plant located southwest of the Site</td>
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### Photographic Log

<table>
<thead>
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<tbody>
<tr>
<td>55</td>
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<td>South Site boundary (12th Street) looking south to the light industrial adjoining the Site</td>
</tr>
<tr>
<td>56</td>
<td>06/01/2016</td>
<td>Southeast Site boundary (12th Street and Awalua intersection) looking southeast to the warehouse adjoining the Site</td>
</tr>
<tr>
<td>57</td>
<td>06/01/2016</td>
<td>Southeast Site boundary (12th Street and Awalua intersection) looking northeast to the parking lot and storage containers adjoining the Site</td>
</tr>
<tr>
<td>58</td>
<td>06/21/2016</td>
<td>Former Emulsion Plant Site – fenced off</td>
</tr>
<tr>
<td>Photo No.</td>
<td>Date</td>
<td>Description</td>
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</tr>
<tr>
<td>59</td>
<td>06/01/2016</td>
<td>East Site boundary (from Fraser Avenue) looking east across the Site; overgrown vegetation</td>
</tr>
<tr>
<td>60</td>
<td>06/01/2016</td>
<td>Former Oshiro gas station located to the north-northeast of the Site (LUST listing with NFA)</td>
</tr>
<tr>
<td>61</td>
<td>06/21/2016</td>
<td>Quonset Shed</td>
</tr>
<tr>
<td>62</td>
<td>06/01/2016</td>
<td>Quonset shed, interior overview</td>
</tr>
</tbody>
</table>
### Photographic Log

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<th>Description</th>
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</thead>
<tbody>
<tr>
<td>63</td>
<td>06/21/2016</td>
<td>Quonset shed, storage containers located west of the shed. Locked and reportedly storing equipment</td>
</tr>
<tr>
<td>64</td>
<td>06/21/2016</td>
<td>Quonset shed, contents of flammable cabinet in good condition</td>
</tr>
<tr>
<td>65</td>
<td>06/21/2016</td>
<td>West Site boundary looking west-northwest across Waste Water Treatment Plant northmost ponds (ponds are lined)</td>
</tr>
<tr>
<td>66</td>
<td>06/21/2016</td>
<td>West Site boundary looking North across the Site, overgrown vegetation</td>
</tr>
</tbody>
</table>
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<table>
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</thead>
<tbody>
<tr>
<td>67</td>
<td>06/21/2016</td>
<td>Upper elevation beyond the Site overlooking the Waste Water Treatment Plant with the Site beyond.</td>
</tr>
</tbody>
</table>

**Client Name:** Pulama Lanai  
**Site Location:** Lanai City Expansion – 200 Housing Units  
**Project No.:** 258407

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APPENDIX F:  
TRC STAFF AND ENVIRONMENTAL PROFESSIONAL QUALIFICATIONS/RESUMES
ROSS SURRENY, PG

EDUCATION
B.S., Geology, Georgia Southern University, 1990

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS
Professional Geologist, Arizona, (#50914), 2010
Professional Geologist, California, (#8005), 2005
Professional Geologist, Georgia, (#1294), 1996

AREAS OF EXPERTISE
Mr. Ross Surrency, PG, has expertise in the following areas:
- Project Management
- Phase I and II Environmental Site Assessments
- Soil and Groundwater Remediation
- Underground Storage Tank Removal/Management
- Regulatory Negotiation/Liaison
- CERCLA/RCRA

REPRESENTATIVE EXPERIENCE
Mr. Surrency has over 22 years of experience in the environmental industry serving private- and public-sector and government clients. This experience encompasses over 180 environmental investigations in 14 states involving a variety of project types, including fuel service stations, bulk fuel terminals, refineries, petroleum pipelines, manufacturing/industrial facilities, construction sites, landfills and United States military installations. These projects have involved a wide variety of contaminants including petroleum hydrocarbons, fuel oxygenates, industrial solvents, pesticides, PCBs, and metals. Mr. Surrency’s responsibilities have included acquisition of environmental permits; preparation of work plans, health and safety plans, corrective action plans, and technical reports; planning, direction, and supervision of field, laboratory, and office studies to establish geologic and hydrogeologic site characteristics; implementation of corrective action activities; and regulatory compliance and liaison with regulatory agencies. His experience includes extensive hands-on planning, field investigation and remediation management, permitting, cost estimating, and project management.

Circle K Stores Inc., Site Management – Various Retail Sites, Southern CA (Project Manager: 2012-present)
Mr. Surrency serves as Project Manager managing site assessment, remediation, and operation and maintenance (O&M) activities for 10 retail gasoline stations located throughout Los Angeles and Orange Counties. He is responsible for scheduling all aspects of site work including frequent correspondence with various regulatory agencies.

Confidential Client, Remedial Excavation, Riverside, California (Senior Project Geologist: July 2013 – March 2014)
Mr. Surrency served as Senior Project Geologist during targeted soil removal on a 62-acre private property being developed for residential use. Approximately 165,227 tons of PCB-impacted soil was removed to achieve a residential cleanup goal of 0.22 mg/kg for PCBs. Approximately 995 confirmation soil samples were collected for laboratory analysis. Mr. Surrency prepared the removal documentation report for California Department of Toxic Substances Control (DTSC) submittal. Following report submittal, DTSC quickly responded with a certificate of completion for the project.

Holly Energy Partners, Remedial Excavation, Tucson, Arizona (Project Manager: 2011)
Mr. Surrency served as Project Manager for the removal of petroleum hydrocarbon impacted soil resulting from a gasoline release from an aboveground storage tank at a bulk fuel terminal. Approximately 234 tons of soil were excavated and transported offsite for disposal. Confirmation soil samples were collected to verify that the affected material had been successfully removed according to the state regulatory agency cleanup goals. Specialized equipment was utilized and safety was emphasized due to space limitations within the excavation area.

Burlington Northern and Santa Fe Railroad, Southern California International Gateway Properties Phase 2 Investigation, Wilmington, CA (Senior Project Geologist: June 2011)
Mr. Surrency served as Senior Project Geologist conducting a Phase II site assessment of the approximately 100-acre property. Assessment activities included identifying several active petroleum pipelines that traverse the property, drilling 95 soil borings to a maximum depth of 25 feet, and collecting soil and groundwater samples for laboratory analysis. A total of 268 soil samples and 39 groundwater samples were collected.

Carroll Shelby Enterprises, Inc., Gardena, CA (Senior Project Geologist: July 2010-Present)
Mr. Surrency serves as Senior Project Geologist coordinating site assessment and remediation activities at this facility. Activities have included additional onsite and offsite assessment, a tidal fluctuation study, a soil gas investigation including both sub-slub horizontal wells and vertical wells, cone penetration test (CPT) borings, microbial testing of site groundwater, enhanced in-situ bioremediation of groundwater, and installation of groundwater monitoring wells to delineate the lateral extent of dissolved-phase chlorinated solvents. Approximately 1,787 tons of soil were excavated and hauled offsite for disposal. The project includes frequent correspondence with the DTSC.
Canners Steam Company, San Pedro, California (Senior Project Geologist: 2008-present)
As Senior Project Geologist, Mr. Surrency coordinated site assessment and remediation activities at the former steam production plant located in the Port of Los Angeles. Activities have included additional site assessment and feasibility testing, tidal fluctuation study, dewatering pilot test, and installation of groundwater monitoring and extraction wells to facilitate future remediation and delineate the lateral extent of dissolved-phase hydrocarbons. In addition, 6,402 tons of petroleum hydrocarbon-impacted soil were removed from the site for disposal.

ConocoPhillips Company, Site Management – Various Retail Sites, Southern CA (Project Manager: 2005-2008)
Mr. Surrency served as Project Manager managing site assessment or remediation activities for 30 retail gasoline stations located throughout Los Angeles and Orange Counties. He was responsible for scheduling all aspects of site work including frequent correspondence with various regulatory agencies. Mr. Surrency also conducted quarterly project status meetings with the ConocoPhillips site manager. Mr. Surrency achieved regulatory closure on six of the sites. He also coordinated the performance of due diligence site assessments at 15 additional sites throughout California.

ConocoPhillips Company, Marine Terminal - Wilmington, CA (Senior Project Geologist: 2007)
Mr. Surrency served as Senior Project Geologist coordinating site assessment activities at the 15 acre fuel terminal property. Activities included oversight of 16 CPT borings to collect discrete-depth groundwater samples and lithologic information. In addition, ultra-violet induced fluorescence was used to determine the vertical distribution of petroleum hydrocarbons in the subsurface. Mr. Surrency also coordinated a 72-hour tidal study to evaluate tidal influences on contaminant migration and determine net gradient.

ConocoPhillips Refinery, TBA Investigation - Wilmington, CA (Senior Project Geologist: 2005-2008)
As Senior Project Geologist, Mr. Surrency coordinated site-wide TBA investigation activities on the 424-acre refinery property. His activities included oversight of shallow direct-push soil borings, deep soil borings (up to 700 feet) using mud rotary drilling methods, monitoring well installation (up to 370 feet), aboveground storage tank release investigations, aquifer testing, downhole geophysics and video surveys, and waste disposal coordination.

California Department of Transportation, Aerially Deposited Lead (ADL) Studies – Riverside County, CA and Orange County, CA (Senior Project Geologist: 2008)
Mr. Surrency served as Senior Project Geologist coordinating ADL soil sampling efforts along a 20-mile section of Interstate 15 in Riverside County and a 4-mile
section of Interstate 405 in Orange County prior to planned freeway widening and HOV lane construction. The sampling program included marking approximately 440 locations, recording global positioning system (GPS) data at each location, directing two sampling teams consisting of direct-push drilling rigs, sampling technicians and traffic control. Mr. Surrency also prepared the summary reports for each project including a statistical evaluation of the laboratory data.

**ConocoPhillips Los Angeles Terminal, Release Investigation – Los Angeles, CA (Senior Project Geologist: 2005-2007)**

Mr. Surrency served as Senior Project Geologist conducting site assessment activities to assess an estimated 197,000 gallon gasoline pipeline release. His investigation activities included emergency response shallow soil borings around pipelines to determine point of release, installation of product recovery wells, installation of offsite monitoring wells and dual completion remediation wells to assess the extent of the product plume, and a soil gas survey. Mr. Surrency served as a liaison with adjacent property owners during offsite assessment activities.

**City of Santa Ana, Fire Station No. 6 UST Project - Santa Ana, CA (Project Manager: 2007-2011)**

Mr. Surrency served as Project Manager for a UST site assessment for the City. Project activities included monitoring well installation, quarterly groundwater sampling, groundwater over-purge events on select wells, quarterly report preparation, well abandonment, and regulatory agency negotiation. Case closure was obtained from the regulatory oversight agency.

**City of Fountain Valley, Former Police Station UST Project – Fountain Valley, CA (Project Manager: 2007-2011)**

Mr. Surrency served as Project Manager for a former UST release site owned by the City. Project activities included site assessment, monitoring well installation, remediation using a mobile vapor extraction unit, and quarterly groundwater monitoring, sampling and reporting.

**Voit Anaheim Business Park, LLC, Former Kwikset Facility - Anaheim, CA (Project Geologist: 2005)**

Mr. Surrency served as Project Geologist for remedial excavation of the 16-acre site. He was responsible for the excavation and disposal of soil containing tetrachloroethene, metals, and miscellaneous chemicals of potential concern related to the redevelopment of the property from industrial use to residential use. Other responsibilities included permitting; oversight and coordination of contractors, various consultants, and agencies during the excavation; and removal of approximately 95,000 tons of soil.

**City of Santa Ana, Widening Project, Edinger Avenue at 55 Freeway - Santa Ana, CA (Project Geologist: 2005)**

Mr. Surrency provided oversight for the removal of four USTs and remedial excavation in preparation for the widening of Edinger Avenue. He also collected soil samples beneath the USTs, product lines, and dispenser islands at the direction of the City Fire Department inspector.

**Charleston Air Force Base, Charleston, SC (Senior Project Geologist: 2001-2002)**

Mr. Surrency served as Senior Project Geologist for the characterization and closure of an inactive landfill at Charleston AFB. Characterization efforts included measuring the fill material thickness and lateral delineation, and groundwater characterization including monitoring well installation using the sonic drilling method. Mr. Surrency also prepared a feasibility study for the site to select the appropriate closure method.


Mr. Surrency assisted on U.S. Army Corps of Engineers clearance projects at unexploded ordnance sites in Brooksville, Florida; Carrabelle, Florida; Tampa, Florida; Durham, North Carolina; and Memphis, Tennessee. He worked on survey teams using various geophysical instruments (EM-61, EM-31, Schoenstadt) in tandem with global positioning system equipment on multi-acre sites to locate and map shallow buried ordnance for future removal or in-place detonation.


Mr. Surrency served as Site Manager and Health and Safety Officer for an intrusive investigation at a chemical warfare material burial site in Memphis, Tennessee, under contract with the U.S. Army Corps of Engineers. He managed a group of 12 people performing various activities such as drilling and well installation, soil and groundwater sampling, geophysics, air monitoring, onsite laboratory analysis, and medical monitoring. Mr. Surrency also presented findings at a public meeting.

**Department of Energy (DOE), Savannah River Site - Aiken, SC (Project Geologist: 1996-1998)**

Mr. Surrency served as Project Geologist on several environmental assessment projects on the 310-square-mile nuclear facility. He oversaw field investigation activities at low-level radioactive burial sites and chlorinated solvent groundwater plume sites including monitoring well installation, down-hole geophysical logging, cone penetrometer soil borings, aquifer testing and soil sampling. Mr. Surrency obtained regulatory approval of workplans from the state agency and presented findings of select projects to DOE environmental staff.
Ross Surrency, PG

Department of Defense, Natural Attenuation Demonstration – Eglin Air Force Base, FL (Project Geologist: 1995)
Mr. Surrency served as Project Geologist on natural attenuation demonstration projects at Department of Defense (DOD) facilities in conjunction with the Air Force Center for Environmental Excellence (AFCEE) and the EPA Robert S. Kerr Laboratory. His activities included petroleum hydrocarbon plume definition by collecting groundwater and soil samples using direct-push methods and performing onsite analyses.

Keesler Air Force Base, Biloxi, MS (Senior Project Geologist: 1995-2002)
Mr. Surrency served as Senior Project Geologist coordinating site investigation and assessment efforts and long-term groundwater monitoring efforts at the 1,500-acre installation during a RCRA Facility Investigation. Site assessments were conducted at eight UST sites, three landfills, a former fire training area, and seven solid waste management units at various locations across the Base.

Exide Batteries, Atlanta, GA (Project Geologist: 1996)
Mr. Surrency served as Project Geologist conducting site assessment activities at a former battery manufacturing facility. Activities included evaluating shallow soils for the presence of lead using XRF technology for onsite analysis of soil samples, and installing one shallow bedrock groundwater monitoring well.

Owens-Corning Plant, Anderson, SC (Staff Geologist: 1995)
Mr. Surrency served as Staff Geologist during site characterization efforts at this fiberglass manufacturing facility. Characterization activities included bedrock drilling and well installation using air rotary, and packer testing of fractured bedrock zones to estimate aquifer yield.

Chanute Air Force Base, Rantoul, IL (Staff Geologist: 1990-1992)
Mr. Surrency provided construction oversight during the removal of 21 USTs and over 13,000 linear feet of petroleum pipeline. He coordinated all soil and groundwater sampling activities and directed the remediation contractor when over excavation was necessary. Attended weekly project progress meetings with the U.S. Air Force resident engineer. As a follow-on to this project, Mr. Surrency coordinated and oversaw the installation of groundwater monitoring wells around several of the former UST sites to assess groundwater quality.

Various Clients, Site Investigations – Various Locations, GA, FL, SC, NC, MS, IL (Site Investigations: 1990-2001)
Mr. Surrency has performed site investigations, including RCRA Facility Investigations, site assessments at retail gasoline stations, UST removal activities, and DNAPL investigations at industrial chemical facilities. He has conducted investigations at DOD and DOE installations, landfills, fire training areas, industrial chemical facilities, petroleum pipeline sites, and sludge disposal pits.

SPECIALIZED TRAINING
- OSHA 8-Hour Hazardous Waste Supervisor Training, CCR Title 8, Section 5192, 2005
- OSHA 8-Hour Refresher Safety Training, 29 CFR 1910.120 and CCR Title 8, Section 5192, Annually
- MSHA 24-Hour Mine Safety Training, Part 46, New Miner Training, March 2012
- CAL-OSHA Trenching and Excavating Standards of California Competent Person Training, 2004
- DOE Order 5480.11 Radiation Worker, 1997
- Los Angeles Refinery Safety Overview (RSO), 2004
Kacey N. Swindle

EDUCATION
B.A., Biology, Hendrix College, 2006
A.A., Education, Central Baptist College, 2003

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS
EPA/AHERA (HIASB-3378) Accredited Asbestos Inspector - Hawaii
EPA/AHERA (HIASB-3378) Accredited Asbestos Contractor/Supervisor - Hawaii
EPA/AHERA (HIASB-3378) Accredited Asbestos Project Monitor – Hawaii
EPA (PB-0509) Certified Lead Inspector – Hawaii
NIOSH 582 Equivalent Sampling and Evaluating Airborne Asbestos Dust

AREAS OF EXPERTISE
Ms. Kacey N. Swindle has technical experience in the following general areas:
- Environmental Assessments and Audits
- Site Remediation Design and Implementation
- Asbestos Surveys
- Hazardous Material Surveys
- Microbial Investigations
- Lead Based Paint Inspections
- OSHA Compliance

REPRESENTATIVE EXPERIENCE
Ms. Swindle’s responsibilities include large and small scale asbestos and lead (Pb) inspections for private, public, commercial and governmental agencies, air monitoring and compliance certification. Ms. Swindle is a certified lead inspector, AHERA inspector, contractor / supervisor, and project monitor.

In addition to asbestos and lead consulting, Ms. Swindle is also proficient in industrial hygiene air monitoring exposure and evaluations, including OSHA compliance and safety program development, as well as indoor air quality studies. Ms. Swindle has performed microbial investigations on multi-family residential and commercial structures. The investigations have encompassed microbial sampling, moisture mapping, project design, and coordination with company senior-level scientists (Ph.D.s, C.I.H.s). Ms. Swindle also performs microbial remediation oversight and post-remediation sampling. She is knowledgeable of construction practices, means, and methods. Ms. Swindle has performed Phase I Environmental Site Assessments including conducting site visits and generating reports.

ASBESTOS ASSESSMENTS
Lanai Resorts, LLC, Asbestos Surveys – Lanai, Hawaii (2014 - 2016)
Performed asbestos inspections prior to proposed renovation activities for various properties located on the island of Lanai. The investigations included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment.

Highgate, Pacific Beach Hotel and Retail Spaces Asbestos Surveys - Honolulu, Hawaii (2014 - 2015)
Performed asbestos inspections prior to proposed renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment.

Kyo-Ya, Ltd., Princess Kauiulani Hotel and Retail Spaces Asbestos Surveys - Honolulu, Hawaii (2013 - 2014)
Performed asbestos inspections prior to proposed renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment.

Hawaii Pacific University, Aloha Tower Marketplace Asbestos/Lead Paint Surveys - Honolulu, Hawaii (2013 - 2014)
Performed asbestos/lead paint inspections prior to proposed renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment.

General Growth Properties, Sears Asbestos/Lead Paint Surveys and Abatement Oversight - Honolulu, Hawaii (2012 - 2013)
Performed asbestos/lead paint inspections and asbestos abatement oversight during demolition activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment. Oversight activities included daily asbestos air monitoring, clearance inspections and waste disposal
Kacey N. Swindle

characterizations and laboratory data interpretation to ensure that human health was protected.

Performed asbestos inspections and asbestos remediation oversight of during renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment. Oversight activities included daily asbestos air monitoring, clearance inspections and waste disposal characterizations and laboratory data interpretation to ensure that human health was protected.

Performed asbestos/lead paint inspections and asbestos remediation oversight during renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment. Oversight activities included daily asbestos air monitoring, clearance inspections and waste disposal characterizations and laboratory data interpretation to ensure that human health was protected.

Performed asbestos/lead paint inspections and asbestos remediation oversight during renovation activities. The investigation included sample collection, analysis, square footage estimates and friability status to determine if the materials pose a health risk to workers and the general public. Written reports were issued to the client detailing laboratory findings with regulatory recommendations including health risk assessment. Oversight activities included daily asbestos air monitoring, clearance inspections and waste disposal characterizations and laboratory data interpretation to ensure that human health was protected.

LEAD BASED PAINT ASSESSMENTS

Ala Wai Townhouse AOAO, Ala Wai Townhouse Lead Based Paint Inspection - Honolulu, Hawaii (2012)
Performed a lead based paint inspection of the above referenced residential building consisting of one hundred (100) similar dwellings as defined by the State of Hawaii, Environmental Protection Agency (EPA) and United States Department of Housing and Urban Development. A written report was issued to the client detailing findings with regulatory recommendations.

PHASE I ENVIRONMENTAL SITE ASSESSMENTS

Lanai Resorts, LLC, Phase I Environmental Site Assessments – Lanai City, Hawaii (2014 – Present).
Performed Phase I Environmental Site Assessments for the development of various properties within Lanai City, HI. Responsibilities included assisting or conducting the site investigations and report generation.
APPENDIX G:  
ENVIRONMENTAL PROFESSIONAL STATEMENT

DEFINITION OF ENVIRONMENTAL PROFESSIONAL AND RELEVANT EXPERIENCE THERETO PURSUANT TO 40 CFR 312

(1) A person who possesses sufficient specific education, training, and experience necessary to exercise professional judgment to develop opinions and conclusions regarding conditions indicative of releases or threatened releases (see §312.1(c)) on, at, in, or to a property, sufficient to meet the objectives and performance factors in §312.20(e) and (f).

(2) Such a person must: (i) hold a current Professional Engineer’s or Professional Geologist’s license or registration from a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) and have the equivalent of three (3) years of full-time relevant experience; or (ii) be licensed or certified by the federal government, a state, tribe, or U.S. territory (or the Commonwealth of Puerto Rico) to perform environmental inquiries as defined in §312.21 and have the equivalent of three (3) years of full-time relevant experience; or (iii) have a Baccalaureate or higher degree from an accredited institution of higher education in a discipline of engineering or science and the equivalent of five (5) years of full-time relevant experience; or (iv) have the equivalent of ten (10) years of full-time relevant experience.

(3) An environmental professional should remain current in his or her field through participation in continuing education or other activities.

(4) The definition of environmental professional provided above does not preempt state professional licensing or registration requirements such as those for a professional geologist, engineer, or site remediation professional. Before commencing work, a person should determine the applicability of state professional licensing or registration laws to the activities to be undertaken as part of the inquiry identified in §312.21(b).

(5) A person who does not qualify as an environmental professional under the foregoing definition may assist in the conduct of all appropriate inquiries in accordance with this part if such person is under the supervision or responsible charge of a person meeting the definition of an environmental professional provided above when conducting such activities.

Relevant experience, as used in the definition of environmental professional in this section, means: participation in the performance of all appropriate inquiries investigations, environmental site assessments, or other site investigations that may include environmental analyses, investigations, and remediation which involve the understanding of surface and subsurface environmental conditions and the processes used to evaluate these conditions and for which professional judgment was used to develop opinions regarding conditions indicative of releases or threatened releases (see §312.1(c)) to the Site. TRC personnel resume(s) are included in Appendix F.

I declare that, to the best of my professional knowledge and belief, I meet the definition of environmental professional as defined in §312.10 of 40 CFR 312.

I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

Signature of Environmental Professional: ___________________________ Date: 6/29/16
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ACRONYM LIST

AOC  area of concern  
bgs  below ground surface  
COPCs  chemicals of potential concern  
CSM  conceptual site model  
CY  cubic yard  
DU  Decision Unit  
EAL  Environmental Action Level  
EHE  Environmental Hazard Evaluation  
EHMP  Environmental Hazard Mitigation Plan  
EPA  United States Environmental Protection Agency  
ESA  environmental site assessment  
FTC  Fast Track Cleanup  
GPS  global positioning satellite  
HEER  Hazard Evaluation and Emergency Response  
HDOH  Hawaii Department of Health  
MECO  Maui Electric Company  
mg/kg  milligrams per kilogram  
mg/L  milligrams per liter  
MI  multi-increment  
msl  mean sea level  
OCPs  organochlorine pesticides  
PCBs  polychlorinated biphenyls  
QAPP  Quality Assurance Project Plan  
RSL  Regional Screening Level  
SAP  Sampling and Analysis Plan  
SVOCs  semi-volatile organic compounds  
TEQ  toxicity equivalency quotient  
TGM  Technical Guidance Manual  
TPH  total petroleum hydrocarbons  
TPH-G  total petroleum hydrocarbons as gasoline  
TPH-D  total petroleum hydrocarbons as diesel  
TPH-O  total petroleum hydrocarbons as motor oil  
VOCs  volatile organic compounds  

EXECUTIVE SUMMARY

Introduction

The site characterization was conducted by Pulama Lanai with the objective to characterize surface soils within the defined Site boundary to determine if the Site is suitable for residential use. In advance of planned construction activities at the Site, surface soil samples were collected according to guidance provided in the State of Hawaii Department of Health (HDOH) Hazard Evaluation and Emergency Response (HEER) Office Technical Guidance Manual (TGM [HDOH, 2017]) to evaluate the nature and extent of potential contamination due to historical operations, including the use of a large portion of the Site as pineapple growing fields. This Site Characterization Report documents all sampling activities, laboratory analysis, data validation, additional stockpile characterization, and soil removal actions performed to achieve the overall objective of concentrations of chemicals of potential concern (COPCs) in surface soils are below the screening levels. Screening levels used for the Site Characterization are the HDOH HEER Tier 1 Environmental Action Levels (EALs) for unrestricted residential (unrestricted) land use for a site where groundwater is a potential drinking water resource and surface water is greater than 150 meters from the site boundary (Tier 1 EAL [HDOH, 2017]), or if there is no Tier 1 EAL, the Region 9, United States Environmental Protection Agency Regional Screening Levels for residential soil (EPA RSLs) (EPA, 2019).

Summary of Work

This site characterization was performed by TRC on behalf of Pulama Lanai and the documented work scope was proposed in the Final Sampling and Analysis Plan, Lanai City Expansion, Lanai City, Hawaii (TRC, 2017). The HDOH is providing regulatory oversight for this project and approved the work plan in correspondence dated December 20, 2017.

The site characterization was conducted according to guidance provided in the HDOH Hazard HEER Office TGM. For this site characterization, each area of concern (AOC) was subdivided into several decision units (DUs) and sampled using multi-increment (MI) methodology. Soil samples were analyzed for specific COPCs based on the AOC being characterized.

Summary of Results - Soil Sampling

With the exceptions of the former MECO Power Plant and the former Pesticide Shed, the results of the MI sampling indicate residual levels of COPCs are not present in surface soil at concentrations above screening levels and the site is suitable for unrestricted/residential use.

One DU from the pesticide shed (PS-DU2) and seven DUs from the former MECO Power Plant resulted in concentrations above the Tier 1 EALs. The remainder of the Site soils have no other exceedances of screening levels for the COPCs analyzed.

Additional Investigations and Removal Action

Site-Wide Stockpile Investigation

Over the course of the Site characterization, multiple stockpiles were discovered throughout the Site. Some of these stockpiles restricted access to DUs within the former agricultural area.
These site-wide stockpiles were comprised of raw construction materials (gypsum, cerider or mulch) and some were a combination of soil, construction debris, and refuse. No laboratory data was available for the stockpiles containing soil, therefore sampling and analysis was necessary to properly characterize prior to relocation or disposal. Results of laboratory analysis were compared to the Tier 1 EALs and EPA RSLs for unrestricted/residential use. Concentrations of COPCs from the site-wide stockpiles were below screening levels for the COPCs analyzed.

Former MECO Power Plant – Demolition and Soil Sampling

Demolition activities associated with the decommissioning of the former MECO Power Plant resulted in the discovery and subsequent excavation of motion-dampening concrete footings beneath the plant structure. Removal of the footings led to the excavation and stockpiling of soil from beneath the building. Previous investigations in this area indicated the presence of hydrocarbon-impacted soil beneath the building which may have been removed during excavation activities.

The final excavation was measured at approximately 4,122 square feet to 10 feet below ground surface (bgs). TRC collected MI samples from the base and sidewalls of the excavation. A total of approximately 500 yards3 of excavated soil was placed into seven stockpiles ranging from approximately 36 yards3 to 128 yards3.

From the excavation, laboratory analysis resulted in concentrations exceeding the Tier 1 EAL for total petroleum hydrocarbons as diesel (TPh-D) and TPH as motor oil (TPh-O) in the MI sample collected from the base of the excavation decision unit. No other exceedances were observed as concentrations were below screening levels for other samples collected from the former MECO Power Plant excavation.

Stockpile samples collected resulted in concentrations exceeding the Tier 1 EAL for TPh-D and TPh-O in two of the stockpiles sampled. The remaining stockpile samples were below the screening levels.

Following the sampling and discussions with HDOH personnel, the excavation was first backfilled utilizing the stockpiled soil from the former MECO Power Plant with the soil exceeding Tier 1 EALs replaced at 10 feet bgs. Soil from the Site-wide stockpiles located north of the Commercial Nursery was used to complete the backfill.

Pesticide Shed Removal Action

Based on laboratory results of the MI sampling at the Pesticide Shed AOC, a removal action was implemented to address impacted soil in one DU. Prior to the removal action, discrete-depth soil samples were collected at 1-foot intervals to a depth of 5 feet bgs to pre-characterize the depth of the excavation.

Based on the results of the subsurface soil samples, the impacted DU was excavated to a depth of approximately 2.5 feet bgs and approximately 25 cubic yards (CY) of soil was loaded directly into an onsite container for off-island disposal. Following completion of the excavation, confirmation soil sampling was performed on the base and the sidewalls of the excavation. Laboratory analysis of all confirmation soil samples resulted in concentrations below Tier 1 EALs.

Environmental Hazard Evaluation (EHE)

An EHE was performed to identify potential environmental hazards associated with contaminant concentrations in site soils through comparisons with established Tier 1 EALs for specific hazards and transport mechanisms. The evaluation of the MI soil data resulted in seven surface DU's at the former MECO Power Plant being flagged as potential hazards due to concentrations exceeding COPC Tier 1 EALs for either gross contamination, potential for leaching to groundwater, or human direct exposure. Additionally, three MI soil samples collected from the base of the MECO excavation and MECO stockpiles also exceeded COPC Tier 1 EALs.

Environmental Hazard Management Plan (EHMP)

Potentially unacceptable risks and hazards identified in the EHE must be managed with a site-specific EHMP. While most of the Site poses no environmental hazards for a proposed residential scenario, potential gross contamination, direct exposure, and leaching hazards are present at the former MECO Power Plant AOC. Hazards previously identified in the former Pesticide Shed area were subsequently addressed with the removal action and require no EHMP.

Based on planned future land use, these hazards require either corrective action or land use controls and long-term management of contaminated soil. During construction or Site activities which pose a potential risk of exposure for workers to contaminated dust, work must be supervised and performed by properly trained and certified personnel. Those working in the areas with a potential for contact and exposure shall have current HAZWOPER training. Potentially impacted soil handled during future construction activities within the MECO AOC, will need to be managed with a programmatic EHE/EHMP, as necessary. Soil to be removed should be evaluated for reuse, recycling, or disposal options.

Conclusions and Recommendations

With the exception of the former MECO Power Plant AOC, the remainder of the 85-acre site has been fully assessed for the purposes of residential redevelopment based on the results of this investigation. Concentrations of potential COPCs identified in the work plan for each AOC are either below Tier 1 EALs, EPA RSLs, or below laboratory detection limits and should have no restrictions for future use.

It is recommended impacted DUs within the former MECO Power Plant AOC undergo additional assessment and a removal action be conducted to adequately address hazards identified in this investigation. Additionally, hydrocarbon-affected soil at 10 feet bgs within the former MECO Power Plant excavation should be assessed for possible vapor migration to the surface and to confirm there are no vapor migration risks to human health.
1.0 Introduction and Background

This report documents the site characterization conducted for the proposed Lanai City Expansion (Site) located in Lanai City, Hawaii. See Figure 1 for the Site location and vicinity. This report was prepared by TRC on behalf of Pulama Lanai and the work scope was documented in the Final Sampling and Analysis Plan, Lanai City Expansion, Lanai City, Hawaii (TRC, 2017). The Hawaii Department of Health (HDOH) is providing regulatory oversight for this project and approved the work plan in correspondence dated December 20, 2017.

Information provided herein includes a site background, a summary of previous investigation work at the Site, and the results of the site characterization. This Site Characterization Report documents all sampling activities, laboratory analysis, data validation, additional stockpile characterization, and soil removal actions performed to achieve the overall objective of concentrations of chemicals of potential concern (COPCs) in surface soils are below the HDOH HEER Tier 1 Environmental Action Levels (EALs) or unrestricted/unrestricted (unrestricted) land use for a site where groundwater is a potential drinking water resource and surface water is greater than 150 meters from the site boundary (Tier 1 EAL) (HDOH, 2017); or if there is no Tier 1 EAL, the Region 9, United States Environmental Protection Agency Regional Screening Levels for residential soil (EPA RSLs) (EPA, 2019).

1.1 Background

1.1.1 Site Location and Background

The Site is irregular-shaped and is located in the western portion of Lanai City in Maui County, Hawaii, approximately 4 miles east of the Pacific Ocean and 0.2 mile north of Kaunakakai Highway (Figure 1). The surface elevation of the Site is approximately 1,545 feet above mean sea level (msl). The approximately 85-acre Site encompasses portions of parcels 2-4-9-014-001, 2-4-9-014-009, and 2-4-9-002-061. According to the Maui County Tax Assessor, the Site is zoned as open space and agricultural land, and is currently owned by Lanai Resorts, LLC.

The Site is bounded by the:
- East-northeast by a police station, churches, and Fraser Avenue.
- North by athletic fields and Lanai High School.
- South by 12th street, followed by former agricultural land.
- South-southeast by a recycling center.
- Northwest by undeveloped land owned by Maui County.
- South-southwest by the Maui County Highway Department.
- West-southwest by a wastewater treatment plant.
- East-southeast by warehouses and an unpaved parking lot (former Emulsion Plant location) with storage containers.

1.1.2 Climate

The climate in Lanai City is considered subtropical rather than tropical. The island lies in the rain shadow of West Maui and East Molokai, so it is considered arid. The temperature for Lanai City ranges from 60 degrees Fahrenheit (°F) to 81°F, with temperatures rarely falling below 55°F or exceeding 84°F (Weather Spark, 2017). Lanai is subject to persistent northeasterly trade winds with southerly or “kona” winds interrupting the trade winds, especially during the winter.

The average rainfall on Lanai ranges from less than 10 inches along the coast to 38 inches at Kohelo and the summit. The summer marks the dry season on Lanai, and July is typically the driest month. Winter marks the wet season, and December is typically the wettest month, but heavy downpours during a single kona storm can account for a large part of the annual rainfall (Stearns, 1940).

1.1.3 Hydrology

Lanai is a small island, totaling approximately 140 square miles with only one significant stream, Maunalei Gulch. The island consists of a single volcanic shield. Lanai has groundwater levels that range from a few feet near the coast to over 1,500 feet above msl near the central portion of the island. Lanai relies on high-level groundwater where water level elevations of wells range between 520 feet above msl and 836 feet above msl based on well data in the vicinity of Lanai City (CWRM, 1996).

1.1.4 Regional and Site Geology

The island of Lanai is an inactive shield volcano formed by eruptions of magma that built up the shield and summit, and by eruptions along three rift zones. The primary rift zone is a broad northwest-trending ridge, approximately 5 miles long; two minor rift zones trend in the southwest and south-southeast directions. The Palawai Basin is located in the southern portion of Lanai and is the remnant of a caldera formed by the collapse of the shield summit (USDA, 1975).

The lava flows on Lanai consists primarily of tholeiitic basalt. Lava flows range from 1 foot to 98 feet thick, with an average thickness of 20 feet, and appear to have been deposited relatively continuously, since there is little evidence of erosion or weathering between successive flows. Two pahoehoe (ropy) and a a (chunky, angular) flows occur on Lanai, with pahoehoe flows predominating near vents and a a flows occurring on the lower slopes (MacDonald, et al., 1983).

The climate of Lanai is considered arid since the island lies in the rain shadow of West Maui and East Molokai. The average annual rainfall at the summit is approximately 40 inches per year. The northeast portion of the island is sheltered from wave erosion, with broad expanses of alluvium and beaches. Conversely, the southwest portion of the island is fully exposed to waves generated by southwestern storms, creating the phenomenon of high sea cliffs, known as palis, along the leeward portion of the island (Macdonald, et al., 1983).

1.1.5 Regional and Site Hydrogeology

Drinking water for Lanai (and all the Hawaiian Islands) is primarily supplied by rainwater that has percolated down through soil and permeable volcanic rock, known as basal groundwater. The portion of the island that is below sea level, except within the rift zones, is saturated with salt water. The less-dense fresh water forms a basal lens above the salt water, known as the “Glyben Herzberg” lens, and is referred to as a basal aquifer. A transitional zone occurs across the
the fresh water and salt water interface, which moves constantly due to tidal influence, seasonal fluctuations in recharge and discharge, and aquifer development (Macdonald, et al., 1983).

Perched or high-level aquifers that are not in contact with salt water occur as a result of downward percolation of rainwater being blocked by impermeable layers of dense lava, clay or volcanic ash. These aquifers are recharged by rainfall in high, mountainous areas. Groundwater flows from the recharge zones to discharge zones at the shoreline; however, frictional resistance to flow causes the groundwater to accumulate within the island, resulting in a basal groundwater gradient that slopes toward the shoreline (Macdonald, et al., 1983).

The Site is underlain by the Leeward Aquifer System, which is part of the Central Aquifer Sector on the island, and includes an unconfined, high-level aquifer in dike compartments. The groundwater in this aquifer is currently in use and contains groundwater with fresh salinity (<250 milligrams per liter of chloride [mg/L]). The groundwater is considered an inreplaceable drinking water source with a high level of vulnerability to contamination (Mink and Lau, 1993). The Site is above the underground injection control (UIC) line and therefore, the groundwater is considered a source of drinking water. Groundwater was not encountered during this investigation.

1.1.6 Land Use History

According to a Phase I Environmental Site Assessment (ESA) report (TRC, 2016), and information provided by Pulema Lanai, historic land use on the Site is summarized as follows:

- 1920-1941: Lanai City was reportedly first developed in the early 1920s, which is when pineapple plantation activities most likely began on the Site.
- 1942-1947: The Maui County Tax Assessor indicates a Quonset shed was built on the Site in 1942. It is unknown what the shed was used for.
- 1948-1988: The power plant was built on the Site in 1948 and was reportedly operated by the Dole Company to support pineapple plantation operations until 1988. In the 1980s, the former schoolhouse and former Boy Scout hall were relocated onto the Site.
- 1989-1996: The Maui Electric Company (MEO) operated the power plant. As of 1992, the pineapple plantations ceased operations, and the nursery and community gardens were developed on the Site.
- 1996-2003: The power plant stopped operating in 1996 and MEO vacated the premises in 2000 following the removal of the last two generating units. The facility was then utilized for storage. In 2003, an evaluation of the power plant was completed. The evaluation report (Maui Architectural Group, Inc., 2003) indicated petroleum-contaminated soil was present on the Site. Additionally, the evaluation report indicated that trace amounts of polychlorinated biphenyls (PCBs) were present in the soil on the Site. Based on interviews with knowledgeable Lanai personnel, the northwest area of the Site was used as a concrete batch plant for an unknown period. Later, this area was used to store obsolete pineapple harvesting equipment and scrap metal.
- 2003-2017: The Department of Land and Natural Resources (DLNR) leased the Quonset shed from Lanai Resorts to operate as offices and a storage facility in 2006. The MEOC plant located on the Site continues to serve as a storage facility. The commercial nursery continues to operate on the Site. Residents of Lanai rent the community garden areas and use these areas to grow gardens and raise animals.

Hawaii Gas Company utilizes the northwest area of the Site for distribution of natural gas.

Reportedly, there was some historical military activity on Lanai that included the following:

- Army Air Corps and aviators making brief stops on the island;
- Military occupation during World War II;
- Development of machine gun and artillery emplacements to create furrows on open lands to prevent possible enemy landings;
- Bombing and target practice at Kapukalao Hulopo’e and other sites; and

Based on inquiries with knowledgeable Lanai personnel, there is no indication that military activity was conducted within the Site area.

1.1.7 Current Site Use

The current land use in the immediate vicinity of the Site is right industrial, agricultural, and residential. The current activities conducted on the Site are described as follows:

- DLNR utilizes the Quonset shed as an office and storage facility.
- Prior to its demolition completed on January 21, 2013, Pulema Lanai utilized the former MECO Plant building as a storage facility. An electrical substation located to the northwest of the former MECO building is still in operation.
- A commercial nursery operates on a portion of the Site. Multiple single-story, wood and metal structures are utilized to facilitate nursery activities.
- Hawaii Gas Company operates a distribution area in the northwest area of the Site.
- Lanai residents utilize the community gardens for growing gardens and raising animals.

2.0 Investigation History

The following sections summarize Phase I and Phase II activities conducted previously at the Site.

2.1 Phase I Environmental Site Assessment

A Phase I ESA was conducted for this Site in June 2016 in accordance with the American Society of Testing and Materials (ASTM) Practice E1527-13 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process and is documented in the TRC Phase I Environmental Site Assessment Report (TRC, 2016a). The ESA identified four recognized environmental conditions (RECs) where additional investigation was recommended. These RECs included the following:

- Former pesticide storage shed
- 55-gallon diesel fuel drum located in the northeast of the Commercial Nursery
2.2 Phase II Site Assessment

In September 2016, TRC performed Phase II Site Assessment activities at the Site. Details of this investigation are provided in the Draft Site Assessment Report (TRC, 2016b). Soil sampling consisting of both surface and subsurface samples was performed around the above-identified RECs and former agricultural areas listed below:

- Former pesticide storage shed: Soil samples were collected at 0.5 and 2 feet bgs.
- 55-gallon diesel fuel drum: two soil borings directly adjacent to the concrete pad the drum is resting on. Soil samples were collected at 0.5 and 2 feet bgs.
- Former Emulsion Plant: six surface soil samples were collected around the western and southern boundaries of the former plant.
- Former MECO plant: 10 surface soil samples were collected around the perimeter of the building and adjacent to various features.
- Former agricultural areas: surface soil samples were collected.
- Former wash-down pad: two surface soil samples were collected adjacent to the concrete pad to evaluate potential impacts related to the former use of this pad as an equipment wash-down area.

The laboratory results for soil samples collected during the Phase II investigation were compared to the Tier 1 EALs and EPA RSLs. The chemicals of concern that exceeded these Tier 1 EALs included the following:

- TPH-D at the 55-gallon diesel fuel drum location. The Tier 1 EAL for TPH-D is 200 milligrams per kilogram (mg/kg) and the maximum concentration detected in soil was 8,000 mg/kg.
- TPH-O at the 55-gallon diesel fuel drum location. The Tier 1 EAL for TPH-O is 500 mg/kg and the maximum concentration detected in soil was 1,000 mg/kg.
- Dioxins/furans at the former Emulsion Plant area. The Tier 1 EAL for dioxins/furans 2,3,7,8 TCDD Equivalence is 0.00024 mg/kg and the maximum concentration detected in soil was 0.0017 mg/kg (Sample collected at the perimeter).

The petroleum-impacted soil at the 55-gallon diesel drum location appeared to be of limited extent. Residual TPH-D and TPH-O concentrations observed in the soil samples collected from this area were not detected in the samples collected at 2 feet bgs.

Dioxins/furans were detected in the two samples from the perimeter of the former Emulsion Plant that were tested for these analytes. The result for one sample exceeded the Tier 1 EAL.

2.3 Former Emulsion Plant Site

At the intersection of Fraser Avenue and 12th Street is a site known as the former Dole Packaged Foods Company Emulsion Plant Facility (Emulsion Plant). This site is currently undergoing an environmental investigation with oversight by the HDOH. Several investigations and limited remediation have been performed at this site following the removal of two 10,000-gallon underground storage tanks (USTs) in 1989, (ETC, 2007 and 2015).

2.4 Former MECO Power Plant Investigations

2.4.1 PCB Investigation

On December 18, 1997, MECO collected one soil sample in the former transformer storage area and submitted it to a laboratory for PCB analysis. Aroclors-1254 and -1260 were detected at concentrations of 49.1 and 40.2 micrograms per kilogram (μg/kg), respectively. These results were documented in a letter from MECO to the Maui Architectural Group, Inc. dated February 26, 2003. (Maui Architectural Group, Inc., 2003)

2.4.2 UST Removal and Investigation

In October 1989, a 25,000-gallon UST was removed from the northeast corner of the former MECO power plant. Site investigations were conducted in 1991 and 1992. Subsequently, in 1993 an estimated 90 CY of petroleum-impacted soil was excavated from the southeast portion of the UST cavity. On January 13, 2003, a 5,800-gallon diesel fuel UST was also removed. Viable stained soil was removed to the extent practical to a maximum depth of 23 feet bgs. Approximately 170 CY of soil was removed. Some stained soil in the west sidewall of the excavation could not be removed due to the presence of the power plant building. In this area, stained soil was observed from approximately 4 to 15 feet bgs (ETC, 2005).

In August 2006, three soil borings were advanced around the perimeter of the power plant building with a direct-push drilling rig to a depth of 20 feet bgs to further delineate the extent of the hydrocarbon-impacted soil. Soil samples were collected from each boring at 10 and 20 feet bgs and analyzed for TPH-D, benzene, toluene, ethylbenzene, and xylene (BTEX), and polycyclic aromatic hydrocarbons (PAHs). Constituents were not detected above their respective laboratory detection limits (ETC, 2006). In a letter from HDOH Solid and Hazardous Waste Branch, UST Section dated February 2, 2007, it was stated that no further action was necessary for this release; however, the letter does acknowledge the area of petroleum hydrocarbon-impacted soil that remains in place beneath the building.

In April 2018, a total of 24 soil borings were advanced using a direct push rig to depths of up to 20 feet bgs both inside and outside the power plant building to conduct a more thorough site assessment and further evaluate subsurface conditions at the Site for potential redevelopment. Soil samples were collected and analyzed for organochlorine pesticides (OCPs), PCBs, TPH-D, TPH-O, and lead. Laboratory analysis resulted in concentrations of TPH-D and TPH-O exceeding Tier 1 EALs. These concentrations were observed in samples collected within the northeast and southern corners within the plant building at depths ranging from 3 to 5 feet bgs (TRC, 2018).
3.0 Summary of Data Quality Objectives

3.1 Problem Statement

The Site is being evaluated for redevelopment for future residential use with up to 100 single
family homes and other multi-family units to be constructed, as well as parks and open spaces.
Given the historic and current land uses on this property, and the limited amount of
environmental investigations and data available, there were data gaps related to the presence
or absence of COPCs in areas of concern (AOCs) identified at the Site. To determine if the Site
is suitable for residential use, the following environmental investigation was performed to
address the data gaps.

3.2 Objectives

The objective of this investigation was to characterize surface soils within the defined Site
boundary to determine if the Site is suitable for residential use. The collection of surface soil
samples was performed as technically defensible and representative of site conditions as
possible. The investigation was conducted according to guidance provided in the HDOH HEER
Office TGM (HDOH, 2017). During the site characterization, each AOC was sub divided into
decision units (DUs; see Section 4.4) and sampled using MI methodology. The data collected
during the site characterization was compared to the Tier 1 EALs for unrestricted land use in
areas where a current or potential source of drinking water is threatened, and where the nearest
surface water body is greater than 150 meters (approximately 500 feet) from the Site; or if there
is no Tier 1 EAL, the Region 9 United States Environmental Protection Agency Regional
Screening Levels for residential soil (EPA RSLs) (EPA, 2019) were used.

3.3 Data Information Needs

Based on the preliminary identification of data gaps (see Section 4.1 above), additional data
was needed for site characterization, health and safety planning, advanced evaluation of
potential environmental hazards (e.g., need for a human health risk assessment), and the
development of remedial alternatives. Data needs were continually re-evaluated and refined as
more information about the Site was gained and potential environmental hazards were
identified. Data information needs included the following:

- Data Needs for Purposes of this Work Scope:
  - Based on the COPCs determined for each of the proposed DUs (see Section 4.4
    and 4.5) at the Site, surface soil samples were collected via MI sampling for
    laboratory analysis at detection limits that facilitate comparison with screening
    levels.
  - Additional Data Needs and Evaluations:
    - Locate soils that have COPC concentrations that are above screening levels and
      may pose a significant threat to human health and the environment.
    - Determine the need for subsurface delineation based upon review of the data
      from the surface soil investigation.

3.4 Decision Unit Determination

The Site was subdivided into seven AOCs (see Figure 2). The following is a list of AOCs and
their associated COPCs:

<table>
<thead>
<tr>
<th>AOC</th>
<th>COPCs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Former agricultural (pineapple growing)</td>
<td>Organochlorine pesticides, arsenic, bioaccessible arsenic*</td>
</tr>
<tr>
<td>areas</td>
<td></td>
</tr>
<tr>
<td>Former MECO Power Plant</td>
<td>PCBs, TPH-O, TPH-D, lead, pesticides</td>
</tr>
<tr>
<td>Former pesticide shed</td>
<td>SVOCs, TPH-O, dioxins/furans, organochlorine pesticides, herbicides, arsenic, lead, carbamates</td>
</tr>
<tr>
<td>Commercial Nursery</td>
<td>Organochlorine pesticides, arsenic, bioaccessible arsenic*</td>
</tr>
<tr>
<td>Community Gardens</td>
<td>Organochlorine pesticides, arsenic, bioaccessible arsenic*</td>
</tr>
<tr>
<td>East Dirt Access Road</td>
<td>Dioxins/furans, organochlorine pesticides, arsenic, bioaccessible arsenic*</td>
</tr>
<tr>
<td>Former Storage Area</td>
<td>TPH-D, organochlorine pesticides, arsenic, bioaccessible arsenic*</td>
</tr>
</tbody>
</table>

Notes:
* Samples collected for bioaccessible arsenic analysis were held pending the results for total arsenic. If a total arsenic result exceeded the Tier 1 EAL of 24 mg/kg, the sample was analyzed for bioaccessible arsenic.

Each AOC was subdivided into several decision units (DUs) up to 1 acre in size. Since the Site
is approximately 85 acres and is considered a “very large area for redevelopment,” the size of
each DU in the former agricultural area was 1-acre pursuant to HDOH guidance. DUs in other
AOCs were sized according to the area being investigated. The DUs for each AOC are shown
on Figures 3 through 9 and described in detailed field data sheets provided in Appendix A.
3.4.1 **Former Agricultural Areas**

Fifty-six (56) DUs ranging in area from 8,517 square feet to 1.35 acres were sampled to characterize former agricultural areas of the Site surrounding the other AOCs. Thirty (30) increments were collected from each DU. The DUs are shown on Figure 3.

3.4.2 **Former MECO Power Plant**

A total of eleven (11) DUs ranging in area from 1,439 square feet to 4,644 square feet were sampled at the former MECO Power Plant, consisting of nine DUs in the area around the building and two DUs in the footprint of the former building/warehouse. These DUs were sampled following the demolition of the power plant, subsurface structure removals, and backfill. Since PCBs are a COPC in this AOC, seventy-five (75) increments were collected from each DU. The DUs are shown on Figure 4.

3.4.3 **Former Pesticide Shed Area**

Three (3) DUs ranging in area from 291 square feet to 408 square feet were sampled for the former pesticide storage shed area. This area consists of an enclosed shed, a covered storage structure (removed during soil removal action), and a loading/unloading area. One DU was sampled for each structure/area. Thirty (30) increments were collected from each DU. The DUs are shown on Figure 5.

3.4.4 **Commercial Nursery**

Four (4) DUs ranging in area from 2.36 acres to 2.76 acres were sampled to characterize the commercial nursery area. Thirty (30) increments were collected from each DU. The DUs are shown on Figure 6.

3.4.5 **Community Gardens**

Eighteen (18) DUs ranging in area from 1,266 square feet to 9,420 square feet were sampled to characterize the community gardens area. Since the individual garden plots are still being used by community members, and following a site visit by HDOH on February 28, 2017, it was decided to characterize this area with DUs situated on the network of dirt roads that crisscross the area. Thirty (30) increments were collected from each DU. The DUs are shown on Figure 7.

3.4.6 **East Dirt Access Road (Northwest of Former Emulsion Plant)**

The East Dirt Access Road (DAR) area is located northwest of the former Emulsion Plant (see Figures 2 and 8). Based on previous investigation results at the former Emulsion Plant site, a data gap was identified, and dioxins/furans required delineation in the area adjacent to the Emulsion Plant in the area of the dirt access road (within the Site boundary) during the site characterization. During site characterization activities, it was observed that the former Emulsion Plant site is used as a storage area, is paved with gravel, and fenced to reduce pedestrian access. DU1 was 8,599 square feet and DU2 was 8,813 square feet and located immediately adjacent to former Emulsion Plant (TRC, 2017) and within the dirt access road, as shown on Figure 8.

3.4.7 **Former Storage Area**

The Former Storage Area (SA) is located at the north/northwest Site boundary and north of the Commercial Nursery (see Figure 2). Fourteen (14) approximately 1-acre DUs were sampled to characterize this area based on the location adjacent to former agricultural lands and storage of equipment. Thirty (30) increments were collected from each DU. The DUs are shown on Figure 9.

4.0 **Field Investigations**

This section summarizes the investigation procedures followed for the site characterization. Investigation activities were conducted in general accordance with the Sampling and Analysis Plan (TRC, 2017) and were performed using an MI sampling approach within the AOCs described in Section 4.0. Photos of each DU are incorporated into the field data sheets which are included in Appendix A.

4.1 **Pre-Field Activities**

Pre-field activities included the following:

- Pre-field reconnaissance visit to assess site access, locate Site and DU boundaries, and field execution logistics.
- Mowing and brush clearing of dense vegetation. Vegetation removal was conducted by using a brush cutter attachment to a skid steer. No soil grubbing or grading was performed.

4.2 **Surface Soil Sample Collection**

Before sampling began at each DU, the boundaries were identified and marked using hand held Trimble global positioning satellite (GPS) units and survey flags. GPS coordinates for each DU endpoint are included in Appendix B. In some DUs, boundaries were adjusted to account for obstructions, changes in surface layout, or other site features not anticipated during DU selection and map preparation. Significant changes are summarized as follows:

- CN-DU1 and CN-DU2 were extended to the northeast to account for additional areas adjacent to the fence.
- AG-DU22 was altered to remove paved portions of 9th Street or Police Station property. This area of the Site will remain as-is based on design of the Site redevelopment.
- AG-DU41 was amended to add the small triangular area of AG-DU42. This alteration made both DUs more symmetrical and improve collection of MI soil samples.
- AG-DUs 13, 14, 15, 24, 2S, and 26 required alterations to their boundaries due to the presence of soil and debris stockpiles.
- MECO-DU10 was altered to make a symmetrical rectangle shape; and MECO-DU3 was extended to the northwest to cover the area removed from MECO-DU10.
- MECO-DU4 was extended to cover remaining areas within the fence in the southern corner.
Once the DU boundary was delineated, MI samples were collected using a systematic random grid method. Sample collection included square, rectangular, or irregularly shaped DUs used an evenly spaced, square sampling grid, and the sample was collected from the same area of each cell within the grid (e.g., the lower left-hand corner). For sample collection in long, narrow DUs (such as the east dirt access road DUs), a triangular sampling grid was used.

Triplicate samples were collected at a rate of approximately 10% with a minimum of one triplicate sample per ACG. A total of 108 DUs were completed and 14 DUs were sampled in triplicate (28 additional quality control/quality assurance samples), for a total of 136 samples. Triplicate samples were collected by taking the first sample at the designated location within the DU, and then shifting the grid 2-3 feet of the calculated increment spacing in the direction of the X axis and then the Y axis to collect the second and third samples. Field data sheets detail the location of the increments (Appendix A).

Surface soil samples were collected from DUs using precleaned stainless steel trowels, stainless steel hand cores, or a hand-held drill. Soil increments consisted of soil from the ground surface to 0.5 feet deep. Care was taken to ensure that each increment had a representative amount of soil from the entire 0- to 0.5-foot column of soil, and that the volume of each increment was consistent. Rocks and debris were not included with each increment. The soil increments were collected using a stratified, random pattern within each decision unit, ensuring the overall sample represented all portions of the decision unit area. Each MI sample was placed into a new, 1-gallon sized resealable polyethylene bag and each bag was labeled with the sample identification, date/time of sample collection, and the initials of the collector. The samples were then placed at a designated sample cooler with ice pending off-site shipment and delivery to the laboratory. Field data sheets documenting the collection of the samples are included in Appendix A.

4.3 Laboratory Analysis and Data Validation

To achieve the project objectives, site characterization MI samples were collected and analyzed in accordance with the Work Plan and the project specific Quality Assurance Program Plan (QAPP) (TRC, 2017). Samples were analyzed by SGS Laboratory, in Orlando, Florida, and APPL, Inc. in Clovis, California, both of which have been certified by the California Environmental Laboratory Accreditation Program to perform these services. In summary, all data is valid and may be used for decision-making purposes. Reported issues are noted, qualifiers added and relative standard deviations (RSDs) are discussed in detail in Appendix C.1.

Analytical methods were completed in accordance with the method-specific requirements as described in the project-specific QAPP. Analytical data was provided to TRC as Level IV data deliverables in portable document format (PDF) as well as in electronic data deliverable format. Results were validated by TRC chemists for compliance with QAPP requirements. Level IV data validation was performed on 32 MI soil samples (including field replicates and lab replicates) which included validation of samples submitted for analysis to include at least one sample delivery group for each analytical method required for this site characterization. Level II data validation was performed on the remaining 89 MI soil samples including field triplicates. Level IV Data Validation Memorandums/Reports, Level II Data Validation Checklists, and analytical laboratory reports are included in Appendices C.1 to C.3.

5.0 Findings

5.1 Data Evaluation Criteria

MI soil analytical results for this investigation are compared to the current HDHO Tier 1EALs for sites with unrestricted land use, groundwater is a current or potential source of drinking water and a surface water body is located greater than 150 meters from the site (HDHO, 2017). If no EAL was available for an analyte, then EPA Region 9 Regional Screening Levels (RSLs) for residential soil were used.

5.2 Results of Multi-Incremental Sampling

5.2.1 Former Agricultural Area

A total of 68 MI samples (56 primary and 12 replicates) were collected from the former agricultural area. See Figure 3 for DU locations. Samples collected from the former agricultural area were analyzed for the following:

- OCPs by EPA Method 8081B
- Arsenic by EPA Method 6010

At the request of HDHO, two DUs from the former agricultural area (AG-DU20 and AG-DU21) were also analyzed for lead by EPA Method 6010. Sample AG-DU21 was also collected in triplicate. These two areas contained former historical structures (former school buildings) with lead-based paint, so lead was a COPC for these specific DUs.

OCPs, arsenic, and lead concentrations were detected in surface soil in the former agricultural area DUs. However, all concentrations were below the Tier 1 EALs.

See Table 1 for results summary of laboratory analysis from the former agricultural area.

5.2.2 Former MECO Plant

A total of 15 MI samples (11 primary and four replicates) were collected from the former MECO plant. See Figure 4 for DU locations. These samples were collected following the demolition of the former MECO Power plant and subsequent excavation and backfill (excavation details to follow in Section 8.0). Samples collected from the former MECO Power Plant were analyzed for the following:

- TPH-D by EPA Method 8015
- TPH-O by EPA Method 8015
- OCPs by EPA Method 8081B
- PCBs by EPA Method 8082
- Lead by EPA Method 6010

During demolition work, soil was observed to be stockpiled in the location of AG-DU39 which is immediately adjacent to the former MECO plant area and had been previously sampled.
such, a second MI sample was collected from AG-DU39 and analyzed for the MECO AOC suite of analyses.

TPH-D, TPH-O, OCPs, PCBs, and lead were detected in surface soil in the former MECO plant. Concentrations were below Tier 1 EALs and EPA RSLs except for the following:

- Sample MECO-DU1 resulted in a concentration of 223 mg/kg TPH-D.
- Sample MECO-DU2 resulted in concentrations of 1,320 mg/kg TPH-O and 290 mg/kg lead.
- Sample MECO-DU3 resulted in concentrations of 416 mg/kg TPH-D, 1,810 mg/kg TPH-O, and 638 mg/kg lead.
- Sample MECO-DU4 resulted in concentrations of 263 mg/kg TPH-D, 1,630 mg/kg TPH-O, and 735 mg/kg lead.
- Sample MECO-DU5 resulted in concentrations of 277 mg/kg TPH-D and 440 mg/kg lead.
- MECO-DU9 resulted in a concentration of 1.37 mg/kg total PCBs.
- MECO-DU11 resulted in a concentration of 637 mg/kg lead.

No exceedances of Tier 1 EALs or EPA RSLs were detected from the resampling of AG-DU39.

See Table 2 for the results summary of laboratory analysis of the former MECO Power Plant and AG-DU39.

5.2.3 Former Storage Area

A total of 16 MI samples (14 primary and two replicates) were collected from the former MECO plant. See Figure 9 for DU locations. Samples collected from the former storage area were analyzed for the following:

- TPH-D by EPA Method 8015
- OCPs by EPA Method 8081B
- Arsenic by EPA Method 6010

TPH-D, OCPs, and arsenic concentrations were detected in surface soil in the former storage area DUs. However, concentrations were below the Tier 1 EALs and EPA RSLs.

See Table 3 for results summary of laboratory analysis of the former storage area.

5.2.4 Commercial Nursery

A total of six MI samples (four primary and two replicates) were collected from within the commercial nursery. See Figure 8 for DU locations. Samples from the commercial nursery were analyzed for the following:

- OCPs by EPA Method 8081B
- Arsenic by EPA Method 6010

OCPs and arsenic concentrations were detected in surface soil in the commercial nursery DUs. However, concentrations were below the Tier 1 EALs and EPA RSLs.

See Table 4 for completed results of laboratory analysis of the commercial nursery.

5.2.5 East Dirt Access Road

A total of four MI samples (two primary and two replicates) were collected from the east dirt access road. See Figure 8 for DU locations. Samples from the east dirt access road were analyzed for the following:

- OCPs by EPA Method 8081B
- Arsenic by EPA Method 6010
- Dioxins and Furans by EPA Method 8299A

OCPs, arsenic, dioxin and furan concentrations were detected in surface soil in east dirt access road DUs. However, concentrations were below the Tier 1 EALs and EPA RSLs.

See Table 5 for results summary of laboratory analysis for the east dirt access road.

5.2.6 Former Pesticide Shed

A total of five MI samples (three primary and two replicates) were collected from the former pesticide shed. See Figure 5 for DU locations. Samples from the former pesticide shed were analyzed for the following:

- SVOCs by EPA Method 8270
- TPH-D by EPA Method 8010
- OCPs by EPA Method 8081
- Triazine pesticides by EPA Method 8141A
- Propiconazole by EPA Method 8081A
- Carbamates by EPA Method 8321
- Chlorinated herbicides by EPA Method 8151A
- Arsenic and lead by EPA Method 6010
- Dioxins and furans by EPA Method 8299A

SVOCs, TPH-D, OCPs, carbamates, chlorinated herbicides, arsenic, lead, and dioxins and furans were detected in surface soil. Concentrations were below the Tier 1 EALs and EPA RSLs, except for the following:

- Sample PS-DU2 resulted in concentrations of 531 mg/kg TPH-D, 149 mg/kg arsenic, and 162 mg/kg bioavailable arsenic.

See Table 6 for results summary of laboratory analysis for the former pesticide shed.
5.2.7 Community Gardens

A total of 22 MI samples (18 primary and four replicates) were collected from the community gardens. See Figure 7 for DU locations. Samples from the community gardens were analyzed for the following:

- OCPs by EPA Method 8081A
- Arsenic by EPA Method 6010

OCPs and arsenic concentrations were detected in surface soil in the community garden DUs. However, concentrations were below the Tier 1 EALs and EPA RSLs.

See Table 7 for complete results of laboratory analysis for the community garden.

6.0 Site-Wide Stockpile Characterization

During the initial mobilization in October 2018 to perform the MI sampling outlined in the SAP, a total of 10 stockpiles were discovered throughout the Site restricting access to six proposed DUs within the former agricultural area AOC and two proposed DUs within the Commercial Nursery AOC. Four of the stockpiles were comprised of raw construction materials (gypsum and cinder) or mulch. Six of the stockpiles were generated from historical construction activities and contained a combination of soil, construction debris, and refuse. Therefore, sampling and analysis was necessary to properly characterize the soil before its relocation or disposal in accordance with HDOH requirements for an unrestricted site use designation, and the completion of the site characterization.

6.1 Field Activities and Laboratory Analysis

Samples from the site-wide stockpiles were collected using MI methods as outlined in HDOH HEER Guidance for Soil Stockpile Characterization and Evaluation of Imported and Exported Fill Material, dated October 2017. As per the HDOH guidance, each stockpile was approximately 100 CY or less, therefore each stockpile was to be treated as an individual DU. The MI samples were identified by their stockpile number (i.e., Stockpile 1 = SP-1, etc.) and thirty (30) increments were collected from each DU. Please see Figures 10A and 10B for the location of stockpiles sampled.

Samples were submitted to Enthalpy Analytical in Berkeley, CA and were analyzed for the following:

- TPH as Gas (TPH-G), TPH-D, and TPH-O by EPA Method 8015
- OCPs by EPA Method 8081
- Metals by EPA Method 6010/7174
- SVOCs by EPA Method 8270C
- Dioxins/Furans by EPA Method 8290

Based on field observations, two stockpiles (SP-6 and SP-7) were suspected to have been generated from soil excavated at the local service station. Therefore, these two stockpiles were also analyzed for:

- Volatile Organic Compounds (VOCs) by EPA Method 8260B

Copies of the laboratory reports and chain-of-custody records are provided in Appendix C.3.

6.2 Laboratory Analytical Results

The soil sample analytical results for this investigation were compared to the site characterization screening levels.

A total of six MI samples (one from stockpiles SP-1, SP-2, SP-6, SP-7, SP-9, and SP-10) were collected. Laboratory results were as follows:

- TPH-G, TPH-D, and TPH-O were detected in the soil samples collected. All concentrations were below the Tier 1 EALs.
- One VOC compound (bromomethane) was detected in one of the two samples analyzed for VOCs. This concentration is below the Tier 1 EAL. No other VOCs were detected in the two samples SP-6 and SP-7.
- Sixteen different OCPs were detected in the soil samples collected. All concentrations were below the Tier 1 EALs or EPA RSLs.
- Fifteen different metals were detected in the soil samples collected. All concentrations were below the Tier 1 EALs.
- Seven different SVOCs were detected in the soil samples collected. All concentrations were below the Tier 1 EALs or EPA RSLs. No other SVOCs were detected in the soil samples.
- Dioxins and furans were detected in the soil samples collected. All toxicity equivalency quotients (TEQs) were below the Tier 1 EAL.

Please see Table 9 for results summary of laboratory analysis for the Site-wide stockpile characterization.

7.0 Former MECO Power Plant Demolition and Excavation

Demolition and earthwork associated with the decommissioning of the former MECO Power Plant began in November 2018 and was performed by Ohana Environmental Construction, Inc (OECI). During the demolition activities around December 21, 2018, concrete footings were discovered beneath the structure. The footings were approximately 10 feet deep by 40 feet long, with spacing between approximately 4 feet wide. They were poured in a parallel position with the building.

Demolition continued by OECI with heavy equipment (excavator with hammer attachment and trencher) to remove the concrete footings. During the concrete removal, soil surrounding and between the footings was excavated and placed around the perimeter of the excavation. Based on results of previous assessment activities at the site, it was possible hydrocarbon-impacted soil was excavated from beneath the former MECO Power Plant building. A site visit with Pualana Lanai, OECI, and TRC on January 9, 2019 was held to determine safe entry into the
excavation for confirmation soil sampling, possible reuse of MECO site soils for backfill, and stockpile characterizaton

7.1 Excavation and Confirmation Sampling

Plant demolition and concrete excavation activities were completed on January 21, 2019. The corners of the excavation were located with a GPS and the excavation area was measured at approximately 4,122 square feet (See Figure 13). Post excavation soil management was recommended by TRC and a Soil Management Plan (SMP) was prepared and provided to Pulama Lanai and OECI on January 23, 2019. The SMP outlined the process for stockpile generation and air monitoring activities; stockpile sample collection procedures; proposed analytical methods to characterize the soil; and soil screening criteria to evaluate whether material is suitable for reuse on site or should be transported off site for recycling or disposal. A copy of this SMP is included in Appendix D.

A site visit was held on January 24, 2019, with TRC and OECI to evaluate the status of the excavation. It was determined the excavation could not be accessed safely by field personnel to collect excavation confirmation samples due to the potential for caving of side walls. The perimeter security fence did not allow for the required sloping of the excavation; therefore, the excavator was used to collect soil for incremental sampling.

On January 25, 2019, TRC collected MI samples with OECI operating an excavator with a 2-foot wide bucket. The following confirmation sampling DU's were sampled in the following order:

- Excavation floor – DU-EX1
- West Excavation Sidewall – DU-EX2
- South Excavation Sidewall – DU-EX3 (collected triplicate at this location)
- East Excavation Sidewall – DU-EX4
- North Excavation Sidewall – DU-EX5

For the excavation DU's, the excavator bucket scraped the top 4 to 6 inches of soil and increments were collected from within the top 12 inches of soil in the bucket and placed in a plastic Ziploc® bag. A total of 75 increments for approximately 30 grams per increment of soil were collected for each MI sample. For the excavation floor, the DU was split into two sections divided by east and west. In both sections, the excavator bucket collected soil from three rows (oriented east-west and each bucket was divided into 12 to 13 increments. For the east and west sidewalk DU's, the DU was split into six vertical sections, and each bucket was divided into 12 to 13 increments. For the north and south DU's, the sidewalks were split 38 (south) to 43 (north) vertical sections, and each bucket was divided into 1 to 2 increments. One primary and two field replicates were collected at DU-EX3.

A photoionization detector (PID) was used during sampling activities to monitor for potential VOCs. Only one detection from the excavator bucket of 0.1 parts per million (ppm) was observed from the southern sidewalk excavation, at approximately 32 feet from the southwest corner.

7.2 MECO Soil Stockpile Characterization

As it was unknown if the excavated soil has been impacted by petroleum hydrocarbons, the excavated soils were stockpiled for further characterization. On January 26, 2019, the stockpiles were staged at least four feet from the edge of the excavation and flattened to approximately four feet high to prepare the stockpiles for incremental sampling.

Soil was located around the perimeter of the MECO concrete footing excavation and had a total volume of approximately 500 CY. There were seven stockpiles (MECO-SP7 through MECO-SP17) at the site ranging from 36 CY to 128 CY (see Figure 13). Each stockpile was divided into three sampling zones (divided horizontally lengthwise) to collect 25 increments per layer, for a total of 75 increments per stockpile. Increments were collected from depths ranging from 3 inches to 36 inches from the surface of the stockpiles. One primary and two field replicates were collected from MECO-SP7. Increments were collected placed in a plastic Ziploc® bag, and 75 total increments of approximately 30 grams per increment of soil were collected. A PID was used to monitor sampling activities however, no measurable readings were detected.

7.3 Laboratory Analysis

A total of seven MI samples (five primary and two replicates) were collected from the excavation and nine MI samples (seven primary and two replicates) were collected from the stockpiles. See Figure 13 for DU and stockpile locations. Samples collected from the former MECO Power Plant were analyzed for the following:

- TPH-D by EPA Method 8015
- TPH-O by EPA Method 8015
- OCPs by EPA Method 8081B
- PCBs by EPA Method 1618
- Lead by EPA Method 6010

7.4 Laboratory Analytical Results

The soil sample analytical results were compared to Tier 1 EALs and EPA RSLs. Laboratory results were as follows:

Excavation Confirmation Samples

- TPH-D was detected in the confirmation soil samples collected. Sample DU-EX1 resulted in a concentration of 890 mg/kg, which exceeds the Tier 1 EAL. The remaining confirmation samples were below the Tier 1 EAL.
- TPH-O was detected in the confirmation soil samples collected. DU-EX1 resulted in a concentration of 890 mg/kg, which exceeds the Tier 1 EAL. The remaining confirmation samples were below the Tier 1 EAL.
- Eleven different OCPs were detected in the confirmation soil samples collected but did not exceed their respective Tier 1 EAL or EPA RSL.
- PCBs were detected in the confirmation soil samples collected but did not exceed the Tier 1 EAL.
Lead was detected in the confirmation soil samples collected but did not exceed the Tier 1 EAL.

**Soil Stockpile Characterization**

- TPH-D was detected in the stockpile samples collected. Samples MECO-SP1 and MECO-SP2 resulted in concentrations of 2,700 mg/kg and 610 mg/kg, respectively. These concentrations both exceed the Tier 1 EAL for TPH-D. The remaining stockpile samples were below the Tier 1 EAL.
- TPH-O was detected in the stockpile samples collected. Samples MECO-SP1 and MECO-SP2 resulted in concentrations of 920 mg/kg and 630 mg/kg, respectively. These concentrations both exceed the Tier 1 EAL for TPH-O. The remaining stockpile samples were below the Tier 1 EAL.
- Fifteen different OCPs were detected in the confirmation soil samples collected but did not exceed their respective Tier 1 EAL or EPA RSL.
- PCBs were detected in the confirmation soil samples collected but did not exceed the Tier 1 EAL.
- Lead was detected in the confirmation soil samples collected but did not exceed the Tier 1 EAL.

Please see Table 10 for results summary of laboratory analysis of the excavation and stockpile characterization samples.

**7.5 Excavation and Backfilling**

Following completion of the sampling and after conferring with HDOH personnel, the excavation was backfilled with the soil originally removed from beneath the former MECO Power Plant and soil located in the Site-wide stockpiles north of the Commercial Nursery (see Section 7.0). Stockpiles MECO-SP1 and MECO-SP2 were utilized first and placed at a depth of approximately 30 feet bgs. The other five MECO stockpiles were then added to the excavation. The remainder of the excavation was backfilled using soil from north of the commercial nursery, which was screened and cleared of construction debris to conform with the HDOH guidelines for acceptable fill (i.e., soil with inert materials [concrete, brick, other debris] less than eight inches in diameter).

**8.0 Former Pesticide Shed Additional Site Assessment and Removal Action**

Laboratory analysis of the surface MI Sample PS-DU2 resulted in concentrations of 531 mg/kg for TPH-D and 149 mg/kg for arsenic, which both exceed the Tier 1 EAL for their respective analytes. Based on the exceedances at the Pesticide Shed AOC, a removal action was implemented to excavate impacted soil at PS-DU2.

**8.1 Discrete-Depth Sampling**

Prior to the implementation of the removal action, two hand-auger borings were advanced within PS-DU2 to guide the depth of the excavation. Discrete-depth soil samples were collected on one-foot intervals to a total depth of 5 feet bgs and analyzed for TPH-D and arsenic. Laboratory analysis of these samples indicated concentrations of TPH-D and arsenic exceeding Tier 1 EALs were limited to the surface of the PS-DU2 (see Table 8 for results summary of the discrete-depth samples).

**8.2 Excavation and Confirmation Sampling**

Based on results of the discrete-depth samples, the removal action was implemented at PS-DU2 beginning April 1, 2019. A wooden canopy located in this DU was removed and the area was excavated to a total depth of approximately 2.5 ft bgs. A total volume of approximately 25 CY was removed and directly loaded into an onsite container for disposal. Following completion of the excavation, confirmation soil sampling was performed on the base and the sidewalls of the excavation and confirmation MI samples were collected.

A total of seven MI samples of 30 increments each were collected following the excavation. One primary sample and two replicates were collected from the base of the excavation and one sample was collected from each of the four sidewalls.

Samples were submitted to SGS Laboratories in Orlando, Florida and were analyzed for the following:

- TPH-D by EPA method 8015
- Arsenic by EPA Method 8010

The confirmation soil sample analytical results following the removal action were compared to the Tier 1 EALs and confirmation sampling results were all below the Tier 1 EALs for TPH-D and arsenic. See Table 10 for results summary from the former Pesticide Shed removal action and Appendix C-3 for copies of the laboratory reports.

**8.3 Excavation Backfilling**

Following completion of the confirmation soil sampling, the excavation at the former Pesticide Shed was backfilled to grade using soil taken from the Site-wide stockpiles located to the north of the Commercial Nursery which was screened and cleared of construction debris to conform with the HDOH guidelines for acceptable fill (i.e., soil with inert materials [concrete, brick, other debris] less than eight inches in diameter). This soil was sampled prior to use with no exceedances over Tier 1 EALs (see Section 7.0).

**9.0 Conceptual Site Model**

The CSM for the Site has been updated based on the results of the investigation conducted and available historical information for the Site. The elements of the CSM are described in the subsections below.
9.1 Site Land Use

The Site is located in a mixed-use area that has included agricultural, industrial, and residential. Land use within the Site boundary (see Figure 2) has consisted of the following:

- Historically occupied by a former:
  - Agricultural area used for pineapple growing fields
  - Emulsion Plant
  - MECO Power Plant
  - Pesticide Shed
  - Storage Area/Concrete Batch Plant

- Currently occupied by the following:
  - Commercial Nursery
  - Community Gardens
  - Quonset shed used by DLNR
  - Hawaii Gas Company
  - Open Space

The current and reasonably anticipated land use for the Site is unrestricted/residential use.

9.2 Contaminants of Potential Concern

In this report, COPCs are defined as those compounds with concentrations above the Tier 1 EAL or EPA RSLs. Based on investigation and confirmation sampling results, the COPCs at the Site are the following: TPH-D, TPH-O, PCBs, and Lead.

9.3 Sources of Contamination

Based on the historical data and data collected during this investigation, the most likely sources of impacts at the Site are the former USTs located at the former MECO Power Plant, historical power plant operations, and historical agricultural operations at the former Pesticide Shed. While trace levels of other contaminants were detected throughout the site, no other COPCs were detected in the remainder of the Site at concentrations above their designated Tier 1 EAL or EPA RSL.

9.4 Transport Mechanisms

Transport mechanisms for COPCs found in soil from the surface and approximately 10 feet bgs at the Site include the following:

- Leaching of COPCs from surface/subsurface soil to deeper soil
- Leaching of COPCs from subsurface soil to groundwater

9.5 Potential Receptors and Exposure Pathways

Based on current and reasonably anticipated future land use of the Site and the investigation results, potentially complete exposure pathways exist for the following human and ecological exposure scenarios:

- Future hypothetical residents: Potential exposure of hypothetical residents to COPCs in surface soil and subsurface soil (down to 10 feet bgs) could occur by incidental ingestion, dermal contact, and inhalation of soil particles if contaminated soil was removed and reused outside the proposed Hokuao Housing project in a residential area.
- Trespassers/recreational users: Potential intermittent exposure of trespassers and recreational users to COPCs in surface and subsurface soil (down to 1 feet bgs) could occur during project construction by incidental ingestion, dermal contact, and inhalation of soil dust particles.
- Construction workers: Exposure of construction workers to COPCs in surface and subsurface soil (down to construction depths estimated to be shallow subsurface) could occur during project construction by incidental ingestion, dermal contact, and inhalation of soil dust particles.
- Ecological Receptors: Since the Site is located greater than 150 meters from surface water bodies, no aquatic ecological receptors would be impacted. There are no known terrestrial ecological habitats in the immediate vicinity of the site and the site has historically been located in an area used for commercial agricultural operations. Anticipated future use does not include plans that would be conducive to terrestrial or ecological habitats and/or use by endangered species.

10.0 Environmental Hazard Evaluation

The Environmental Hazard Evaluation (EHE) process was developed by HDOH to serve as a link between site investigation activities and the proposed remedial response activities to be undertaken and evaluated. The EHE is intended to identify potential environmental hazards associated with contaminant concentrations in site media through comparison with DOH EALs established for common environmental hazards. This section evaluates potential hazards associated with COPC concentrations in soil at Site.

10.1 Soil Evaluation

Soil analytical data were compared to the appropriate Tier 1 EALs for the following potential hazards:

- Gross contamination
- Leaching to groundwater
- Human direct exposure

Drinking water resources EALs are not considered in this evaluation because the aquifer system beneath the Site is anticipated to be at a depth of 600 feet bgs or greater and the COPCs detected in soil are not volatile. Additionally, as discussed in Section 9.5, the Site is proposed to be redeveloped and no terrestrial ecological receptors would be present at the Site. Therefore,
soil terrestrial ecotoxicity EALs do not apply for the Site. As the proposed Site development is for residential, the land use/exposure scenarios evaluated for this EHE are for unrestricted land use and a construction/trench workers scenario. Outcomes of the EHE for soil are discussed below and are summarized in Table 11.

10.2 Gross Contamination

Gross contamination of soil generally refers to the presence of LNAPL, offensive odors, unesthetic appearance, general resource degradation, and generation of explosive vapors (HDOH, Fall 2017). Soil data were initially compared to gross contamination EALs for “Exposed or Potentially Exposed Soil” provided as Table F-2 in the HDOH EAL Surfer (HDOH, Fall 2017). Additional evaluation was then conducted based on field observation of soils encountered during the site investigation.

Based on comparison to gross contamination EALs (Table 10 and Table 11), surface soil samples from MECO-DU2, MECO-DU3, MECO-DU4, and MECO-DU11 were flagged as posing potential gross contamination hazards under a hypothetical residential scenario because they exceed the TPH-O EALs of 500 mg/kg. Additionally, the soils sampled during the MECO excavation (excavation base and impacted stockpiled soil placed at 10 feet bgs) also exceed the gross contamination EALs for TPH-D and TPH-O. No other samples throughout the Site resulted in concentrations exceeding gross contamination EALs for soil.

Light Non-Aqueous Phase Liquids

No evidence of LNAPL (i.e., petroleum-saturated soil or strong odor/staining) was observed during soil sampling activities at any of the DUs throughout the site.

Odor Concerns

No odor concerns were observed during the soil sampling activities at any of the DUs throughout the site.

Unesthetic Appearance and General Resource Degradation Concerns

Based on no staining, odor or other unesthetic appearance, surface soil contamination at the site has not caused any resource degradation concerns at any of the DUs throughout the site.

Explosive Vapor Concerns

The COPCs in soil at the Site are not volatile. Therefore, no explosive vapor concerns exist at the Site.

Summary of Gross Contamination Concerns

It is concluded that gross contamination concerns in soil at the Site are limited to the area within the former MECO Power Plant where elevated levels of TPH-O were detected in soil samples from four DUs.

10.3 Leaching to Groundwater

Soil data were compared to the leaching EALs (Table E in the HDOH EAL Surfer, HDOH, Fall 2017) to evaluate whether contaminants in the soil could potentially leach to groundwater. As shown in Table 11, this evaluation resulted in the flagging of MECO-DU2, MECO-DU3, and MECO-DU4 from the surface soil and MECO-SPI from the excavation stockpiles as posing potential leaching concerns due to exceedances of TPH-D or TPH-O. The determination of leaching potential from soil impacts from lead should ultimately be determined by laboratory analysis using the toxicity characteristic leaching procedure (TCLP) which was not performed in this investigation. However, with a depth to groundwater of at least 520 feet bgs or greater, it is unlikely that concentrations of TPH-D, TPH-O, or lead in soil is impacting groundwater beneath the site.

10.4 Direct Exposure

Soil data were compared to the direct exposure EALs (Table I-1 in the HDOH EAL Surfer; HDOH, Fall 2017) to evaluate whether contaminants in soil potentially pose risks to human health by direct contact. Table I-1 in the HDOH Guidance provides EALs based on a target risk of 1E-6 for carcinogenic compounds, soil saturation levels, risk with target hazard quotient (HQ) of 0.2 (0.5 for TPH), or risk with a HQ of 1.0 for non-carcinogenic compounds.

As shown in Table 11, this evaluation resulted in tagging of seven DUs within the former MECO Power Plant AOC from Table 10 as posing potential direct exposure hazards under the current and reasonably anticipated residential scenario due to exceedances of these COPCs (TPH-D, TPH-O, lead, and/or PCBs). The concentrations from the surface soil do not exceed the direct exposure EALs for construction or trench workers.

Additionally, three MI samples collected during the MECO excavation (base of excavation and stockpiled soil placed at 10 feet bgs) have exceedances of the direct exposure EAL and construction worker exposure EAL for TPH-D. However, as this soil is located at 10 feet bgs it will not likely be encountered as during the redevelopment activities or by future residential occupants.

As previously discussed, these results are likely related to historical power plant operations and the former USIS located within this AOC. The remaining samples collected from the former MECO Power Plant and other Site AOCs resulted in concentrations below unrestricted use EALs for human direct exposure.

11.0 Environmental Hazard Management Plan

The EHE, described in Section 10.0, identified potentially unacceptable risks and hazards in soil including human direct exposure and gross contamination, and these potential risks must be addressed through an Environmental Hazard Management Plan (EHMP). This site-specific EHMP describes the proposed strategy for management of contaminated soil at the Site.

11.1 Summary of Environmental Hazards
Based on the site investigation data and the EHE, it is concluded that while most of the Site poses no environmental hazards for a proposed residential development, potential gross contamination, direct exposure concerns (including construction worker exposure), and potential leaching concerns are isolated to the former MECO Power Plant AOC within the surface soil and also at a depth of 10 feet bgs at the location of the MECO excavation. Soil impacts discovered within the former Pesticide Shed AOC were subsequently removed during the removal action and therefore pose no remaining hazard. As discussed in Section 6.0, site-wide stockpiles of soil and debris were also confirmed to have no exceedances of Tier 1 EALs for any COPCs.

The environmental concerns requiring either corrective action or long-term management in the former MECO Power Plant area are summarized as follows:

**Direct human exposure hazard in surface soil (0 to 0.5 feet bgs) under a residential scenario:**
- MECO-DU1
- MECO-DU3
- MECO-DU4

**Gross contamination hazards in surface soil (0 to 0.5 feet bgs) under a residential scenario:**
- MECO-DU2
- MECO-DU3
- MECO-DU4

**Leaching hazard in subsurface soil (10 feet bgs):**
- Soil from MECO Excavation (DU-EX1 [excavation base], MECO-SP1, and MECO-SP2)

### 11.2 Site Controls Implementation and Management of Contaminated Media

Based on planned future use of the Site, the environmental hazards and concerns identified above require either corrective action (i.e. excavation) or land use controls (LUCs) combined with long-term management of contaminated soil during construction and future Site activities.

Construction activities that pose a potential risk of exposure for construction workers to contaminated soil or dust (such as grading of soil) must be supervised by properly trained and certified personnel. Personnel working in areas where there is potential for direct contact with contaminated media shall have current 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) certification and annual 8-hour HAZWOPER refresher training. The contractor’s written health and safety plan will also be required to identify HAZWOPER-

### 11.2.1 Former MECO Power Plant

The area of the Former MECO Power Plant is included in the proposed construction of the Site into a residential development. Therefore, prior to the onset of construction, it would be necessary to remove or remediate this soil from the affected DUs to meet the HDOH requirements for unrestricted (residential) use. The table below summarizes the affected DUs and proposed soil removal action.

#### Summary of Surface DUs

<table>
<thead>
<tr>
<th>DU</th>
<th>Unrestricted Scenario Hazard Concern</th>
<th>COPC</th>
<th>Appx. Volume per Foot (cubic ft)</th>
<th>Appx. Volume per Foot (CY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MECO-DU1</td>
<td>Direct Human Exposure</td>
<td>TPH-D</td>
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<td>82</td>
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<tr>
<td>MECO-DU2</td>
<td>Gross Contamination and Direct Exposure</td>
<td>TPH-D and Lead</td>
<td>4,725</td>
<td>180</td>
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<tr>
<td>MECO-DU3</td>
<td>Gross Contamination and Direct Exposure</td>
<td>TPH-D, TPH-O, and Lead</td>
<td>1,575</td>
<td>58</td>
</tr>
<tr>
<td>MECO-DU4</td>
<td>Gross Contamination and Direct Exposure</td>
<td>TPH-D, TPH-O, and Lead</td>
<td>4,035</td>
<td>150</td>
</tr>
<tr>
<td>MECO-DU5</td>
<td>Direct Exposure</td>
<td>TPH-O and Lead</td>
<td>2,475</td>
<td>92</td>
</tr>
<tr>
<td>MECO-DU9</td>
<td>Direct Exposure</td>
<td>PCBs</td>
<td>3,300</td>
<td>122</td>
</tr>
<tr>
<td>MECO-DU11</td>
<td>Gross Contamination</td>
<td>TPH-O</td>
<td>2,280</td>
<td>85</td>
</tr>
</tbody>
</table>

Soil impacts may be localized within these DUs and a focused assessment within each area may lead to the detection of isolated impacts ("hotspots"). Additionally, as the depth of impacted soil is unknown, discrete-depth sampling should be performed prior to any removal action in affected DUs to guide the limits of the excavation. Once the removal is complete, confirmation soil samples completed using MI sampling methods would be required to verify the effectiveness and completeness of the removal action.
12.0 Conclusions and Recommendations

This report documents the site characterization investigation conducted from October 2018 to April 2019 for the proposed Lanai City Expansion located in Lanai City, Hawaii. The Site is being evaluated for possible redevelopment for residential use with up to 100 single family homes and other multi-family units to be constructed, as well as parks and open spaces.

Per the HDOH TGM (HDOH, 2017), the site characterization was completed on various sized DU's utilizing a multi-increment (MI) sampling approach. With the exceptions of the former MECO Power Plant and the former Pesticide Shed, the results of the MI sampling analyses indicated residual levels of COPCs are not present in surface soil at concentrations above Tier 1 EALs for unrestricted site use.

Additionally, in the course of the investigation, ten stockpiles were discovered throughout the Site restricting access to DU's within the former agricultural area and commercial nursery AOCS. Four of the stockpiles contained raw materials (gypsum, cinder, mulch) and six were comprised of soil, construction debris, and refuse. Sampling and analysis were necessary to properly characterize the soil before its relocation or disposal in accordance with HDOH requirements for an unrestricted site use designation. Concentrations of COPCs from the sampled stockpiles were below HDOH Tier 1 EALs for unrestricted site use.

During the initial mobilization in October 2018 to perform the MI sampling outlined in the SAP, a total of 10 stockpiles were discovered throughout the Site restricting access to six proposed DU's within the former agricultural area AOCS and two proposed DU's within the Commercial Nursery AOCS. Four of the stockpiles were comprised of raw construction materials (gypsum and cinder) or mulch. Six of the stockpiles were generated from historical construction activities and contained a combination of soil, construction debris, and refuse. Therefore, sampling and analysis was necessary to properly characterize the soil before its relocation or disposal in accordance with HDOH requirements for an unrestricted site use designation, and the completion of the Site characterization.

Concentrations of TPH-D and arsenic were reported in the MI sample from one DU at the former Pesticide Shed. After delineating possible vertical impacts, the impacted DU was excavated to a total depth of approximately two feet bgs and MI samples were collected from the base and sidewalls of the excavation to confirm the effectiveness of the removal action. Results of the confirmation sampling indicated remaining concentrations of TPH-D and arsenic were below Tier 1 EALs for unrestricted use.

During the demolition of the former MECO Power Plant, concrete footings were discovered emplaced beneath the building's structure. While removing the concrete footings, soil surrounding the footings was excavated and placed around the perimeter of the excavation. Confirmation soil samples (including one triplicate) were collected from the base and the sidewalls of the rectangular excavation. Additionally, seven stockpiles of excavated soil totaling approximately 500 CY were sampled for characterization of COPCs associated with the former MECO Power Plant AOCS. Concentrations of TPH-D and TPH-O exceeding Tier 1 EALs for unrestricted use were present at the base of the excavation (approximately 10 feet bgs) and from two of the seven stockpiles. No other Tier 1 EAL exceedances were reported for other COPCs in the samples from the excavation or the stockpiles. Following discussions between

HDOH and Pulama Lanai, it was decided to return the soil to the excavation. The hydrocarbon-impacted soil was placed at 10 feet bgs, followed by the remainder of the soil from MECO which was below the Tier 1 EALs. The remainder of the excavation was backfilled with soil from a stockpile located north of the Commercial Nursery which had also been characterized with results below Tier 1 EALs and screened of debris prior to being used.

Following the completion of the plant demolition and backfill, the surface MI sampling was performed within the former MECO Power Plant AOCS. An additional MI sample was also collected from AG-DU39 at this time as soil excavated from the former MECO Power Plant had been staged within this DU following its original sample collection (resample concentrations were below Tier 1 EALs). Laboratory analysis of surface soil from the former MECO Power Plant resulted in concentrations of TPH-D, TPH-O, lead, and/or PCBs present at levels exceeding HDOH Tier 1 EALs for unrestricted use in seven DU's. These concentrations resulted in hazards both for gross contamination and direct human exposure based under the current and reasonably anticipated residential scenario.

With the exception of the former MECO Power Plant AOCS, the remainder of the Site has been fully assessed for the purposes of residential redevelopment based on the results of this investigation. Concentrations of COPCs identified in the Final Sampling and Analysis Plan (TRC, 2017) for each of the AOCS are either below HDOH Tier 1 EALs, EPA RSLs, or below laboratory detection limits. To proceed with the proposed residential development as planned, it is recommended impacted soil from the DU's within the former MECO Power Plant AOCS undergo additional focused assessment and a removal action to adequately mitigate the hazards identified during this investigation. Additionally, hydrocarbon-affected soil at 10 feet bgs within the former MECO Power Plant excavation should be assessed for possible vapor migration to the surface and to confirm there are no vapor migration risks to human health.
13.0 References

Commission on Water Resource Management (CWRM), Department of Land and Natural Resources (DLNR), State of Hawaii, 1996, A Numerical Ground-Water Model for the Island of Lana'i, Hawaii, April.


ETC, 2015, Draft Site Investigation Report, Fraser Development Site, TMK (2) 4-19-15: Parcel 9 (portion), Lanai City, Lanai, Hawaii, June.


Pulama Lanai, 2017, Personal Communication with Kepa Maly, Senior Vice President of Culture & Historic Preservation, regarding the Former Storage Area, via email October 16.

Steams, Harold T., 1940, Geology and Ground-Water Resources of the Islands of Lanai and Kahoolawe, Hawaii.

TRC, 2016a, Draft Phase I Environmental Site Assessment, Lanai City Expansion, 200 Housing Units, Lanai City, Hawaii, June 29.

TRC, 2016b, Draft Site Assessment Report, Lanai City Expansion, 200 Housing Units, Lanai City, Hawaii, November 3.

TRC, 2017, Final Sampling and Analysis Plan, Lanai City Expansion, Lanai City, Hawaii, December 5.


APPENDIX A
Field Data Sheets and Site Photos (USB Flash Drive)

APPENDIX B
Decision Unit GPS Coordinates
APPENDIX C
Laboratory Analysis and Data Validation

APPENDIX C.1
Level IV Data Validation Memorandums/Reports
APPENDIX C.2
Level II Data Validation Checklists

APPENDIX C.3
Laboratory Analytical Reports (USB Flash Drive)
APPENDIX D

Former MECO Power Plant Soil Management Plan Site Plan
STATE DEPARTMENT OF HEALTH HAZARD EVALUATION AND EMERGENCY RESPONSE OFFICE LETTER ON SITE CHARACTERIZATION REPORT

APPENDIX

G-1
March 23, 2021

Transmitted via e-mail to: JSwope@trccompanies.com

Jon Swope
TRC
1600 Kapiolani Blvd, Suite 717
Honolulu, HI 96814

Facility/Site: Lanai City Expansion 200 Housing Units, iHeer ID 1213


Dear Mr. Swope,

The Hawaii Department of Health (HDOH), Hazard Evaluation and Emergency Response (HEER) Office has reviewed the subject report and has no additional comments at this point. HDOH HEER is looking forward to receiving the Removal Action Completion Report (RACR) once all removal has been completed.

If you have any questions regarding the project, feel free to contact me at 808-586-4653 or iris.vanderzander@doh.hawaii.gov.

Sincerely,

Iris van der Zander, Ph.D.
Remedial Project Manager
Hazard Evaluation and Emergency Response Office
Hawaii Department of Health

cc: Sharon Thom (via e-mail)
    Deb Rosenblum (via e-mail)
    Bart Ashley (via e-mail)
    Fenix Grange (via e-mail)
MARKET STUDY ECONOMIC INCOME ANALYSIS & PUBLIC COST BENEFIT ASSESSMENT
Dear Ms. Thom:

At your request, we have completed a series of market and econometric analyses associated with the proposed Hokuao 201-H Housing project, a 150-house single family subdivision to be set on some 76 acres of currently vacant land southwesterly adjacent to and downhill from the existing village core of Lanai City, Lanai Island, Maui County, Hawaii. The site is identified on State of Hawaii Tax Map Key as (2) 4-9-002:061(por), (2) 4-9-014:001(por), and (2) 4-9-014:009(por). The site is currently classified for agricultural use and Urban for the SLUD; Agricultural, Interim, Active Open Space, and Open Space for County Zoning, and Mixed Use Residential, Park, Public/Quasi Park, and Open Space in the Lanai Community Plan (2016).

The project will be fully offered as “for rent” residential homes for Lanai residents, which the developer plans to own and operate on a long-term basis.

The current master plan includes:

- 76 workforce “affordable-rent” two-bedroom homes averaging 1,080 square feet of living area and 327 square feet of Lanai on 8,000 square foot lots.
59 “market-rent” two-bedroom homes averaging 1,080 square feet of living area and 327 square feet of Lanai on 8,000 and up square foot lots.

15 “market-rent” four-bedroom homes averaging 1,858 square feet of living area, 470 square feet of Lanai, and 250 square foot garage, on 10,000 to 12,000 square foot lots.

A 1.0-acre improved park with 1,500 square foot community center (for use by Lanai City events), and 60 surface, striped parking stalls for Hokuao residents.

The workforce inventory will be offered for long-term tenancy at rents meeting County/HUD affordability pricing guidelines. The market-rent component will be leased at competitive price. No Transient Vacation Rentals will be permitted, nor Accessory Dwelling (Ohana) units in the near-term. Pulama Lanai will own, manage and maintain the homes and common areas/landscaping of the project using centralized services. Renters will be responsible for all utilities and grounds maintenance of their lots.

The map below displays the master plan for Hokuao with some 150 homes.

It is our understanding that the new neighborhood would be entitled as a Maui County “201H” project designation requiring that more than 50 percent of the inventory meet affordability guidelines.

As a result, portions of our assignment scope and presentation are more-oriented towards County-based issues. Our summary report is suitable for inclusion into an Environmental Assessment or Environmental Impact Statement submitted for County of Maui review quantifying the market demand and resulting economic and public fiscal impacts associated with the implementation of the proposed master plan.

Our study consists of the following three general components:

1. **Market Study.** This analysis included an overview of the Lanai economy focusing on the residential real estate market sector; and, forecast demographic and land use trends over the coming 15+ years (through 2035).
   
   We quantified the demand for the workforce (affordable) and market single family product on Lanai homes using methods appropriate, identified existing and proposed competing supply, determined the appropriateness of the property to support the proposed project components; and, estimated subject inventory absorption over time.
   
   The location of the proposed Hokuao project nearby an existing wastewater treatment plant and its potential effect on product desirability, home pricing and absorption was also a consideration.
   
   We also surveyed prominent Lanai/Maui County community members, real estate brokers and other market participants.

2. **Economic Impact Analysis.** This analysis used a micro-econometric model depicting the project from ground-breaking through construction build-out, lease and “stabilization” quantifying the flow of capital investment, creation of jobs/wages during construction and stabilized operations/use projection of resident and de facto population, on- and off site tenant expenditures, and other aspects of impact in the community.

   We also analyzed the impact of the project using the State of Hawaii “Inter-County Input-Output Economic Model,” a macro-economic application.

3. **Public Fiscal (Cost/Benefit) Assessment.** This assessment quantified the favorable impacts the project will have on the County and State purses by forecasting the tax revenues (primary and secondary) created by the development and its population.

   During the course of study, the COVID-19 Pandemic and resulting trans-pacific quarantine on travel to Hawaii has resulted in the virtual closure and massive unemployment in the Statewide tourism and restaurant industries; with Lanai being particularly hard-hit. This skew all short-term
economic analysis due to uncertainties as to when the islands will “re-open” and what impacts it will have as it recovers over the next several years.

However, most consider the viral outbreak to be a passing event with a vaccine or effective treatments and testing available for wide-spread distribution within a year; before the first homes are constructed and completed at Hokuao by the end of 2022.

Our projections extend to 2035, following historic/market statistics over a long-term horizon; hopefully well past any lingering COVID concerns.

Pandemic concerns and impacts are discussed throughout the report as it helps establish a current perspective, but our focus has been on data-trending since 1980 and anticipated future evolutions, while recognizing continuing economic disruptions for several years.

CBRE - VALUATION & ADVISORY SERVICES

Tom Holliday, CRE, FRICS
Director
Phone: (808) 541-5120
Email: Tom.Holliday@cbre.com

Benjamin Holliday
Senior Valuation Associate
Hawaii Appraiser Trainee, REAT-1349
Phone: (808) 497-1006
Email: Benjamin.holliday@cbre.com
INTRODUCTION

The CBRE, Inc. assignment was to analyze the proposed “for rent” Hokuao 201-H Master Planned community from a real estate market perspective and to identify and quantify probable market and economic impacts associated with the master plan in light of competitive, regional, prevailing and forecast trends in order to answer five basic study questions:

1. Is there sufficient demand to absorb the 76 “workforce/affordable-rent” and 74 “market-rent” single family homes within the Hokuao community during a reasonable exposure period given competing developments and projected island/statewide/regional market trends?

2. Is the project an appropriate use of the underlying site relative to market needs, standard land planning objectives, accepted master plan design characteristics, and the area environs?

3. What will be the general/specific and direct/indirect economic impacts on Lanai resulting from the undertaking of the Hokuao development via employment, wages, business operations, population, property values and other economic activity related to the real property asset?

4. What will be the benefits to the state and county ‘public purse’ from the project from tax/fee receipts?

5. What is the opinion of Lanai City community members and real estate professionals of the project and the need for its development?

These issues were addressed through a comprehensive research and inquiry process utilizing data from market investigation, governmental agencies, various Hawaii-based media, industry spokespersons/sources, on-line databases, survey/interviews, published public and private documents, and our files.

We have also considered the near-term impacts of the continuing COVID Pandemic on the Lanai economy and real estate market anticipating an effective vaccine/treatment or testing regimen allows for wide-spread re-opening and recovery commencement by mid to late-2021, with full ramp-up and stabilization in 2022-23. An outcome of the study was a lessening of interest in land entitlement and real estate issues as attention is focused elsewhere.
The pertinent results of our study are highlighted in the following summary report which contains brief narrative, tabular data and other materials contributing to our conclusions. The presentation is divided into eight sections:

1. **Primary Study Conclusions**
2. **The Subject Property and Proposed Project**
3. **Market Study of the Lanai Residential Sector**
4. ** Appropriateness of the Lanai Lands for the Proposed Residential Uses and Absorption Estimates**
5. **Analysis of the Economic Impacts of the Hokuao Developments**
6. **DBEDT 3rd Quarter Economic Projections**
7. **Assessment of the New Public Fiscal Impact Benefits Associated with the Project**
8. **Public Opinion of the Proposed Development**

The primary source information regarding the subject used in our study were:

- Maps, master plans, unit counts, density estimates and background materials provided by Pulama Lanai, and other members of the planning team;
- Infrastructure cost estimates (on and off-site) previously completed for Hokuao and actual and budgeted costs for recently-developed and proposed neighbor island developments;
- Maui County Lanai Community Plan ordinance 4343 (2016);
- Resident population and housing projections, proposed development and other maps, community plan materials, and other data from the County of Maui Planning Department and State of Hawaii Office of Planning;
- The United States 2010 Census and subsequent updates through 2018;
- Sales and listing data from the Maui Board of Realtors (Multiple Listing Service) and Hawaii Information Service; and,
- Data from published and on-line sources and from our files.

The Hokuao site and environs have been viewed by our firm on several occasions and we have completed appraisal and consulting assignments regarding the holding on several occasions over the past three decades.

Our Market Study time-frame which serves as a basis for subject absorption projections extends approximately 15+ years, from mid-2020 through 2035, although it is anticipated all of the homes, will be absorbed by the market in a shorter period. The demand for single family homes on Lanai is quantified during this period, existing, planned competitive supply is identified, the appropriateness of the site for the proposed subdivision is analyzed, and absorption is estimated using several market-based methods.

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### Market Study

- **Primary Study Conclusions**
  - Entitlements and approvals will be achieved during 2020-21;
  - Infrastructure emplacement will take place in 2021, and pre-leasing will commence;
  - Lease-up and build-out of finished single home product over the following 8 years (2022-2029);
  - Reaching stabilized community “operations” in 2030 (and beyond).

This time-frame effectively depicts the life-span of Hokuao from today, through final entitlement, ground-breaking, absorption/build-out, and its eventual functional “stabilization.”

Primary and direct secondary capital/economic outcomes from the development of Hokuao are quantified in two five-year periods, 2021-2025 and 2026-2030 (no meaningful activity at the site is anticipated during the remainder of this year). We forecast the de facto population in the community and associated income and spending with the resultant taxes flowing to the County and State estimated.

We have also tested our econometric model outcomes against the formulae within the State DBEDT “2012 Hawaii Inter-Island Input-Output Model” (approved August 2016).

It is noted, our economic and fiscal models are not specifically time-sensitive as all dollar amounts are expressed in constant 2020 dollars. Should the project timeline move several years in either direction from the modeling period we would not anticipate major changes to our stated conclusions.

### PRIMARY STUDY CONCLUSIONS

Based on our analysis of the subject property, its environs, and envisioned development we have reached the following conclusions as of the Third Quarter of 2020 regarding the probable market standing and economic impacts of the proposed Hokuao community.

#### Market Study

- Prior to the onset of the COVID-19 Pandemic, the State of Hawaii had steadily rebounded from the 2008-09 recession and associated down-cycle in the real estate market with an extended-term favorable economic period featuring gradually and consistently strengthening property sectors. Sales activity, volume, and prices all showed meaningful past-recession recovery/stabilization on Lanai; in many cases reaching near to full recovery to the levels achieved during the 2004-07 peak market years. The state economy had one of its best years ever in 2019 and the first three months of 2020 were showing signs of an even stronger year. However, the global pandemic has erased any economic gains of 2020 and has pushed the state into a recession due to a state mandated 14-day quarantine.
- The July unemployment rate on Lanai was at 4.8 percent (near peak recession levels), and some 752 employees of the Four Season Lanai were issued furlough and lay-off notices in...
As with most in Hawaii, the Lanai residential real estate market has generally weathered the COVID Pandemic well, a function of generationally-low mortgage interest rates, chronic housing shortages, and limited inventory. 2020 is on pace to have the highest single family “Sales volume” (total dollars spent) since record-setting 2014; the “number of sales” for the year will be well-above annual averages for the past decade; and stable; and, relatively-high median prices are being maintained.

Lanai City is the focal point of the Lanai economy and community, with more than 90 percent of the resident population and three-quarters of the economic activity. It is now home to one of the most exclusive and expensive destination resort communities in the world with a reputation for quality. And, the recently refurbished and re-positioned Sensei Retreat is an ultra-luxury, personal experience. This trend toward upscale visitor inventory has drawn visitors to the island will remain after the event fades away; sun, beaches, dry warm weather, and a low intensity, retreat ambience. The latter of which should assist recovery to the inventory, and appreciation (though cyclical) continues.

Although stymied by the economic limitations of scale and orientation, we project the Lanai economy will substantially recover from the negative COVID impacts by 2023-24 with modest, sustainable growth thereafter. Apart from external influences, post-Pandemic annual expansion at greater than three percent compounded is anticipated for most sectors. The overall mid-term to long-term outlook is favorable, as the same characteristics which drew visitors to the island will remain after the event fades away; sun, beaches, dry warm weather, and a low intensity, retreat ambience. The latter of which should assist recovery as Lanai is viewed as a “refuge” from the virus.

Though difficult to accurately estimate, the population of the island has declined in recent years and is now likely below the 3,335 persons counted in the 2010 census. The most recent (2018) Census estimate was at 2,802 persons, down from the 3,356 average count since 2010. Further with the onset of COVID and associated loss of employment there has been some out-migration. We have used a conservative estimate of 3,000 residents on Lanai as of mid-2020, reaching between 3,433 and 3,486 persons by the end of our projection modeling period, as shown below.

There are an estimated 1,463 ‘housing units’ on Lanai; there have been no major additions over the past two years but some individual homes have been built. We have estimated the 2020 housing unit count is about 1,480, of which 13 are identified as vacation rentals, resulting in 1,467 available housing units.

The non-resident second/vacation home buyer demographic has grown over the past two decades and is now represented in virtually every market project; particularly new development. The percentage of this segment is anticipated to continue increasing and stabilize at about 20 to 25 percent by 2035.

The current average Lanai resident household size is about 2.48 persons and is forecast to decline in coming decades as a result of evolving family/household trends and an increasingly diverse mix of unit types of new development. By 2035, the average household size in the study area is anticipated to lower to 2.30 to 2.34 persons.

The median prices for residential product in the Lanai year-to-date 2020 was at $436,000 for single family homes, $850,000 for condominium units, and insufficient data for vacant lots/land. Post-COVID median prices are anticipated to increase into the long-term as new units manifest the higher costs of land, construction, impact fees and entitlement, are added.

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insufficient to provide for general market demands, meeting a diversity of specific tenant needs, and a vacancy allowance capable of servicing the community.

- Maui County/HUD 2020 "affordable" housing pricing guidelines set rents for two-bedroom units at from $603 monthly (households at 50% of the Lanai Median Household Income - MHI) to $1,688 monthly (140% of Lanai MHI). Affordable rents for four-bedroom units ranges from $777 (50% of MHI) to $2,176 (140% of MHI). The average monthly rent in Maui County for long-term residential tenancy was $1,406 in 2018.

- Four-bedroom homes are rare on the island; particularly for rent. While some 25.9% of all Lanai resident households have four or more persons, only 12.6 percent of the housing inventory has four or more bedrooms.

- We estimate the mid-point demand for new residential (non-TVR) units in Lanai through 2035 will total 465 units, as shown following. Single family homes and lots will comprise about 76 percent of the total area demand and condominium units 24 percent.

### QUANTIFICATION OF HOUSING UNIT DEMAND FOR LANAI 2020 TO 2035

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Current 2020</th>
<th>Revised Lanai Resident Population</th>
<th>Additional Units Required by 2035</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tens</strong>: Based on Historic Growth Trend 1980 to 2020</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resident Population</td>
<td>3,000</td>
<td>3,138</td>
<td>2,822</td>
</tr>
<tr>
<td>Average Household Size</td>
<td>2.28</td>
<td>2.43</td>
<td>2.39</td>
</tr>
<tr>
<td>Total Resident Units Required</td>
<td>1,310</td>
<td>1,490</td>
<td>1,273</td>
</tr>
<tr>
<td>Part-Time Resident/Second Homes (Max 20%)</td>
<td>121</td>
<td>161</td>
<td>206</td>
</tr>
<tr>
<td>Transient Units (Max 4%)</td>
<td>36</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>Vacancy Allowance (Max. 3%)</td>
<td>26</td>
<td>26</td>
<td>41</td>
</tr>
<tr>
<td><strong>TOTAL MARKET UNIT DEMAND</strong></td>
<td>1,367</td>
<td>1,516</td>
<td>1,678</td>
</tr>
</tbody>
</table>

| | | | |
| **Tens**: Maximum Based on Extrapolated/Adjusted County Planning Department Technical Forecasts | | | |
| Resident Population | 3,000 | 3,156 | 3,216 | 3,486 |
| Average Household Size | 2.28 | 2.42 | 2.38 | 2.34 |
| Total Resident Units Required | 1,310 | 1,490 | 1,273 | 1,060 |
| Part-Time Resident/Second Homes (Max 25%) | 212 | 248 | 309 | 379 |
| Transient Units (Max 4%) | 36 | 39 | 36 | 36 |
| Vacancy Allowance (Max. 3%) | 26 | 26 | 41 | 41 |
| **TOTAL MARKET UNIT DEMAND** | 1,448 | 1,617 | 1,814 | 2,002 |

### CALCULATION OF MID-POINT PERIODIC HOUSING UNIT DEMAND

| Absorption Estimates | | | |
| **MINIMUM DEMAND** | | | |
| Periodic | 100 | 149 | 162 | 184 |
| Cumulative | 115 | 244 | 295 |
| Average Annual Demand | 23 | 26 | 30 |
| **MAXIMUM DEMAND** | | | |
| Periodic | 19 | 170 | 197 | 187 |
| Cumulative | 163 | 354 | 535 |
| Average Annual Demand | 33 | 38 | 36 |
| **MID-POINT DEMAND** | | | |
| Periodic | 60 | 159 | 180 | 186 |
| Cumulative | 139 | 299 | 465 |
| Average Annual Demand | 28 | 32 | 33 |
Economic Impact Analysis

We have constructed a model depicting the economic impact of the Hokuao projects on the Lanai and Statewide community during the course of its “lifespan” from anticipated ground-breaking in 2021, through absorption (2029), to build-out 2030, and stabilized “operations” thereafter.

The model builds on the absorption estimates and data contained in our market study. All estimated amounts are in constant 2020 dollars. We note, that even if the timing of development or absorption moves substantially from our projections it does not change the estimated amounts are in constant 2020 dollars. We note, that even if the timing of development or absorption moves substantially from our projections it does not change the.

- The purpose of the model is to illustrate how capital, jobs, wages, population and earnings statewide would be $78.3 million. The on-going business activity (excluding construction) in the community will total $51.1 million during the projection period and average $8.3 million per year on a stabilized basis.

- The on-going business activity (excluding construction) in the community will total $51.1 million during the projection period and average $8.3 million per year on a stabilized basis. The base impact to the Lanai from 2021 through 2030 will be $166.3 million.

- At build-out the average daily de facto population of the community will be some 418 full-time residents (exclusive of guests). The cumulative resident household income during the first 10 years of occupancy (2021 through 2030) will total $70.4 million, and will stabilize at $12.1 million annually thereafter. Discretionary expenditures into Lanai businesses by the Hokuao population will be some $34.4 million during build-out and average $5.4 million per year on a stabilized basis.

- The community common element, Pulama Lanai management, landscaping and maintenance, and renovations of the 150 homes will create 39 worker-years of employment from 2021 through 2030 and associated wages of $2.7 million. Once stabilized these project components will have 18 FTE positions and annual wages of $1.24 million.

- Associated secondary/off-site employment during the overall development and absorption time-frame will total 172 worker-years with wages of $11.8 million and a stabilized FTE job-count of 6 with total wages of $412,000 per year.

All forecasts and calculations consider the two components of Hokuao, the workforce/affordable and market-rent units, as a single, integrated development.

- The development of Hokuao will bring in an estimated $115.2 million of new, direct capital investment with significant unquantified indirect expenditures into the island’s real estate market and generate: $166.3 million in total new economic activity island-wide during its build-out over an 10-year period (forecast from 2021 through 2030). It will contribute some $8.3 million in annual economic activity on a stabilized basis thereafter.

- The construction of the Hokuao infrastructure and finished single family homes will directly create an estimated 476 “worker-years” of employment (the equivalent of 52 work weeks at 40 hours per week) in the trades and supply businesses during build-out, averaging about 48 worker years annually, with an estimated $37.5 million in wages (averaging about $4 million per year).

- The State model also estimates the total annual economic output from on-going activity within Hokuao would be at $71.4 million during build-out and $12.9 million annually on a stabilized basis. The total number of worker-years statewide attributable to the subject dollars flowing through the economy would be 99.4 positions upon stabilization.

Public Fiscal Benefits

Public fiscal benefits impacts were estimated using the outputs from the economic impact model.
Introduction and Primary Study Conclusions

- The County of Maui will realize Real Property Taxes ($2.6 million), and other secondary receipts and development fees totaling $6.9 million during the 10-year building and absorption projection period (2020-2030), and $1.5 million annually on a stabilized basis thereafter.
- The State of Hawaii will receive Gross Excise and Income taxes, secondary revenues, and school impact fees of $19.5 million during the 2020-2030 modeling period, and $712,000 per year thereafter.
- The major economic impacts and public fiscal conclusions for Hokuao are summarized on the following table. The column on the left summarizes the cumulative impacts during the construction and build-out period (2020-2030) covering infrastructure emplacement, lot absorption, home construction and ramp-up to stabilization of economic activity, and the right hand column the annual impacts after stabilization.

<table>
<thead>
<tr>
<th>Analysis Item</th>
<th>Cumulative During Build-Out Period</th>
<th>Stabilized Annually Thereafter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Capital Investment</td>
<td>$115,182,583</td>
<td></td>
</tr>
<tr>
<td>Local Contractor's Profits</td>
<td>$11,518,258</td>
<td></td>
</tr>
<tr>
<td>Local Supplier's Profits</td>
<td>$4,607,303</td>
<td></td>
</tr>
<tr>
<td>Worker Years of Jobs</td>
<td>6,872</td>
<td>24</td>
</tr>
<tr>
<td>Employee Wages</td>
<td>$51,956,674</td>
<td>$1,656,960</td>
</tr>
<tr>
<td>De Facto Population</td>
<td>418</td>
<td></td>
</tr>
<tr>
<td>Full-Time Resident Household Income</td>
<td>$70,336,875</td>
<td>$12,057,750</td>
</tr>
<tr>
<td>Total Lanai Island &quot;Base&quot; Economic Impact</td>
<td>$166,282,028</td>
<td>$8,282,948</td>
</tr>
</tbody>
</table>

SUMMARY OF MAJOR ECONOMIC IMPACTS AND PUBLIC FISCAL BENEFITS
All Amounts Expressed in Constant, Uninflated 2020 Dollars

The Subject Property and Proposed Project

The Hokuao master-planning area encompasses some 76 acres of vacant land in Central Lanai southwesterly adjacent to, and down-slope from, the existing Lanai City core. According to descriptions from development team members:

- The project is sited close to Dole Park to take advantage of its walkable proximity to shops, groceries, educational, and entertainment venues. The project visually and physically connects to the town via 9th avenue and 12th avenue road extensions, continuing the existing street grid pattern into the new development. 9th avenue will also have a wide concrete bike/walk path connecting the community to Fraser Avenue.
- Along the east edge bordering the school fields, the project provides a one-acre park, a 1,500 square foot pavilion, comfort stations, and 60 parking stalls for use by the community.
- The Hōkūao project proposes construction of 150 “for rent” single family homes, comprised of 76 affordable homes exclusively “for rent” to households falling within HUD low-income guidelines, and 74 market-rent homes. Workforce/affordable home lots will typically be 8,000 square feet minimum, with market-priced home lots ranging from 8,000 to 12,000 square feet.
- The mix of homes is appropriate for the Lanai market with 76 homes (or 51% of the total count) for affordable renter-occupancy and 74 homes (49% of total) for market-priced tenant-occupancy.
- The character of the homes will reflect the existing design vernacular of Lanai City. The two-bedroom homes will have 1,080 square feet of living area, a 327 square foot Lanai and a pad for parking. The four-bedroom homes will have 1,858 square feet interiors, a 470 square foot Lanai and a 250 square foot garage. Houses will have hipped or gable roofs, covered front Lanais, board & batten siding, large trim profiles, and other design details matching historic Lanai buildings.
- Most of the project area topography consists of flat to gently sloping open, patchy forest and scrub lands. An existing drainage swale on the western boundary of the site carries storm water away from the existing town and community center. On the western flank, the project sets back from the existing wastewater treatment plant (WWTP), with a 600 foot buffer between the closest lot and the WWTP edge.
A “Sustainable Environmental Design” was a focal point of master planning according to the team: “Hokuao is being designed to integrate the latest commercial technologies within a palette of historically significant design patterns. Hokuao will incorporate Hawaii 2050 sustainability guiding principles to responsibly and respectfully utilize and preserve the island’s natural resources. Thus sustainable design intentions are at the forefront being established now during the initial site planning and programming stages, and will continue through design, materials specification, and construction phases.

Outlined below are the project’s environmental sustainability intentions relative to the US Green Building Council LEED categories, the standard bearer for sustainability determination.

**Location and Transportation** focuses on compact development, connection to existing infrastructure, community, and amenities.
- Hokuao will continue the grid layout pattern of Lanai city to minimize roads, utilities, and land development requirements.
- The site is immediately proximate to the educational, recreation, and commercial areas of Lanai city, promoting pedestrian and bike use over the reliance upon automobiles.

**Sustainable Sites** focuses on the environment surrounding the project by restoring site land features and preserving site ecosystems.
- The parcel is serviced by existing water, electric, and wastewater utilities to minimize infrastructure excavation and land disruption.
- Site lighting will be oriented to shield against up lighting
- Road and lot layouts are oriented with topography to minimize site mass grading requirements.
- Houses will use post and beam construction to minimize fine grading through the site, while maintaining soil permeability, minimizing runoff, and enhancing aquifer refresh.
- Construction contractors will be required to follow ‘best practices’ in sitework and construction, to control run-off and construction impacts upon the land.

**Water efficiency** considers ways to minimize water utilization both indoors and out.
- Site landscaping design will focus on low-water and drought tolerant plantscape
- Homes will follow county requirements for low-flow fixtures and fittings.
- Generated gray and black water will be treated to an R-1 water level to be used by Pulama Lanai in its irrigation needs.

**Energy and atmosphere** focuses on reducing energy consumption through efficient design strategies and renewable energy sources.
- Site lighting will be low-energy consumptive.

- Homes will be designed to maximize natural air flow.
- Homes will incorporate Energy Star fixtures, LED lighting, and interior fans
- Homes will be constructed to include R-19 insulation, solar roof ventilators, and reflective roof heat barriers.
- Homes may include solar photovoltaic on-site generation with individual home battery storage.

**Materials and resources** focuses on minimizing the energy required for materials to be processed and transported to the site, and the subsequent disposal of building materials. Hokuao’s island location is a limiting factor, however the project is working towards other opportunities through smart design:
- Excavated soils will be re-utilized at other island locations for required fill conditions.
- Homes will be designed to industry standard sizes to minimize construction waste.
- Homes will be pre-panelized to minimize materials debris and expedite construction process.
- Construction contractors will be required to follow ‘best practices’ in materials stockpiling, construction, and removal.

**Indoor environmental quality** focuses on thermal, visual, and acoustic comfort to benefit the daily health and comfort of occupants.
- Design will foster fresh air movement and natural daylight into the homes.
- Interior finished will be specified to be low VOC.
- With the reliance necessarily on fresh-air ventilation, variations of house designs will work to offset window/door locations to decrease noise transmission.

Hokuao’s goal is to provide exemplary housing units that are also minimally impactful upon the environment. With one-ownership leadership driving site planning, design, and construction, the opportunity to achieve a high level of sustainable practices can be assured.

The property is currently classified as:
- **State Land Use (SLU)** - The following map shows the Hokuao project area on the base SLU map as primarily “Green” or as within the Agricultural District. A small portion is within the Urban District.
The Lanai Residential Market

- **Lanai Community Plan**: The Hokuao project area is shown as split-designated on the Lanai Community Plan and is identified in multiple Community Plan Land Use Designations, include Public/Quasi-public, Park, Mixed Use Residential, and Open Space.

- **County of Lanai Zoning**: The Hokuao project site is currently split-zoned, including areas designated as Agricultural, Interim, Active Open Space, and Open Space.

A current Hokuao development master plan with approximately 150 single family lots is shown below.

**Hokuao Design**

Hokuao is designed to perpetuate the site-planning and architectural character already present throughout Lāna`i City. As an intact plantation town, and with a unique town center seen nowhere else in the islands, this strong and attractive vernacular serves as the design basis for Hokuao. And in its expansion westward of Fraser Avenue, this development will also serve as a model for future private and public housing projects proposed in the immediate vicinity.

**Hokuao Master-planning**

Two primary egress roads with curb/gutter and pedestrian sidewalks connect the Hokuao community to town. Interior community roads mimic existing city patterns and drain rainwater to side swales without sidewalks and gutters. This keeps the streetscape character small scale and rural.

The development includes an improved park as a community amenity feature. This park is located along the primary pedestrian path to schools and shops, but is nestled at a lower elevation within the community, ensuring active use yet with a sense of intimacy for Hokuao residents.
Homes will be similar in height, shape, and size to the surrounding historic Lanai City. They will also have similar setbacks and orientation towards neighbors, and compatible proportions, shapes and placements of nearby historic buildings.

**Hokuao Architectural Design**

Original Lanai City houses were kit homes pre-packaged on the mainland by James Dole. Adapted to the local environment, the units integrated aspects defining island design: covered front Lanai entries; simple hipped roofs, board and batten siding; double-hung six over six windows, and wide trims to frame windows and doors within single layer sheathing. This mix of elements created a style of architecture unique to Hawaii and meritorious of being replicated to the greatest extent possible.

Selected preliminary house plans are shown below.

It is our understanding, and we have assumed throughout our study, no homes/units will be permitted to be used as a Transient Vacation Rental (TVR).

Assuming sufficient market demand, the Hokuao project will transform a vacant bulk acreage holding having limited agricultural or other near-term use potentials and nominal regional economic benefit, into an asset providing needed affordable/workforce and market-priced housing, producing hundreds of “worker years” of employment and wages, attracting significant new capital investment and stimulating regional business activity. This activity will in turn create employment, housing and business opportunities for Lanai residents and an expanded tax base for the state and county.
The Lanai Residential Market

We have analyzed the market demand for the 150 Hokuao “for rent” single family homes based on the long-term population and household growth within the context of the overall Lanai Island residential market.

Full-size tables of those excerpted into the text are presented in the Addenda for easier viewing.

Residential development in Lanai has historically been focused towards Lanai City, where upwards of 90 percent of the de facto daily population on the island resides.

In 2018, the US Census “American Community Survey”, the source for many data in our study, counted 1,463 housing units on Lanai. There have been no major inventory additions in the past 18 months, and we estimate the total unit count using this baseline figure is currently about 1,480 units.

Thirteen of the units are identified as being available for vacation rental, leaving 1,467 units available for residential uses.

Today, about 78 percent of the residential inventory in the study area is single family; 22 percent multifamily.

The COVID Pandemic has not, as yet, had a significant impact on the sector; sales activity has been buoyed by pent-up demand and generationally-low mortgage rates, with median prices remaining stable to up from recent previous years.

However, the impacts on the Lanai residential market have thus far been muted, but will likely increase as unemployment remains high and household budgets are tightened. Economic recovery and return towards stabilized levels will take several years, depressing activity in the short-term, but for the most part will be ramped-up by the time the first Hokuao homes are occupied in late-2022.

QUANTIFICATION OF DEMAND FOR HOUSING UNITS

We have projected the total number of residential housing units which will be required on Lanai to meet basic community stabilized demand through the year 2035. Our estimates were based on several indicators, primarily:

5. U.S. Census Data – from 2010 census, and five-year rolling data from 2011 through 2018 updates.

According to the US Census Interim Survey Data releases, the estimated current average household size has dropped meaningfully since 2011 to about 2.48 persons by 2018, which we have used as a current figure. The following table displays the “American Fact Finder” data for Lanai City along with the 2000 and 2010 census conclusions.
The Lanai Residential Market

The Lanai Residential Market

RESIDENT POPULATION AND HOUSING UNIT ESTIMATES FROM THE U.S. CENSUS BUREAU FOR LANAI CITY CDP THROUGH 2018

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident Population</td>
<td>3,174</td>
<td>3,106</td>
<td>3,046</td>
<td>3,014</td>
<td>3,014</td>
<td>3,014</td>
<td>3,014</td>
<td>3,014</td>
<td>3,014</td>
<td>3,014</td>
</tr>
<tr>
<td>Percent Average Annual Change</td>
<td>1.1%</td>
<td>1.8%</td>
<td>2.0%</td>
<td>0.7%</td>
<td>0.7%</td>
<td>1.9%</td>
<td>1.6%</td>
<td>1.8%</td>
<td>1.7%</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

LANAI HOUSING UNIT INVENTORY BY NUMBER OF BEDROOMS

<table>
<thead>
<tr>
<th>Number of Bedrooms</th>
<th>Unit Count</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studio</td>
<td>22</td>
<td>1.46%</td>
</tr>
<tr>
<td>1 Bedroom</td>
<td>132</td>
<td>9.20%</td>
</tr>
<tr>
<td>2 Bedroom</td>
<td>250</td>
<td>17.27%</td>
</tr>
<tr>
<td>3 Bedroom</td>
<td>667</td>
<td>44.52%</td>
</tr>
<tr>
<td>4 Bedroom or more</td>
<td>194</td>
<td>13.27%</td>
</tr>
<tr>
<td>Total</td>
<td>1,543</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

FINDINGS: 90% of Middle Income (MHI) households earn more than 120% of the MHI and would comprise the majority of the demand for the 74-home market-rent Hokauo homes.

The Lanai Residential Market

FINANCIAL CHARACTERISTICS OF HOUSEHOLDS LANAI FROM U.S. CENSUS AMERICAN COMMUNITY SURVEY ESTIMATES FOR 2018

<table>
<thead>
<tr>
<th>Household Income</th>
<th>Number</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$35,000 to $49,999</td>
<td>204</td>
<td>13.57%</td>
</tr>
<tr>
<td>$50,000 to $74,999</td>
<td>217</td>
<td>14.39%</td>
</tr>
<tr>
<td>$75,000 to $99,999</td>
<td>213</td>
<td>14.11%</td>
</tr>
<tr>
<td>$100,000 to $124,999</td>
<td>317</td>
<td>21.40%</td>
</tr>
<tr>
<td>$125,000 to $149,999</td>
<td>209</td>
<td>14.01%</td>
</tr>
<tr>
<td>$150,000 to $199,999</td>
<td>185</td>
<td>12.41%</td>
</tr>
<tr>
<td>$200,000 or more</td>
<td>90</td>
<td>6.00%</td>
</tr>
</tbody>
</table>

Income Below 120% of 2020 Lanai Median Household Income

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Number</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$35,000 or less</td>
<td>213</td>
<td>14.11%</td>
</tr>
<tr>
<td>$35,000 to $49,999</td>
<td>204</td>
<td>13.57%</td>
</tr>
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<td>$50,000 to $74,999</td>
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</tr>
<tr>
<td>$200,000 or more</td>
<td>90</td>
<td>6.00%</td>
</tr>
</tbody>
</table>

As shown below (based on 2018 data) some 41.3 percent of Lanai household earn more than 120 percent of MHI and would comprise the majority of the demand for the 74-home market-rent Hokauo homes.

The Lanai Residential Market

The average household size is anticipated to continue dropping over the coming decades to about 2.34 persons by 2035 as families/household demographic dynamics continue to change (nationwide) and new development changes the traditional mix of unit types in the area. Relative to many neighbor islands, the balance between demand and supply in Lanai has been more stable than average trends statewide. The island develops inventory slowly (supply) and the number of potential purchases (demand) remains somewhat static over time, primarily a result of natural family growth; this compares with periods of high-demand, hyper-appreciation and low

The Lanai Residential Market

However, only 12.6 percent of housing inventory on the island is four or more bedrooms, as presented in the following chart.

As shown below (based on 2018 data) some 41.3 percent of Lanai household earn more than 120 percent of MHI and would comprise the majority of the demand for the 74-home market-rent Hokauo homes.

The average household size is anticipated to continue dropping over the coming decades to about 2.34 persons by 2035 as families/household demographic dynamics continue to change (nationwide) and new development changes the traditional mix of unit types in the area. Relative to many neighbor islands, the balance between demand and supply in Lanai has been more stable than average trends statewide. The island develops inventory slowly (supply) and the number of potential purchases (demand) remains somewhat static over time, primarily a result of natural family growth; this compares with periods of high-demand, hyper-appreciation and low

The Lanai Residential Market

However, only 12.6 percent of housing inventory on the island is four or more bedrooms, as presented in the following chart.

The breakdown of Lanai households by numbers of persons in 2018 is shown following, with 25.9 percent having four or more persons, a target segment for the Hokauo market-rent units.

Incomes Above 120% of 2020 Lanai Median Household Income

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Number</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$35,000 or less</td>
<td>213</td>
<td>14.11%</td>
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</tr>
</tbody>
</table>

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The Lanai Residential Market

However, only 12.6 percent of housing inventory on the island is four or more bedrooms, as presented in the following chart.
supply during up-cycles and low-demand, stable to declining prices and overhanging supply during recessions as seen on other islands.

However, at this time, with the population and job loss, there is a statistical indication of a slight overhang of available units.

Historically, it has taken Lanai several years longer than other neighbor islands in recovering from periodic down-cycles due to its limited economy and associated activity. Like most elsewhere on the neighbor islands, the Lanai market is projected to continue in a generally undersupplied mode into the mid to long-term and there remains significant unmet need for additional workforce/affordable housing opportunities.

Acknowledging the long-term trend towards smaller households, the impact of non-resident renters (moving from between 13 percent to 25 percent by 2035), and a vacancy allowance moving up to 3 percent to achieve a stable market, we have quantified the total mid-point demand for new housing inventory in Lanai at 465 units between late-2020 and the end of 2035.

This figure includes an implied existing, over-supply for some 122 residential units on the island as of the study date; however, we believe the actual count to be much less.

### QUANTIFICATION OF HOUSING UNIT DEMAND FOR LANAI 2020 TO 2035

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Current 2020</th>
<th>Projected Lanai Resident Population</th>
<th>Additional Units Required by 2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low: Based on Historic Growth Trend 1980 to 2020</td>
<td>3,000</td>
<td>3,138</td>
<td>3,282</td>
</tr>
<tr>
<td>Average Household Size (3)</td>
<td>2.49</td>
<td>2.46</td>
<td>2.43</td>
</tr>
<tr>
<td>Total Resident Units Required</td>
<td>7,490</td>
<td>7,643</td>
<td>7,796</td>
</tr>
<tr>
<td>Part-Time Resident/Second Homes (Max 20%)</td>
<td>1,498</td>
<td>1,529</td>
<td>1,560</td>
</tr>
<tr>
<td>Transient Units (Max 4%)</td>
<td>299</td>
<td>315</td>
<td>331</td>
</tr>
<tr>
<td>Vacancy Allowance (Max 3%)</td>
<td>0</td>
<td>26</td>
<td>55</td>
</tr>
<tr>
<td>TOTAL MARKET UNIT DEMAND</td>
<td>1,347</td>
<td>1,516</td>
<td>1,678</td>
</tr>
</tbody>
</table>

| Low: Based on Extrapolated/Adjusted County Planning Department Technical Forecasts | 3,000 | 3,138 | 3,282 | 3,432 |
| Average Household Size (3) | 2.49 | 2.46 | 2.43 | 2.39 | 2.34 |
| Total Resident Units Required | 7,490 | 7,643 | 7,796 | 7,946 |
| Part-Time Resident/Second Homes (Max 25%) | 1,498 | 1,529 | 1,560 | 1,591 |
| Transient Units (Max 4%) | 299 | 315 | 331 | 347 |
| Vacancy Allowance (Max 3%) | 0 | 26 | 55 | 92 |
| TOTAL MARKET UNIT DEMAND | 1,347 | 1,516 | 1,678 | 1,843 |

### CALCULATION OF MID-POINT PERIODIC HOUSING UNIT DEMAND

#### MEDIUM DEMAND

- Periodic: 150
- Cumulative: 115
- Average Annual Demand (4):
  - Periodic: 33
  - Cumulative: 26
  - MID-POINT DEMAND:
    - Periodic: 109
    - Cumulative: 86
    - Average Annual Demand (4):
      - Periodic: 28
      - Cumulative: 23

#### MID-POINT DEMAND

- Periodic: 150
- Cumulative: 115
- Average Annual Demand (4):
  - Periodic: 33
  - Cumulative: 26

#### MEDIUM DEMAND

- Periodic: 150
- Cumulative: 115
- Average Annual Demand (4):
  - Periodic: 33
  - Cumulative: 26

#### MEDIUM DEMAND

- Periodic: 150
- Cumulative: 115
- Average Annual Demand (4):
  - Periodic: 33
  - Cumulative: 26

### DEMAND BY RENT AMOUNT

Using housing affordability calculations and historic trends in the relationship between Lanai residential pricing and household income level, we have estimated the range in unit leasing prices best fitting the forecast demand for new units in the region over the next 15+ years.

In conjunction with the US Department of Housing and Urban Development (HUD), the County of Maui Housing Division of the Department of Housing and Human Concerns, establishes rental...
amount guidelines for the County based on household incomes and prevailing mortgage rates. The table below shows the Lanai rental guidelines for 2020.

**ISLAND OF LANAI WORKFORCE/AFFORDABLE RENTAL GUIDELINES FOR 2020**

<table>
<thead>
<tr>
<th>Income Limits</th>
<th>Total Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Under 80%</td>
</tr>
<tr>
<td></td>
<td>80% to 120%</td>
</tr>
<tr>
<td>Lanai MHI</td>
<td>32</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>34</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>35</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>100</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>23.0%</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>21.0%</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>21.0%</td>
</tr>
</tbody>
</table>

* The estimated median household income for the Island of Lanai in 2020 was estimated at $53,590 for a four-person household, the accepted median baseline.

The trending of demand by stratiﬁed MHI from 2020 through 2035 is shown on the following table.

**TABLE 7:** STRATIFIED PROJECTIONS OF STANDARD RESIDENT HOUSING UNIT DEMAND BY MEDIAN HOUSEHOLD INCOME LEVEL ON LANAI USING MID-POINT PROJECTIONS 2020 TO 2035

<table>
<thead>
<tr>
<th>Period</th>
<th>2020 to 2025</th>
<th>2026 to 2030</th>
<th>2031 to 2035</th>
<th>Total Demand 2020-2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 80% Median Household Income (Under $43,872 Annually)</td>
<td>32</td>
<td>34</td>
<td>35</td>
<td>100</td>
</tr>
<tr>
<td>Percent of Total Demand</td>
<td>23.0%</td>
<td>21.0%</td>
<td>21.0%</td>
<td>21.6%</td>
</tr>
<tr>
<td>80% to 120% of Lanai MHI (Between $43,872 and $64,308 Annually)</td>
<td>50</td>
<td>61</td>
<td>63</td>
<td>174</td>
</tr>
<tr>
<td>Percent of Total Demand</td>
<td>36.0%</td>
<td>38.0%</td>
<td>38.0%</td>
<td>37.4%</td>
</tr>
<tr>
<td>120% and Above Lanai MHI (Over $64,308 Annually)</td>
<td>57</td>
<td>65</td>
<td>68</td>
<td>191</td>
</tr>
<tr>
<td>Percent of Total Demand</td>
<td>41.0%</td>
<td>41.0%</td>
<td>41.0%</td>
<td>41.0%</td>
</tr>
</tbody>
</table>

**Total Market Demand**

<table>
<thead>
<tr>
<th></th>
<th>139</th>
<th>160</th>
<th>166</th>
<th>465</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of Total Demand</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Note: The estimated median household income for the Island of Lanai in 2020 was estimated at $53,590 for a four-person household; the accepted median baseline.

Based on market analysis, new housing units in Lanai should be generally priced/rented within the following ranges:

- 21.6 percent affordable price or rent, according to affordability guidelines for households earning 80 percent or less of the MHI ("Low Income");
- 37.4 percent affordable for households earning 80 to 120 percent of the MHI ("Below Moderate" to "Gap Income" categories);
- 41.0 percent at market prices/rents with household earning above 120 percent of Lanai MHI.

The 76 two-bedroom workforce/affordable homes at Hokuao will have rents set according to prevailing HUD/County formula at the time of construction, with rents ranging from $603 to $1,688 per month in 2020 dollars.
home prices (spec-built and custom) will rise over time; pricing many households out of the single-family market and into the multi-family sector.

The projected demand for finished homes, vacant house lots and multifamily units is shown following; a function of both buyer preference and available inventory. However, the efficacy of this metric is limited by the small size of the Lanai City market and concentrated land use/ownership, as the “market” does not provide the opportunity for supply to accurately reflect demand desires.

DIVISION OF PROJECTED DEMAND BY UNIT TYPE FOR HOUSING UNITS ON THE ISLAND OF LANAI 2020 TO 2035

<table>
<thead>
<tr>
<th></th>
<th>2020 to 2025</th>
<th>2026 to 2030</th>
<th>2031 to 2035</th>
<th>Total Demand 2020-2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family Homes &amp; Lots</td>
<td>107</td>
<td>121</td>
<td>126</td>
<td>355</td>
</tr>
<tr>
<td>Multifamily Units</td>
<td>32</td>
<td>38</td>
<td>40</td>
<td>110</td>
</tr>
<tr>
<td>Percent of Total</td>
<td>23%</td>
<td>24%</td>
<td>24%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: CBRE

MULTIPLE LISTING SERVICE DATA

The Multiple Listing Service (MLS) transaction data summarized in the following table shows 12 years of transaction data from 2008 to 2020 (August year-to-date). A table showing additional years of transaction data from 2000 to 2020 is included in the addenda. Also included is two graphs showing Year-End Median Sales Price and Year-End Number of Sales from 2000 to 2020.

Due to Lanai being a small island with limited inventory, the number of transactions occurring on an annual basis is sparse. In the following graph, Year-End Numbers of Sales, after the 2008 - 2009 recession purchases for single family homes and condominiums were strongest between 2011 and 2013. From 2014 to 2020 number of sales moderated, but less so for Single family homes as compared to Condominiums.

Vacant Land Sales are also uncommon with only a total of 9 vacant land transactions occurring between 2008 and 2020.
The Lanai Residential Market

Year-end median sales prices for single family homes recovered after the recession, peaking in 2014, and showing stabilization within a minor-upcycle since.

Condominium median sales prices have also fluctuated greatly over the years, though recent median price levels have not been able to surpass 2006 where the median condominium price was $2,384,800.

ASKING RENTS FOR LANAI HOMES

We identified four homes for rent on Lanai as of the report date, summarized in the following tables. This is a typical level of offered inventory, based on our past periodic review of available rental supply on the island, the “days on market” is generally less than one month.

**SUMMARY OF AVAILABLE MARKET PRICED RENTAL HOMES ON LANAI 9/25/2020**

<table>
<thead>
<tr>
<th>Listing</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>House Type (Bed/Bath)</td>
<td>4/2</td>
<td>2/2</td>
<td>4/1</td>
<td>1/1</td>
</tr>
<tr>
<td>Size in Square Feet</td>
<td>N/A</td>
<td>1,085</td>
<td>1,024</td>
<td>N/A</td>
</tr>
<tr>
<td>Mo. Asking Rent</td>
<td>$2,500</td>
<td>$3,000</td>
<td>$3,328</td>
<td>$2,500</td>
</tr>
<tr>
<td>Utilities Paid By</td>
<td>Tenant</td>
<td>Landlord</td>
<td>Tenant</td>
<td>Landlord</td>
</tr>
<tr>
<td>Days Listed on Market</td>
<td>28</td>
<td>2</td>
<td>27</td>
<td>61</td>
</tr>
<tr>
<td>Comments</td>
<td>Furnished</td>
<td>Furnished</td>
<td>Rent to Own/FSBBO</td>
<td>Furnished Cottage</td>
</tr>
<tr>
<td>Source</td>
<td>Craigslist</td>
<td>Zillow</td>
<td>HomeFinder</td>
<td>Craigslist</td>
</tr>
</tbody>
</table>

Compiled by CBRE

PROPOSED SUPPLY

There are few residential entitled residential projects on Lanai. Numerous developments have been announced over the years, as shown on the following table, but many are on-hold, controlled by a single landowner, being reduced in scale, or proceeding at a very slow pace.
Other considerations in analyzing the level of proposed supply include:

- It is unlikely all the still-unapproved units will successfully gain necessary entitlements.
- Many development sites currently lack water and/or other critical service systems and may never obtain them, or will require decades for regional systems to extend/expand to service their property.
- Master planned projects, particularly larger proposed communities, are often not built out to maximum densities.

Due to the uncertainty of several major projects and their current lack of inertia, precise quantification of probable additions to supply during the 2020 to 2035 projection period is problematic.

If all the projects were to come on-line at near maximum build-out over the next four decades there still would be insufficient inventory to meet quantified market demand. And, several are intended as extended (very long-term) planning efforts requiring generations of development.

We consider it highly unlikely that all these projects and their units will be constructed in our study time-frame, likely well-below 225 total units and have made our absorption estimates accordingly.
Residential Product Absorption Projections

The full-size tables of those excerpted into this section of the report are contained in Addenda B.

APPROPRIATENESS OF THE SITE FOR THE PROPOSED DEVELOPMENT

Given the quantified support for significant additions to the Lanai residential inventory over the coming two-decades, the next step in analysis is to assess whether the Hokuao site and concept are appropriate from a market perspective, in concert with macro demand trends, and the probable standing of its inventory therein. These insights determine the competitiveness and resulting probable market shares for the residential components of the project.

The master plan for the subject community is consistent with modern urban planning objectives for small single-family residential subdivisions and will provide a high-quality competitive environment for the 150 homes proposed. Among the features we consider most relevant regarding market acceptance are:

- Quality, new affordable-rent single family homes are exceptionally rare on Lanai (and throughout the State) and will be highly sought after; especially on Lanai where there are few products to choose from.
- The location of Hokuao is desirable, with a superior climate, some view panoramas, and proximate to Lanai City community and recreational amenities, Manele Resort, public facilities and supporting commercial services. It will have easy access onto Kaunalapau Highway, a valued commodity among residents, as will be the unique opportunity to rent affordable and market-priced homes in a modern master planned subdivision.
- The parks, open spaces and greenbelts are integrated into the design as to maximize the frontage offered to the abutting residential development sites.
- There will be recreational facilities in Hokuao from passive parks and pathways to an improved park (pavilion, parking lot and comfort station) providing both an "anchor" and theme for the community along with gathering place opportunities.
- The varying lot areas, house sizes and pricing envisaged for the market-rent component of the project will create diversity in the neighborhood, a desirable attribute for sustainability and secondary marketing.

The single meaningful negative attribute of the subject location is its relatively close proximity to the existing Lanai City wastewater treatment plant located beyond a 600 feet buffer southerly of the Hokuao boundary. As is typical for such plants, occasional odors are produced.

An Air Quality Study for the Proposed Hokuao 201H Housing Project was published in January 2019 which identified the plant as a contributor to air quality considerations in the area. In our interviews with brokers, agents and market participants, the indications were the plant would not be a significant factor as:

- The prevailing winds blow the plant odors away from the project site.
- It is a consideration for other Lanai City neighborhoods, so not unique to Hokuao product.
- The demand for new affordable single family homes is so high on Lanai as to overcome any secondary negative factor.

The master plan is an appropriate use of the subject property from a market demand and economic acceptance perspective based on a variety of criteria, including:

- It will convert an economically non-productive agricultural holding into master-planned subdivision which will help in meeting future residential needs in the region, while contributing meaningful economic stimulus to the island.
- It is within and consistent with the County-designated Lanai City expansion node and will provide a transition from the town to the feral farmlands west and south of the urban area.
- The subject will help fill a critical market niche; the unquenchable demand for new affordable housing product on the island. An appropriate mix of residential inventory is vital to a stable regional market.
- The overall low intensity of development, below two units per acre (150 units / 76 acres), will generally maintain the density and ambience of the Lanai City residential neighborhoods.

Based on these attributes of the subject property, our analyses of the Lanai residential market, and the historic experience of competitive projects in the neighbor island marketplace, we have estimated the probable absorption velocity for the subject inventory using three methodologies:

- **Gross Demand/Supply Comparison** -- This straight-forward technique assumes that if there is insufficient existing and planned supply to meet projected market gross demand levels during the projection period, the proposed subject units will be absorbed in a reasonable manner, regardless of competitive qualities, as there are no other alternatives available.

Over the next 15+ years (mid-2020 through 2035), without Hokuao, it is projected there will be at best fewer than 74 total non-Pulama Lanai units built on the island far fewer than the estimated 465-unit mid-point market need; with the remaining units in other projects taking decades to actualize (if ever). The undersupply condition will ensure there is sufficient demand to absorb the 150 subject homes within the projection timeframe.

- **The Residual Method** -- In this technique, the “planned” inventory and in-place but leased units are placed on a time-line depicting the combined lease absorption anticipated by the developers (as estimated by the County, stated in EIS, reported in the media or through interviews) or assuming a
Appropriateness of the Subject Property for Residential Use and Absorption Estimates

reasonable market share. To the extent this supply of units fall short of the forecast demand for product in the study region or exceed the total, a respective undersupply or oversupply situation is present.

Having accounted for all the planned units in the market reasonably moving forward at this time, and acknowledging the unlikelihood of otherwise competitive sites in the region, it can be asserted the subject development will capture a significant portion of all the residual demand.

This approach is generally conservative, as it assumes the subject will capture only what is left over after all other projects garner their share. Given the nature of the subject holding we believe it could be a regional market leader, not a follower.

The residual method model for the combined Hokuao inventory is shown below. It is assumed that 50 percent of the total number of likely-developed proposed units are built by 2030.

The residual method model for the combined Hokuao inventory is shown below. It is assumed that 50 percent of the total number of likely-developed proposed units are built by 2030.

Application of the residual model indicates:

1. There will be excess demand available (total demand exceeding proposed supply) to flow to Hokuao in every offering period of the model from when product first is made available on a pre-lease basis in 2021.

2. Full absorption of the 150 proposed Hokuao units will require some 8 years.

The Market Shares Method -- This approach accounts for the probable competitiveness of the subject inventory regardless of the total level of product being otherwise offered on the regional market. In essence, it is an estimate of how much of total forecast demand in the Lana‘i residential sectors Hokuao could expect to capture on an annual basis in light of its locational, pricing and amenity characteristics.

Generally moderate in application, this technique tests "pure" competitiveness and is considered the classic methodology, but does require judgment in the selection of factors.

The following table displays the Market Shares Method for the Hokuao inventory. We forecast the subject will be able to achieve market penetration, or a share averaging 65 percent of the total regional residential (non-resort) demand during its leasing period, resulting in an absorption period of 8 years commencing with pre-lease in 2021 through full absorption in 2029.

The rounded average absorption is about 15 units per year.

## SUMMARY OF SUBJECT PROJECTED DEMAND LEVELS USING THE MARKET SHARES METHOD

Assuming Pre-Leasing of 150 Subject Units Begin in 2021

### Mid-Point Demand Assumptions

<table>
<thead>
<tr>
<th>Lease Year</th>
<th>Total Island Residential Unit Demand</th>
<th>Effective Subject Share</th>
<th>Indicated Total Subject Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>28</td>
<td>80.00%</td>
<td>22</td>
</tr>
<tr>
<td>2023</td>
<td>28</td>
<td>80.00%</td>
<td>22</td>
</tr>
<tr>
<td>2024</td>
<td>28</td>
<td>75.00%</td>
<td>21</td>
</tr>
<tr>
<td>2025</td>
<td>28</td>
<td>60.00%</td>
<td>17</td>
</tr>
<tr>
<td>2026</td>
<td>28</td>
<td>60.00%</td>
<td>17</td>
</tr>
<tr>
<td>2027</td>
<td>32</td>
<td>60.00%</td>
<td>19</td>
</tr>
<tr>
<td>2028</td>
<td>32</td>
<td>60.00%</td>
<td>19</td>
</tr>
<tr>
<td>2029</td>
<td>32</td>
<td>40.00%</td>
<td>13</td>
</tr>
</tbody>
</table>

**ANALYSIS CONCLUSIONS & TOTALS**

|                      | 7.7 Years | 63.80% | 150 |

Source: CBRE

**Correlation**

Based on absorption analysis, we estimate the full-absorption of the subject residential component of Hokuao will require some eight-years to achieve full absorption, with stabilized annual leasing rate of about 19 homes during the offering period.
Economic Impacts of the Proposed Development

The development of Hokuao will result in significant expenditures that will favorably impact the Lanai economy on both a direct and indirect basis, increasing the level of capital investment and capital flow in the region, which will in turn create employment and widen the tax base.

From a direct perspective, the proposed 150 single-family homes will create numerous construction, equipment operator and specialty trade jobs on- and off-site, directly and indirectly, during the planning and emplacement of the infrastructure, and building of the improvements.

After completion of the common systems, vertical construction, support facilities and amenities over a decade-plus development period, there will be permanent employment positions created by the buildings themselves (landscape, service, maintenance, and renovation needs in the course of their use) and community association operations.

Numerous local businesses will see significant profit opportunities arising for construction trade companies building the improvements, and for local businesses which would supply a substantial portion of the materials needed in the building efforts.

The general island economy also will benefit from the subject development, as its residents, employees and businesses will spend large amounts of discretionary income in off-site shops, restaurants, and service establishments throughout Lanai and Maui County, and in purchasing goods and services.

Indirectly, as these wages, profits, and expenditures move through the regional economy, they will have a ripple, or “multiplier,” effect which increases the amount of capital flowing to the entire community resulting from the development of the subject.

Construction, operational and other workers earning wages via Hokuao development and associated off-site/supporting efforts will spend the majority of their income on living and entertainment expenses while supporting and patronizing other island businesses. Much of this spending would be re-directed by these businesses to other island industries, and significant portions of these secondary profits would in turn be put back through the region’s economic and tax structure.

These substantial direct and indirect economic impacts associated with the proposed subject project, as quantified in the following sections, are all the result of the capital investment and entrepreneurship necessary to convert undeveloped, fair/poor quality agricultural lands into a low intensity diverse residential community. The Lanai/Maui County economy will be meaningfully stimulated by the capital investments, population/user spending and business operations of the development.

We note, our economic modeling is based on a 10-year build-out and absorption period (2021 through 2030). The construction may take longer or shorter. However, whether full development takes 8 or 20 years, the stabilized “operation” of the community and its de facto population will be the same following completion. As constant, uninflated 2020 dollars are used throughout the model, time is not a significant variable in the analysis.

It is anticipated that final approvals, surveys and planning will require approximately one year (2020-21), infrastructure will be emplaced and pre-leasing will commence in 2021, initial homes completed, closed and occupied in late-2022, and full build-out and absorption from 2022 through 2029.

**CAPITAL INVESTMENT AND CONSTRUCTION COSTS**

The subject will bring an estimated $115.2 million in direct development capital into Lanai over the build-out period for the project as summarized on the following table.

<table>
<thead>
<tr>
<th>Item</th>
<th>Development and Lease Period</th>
<th>Build-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure Emplacement</td>
<td>$40,007,958</td>
<td>$40,007,958</td>
</tr>
<tr>
<td>Residential Construction (Combined Workforce and Market Homes, Average Overall Costs, including Sitework and Landscaping)</td>
<td>$50,116,417</td>
<td>$25,058,208</td>
</tr>
<tr>
<td>TOTAL PERIODIC CONSTRUCTION COSTS</td>
<td>$90,124,375</td>
<td>$115,182,583</td>
</tr>
</tbody>
</table>

**Supplier Profits**

<table>
<thead>
<tr>
<th>Supplier Profits</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$3,664,975</td>
<td>$1,002,328</td>
<td></td>
</tr>
<tr>
<td>$4,607,303</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Includes site work, on and off-site infrastructure, roads and contingency; engineering & architecture, permits and study fees and GET for total project.

Source: CBRE

Infrastructure and Residential Construction cost estimates are summarized as shown. Construction costs in Hawaii have stabilized following early-decade inflation and we consider these costs from several years ago to still be reasonable.
Hokuao development will infuse on average an anticipated $11.5 million annually into the Maui/Lanai building industry on average over the build-out period. This will provide a significant near to mid-term boost for the construction trade.

DIRECT BUSINESS PROFITS FROM CONSTRUCTION

While a significant percentage of the materials needed to build the subject infrastructure and residential improvements must be imported to Lanai, a portion of the construction costs spent in the development will directly flow to local businesses in the form of supplier profits.

Typically, within the industry supplier profits are extrapolated at four percent of total costs, or up to $5.5 million. The total annual Supplier’s Profit will be $460,730 in aggregate.

EMPLOYMENT OPPORTUNITIES CREATED

Based on indicators provided by the construction of comparable sized projects and Hawaii industry averages, we have estimated the demand for on- and off-site, direct and indirect, full-time equivalent employment positions associated with laying of initial infrastructure systems, construction of the homes, and in providing continuing services to the occupied residences.

The construction, maintenance, and indirect/off-site employment opportunities created by the subject development will not be "new" jobs requiring new Lanai/Maui residents, but will be vitally needed new opportunities for in-place resident construction trade workers and existing local businesses. The jobs associated with home maintenance and operations will represent an expansion of the currently depressed employment market.

It is assumed the off-site/indirect work created will be steered towards existing Lanai/Maui supply, equipment providers, and other service companies.

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>Total Project Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical and Finished Lot Costs</td>
<td>$75,174,625</td>
</tr>
<tr>
<td>Infrastructure Costs</td>
<td>$31,082,000</td>
</tr>
<tr>
<td>Design &amp; Soft Costs</td>
<td>$3,632,000</td>
</tr>
<tr>
<td>Landscaping, Irrigation &amp; Security</td>
<td>$800,000</td>
</tr>
<tr>
<td>GET</td>
<td>$4,493,958</td>
</tr>
<tr>
<td><strong>Total Project Development Cost Before Land</strong></td>
<td><strong>$115,182,583</strong></td>
</tr>
</tbody>
</table>

Source: Palama Lanai

Our employment estimates are based on full-time "worker-years," although one worker-year (or circa 2,080 working hours) may be comprised of many employees involved in specialized tasks of a much shorter duration.

Our projections are founded on examples provided by various resort/residential developments undertaken on the neighbor islands over the past decade, and via formulae expressing relationships between total worker wages/benefits and construction task costs.

Infrastructure construction employment forecasts are taken from discussions with developers, review of project records and ratios of direct costs to job creation, which currently project one worker-year for every $400,000 in development costs expended. The ratio of job creation to costs is relatively low for these components due to the high equipment, materials and systems expenses associated with major site work.

Home vertical construction, which are more labor intensive in regard to overall costs, are anticipated to require one worker-year per $200,000 in construction expenses.

The finished homes and community assets will require maintenance, landscaping, service, and renovation and repair workers and common element staff. We project centralized Pulama Lanai community management and common area maintenance/uptake personnel of three full-time-equivalent workers, with maintenance and common element staff at the equivalent of one FTE worker for every 15 completed residential units.

Off-site employees were estimated at 33 percent of on-site workers, and are comprised of three groups:

- Off-site building/trade industry positions will be enhanced by the subject development, including such jobs as administration, office help, material providers, equipment maintenance and specialty tasks.
- Off-site support businesses, including contractor/retail/counter sales, fuel providers, shipping, storage and professional services will also benefit.
- Each on-site worker creates demand for services (and related employment) during and directly attributable to the work day. These positions include food businesses, providers of tools and trade goods, payroll/financial and insurance businesses, medical requirements and other secondary indirect/off-site employment.

Application of these ratios to the proposed Hokuao master plan is shown below.
During the 10-year modeling period the number of worker-years created on- and off-site, directly and indirectly, by the development will total some 687 worker-years over the entire timeframe. Of this total, 476 worker-years (an annual average of 48 positions) are direct construction-oriented, 18 are maintenance positions; and 172 are off-site/indirect worker-year requirements.

On a stabilized basis, after the completion of construction (year 2030 and beyond), the project will generate some 24 permanent full-time equivalent employment opportunities--18 directly related to on-site activities, and 6 indirect positions throughout the island.

WAGE INCOME GENERATED

In accordance with data compiled by the state Department of Labor and Industry Relations, as tempered through our analysis, we have estimated the personal income (in the form of wages) which will flow to Lanai/Maui workers as a result of Hokuao construction and use. The results are shown below.


Source: CBRE

The gross full-time equivalent wage estimates for a worker-year according to the identified employment categories for an “experienced” worker in Maui County during 2019 are as follows:

- Construction workers (covering all trades), $78,740 per year.
- Maintenance/common element at $69,160 annually.
- Off-site and indirect employment, $68,680.
- Overall average wages paid via the subject development are equal to $75,779 per worker-year created during the modeling time-frame.

Due to COVID we do not expect any meaningful increase in wages to be evident in 2020.

In the initial five-year period of active development (2021-2025), the "Total Construction Wages" by the subject development effort would be $27.6 million, and $9.9 million in 2026-2030.

After completion of all construction, the stabilized on-going maintenance/common element, off-site and indirect employment would result in total annual wages of $1.7 million thereafter in uninflated 2020 dollars. This equates to an average wage of $69,040 per worker-year.

During the development period, on- and off-site, direct and indirect worker wages would total $60.0 million.
Economic Impacts of the Proposed Development

POPULATION, INCOME AND EXPENDITURES

All 150 “for rent” homes at Hokuao are expected to be 100 percent occupied by full-time Lanai residents.

The resident households and their guests will constitute the de facto population of the community members, whose income and discretionary expenditures will create major positive impacts on the Lanai economy.

We have quantified these focal statistics within the modeling process, as shown following.

<table>
<thead>
<tr>
<th>ESTIMATED RESIDENT POPULATION, HOUSEHOLD INCOME AND DISCRETIONARY EXPENDITURES</th>
<th>Total Home Occupied (End of Period)</th>
<th>Market-Rent Single Family Homes Occupied (End of Period)</th>
<th>Full-Time Resident Average Household Size (persons)</th>
<th>Part-Time Resident Average Household Size (persons)</th>
<th>Full-Time Residents (50% of Total)</th>
<th>Part-Time Residents (5% of Total)</th>
<th>Employment Single Family Homes Occupied (End of Period)</th>
<th>Full-Time Resident Average Household Size (persons)</th>
<th>Part-Time Resident Average Household Size (persons)</th>
<th>Full-Time Residents (50% of Total)</th>
<th>Part-Time Residents (5% of Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2021 to 2025</td>
<td>2026 to 2030</td>
<td>Stabilized</td>
<td>Total Homes Occupied (End of Period)</td>
<td>100</td>
<td>50</td>
<td></td>
<td>Market-Rent Single Family Homes Occupied (End of Period)</td>
<td>50</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

RESIDENT HOUSEHOLD INCOME (1)

Average Annually End of Period $8,038,500 $12,057,750 $12,057,750
Total During Period $20,096,250 $50,240,625 $70,336,875

TOTAL POPULATION EXPENDITURES (2)

Average Annually End of Period $3,617,325 $5,425,988 $5,425,988
Total During Period $9,043,313 $25,321,275 $34,364,588

(1) Average resident households at 150% of Lanai household income average of $53,590 in 2020; or $80,385.
(2) For full-time residents assume 30% of gross income for taxes, 30% for housing costs and 15% for utilities/maintenance. Leaving 45% of gross income as net disposable.

Source: CBRE

It is projected the average full-time resident household size for the Hokuao two-bedroom homes will be 2.65 persons, and the four-bedroom homes at 3.95 persons, all effectively occupied on average 100 percent of the time. These figures are taken from our market demand analysis.

These average household sizes are above the Census estimates to account for the larger unit sizes and that there will be few one or two-person households renting at Hokuao.

The total resident population at build-out is forecast to be 418 persons.

Based on affordable-pricing guidelines coupled with the level of income necessary to support the market-rent inventory, we estimate the average annual income for resident households at Hokuao will be $80,385 in 2020 dollars. This is the equivalent of 150 percent of the established Lanai median. During occupancy of the build-out period, the total resident household income will be $70.3 million, and at $12.1 million annually thereafter.

The resident population of the proposed project will place significant discretionary expenditure dollars into the Lanai/Maui economy. This will be comprised of the year-round, daily expenditures by the full-time resident group.

We estimate that full-time resident households will spend about 45 percent of their total income on discretionary items, with the remainder going towards mortgage debt service and fixed expenses. By build-out, the total population discretionary expenditures made by subject project owners in the local market will be at $5.4 million annually on a stabilized basis, in 2020 dollars. During the development and stabilization model period, the total sum of these expenditures will be $34.4 million.

SUMMARY OF TOTAL ECONOMIC ACTIVITY

The estimated level of total gross on-site economic activity within the proposed Hokuao community during the modeling period and on a stabilized basis is summarized below.

The top half of the table depicts the construction/absorption of the 150 homes and their division between affordable-rent and market-rent residents.
Apart from construction of the neighborhood, the primary stabilized, on-going contributing activity is project population spending, with Home Maintenance and Repairs, and Wages being other notable items.

Overall, Hokuao will create taxable gross operating revenues of $8.3 million per year following stabilization. During the development period, this model projects total on-site of $166.3 million. These dollars will be spent, then re-spent, on goods and services on the island, diminishing in impact on the local economy with each turnover as a portion flows off Lanai/Maui for goods, services and financing commitments.

STATE INPUT/OUTPUT MODEL
We have also analyzed the impacts of the project for Lanai/Maui and Statewide using the Hawaii County Input-Output Economic Model (2012 data approved by DBEDT in 2016) Type II multipliers. These factors quantify the total Direct, Indirect and Induced "effects" of various forms of business and spending activity as it flows through the economy of the islands.

In every instance, application of the macro Input-Output multipliers resulted in higher dollar, employment, and tax revenue indicators than in our subject-focused micro model which was designed to reflect Direct and upper-level Indirect impacts only.

Among the outputs using the State method:
- The $115.2 million in cumulative Hokuao construction costs will generate a total State Economic Output of $233.8 million during build-out with subsequent household spending, association and maintenance/renovation activity averaging $36.6 million annually on a stabilized basis.

## SUMMARY OF ECONOMIC IMPACTS ASSOCIATED WITH 201H DEVELOPMENT
All Amounts Expressed in Constant 2020 Dollars

### Development and Lease Period

<table>
<thead>
<tr>
<th>Description</th>
<th>2021 to 2025</th>
<th>2026 to 2030</th>
<th>Stabilized</th>
<th>Annually</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Costs</td>
<td>$90,124,375</td>
<td>$25,058,208</td>
<td>$115,182,583</td>
<td>$1,200,000</td>
</tr>
<tr>
<td>1. Economic Output Multiplier</td>
<td>2.03</td>
<td>2.03</td>
<td>2.03</td>
<td>2.03</td>
</tr>
<tr>
<td>Total State Economic Output</td>
<td>$182,952,481</td>
<td>$50,868,163</td>
<td>$233,820,644</td>
<td>$2,436,000</td>
</tr>
<tr>
<td>2. Earnings Multiplier</td>
<td>0.68</td>
<td>0.68</td>
<td>0.68</td>
<td>0.68</td>
</tr>
<tr>
<td>Total Increase in State Earnings</td>
<td>$41,284,575</td>
<td>$17,039,583</td>
<td>$78,324,157</td>
<td>$816,000</td>
</tr>
<tr>
<td>3. State Tax Multipliers</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>Total Increase in State Taxes</td>
<td>$9,228,736</td>
<td>$2,565,961</td>
<td>$11,794,697</td>
<td>$123,880</td>
</tr>
<tr>
<td>Total State Jobs Created</td>
<td>1,288.8</td>
<td>358.3</td>
<td>1,647.1</td>
<td>17.2</td>
</tr>
<tr>
<td>5. Direct-Effect Job Multipliers</td>
<td>2.04</td>
<td>2.04</td>
<td>2.04</td>
<td>2.04</td>
</tr>
<tr>
<td>Total Direct Jobs Created</td>
<td>715.7</td>
<td>255.6</td>
<td>970.8</td>
<td>55.1</td>
</tr>
<tr>
<td>Construction Wages</td>
<td>$27,406,400</td>
<td>$9,865,417</td>
<td>$37,271,816</td>
<td>$1,656,960</td>
</tr>
<tr>
<td>Total Increase in Direct Earnings</td>
<td>$44,723,366</td>
<td>$15,791,975</td>
<td>$60,515,342</td>
<td>$3,304,279</td>
</tr>
</tbody>
</table>

Source: "2012 Hawaii Inter-County Input-Output Study" (approved August 2016), CBRE
### Economic Impacts of the Proposed Development

#### ESTIMATES OF TOTAL ECONOMIC IMPACT FROM SUBJECT OPERATIONS USING INTER-COUNTY INPUT-OUTPUT MODEL "TYPE II" MULTIPLIERS FOR "SERVICES"  
All Amounts Expressed in Constant 2020 Dollars

<table>
<thead>
<tr>
<th>Development Year</th>
<th>Totals During Build-Out</th>
<th>Stabilized Annually</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2021 to 2025</td>
<td>2026 to 2030</td>
</tr>
<tr>
<td>Household Spending &amp; Maintenance</td>
<td>$10,543,313</td>
<td>$36,614,588</td>
</tr>
<tr>
<td>1. Economic Output Multiplier</td>
<td>1.95</td>
<td>1.95</td>
</tr>
<tr>
<td>Total State Economic Output</td>
<td>$20,559,459</td>
<td>$71,398,446</td>
</tr>
<tr>
<td>2. Earnings Multiplier</td>
<td>0.53</td>
<td>0.53</td>
</tr>
<tr>
<td>Total Increase in State Earnings</td>
<td>$5,587,956</td>
<td>$19,405,731</td>
</tr>
<tr>
<td>3. State Tax Multipliers</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Total Increase in State Taxes</td>
<td>$606,240</td>
<td>$2,105,339</td>
</tr>
<tr>
<td>4. Total Job Multipliers</td>
<td>15.00</td>
<td>15.00</td>
</tr>
<tr>
<td>Total State Jobs Created</td>
<td>158.1</td>
<td>391.1</td>
</tr>
<tr>
<td>Operating Employment</td>
<td>10.7</td>
<td>24.0</td>
</tr>
<tr>
<td>5. Direct-Efffect Job Multipliers</td>
<td>1.57</td>
<td>1.57</td>
</tr>
<tr>
<td>Total Direct Jobs Created</td>
<td>16.7</td>
<td>37.7</td>
</tr>
<tr>
<td>Operating Wages</td>
<td>$907,725</td>
<td>$2,463,825</td>
</tr>
<tr>
<td>6. Direct-Efffect Earnings</td>
<td>$5,547,442</td>
<td>$18,587,056</td>
</tr>
<tr>
<td>Total Increase in Direct Earnings</td>
<td>$4,599,937</td>
<td>$16,123,231</td>
</tr>
</tbody>
</table>

Source: "2012 Hawaii Inter-County Output Study" (approved August 2016), and CBRE

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### DBEDT 3rd Quarter 2020 Report – Outlook for the Economy

Hawaii’s economy has been greatly impacted by the COVID-19 pandemic. During the April-July 2020 period, the average unemployment rate (not seasonally adjusted) was 18.5 percent. Hawaii lost 115,000 non-agriculture payroll jobs during the April-July period as compared with the same period a year ago. All industry sectors lost jobs except construction and federal civilian jobs. The leisure and hospitality sector accounted for 58.7 percent of the total job loss at 67,500. Natural resource, mining, & construction sector gained 0.5 percent or 200 jobs, federal civilian job count was flat during this period. Overall, statewide non-agriculture payroll jobs decreased by 17.7 percent in the second quarter of 2020.

Hawaii initial unemployment claims started to rise mid-March and peaked at 53,112 during the first week of April and then gradually declined. During the second week of August, initial unemployment claims were still above 5,000 per week. During 2012-2019 period, the weekly initial unemployment claims averaged 1,442 per week.

Visitor arrivals to the State during the second quarter of 2020 totaled 30,748, a decrease of 98.8 percent from the same quarter in 2019. However, these visitors stayed longer in Hawaii with average length of stay at 27.3 days. In 2019 the average length of stay was 8.8 days.

Value of private building permits showed a decrease of 14.3 percent during the second quarter of 2020. The largest decrease occurred in the additions and alterations category which was down by 40.7 percent. Value of residential building permits was down by 3.9 percent and the value for commercial and industrial category was up by 101.2 percent during the same period. Though the value of private building permits was down, state government spending on capital investment projects (CIP) was up by 10.7 percent during the same time period. State government spent an average of nearly $1.5 billion a year on CIP projects during the last three years (2017-2019).

As of August 25, 2020, federal funds allocated to Hawaii totaled $8.4 billion. Most of these federal funds has been or will be received as household income and will be spent by Hawaii households. These funds helped mitigate the economic impact from COVID-19.

At the national level, the U.S. economic growth rate was at 0.3 percent during the first quarter and declined by 9.1 percent in the second quarter, as compared to the same quarter in 2019. The Blue Chip Economic Indicators report from Aug. 10, 2020, which is the consensus of 50 economic forecasting organizations, projected that the U.S. economic growth rate for 2020 will decrease by 5.2 percent. The report projected a positive 3.8 percent U.S. economic growth for 2021. The Blue Chip forecasts for foreign countries were all negative except China and India which showed small growth.

Based on the above development, and the delayed pre-test program for transpacific travel coupled with the August 25th two-week Stay-at-Home, Work-from-Home Order for Oahu, DBEDT projects that Hawaii’s economic growth rate, as measured by the real gross domestic product (GDP), will
drop by 12.3 percent in 2020, then will increase at 2.1 percent in 2021, 2.0 percent in 2022, and 1.2 percent in 2023.

Hawaii will welcome 2.9 million visitors in 2020, a decrease of 71.9 percent from the 2019 level. Visitor arrivals will increase to 7.2 million in 2021, 8.3 million in 2022, and 9.4 million in 2023. Visitor spending will decrease 67.8 percent in 2020, then will increase 109.1 percent in 2021, 18.8 percent in 2022, and 14.7 percent in 2023.

Non-agriculture payroll jobs will shrink by 12.1 percent in 2020, then will increase by 8.5 percent in 2021, 2.0 percent in 2022, and 1.5 percent in 2023.

Overall for 2020, the average annual unemployment rate will be at 10.9 percent, then decrease to 7.2 percent in 2021, 6.6 percent in 2022, and 6.3 percent in 2023. These rates are much higher than the average Hawaii unemployment rate of 2.5 percent 2017 to 2019.

Nominal personal income is expected to decrease by 12.1 percent in 2020, then will increase by 5.3 percent in 2021 and 3.9 percent in 2022. Nominal personal income growth rate will be at 3.0 percent in 2023.

Hawaii’s consumer inflation rate, as measured by the Honolulu Consumer Price Index for All Urban Consumers, will increase at rates between 1.4 to 1.8 for the next few years.

Hawaii’s population is expected to be unchanged in 2020 and increase only by 0.1 percent in 2021, and 0.3 percent each year thereafter. Though international migration (usually net immigration) may be halted in 2020, domestic migration (usually net out-migration) is likely to be on hold as well in 2020.

### ACTUAL AND FORECAST OF KEY ECONOMIC INDICATORS FOR HAWAII 2016 TO 2023

<table>
<thead>
<tr>
<th>Economic Indicators</th>
<th>2016</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total population (thousands)</td>
<td>1,421</td>
<td>1,475</td>
<td>1,518</td>
<td>1,571</td>
<td>1,621</td>
<td>1,675</td>
</tr>
<tr>
<td>Visitor arrivals (thousands)</td>
<td>9,689</td>
<td>10,027</td>
<td>9,822</td>
<td>9,616</td>
<td>9,309</td>
<td>9,322</td>
</tr>
<tr>
<td>Visitor expenditures (billion dollars)</td>
<td>22,064</td>
<td>22,064</td>
<td>22,064</td>
<td>22,064</td>
<td>22,064</td>
<td>22,064</td>
</tr>
<tr>
<td>Hawaii CPI (1982=100)</td>
<td>277.1</td>
<td>281.0</td>
<td>285.5</td>
<td>290.2</td>
<td>294.8</td>
<td>300.1</td>
</tr>
<tr>
<td>Personal income (billion dollars)</td>
<td>76,781</td>
<td>81,460</td>
<td>86,961</td>
<td>92,368</td>
<td>98,666</td>
<td>105,964</td>
</tr>
<tr>
<td>State personal income (millions of 2012$)</td>
<td>61,987</td>
<td>62,551</td>
<td>64,010</td>
<td>65,510</td>
<td>66,910</td>
<td>68,910</td>
</tr>
<tr>
<td>Non-agricultural wage &amp; salary jobs (thousands)</td>
<td>600.9</td>
<td>655.7</td>
<td>576.9</td>
<td>626.5</td>
<td>677.9</td>
<td>747.3</td>
</tr>
<tr>
<td>Diviner unemployment rates</td>
<td>2.4</td>
<td>2.7</td>
<td>3.0</td>
<td>3.2</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>Gross domestic product (million dollars)</td>
<td>63,768</td>
<td>67,028</td>
<td>65,478</td>
<td>64,922</td>
<td>65,355</td>
<td>66,782</td>
</tr>
<tr>
<td>Real gross domestic product (millions of 2012$)</td>
<td>62,551</td>
<td>66,910</td>
<td>73,205</td>
<td>74,779</td>
<td>76,304</td>
<td>77,163</td>
</tr>
<tr>
<td>Gross domestic product deflator</td>
<td>113.5</td>
<td>116.5</td>
<td>119.1</td>
<td>120.3</td>
<td>122.4</td>
<td>124.5</td>
</tr>
</tbody>
</table>

Public Fiscal Benefits from the Proposed Development

We have quantified the public fiscal benefits which will flow into the County of Maui and State of Hawaii coffers from Hokuao.

### REAL PROPERTY TAXES (TO COUNTY OF MAUI)

For the County, the primary tax source will be from Real Property Taxes paid by Pulama Lanai as the developers and fee owners of the 150 “for rent” Hokuao homes.

The potential property tax receipts were estimated by applying current prevailing tax rates against the projected cost of the homes as they are finished over time.

We acknowledge that being based on costs, the tax amount may be overstated as Pulama Lanai will likely subsidize significant amounts (or absorb significant losses) by offering inventory at affordable-pricing (or “below-market”) criteria. Yet, as real property taxes are generally based on reproduction costs new less depreciation and un-subsidized market values, the taxes will steadily grow over time as the entire project moves towards open pricing.

It was assumed all of the “for rent” workforce homes would be renter-occupied and not entitled to any Maui County tenants exemption.

The cumulative net assessed value of the Hokuao homes will total $109.3 million upon build-out. The assessments and associated real property taxes based on current “Apartment” tax rates of $5.55 per $1,000 of assessed value resident and other uses during the build-out period and on a stabilized basis are shown below.

### QUANTIFICATION OF PUBLIC FISCAL BENEFITS TO COUNTY AND STATE FROM HOKUAO DEVELOPMENT

<table>
<thead>
<tr>
<th>Economic Indicator</th>
<th>Development and costs</th>
<th>Total</th>
<th>Total</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Development costs</td>
<td>Build</td>
<td>Build</td>
<td>Build</td>
</tr>
<tr>
<td></td>
<td>Out Period</td>
<td>After</td>
<td>After</td>
<td>After</td>
</tr>
<tr>
<td></td>
<td>$13,884,540</td>
<td>$50,500</td>
<td>$50,500</td>
<td>$50,500</td>
</tr>
<tr>
<td></td>
<td>$150,013,918</td>
<td>$13,884,540</td>
<td>$13,884,540</td>
<td>$13,884,540</td>
</tr>
<tr>
<td></td>
<td>$49,333,540</td>
<td>$150,013,918</td>
<td>$150,013,918</td>
<td>$150,013,918</td>
</tr>
</tbody>
</table>

### CBRE

DBEDT 3rd Quarter 2020 Report – Outlook for the Economy
We estimate the County will receive some $2.6 million in real property tax receipts during the build-out/absorption period from 2021 through 2030 and annual collections of $606,500 on a stabilized basis thereafter.

COUNTY SECONDARY RECEIPTS AND TOTAL TAXES

Real Property Taxes (RPT) are forecast to generate about 41 percent of total Maui County General Fund revenues in the 2018 and 2019 fiscal-year budgets, with secondary taxes and fees the forming the remainder. It is logical to assume the Hokuoa development and business activities will generate secondary taxes in proportion to RPT as does the overall Maui community.

The secondary Maui County receipts are equal to 150 percent of the RPT total (60% divided by 40%).

Application of the total tax revenue ratio of 2.50 against the real property taxes received from Hokuoa, plus inclusion of an allowance of $500,000 for potential County impact fees, results in a cumulative total estimated County tax collection from the subject of $6.9 million during the initial projection period through 2030, and $1.5 million annually on a stabilized basis.

INCOME TAXES (TO STATE OF HAWAII)

The State of Hawaii will receive an estimated $7.0 million in primary receipts from State Income Taxes from worker wages, and profits from businesses based on average statewide corporate and personal payments rates of 4.4 percent and 5.1 percent, respectively, applied against the economic model forecasts.

On an annualized basis after stabilization of the community in 2030, the State will generate income taxes of $182,000.

STATE SECONDARY RECEIPTS AND TOTAL TAXES FROM HOKUAO DEVELOPMENT

In recent fiscal years, Income Tax and GET have generated about 74 percent of total State revenues, and secondary taxes and fees the remainder. We anticipate Hokuoa activity will result in similar ratios of secondary taxes flowing from the project relative to the primary sources quantified.

The secondary State receipts are equal to 35 percent times the Income Tax and GET totals (26% divided by 74%).

Application of the total tax ratio of 1.35 to the Hokuoa income tax and GET sums, plus the addition of an allowance for potential State impact fees of $870,000, results in a cumulative total estimated tax collection from the subject of $19.5 million during the initial forecasting period through 2030, and $712,000 annually on a stabilized basis.

GROSS EXCISE TAXES (TO STATE OF HAWAII)

The State will collect Gross Excise Taxes (GET) of 4.17 percent on the gross amount of building contracts, construction supplies, spending by workers and residents, and from the on-going business activity (association and maintenance). During the construction, absorption and ramp-up period these receipts will total $6.8 million and a stabilized amount of $345,000 annually.
## Public Fiscal Benefits from the Proposed Development

### QUANTIFICATION OF PUBLIC FISCAL BENEFITS TO COUNTY AND STATE FROM HOKUAO 2011 DEVELOPMENT

<table>
<thead>
<tr>
<th>Development Period</th>
<th>2011 to 2025</th>
<th>2026 to 2030</th>
<th>Total During Build-Out Period</th>
<th>Total During Build-Out Period After Build-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PUBLIC BENEFITS Breakdown</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. COUNTY REAL PROPERTY TAXES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Value</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Market Homes Net of Real</td>
<td>50</td>
<td>24</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>Estimated Market Homes Net of GET</td>
<td>50</td>
<td>24</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>Vacant Land (76 acres)/Estimated Lots Prior to Leasing</td>
<td>$1,935,950</td>
<td>$2,897,801</td>
<td>$32,283,640</td>
<td>$0</td>
</tr>
<tr>
<td>Market Homes (Market), Total Assessed Value No Exemptions</td>
<td>$91,235,348</td>
<td>$130,314,311</td>
<td>$559,342,468</td>
<td>$685,847</td>
</tr>
<tr>
<td>Workforce Homes (Market), Total Assessed Value No Exemptions</td>
<td>$87,74,896</td>
<td>$104,426,306</td>
<td>$557,997,981</td>
<td>$685,847</td>
</tr>
<tr>
<td>Total Assessed Value</td>
<td>$112,74,815</td>
<td>$164,736,652</td>
<td>$722,678,625</td>
<td>$797,689,227</td>
</tr>
<tr>
<td>Adjusted County Revenues</td>
<td>$1,314,623</td>
<td>$1,326,621</td>
<td>$217,817,327</td>
<td>$250,322</td>
</tr>
<tr>
<td>2. STATE INCOME TAXES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxable Personal Income (Excludes 100% Population)</td>
<td>$56,143,000</td>
<td>$60,395,000</td>
<td>$125,535,000</td>
<td>$1,840,725</td>
</tr>
<tr>
<td>Taxable Corporate Profits</td>
<td>$13,855,000</td>
<td>$15,455,000</td>
<td>$113,950,000</td>
<td>$860,975</td>
</tr>
<tr>
<td>Personal Taxes Paid</td>
<td>$9,873,679</td>
<td>$13,265,492</td>
<td>$217,817,327</td>
<td>$217,817,327</td>
</tr>
<tr>
<td>Corporate Taxes Paid</td>
<td>$479,013</td>
<td>$624,611</td>
<td>$113,950,000</td>
<td>$113,950,000</td>
</tr>
<tr>
<td><strong>TOTAL STATE INCOME TAXES</strong></td>
<td>$10,352,692</td>
<td>$13,889,103</td>
<td>$217,817,327</td>
<td>$217,817,327</td>
</tr>
<tr>
<td>3. GROSS REAL ESTATE TAX</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Assessed Value</td>
<td>$193,718,415</td>
<td>$282,098,887</td>
<td>$475,817,302</td>
<td>$109,283,292</td>
</tr>
<tr>
<td>Workforce Homes (Rentals), Total Assessed Value No Exemptions</td>
<td>$81,048,889</td>
<td>$123,194,311</td>
<td>$204,243,200</td>
<td>$49,277,724</td>
</tr>
<tr>
<td>Market Homes (Rentals), Total Assessed Value No Exemptions</td>
<td>$99,333,540</td>
<td>$150,013,918</td>
<td>$249,347,458</td>
<td>$60,005,567</td>
</tr>
<tr>
<td>Vacant Land/Finished Lots</td>
<td>$18,336,000</td>
<td>$54,843,500</td>
<td>$73,179,500</td>
<td>$18,336,000</td>
</tr>
<tr>
<td>Total Non-Residential</td>
<td>$188,336,000</td>
<td>$247,957,829</td>
<td>$521,326,358</td>
<td>$151,612,292</td>
</tr>
<tr>
<td>AGGREGATE TAX REVENUE</td>
<td>$11,761,693</td>
<td>$17,951,463</td>
<td>$33,713,156</td>
<td>$3,288,330</td>
</tr>
</tbody>
</table>

### QUANTIFICATION OF PUBLIC FISCAL BENEFITS TO COUNTY AND STATE FROM HOKUAO DEVELOPMENT

All Amounts Expressed in Constant 2020 Dollars

### TOTAL COUNTY AND STATE DIRECT AND SECONDARY TAX RECEIPTS

- **TOTAL GROSS PUBLIC REVENUES**
  - Real Property Taxes To County of Maui: $1,034,596
  - Adjusted for Other Proportional Taxes: $20,000
  - Total: $1,054,596

- **ADJUSTED COUNTY REVENUES**
  - $1,034,596
  - $13,978,000
  - $15,012,596

- **ADJUSTED COUNTY REVENUES TO COUNTY**
  - $1,034,596

- **ADJUSTED COUNTY REVENUES TO STATE**
  - $9,014,896

### TOTAL COUNTY AND STATE DIRECT AND SECONDARY TAX RECEIPTS

- **TOTAL COUNTY AND STATE DIRECT AND SECONDARY TAX RECEIPTS**
  - $1,034,596
  - $13,978,000
  - $15,012,596

The full page integrated fiscal benefits model is shown on the following page.

---

**Source:** CBRE
Public Opinion Regarding the Proposed Development

A 9-question multiple choice survey was emailed on July 31, 2020 to various community members regarding the Hokuao project. The purpose of the survey was to measure public interest in the project. The survey was distributed to 18 community members, whose contacts were provided to us by Pulama Lanai. As of August 10th, 2020, only one response was submitted by the interviewees. A copy of the survey is contained the Addenda.

Based on our past experience in similar projects and discussion with market participants throughout our study period, we conclude the lack of responses and discussion with other community members was indicative of two perspectives:

1. The COVID Pandemic and its economic impacts are overwhelming other non-related community issues and placing stress on its members and the entitlement process; and,
2. The Lanai community appears to be well-informed regarding Hokuao, and development is an accepted outcome.

The State of Hawaii is in a midst of a global pandemic. Interviewees most likely have their attention on dealing with the pandemic as opposed to responding to a survey of an already approved project.

MARKET PARTICIPANT INTERVIEWS

Another way to measure opinion regarding the proposed development would be to interview local realtors/brokers who interact with the Lanai market and understand the needs of resident and non-resident buyers.

We talked to several realtors who both lived and/or took part in transactions on Lanai. The realtors asked that their names not be included due to concerns over being named in a public document within the tight community.

Summarized observations from the interviews:

- A local family on Lanai could probably afford at most a home between the range of $400,000 to $500,000. Generational housing on Lanai is an important aspect to consider as the whole family will move together as one. It can be very difficult to meet the needs of an entire family. Due to the lack of high paying jobs and economic opportunities many families need multiple incomes to purchase a home.
- Project amenities such as a community park would be considered desirable if it has space for BBQ and installed picnic tables and park benches.
- During the interviews it was mentioned that the housing market on Lanai was doing far better than anticipated. Neighbor Island and non-resident buyers were still active in the market despite the pandemic.
Assumptions and Limiting Conditions

1. CBRE, Inc. through its appraiser (collectively, “CBRE”) has inspected through reasonable observation the subject property. However, it is not possible or reasonably practicable to personally inspect conditions beneath the soil and the entire interior and exterior of the improvements on the subject property. Therefore, no representation is made as to such matters.

2. The report, including its conclusions and any portion of such report (the “Report”), is as of the date set forth in the letter of transmittal and based upon the information, market, economic, and property conditions and projected levels of operation existing as of such date. The dollar amount of any conclusion as to value in the Report is based upon the purchasing power of the U.S. Dollar as such date. The Report is subject to change as a result of fluctuations in any of the foregoing. CBRE has no obligation to revise the Report to reflect any such fluctuations or other events or conditions which occur subsequent to such date.

3. Unless otherwise expressly noted in the Report, CBRE has assumed that:
   (i) Title to the subject property is clear and marketable and that there are no recorded or unrecorded matters or exceptions to title that would adversely affect marketability or value. CBRE has not examined title records (including without limitation liens, encumbrances, easements, deed restrictions, and other conditions that may affect the title or use of the subject property) and makes no representations relative to the title or representations on the use of the subject property. Insurance against financial loss that may arise out of defects in title should be sought from a qualified title insurance company.
   (ii) Existing improvements on the subject property conform to applicable local, state, and federal building codes and ordinances, are structurally sound and seismically safe, and have been built and repaired in a workmanlike manner according to standard practices; all building systems (mechanical/electrical, HVAC, elevator, plumbing, etc.) are in good working order with no major deferred maintenance or repair required; and the roof and exterior are in good condition and free from intrusion by the elements. CBRE has not retained independent structural, mechanical, electrical, or civil engineers in connection with this appraisal and, therefore, makes no representations relative to the condition of improvements. CBRE appraisers are not engineers and are not qualified to judge matters of an engineering nature, and furthermore structural problems or building system problems may not be visible. It is expressly assumed that any purchaser would, as a precondition to closing a sale, obtain a satisfactory engineering report relative to the structural integrity of the property and the integrity of building systems.
   (iii) Any proposed improvements, on or off-site, as well as any alterations or repairs considered will be completed in a workmanlike manner according to standard practices.
   (iv) Hazardous materials are not present on the subject property. CBRE is not qualified to detect such substances.
   (v) The presence of substances such as asbestos, urea formaldehyde foam insulation, contaminated groundwater, mold, or other potentially hazardous materials may affect the value of the property.
   (vi) No mineral deposit or subsurface rights of value exist with respect to the subject property, whether gas, liquid, or solid, and no air or development rights of value may be transferred. CBRE has not considered any rights associated with extraction or exploration of any resources, unless otherwise expressly noted in the Report.
   (vii) There are no past, present, or related public initiatives, governmental development controls, rent controls, or changes in the present zoning ordinances or regulations governing use, density, or shape that would significantly affect the value of the subject property.
   (viii) All required licenses, certificates of occupancy, consents, or other legislative or administrative authority from any local, state, or national government or private entity or organization have been or can be readily obtained or renewed for any use on which the Report is based.
   (ix) The subject property and its use, management, and operation are in full compliance with all applicable federal, state, and local regulations, laws, and restrictions, including without limitation environmental laws, seismic hazards, flight patterns, decibel levels/noise envelopes, fire hazards, hillside ordinances, density, allowable uses, building codes, permits, and licenses.
   (x) The subject property is in full compliance with the Americans with Disabilities Act (ADA). CBRE is not qualified to assess the subject property’s compliance with the ADA, notwithstanding any discussion of possible readily achievable barrier removal construction items in the Report.

4. CBRE has assumed that all documents, data and information furnished by or on behalf of the client, property owner, or owner’s representative are accurate and correct, unless otherwise expressly noted in the Report. Such data and information include, without limitation, numerical street addresses, lot and block numbers, Assessor’s Parcel Numbers, land dimensions, square footage areas of the land, dimensions of the improvements, grass building areas, net rentable areas, usable areas, unit count, room count, rent schedules, income data, historical operating expenses, budgets, and related data. Any error in any of the above could have a substantial impact on the Report. Accordingly, if any such errors are subsequently made known to CBRE, CBRE reserves the right to amend the Report, which may include the conclusions of the Report. CBRE assumes no responsibility for any conditions regarding the foregoing, or for any expertise or knowledge required to discover them. Any user of the Report is urged to retain an expert in the applicable field(s) for information regarding such conditions.

5. CBRE has assumed that all, data and information furnished by or on behalf of the client, property owner, or owner’s representative are accurate and correct, unless otherwise expressly noted in the Report. Such data and information include, without limitation, numerical street addresses, lot and block numbers, Assessor’s Parcel Numbers, land dimensions, square footage areas of the land, dimensions of the improvements, grass building areas, net rentable areas, usable areas, unit count, room count, rent schedules, income data, historical operating expenses, budgets, and related data. Any error in any of the above could have a substantial impact on the Report. Accordingly, if any such errors are subsequently made known to CBRE, CBRE reserves the right to amend the Report, which may include the conclusions of the Report. CBRE assumes no responsibility for any conditions regarding the foregoing, or for any expertise or knowledge required to discover them. Any user of the Report is urged to retain an expert in the applicable field(s) for information regarding such conditions.

6. Any cash flows included in the analysis are forecasts of estimated future operating characteristics based upon the information and assumptions contained in the Report. Any projections of income, expenses and economic conditions utilized in the Report, including such cash flows, should be considered as only estimates of the expectations of future income and expenses as of the date of the Report and not predictions of the future. Actual results are affected by a number of factors outside the control of CBRE, including, but not limited to, fluctuating economic, market, and property conditions. Actual results may ultimately differ from these projections, and CBRE does not warrant any such projections.

7. The Report contains professional opinions and is expressly not intended to serve as any warranty, assurance or guarantee of any particular value of the subject property. Other appraisers may reach different conclusions as to the value of the subject property. Furthermore, market value is highly related to exposure time, promotion efforts, terms, motivation, or offering of the subject property. CBRE reserves the right to amend the Report for the sole purpose of providing the intended user with CBRE’s independent professional opinion of the value of the subject property as of the date of the Report. Accordingly, CBRE shall not be liable for any losses that arise from any investment or lending decisions based upon the information or statements contained in the Report, or the client’s reliance on such information or statements. CBRE assumes no responsibility for any conditions arising out of the user’s failure to become familiar with and understand the same.

8. CBRE assumes no responsibility for any costs or consequences arising due to the need, or the lack of need, for flood hazard insurance. An agent for the Federal Flood Insurance Program should be contacted to determine the actual need for Flood Hazard Insurance.

9. Acceptance or use of the Report constitutes full acceptance of these Assumptions and Limiting Conditions and any special assumptions set forth in the Report. It is the responsibility of the user of the Report to read in full, comprehend and thus become aware of all such assumptions and limiting conditions. CBRE assumes no responsibility for any situation arising out of the user’s failure to become familiar with and understand the same.

10. The Report applies to the property as a whole only, and any prorations or division of the title into fractional interests will invalidate such conclusions, unless the Report expressly assumes such pro ration or division of interests.
13. The allocations of the total value estimate in the Report between land and improvements apply only to the existing use of the subject property. The allocations of values for each of the land and improvements are not intended to be used with any other property or appraisal and are not valid for any such use.

14. The maps, plots, sketches, graphs, photographs, and exhibits included in this Report are for illustration purposes only and shall be utilized only to assist in visualizing matters discussed in the Report. No such items shall be removed, reproduced, or used apart from the Report.

15. The Report shall not be duplicated or provided to any unintended users in whole or in part without the written consent of CBRE, which consent CBRE may withhold in its sole discretion. Exempt from this restriction is duplication for the internal use of the intended user and its attorneys, accountants, or advisors for the sole benefit of the intended user. Also exempt from this restriction is transmission of the Report pursuant to any requirement of any court, governmental authority, or regulatory agency having jurisdiction over the intended user; provided that the Report and its contents shall not be published, in whole or in part, in any public document without the written consent of CBRE, which consent CBRE may withhold in its sole discretion. Finally, the Report shall not be made available to the public or otherwise used in any offering of the property or any security, as defined by applicable law. Any unintended user who may possess the Report is advised that it shall not rely upon the Report or its conclusions and that it should rely on its own appraisers, advisors and other consultants for any decision in connection with the subject property. CBRE shall have no liability or responsibility to any such unintended user.
## MARKET STUDY AND ABSORPTION TABLES

### Addendum A

### PROJECTED DEVELOPMENT AND ABSORPTION OF HOKUAO INVENTORY

<table>
<thead>
<tr>
<th>Year (Estimated Calendar)</th>
<th>Project</th>
<th>Development Activity</th>
<th>Workforce Housing Homes Occupied</th>
<th>Market-Priced Homes Occupied</th>
<th>Total Units Absorbed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Long Term Residential Rental</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Annually</td>
<td>Cumulatively</td>
<td>Annually</td>
</tr>
<tr>
<td>2020</td>
<td>1</td>
<td>Entitlement</td>
<td></td>
<td>Pre-Leasing Begins (1)</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>2</td>
<td>Site Prep. &amp; Infrastructure Emplacement</td>
<td>20</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>2022</td>
<td>3</td>
<td>Initial Homes Constructed and Leased</td>
<td>20</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>2023</td>
<td>4</td>
<td>Home Construction and Leasing Continues</td>
<td>20</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>2024</td>
<td>5</td>
<td>Home Construction and Leasing Continues</td>
<td>16</td>
<td>76</td>
<td>4</td>
</tr>
<tr>
<td>2025</td>
<td>6</td>
<td>Home Construction and Leasing Continues</td>
<td>0</td>
<td>76</td>
<td>20</td>
</tr>
<tr>
<td>2026</td>
<td>7</td>
<td>Home Construction and Leasing Continues</td>
<td>0</td>
<td>76</td>
<td>20</td>
</tr>
<tr>
<td>2027</td>
<td>8</td>
<td>Home Construction and Leasing Continues</td>
<td>0</td>
<td>76</td>
<td>20</td>
</tr>
<tr>
<td>2028</td>
<td>9</td>
<td>Final Homes Constructed and Leased</td>
<td>0</td>
<td>76</td>
<td>10</td>
</tr>
<tr>
<td>2029</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2030</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Pre-Leasings are reservation agreements pending completion of the homes and occupancy.

Source: CBRE
TABLE 3

QUANTIFICATION OF HOUSING UNIT DEMAND FOR LANAI 2020 TO 2035

<table>
<thead>
<tr>
<th>Year</th>
<th>Current Required</th>
<th>ID</th>
<th>Total Mid. Period Demand</th>
<th>Total Market Demand</th>
<th>Total L&amp;M Demand</th>
<th>Population Growth Rate</th>
<th>Periodic Housing Unit Demand</th>
<th>Annual Demanded</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>2,135</td>
<td>1,902%</td>
<td>3,000</td>
<td>3,154</td>
<td>3,411</td>
<td>0.90% annually</td>
<td>1,500</td>
<td>2,002</td>
</tr>
<tr>
<td>2025</td>
<td>2,440</td>
<td>1,902%</td>
<td>3,154</td>
<td>3,411</td>
<td>3,660</td>
<td>0.90% annually</td>
<td>1,500</td>
<td>2,020</td>
</tr>
<tr>
<td>2030</td>
<td>2,440</td>
<td>1,902%</td>
<td>3,154</td>
<td>3,411</td>
<td>3,911</td>
<td>0.90% annually</td>
<td>1,500</td>
<td>2,047</td>
</tr>
<tr>
<td>2035</td>
<td>2,440</td>
<td>1,902%</td>
<td>3,154</td>
<td>3,411</td>
<td>4,162</td>
<td>0.90% annually</td>
<td>1,500</td>
<td>2,075</td>
</tr>
</tbody>
</table>

Notes:
- We have assumed a growth rate of 0.9% annually, which is consistent with historical growth rates.
- The total market demand includes both current and additional housing units.
- The total L&M demand is calculated based on the maximum demand identified in the population projection study.
- Annual demand for periodic housing units is calculated based on the periodic housing unit demand.

Resident Population and Housing Unit Estimates from the U.S. Census Bureau for Lanai City GDP through 2018

<table>
<thead>
<tr>
<th>Year</th>
<th>2020</th>
<th>2030</th>
<th>2040</th>
<th>2050</th>
<th>2060</th>
<th>2070</th>
<th>2080</th>
<th>2090</th>
<th>2100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Res. Pop.</td>
<td>2,022</td>
<td>2,075</td>
<td>2,200</td>
<td>2,400</td>
<td>2,600</td>
<td>2,800</td>
<td>3,000</td>
<td>3,200</td>
<td>3,400</td>
</tr>
<tr>
<td>Annual Change</td>
<td>2.67%</td>
<td>2.44%</td>
<td>2.39%</td>
<td>2.34%</td>
<td>2.39%</td>
<td>2.44%</td>
<td>2.49%</td>
<td>2.54%</td>
<td>2.60%</td>
</tr>
</tbody>
</table>

Notes:
- The resident population estimates are based on the U.S. Census Bureau data for Lanai City GDP through 2018.
- The annual change rate is calculated based on the historical growth rate.

Calculation of Mid-Period Periodic Housing Unit Demand

Annual Needed Units = \( \frac{\text{Total Mid. Period Demand}}{\text{Periodic Housing Unit Demand}} \)

Annual Demanded = \( \frac{\text{Total Mid. Period Demand}}{\text{Periodic Housing Unit Demand}} \)

Resident Production and Additions

<table>
<thead>
<tr>
<th>Year</th>
<th>2020</th>
<th>2030</th>
<th>2040</th>
<th>2050</th>
<th>2060</th>
<th>2070</th>
<th>2080</th>
<th>2090</th>
<th>2100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>2,135</td>
<td>2,135</td>
<td>2,135</td>
<td>2,135</td>
<td>2,135</td>
<td>2,135</td>
<td>2,135</td>
<td>2,135</td>
<td>2,135</td>
</tr>
<tr>
<td>Additions</td>
<td>0.902%</td>
<td>0.902%</td>
<td>0.902%</td>
<td>0.902%</td>
<td>0.902%</td>
<td>0.902%</td>
<td>0.902%</td>
<td>0.902%</td>
<td>0.902%</td>
</tr>
</tbody>
</table>

Notes:
- The resident production and additions are based on the historical data for Lanai City GDP through 2018.
- The additions rate is calculated based on the historical growth rate.
### TABLE 4

**FINANCIAL CHARACTERISTICS OF HOUSEHOLDS LANAI FROM US CENSUS AMERICAN COMMUNITY SURVEY ESTIMATES FOR 2018**

<table>
<thead>
<tr>
<th>Household Income</th>
<th>Total LANAI Occupied Housing Units</th>
<th>Owner-Occupied Housing Units</th>
<th>Renter-Occupied Housing Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent of Total</td>
<td>Number</td>
</tr>
<tr>
<td>$5,000 to $9,999</td>
<td>0</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>$10,000 to $14,999</td>
<td>68</td>
<td>6%</td>
<td>38</td>
</tr>
<tr>
<td>$15,000 to $19,999</td>
<td>27</td>
<td>2%</td>
<td>27</td>
</tr>
<tr>
<td>$20,000 to $24,999</td>
<td>166</td>
<td>14%</td>
<td>104</td>
</tr>
<tr>
<td>$25,000 to $29,999</td>
<td>89</td>
<td>7%</td>
<td>51</td>
</tr>
<tr>
<td>$35,000 to $49,999</td>
<td>172</td>
<td>14%</td>
<td>80</td>
</tr>
<tr>
<td>$50,000 to $74,999</td>
<td>199</td>
<td>16%</td>
<td>117</td>
</tr>
</tbody>
</table>

**Incomes Above 120% of 2020 LANAI Median Household Income**

<table>
<thead>
<tr>
<th></th>
<th>Number</th>
<th>Percent of Total</th>
<th>Number</th>
<th>Percent of Total</th>
<th>Number</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$64,308 to $74,999</td>
<td>85</td>
<td>7%</td>
<td>50</td>
<td>7%</td>
<td>35</td>
<td>7%</td>
</tr>
<tr>
<td>$75,000 to $99,999</td>
<td>177</td>
<td>14%</td>
<td>112</td>
<td>15%</td>
<td>65</td>
<td>13%</td>
</tr>
<tr>
<td>$100,000 to $149,999</td>
<td>179</td>
<td>15%</td>
<td>98</td>
<td>13%</td>
<td>81</td>
<td>17%</td>
</tr>
<tr>
<td>$150,000 or more</td>
<td>66</td>
<td>5%</td>
<td>66</td>
<td>9%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,228</td>
<td>100%</td>
<td>742</td>
<td>100%</td>
<td>485</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Median Household Income of Group</th>
<th>Total Surveyed Units</th>
<th>Owner Occupied</th>
<th>Renter Occupied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>$53,589</td>
<td>$42,977</td>
<td>$50,395</td>
</tr>
</tbody>
</table>

**Percent of Households with Incomes Above 120% of Median**

- Total: 41.3%
- Owner: 43.9%
- Renter: 37.3%

Source: US Census and CBRE

### TABLE 5

**LANAI HOUSEHOLDS BY NUMBERS OF PERSONS**

<table>
<thead>
<tr>
<th></th>
<th>Total Surveyed Units</th>
<th>Owner Occupied</th>
<th>Renter Occupied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unit Count</td>
<td>Percent of Total</td>
<td>Unit Count</td>
</tr>
<tr>
<td>1-person Household</td>
<td>319</td>
<td>25.30%</td>
<td>115</td>
</tr>
<tr>
<td>2-person Household</td>
<td>411</td>
<td>32.60%</td>
<td>270</td>
</tr>
<tr>
<td>3-person Household</td>
<td>204</td>
<td>16.20%</td>
<td>89</td>
</tr>
<tr>
<td>4-or-more person household</td>
<td>327</td>
<td>25.90%</td>
<td>169</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,261</td>
<td>100.00%</td>
<td>643</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Percent of Total Units</th>
<th>Total Surveyed Units</th>
<th>Owner Occupied</th>
<th>Renter Occupied</th>
</tr>
</thead>
<tbody>
<tr>
<td>100.00%</td>
<td>1,261</td>
<td>643</td>
<td>618</td>
</tr>
</tbody>
</table>

**Probable Households Seeking 4-bedroom Housing Units**: 25.90%

Source: US Census and CBRE
### TABLE 6

**LANAI HOUSING UNIT INVENTORY BY NUMBER OF BEDROOMS**

<table>
<thead>
<tr>
<th>Number of Bedrooms</th>
<th>Unit Count</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studio</td>
<td>22</td>
<td>1.43%</td>
</tr>
<tr>
<td>1 Bedroom</td>
<td>142</td>
<td>9.20%</td>
</tr>
<tr>
<td>2 Bedroom</td>
<td>498</td>
<td>32.77%</td>
</tr>
<tr>
<td>3 Bedroom</td>
<td>667</td>
<td>44.52%</td>
</tr>
<tr>
<td>4 Bedroom</td>
<td>164</td>
<td>12.57%</td>
</tr>
<tr>
<td>5 or more Bedroom</td>
<td>0</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

**TOTAL HOUSING UNIT COUNT (1)**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Unit Supply of 4 or More Bedroom Units</td>
<td>194</td>
</tr>
</tbody>
</table>

**Percent of Total Count**

(1) Total may vary from other sources due to inclusion of vacation and second-home units and the survey margin-of-error.

Source: US Census and CBRE.

### TABLE 7

**STRIATED PROJECTIONS OF STANDARD RESIDENT HOUSING UNIT DEMAND BY MEDIAN HOUSEHOLD INCOME LEVEL ON LANAI USING MID-POINT PROJECTIONS 2020 TO 2035**

Expressed in Constant 2020 Dollars

<table>
<thead>
<tr>
<th>Period</th>
<th>Periodic Housing Unit Demand</th>
<th>Total Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2020 to 2025</td>
<td>2026 to 2030</td>
</tr>
<tr>
<td>Less than 80% Median Household Income (Under $42,872 Annually)</td>
<td>32</td>
<td>34</td>
</tr>
<tr>
<td>Percent of Total Demand</td>
<td>23.0%</td>
<td>21.0%</td>
</tr>
<tr>
<td>80% to 120% of Lanai MHI (Between $42,872 and $64,308 Annually)</td>
<td>50</td>
<td>61</td>
</tr>
<tr>
<td>Percent of Total Demand</td>
<td>36.0%</td>
<td>38.0%</td>
</tr>
<tr>
<td>120% and Above Lanai MHI (Over $64,308 Annually)</td>
<td>57</td>
<td>65</td>
</tr>
<tr>
<td>Percent of Total Demand</td>
<td>41.0%</td>
<td>41.0%</td>
</tr>
<tr>
<td>Total Market Demand</td>
<td>139</td>
<td>160</td>
</tr>
</tbody>
</table>

Note: The estimated median household income for the island of Lanai in 2020 was estimated at $53,590 for a four-person household; the accepted median baseline.

Source: Maui County, DBEDT, MLS, Leading Banks and CBRE.
### Table 8
**Division of Projected Demand by Unit Type for Housing Units on the Island of Lanai 2020 to 2035**

<table>
<thead>
<tr>
<th></th>
<th>2020 to 2025</th>
<th>2026 to 2030</th>
<th>2031 to 2035</th>
<th>Total Demand 2020-2035</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single Family Homes &amp; Lots</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of Total</td>
<td>77%</td>
<td>76%</td>
<td>76%</td>
<td>76%</td>
</tr>
<tr>
<td><strong>Multifamily Units</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of Total</td>
<td>23%</td>
<td>24%</td>
<td>24%</td>
<td>24%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>139</td>
<td>160</td>
<td>166</td>
<td>465</td>
</tr>
<tr>
<td>Percent of Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: CBRE

### Table 9
**Island of Lanai Multiple Listing Service Transaction Data**

#### Year-End Market Sales Price

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family</td>
<td>$443,000</td>
<td>$391,000</td>
<td>$268,000</td>
<td>$270,000</td>
<td>$249,000</td>
<td>$200,000</td>
<td>$280,000</td>
<td>$348,000</td>
<td>$379,000</td>
<td>$414,000</td>
<td>$383,000</td>
<td>$466,000</td>
<td>$450,000</td>
</tr>
<tr>
<td>Condominiums</td>
<td>$1,270,000</td>
<td>$1,875,000</td>
<td>$1,155,000</td>
<td>$1,022,700</td>
<td>$529,000</td>
<td>$977,000</td>
<td>$1,235,000</td>
<td>$1,800,000</td>
<td>$2,122,500</td>
<td>$895,000</td>
<td>$1,635,000</td>
<td>$1,913,000</td>
<td>$880,000</td>
</tr>
<tr>
<td>Vacant Land</td>
<td>$1,115,000</td>
<td>$0</td>
<td>$0</td>
<td>$1,964,250</td>
<td>$350,000</td>
<td>$445,000</td>
<td>$0</td>
<td>$350,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

#### Year-End Number of Sales

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>14</td>
<td>19</td>
<td>19</td>
<td>21</td>
<td>20</td>
<td>21</td>
<td>19</td>
<td>19</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>Condominiums</td>
<td>2</td>
<td>2</td>
<td>8</td>
<td>23</td>
<td>26</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td>19</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Vacant Land</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

#### Year-End Sales Volume

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family</td>
<td>$3,486,000</td>
<td>$4,790,700</td>
<td>$2,813,000</td>
<td>$4,381,500</td>
<td>$9,146,500</td>
<td>$16,491,900</td>
<td>$16,890,000</td>
<td>$3,819,000</td>
<td>$7,916,000</td>
<td>$7,611,000</td>
<td>$10,508,000</td>
<td>$15,508,000</td>
<td>$13,493,515</td>
</tr>
<tr>
<td>Condominiums</td>
<td>$3,950,000</td>
<td>$9,425,000</td>
<td>$3,210,000</td>
<td>$9,645,000</td>
<td>$19,610,250</td>
<td>$14,615,200</td>
<td>$10,875,000</td>
<td>$3,924,000</td>
<td>$4,170,000</td>
<td>$12,264,500</td>
<td>$8,200,000</td>
<td>$2,073,000</td>
<td>$4,532,640</td>
</tr>
<tr>
<td>Vacant Land</td>
<td>$2,230,000</td>
<td>$20</td>
<td>$0</td>
<td>$3,912,500</td>
<td>$350,000</td>
<td>$2,212,500</td>
<td>$0</td>
<td>$1,690,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

**Note:** 2020 data has been annualized.

### Source
CBRE
INCOME LIMITS FOR RENTAL UNITS (BY FAMILY SIZE & PERCENTAGE OF MEDIAN FAMILY INCOME)

<table>
<thead>
<tr>
<th>Family Size</th>
<th>Percentage of Median Family Income</th>
<th>Income Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2 Person</td>
<td>80%</td>
<td>$38,900</td>
</tr>
<tr>
<td></td>
<td>90%</td>
<td>$45,600</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>$53,590</td>
</tr>
</tbody>
</table>

AFFORDABLE RENT GUIDELINES (BY UNIT SIZE & PERCENTAGE OF MEDIAN FAMILY INCOME)

* The estimated median household income for the Island of Lanai in 2020 was estimated at $53,590 for a four-person household, the accepted median baseline.

Source: County of Maui, Department of Housing and Human Concerns, Housing Division
### Table 12
**Projection of Potential Subject Unit Absorption Using the Residual Method Based on Total Demand for Residential Units on Lanai**

<table>
<thead>
<tr>
<th>Segment</th>
<th>Total Units</th>
<th>2020-2025</th>
<th>2026-2030</th>
<th>2031-2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-Point Demand (Assuming 50% of Proposed Inventory is Developed)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assumed Supply</td>
<td>113</td>
<td>33</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Island Residential Unit</td>
<td>465</td>
<td>139</td>
<td>160</td>
<td>166</td>
</tr>
<tr>
<td>Shortage or (Excess) Supply</td>
<td>353</td>
<td>106</td>
<td>120</td>
<td>126</td>
</tr>
<tr>
<td>Potential Residual Subject Demand</td>
<td>353</td>
<td>106</td>
<td>120</td>
<td>126</td>
</tr>
</tbody>
</table>

- Periods in which Hokuoa inventory of 150 homes would be absorbed. The rounded absorption indicated by this method is about 8 years.

Source: Maui County, Developers/Agents, & CBRE.

### Table 13
**Summary of Subject Projected Demand Levels Using the Market Shares Method**

Assuming Pre-Leasing of 150 Subject Units Begin in 2021

<table>
<thead>
<tr>
<th>Lease Year</th>
<th>Total Island Residential Unit Demand</th>
<th>Effective Subject Unit Share</th>
<th>Indicated Total Subject Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>1</td>
<td>28</td>
<td>80.00%</td>
</tr>
<tr>
<td>2023</td>
<td>2</td>
<td>28</td>
<td>80.00%</td>
</tr>
<tr>
<td>2024</td>
<td>3</td>
<td>28</td>
<td>75.00%</td>
</tr>
<tr>
<td>2025</td>
<td>4</td>
<td>28</td>
<td>60.00%</td>
</tr>
<tr>
<td>2026</td>
<td>5</td>
<td>28</td>
<td>60.00%</td>
</tr>
<tr>
<td>2027</td>
<td>6</td>
<td>32</td>
<td>60.00%</td>
</tr>
<tr>
<td>2028</td>
<td>7</td>
<td>32</td>
<td>40.00%</td>
</tr>
<tr>
<td>2029</td>
<td>8</td>
<td>32</td>
<td>40.00%</td>
</tr>
</tbody>
</table>

**Analysis Conclusions & Totals**

| 7.7 Years | 235 | 63.80% | 150 |

Source: CBRE
## ECONOMIC IMPACT ANALYSIS TABLES

### TABLE A

<table>
<thead>
<tr>
<th>Analysis Item</th>
<th>Cumulative During Build-Out Period</th>
<th>Stabilized Annually Thereafter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Capital Investment</td>
<td>$115,182,583</td>
<td></td>
</tr>
<tr>
<td>Local Contractor's Profits</td>
<td>$11,518,258</td>
<td></td>
</tr>
<tr>
<td>Local Supplier's Profits</td>
<td>$4,607,303</td>
<td></td>
</tr>
<tr>
<td>Worker Years of Jobs</td>
<td>687</td>
<td>24</td>
</tr>
<tr>
<td>Employees Wages</td>
<td>$51,956,674</td>
<td>$1,656,960</td>
</tr>
<tr>
<td>De Facto Population</td>
<td>398</td>
<td></td>
</tr>
<tr>
<td>Full-Time Resident Household Income</td>
<td>$70,336,875</td>
<td>$12,057,750</td>
</tr>
<tr>
<td>De Facto Population Expenditures</td>
<td>$34,364,588</td>
<td>$5,425,988</td>
</tr>
<tr>
<td>Total Lanai island “Base” Economic Impact</td>
<td>$166,282,028</td>
<td>$8,282,948</td>
</tr>
</tbody>
</table>

**Accounting for All Direct Impacts**

| Source: CBRE |

| County of Maui Gross Tax Receipts    | $6,933,043 | $1,516,306 |
| State of Hawaii Gross Tax Receipts   | $19,463,322 | $712,220   |
### TABLE A-1

**PROJECTED HOKUAO BUILD-OUT TIMING**

<table>
<thead>
<tr>
<th>Year</th>
<th>Project Year</th>
<th>Activity</th>
<th>Homes Built by Developers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Annually</td>
</tr>
<tr>
<td>2020</td>
<td>1</td>
<td>Entitlements</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>2</td>
<td>Clearing, grubbing, infrastructure emplacement</td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>3</td>
<td>Initial homes constructed &amp; closed</td>
<td>20</td>
</tr>
<tr>
<td>2023</td>
<td>4</td>
<td>Home construction &amp; closings continue</td>
<td>20</td>
</tr>
<tr>
<td>2024</td>
<td>5</td>
<td>Home construction &amp; closings continue</td>
<td>20</td>
</tr>
<tr>
<td>2025</td>
<td>6</td>
<td>Home construction &amp; closings continue</td>
<td>20</td>
</tr>
<tr>
<td>2026</td>
<td>7</td>
<td>Home construction &amp; closings continue</td>
<td>20</td>
</tr>
<tr>
<td>2027</td>
<td>8</td>
<td>Home construction &amp; closings continue</td>
<td>20</td>
</tr>
<tr>
<td>2028</td>
<td>9</td>
<td>Home construction &amp; closings continue</td>
<td>20</td>
</tr>
<tr>
<td>2029</td>
<td>10</td>
<td>Final homes constructed &amp; closed</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: CBRE

### TABLE A-2

**PROPOSED DEVELOPMENT SCHEDULE AND ESTIMATED CONSTRUCTION COSTS**

All Amounts Expressed in Constant 2020 Dollars

<table>
<thead>
<tr>
<th>Item</th>
<th>Development and Lease Period</th>
<th>Totals During Build-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2021 to 2025</td>
<td>2026 to 2030</td>
</tr>
<tr>
<td>Infrastructure Emplacement (1)</td>
<td>$40,007,958</td>
<td>$40,007,958</td>
</tr>
<tr>
<td>Residential Construction (Combined Workforce and Market Homes, Average Overall Costs, including Sitework and Landscaping)</td>
<td>$50,116,417</td>
<td>$25,058,208</td>
</tr>
</tbody>
</table>

**TOTAL PERIODIC CONSTRUCTION COSTS**

- $90,124,375
- $25,058,208
- $115,182,583

Supplier Profits

- $3,604,975
- $1,002,328
- $4,607,303

(1) Includes site work, on and off-site infrastructure, roadways and contingency; engineering & architecture, permits and study fees and GET for total project.

Source: CBRE
# TABLE A-3

## ESTIMATED YEARLY FULL-TIME EQUIVALENT EMPLOYMENT POSITIONS CREATED BY DEVELOPMENT

<table>
<thead>
<tr>
<th></th>
<th>Development and Lease Period</th>
<th>Totals During Build-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2021 to 2025</td>
<td>2026 to 2030</td>
</tr>
<tr>
<td>Infrastructure Emplacement (1)</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Residential Units</td>
<td>251</td>
<td>125</td>
</tr>
<tr>
<td><strong>Total Periodic Construction Jobs</strong></td>
<td>351</td>
<td>125</td>
</tr>
<tr>
<td>Maintenance &amp; Common Element (2)</td>
<td>11</td>
<td>29</td>
</tr>
<tr>
<td>Total FTE Jobs in Place at End of Period</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>Off-Site Employment (3)</td>
<td>120</td>
<td>51</td>
</tr>
<tr>
<td>Total FTE Jobs in Place at End of Period</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td><strong>TOTAL PERIODIC WORKER YEARS</strong></td>
<td>481</td>
<td>205</td>
</tr>
<tr>
<td><strong>TOTAL END-OF-PERIOD PERMANENT JOB COUNT</strong></td>
<td>11</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Stabilized Annually</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

(1) Infrastructure construction employment estimated at 1 worker-year for every $400,000 in costs. Vertical construction employment estimated at 1 worker-year for every $200,000 in costs. Includes all direct employment associated with construction, on and off-site.
(2) Includes common element administration and maintenance staff of 3 jobs, and single family home services (landscaping, maintenance & renovation) at one FTE for every 10 homes. Includes Palama Lane central employees and outside contractors.
(3) Estimated at one cumulative off-site employment position for every three on-site positions.

Source: CBRE

# TABLE A-4

## ESTIMATED YEARLY EMPLOYEE WAGES CREATED BY DEVELOPMENT

All Amounts Expressed in Constant 2020 Dollars

<table>
<thead>
<tr>
<th></th>
<th>Development and Lease Period</th>
<th>Totals During Build-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2021 to 2025</td>
<td>2026 to 2030</td>
</tr>
<tr>
<td>Infrastructure Emplacement (1)</td>
<td>$7,875,567</td>
<td>$7,875,567</td>
</tr>
<tr>
<td>Residential Units</td>
<td>$19,730,833</td>
<td>$9,865,417</td>
</tr>
<tr>
<td><strong>Total Periodic Construction Wages</strong></td>
<td>$27,606,400</td>
<td>$9,865,417</td>
</tr>
<tr>
<td>Maintenance &amp; Common Element (2)</td>
<td>$726,180</td>
<td>$1,971,060</td>
</tr>
<tr>
<td>Off-Site Employment Wages (3)</td>
<td>$6,266,028</td>
<td>$3,520,790</td>
</tr>
<tr>
<td><strong>TOTAL PERIODIC WAGES</strong></td>
<td>$36,599,408</td>
<td>$15,357,766</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Stabilized Annually</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$1,244,880</td>
</tr>
<tr>
<td></td>
<td>$412,080</td>
</tr>
<tr>
<td></td>
<td>$1,656,960</td>
</tr>
</tbody>
</table>

(1) Average annual wage for experienced full-time-equivalent construction worker (all trades) at $78,740 in 2019.
(2) Average annual wage for experienced full-time-equivalent installation, maintenance and repair workers at $69,160 in 2019.
(3) Average annual wage for experienced full-time-equivalent general worker at $68,680, the 2019 average wage for all "Total All Occupations" in the state.


Source: CBRE
### TABLE A-5

**ESTIMATED RESIDENT POPULATION, HOUSEHOLD INCOME AND DISCRETIONARY EXPENDITURES**

All Amounts Expressed In Constant 2020 Dollars

<table>
<thead>
<tr>
<th>Development and Lease Period</th>
<th>2021 to 2025</th>
<th>2026 to 2030</th>
<th>Stabilized</th>
<th>Totals During Build-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Houses Occupied (End of Period)</strong></td>
<td>100</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Married-Both-Parents Family Houses Occupied (End of Period)</strong></td>
<td>60</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of Total Units</td>
<td>50%</td>
<td>40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-Time Resident Average Household Size (persons)</td>
<td>2.65</td>
<td>2.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-Time Resident Average Household Size (persons)</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-Time Residents (100% of Total)</td>
<td>123</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-Time Residents (5% of Total)</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Workforce Single-Parent Family Houses Occupied (End of Period)</strong></td>
<td>50</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of Total Units</td>
<td>50%</td>
<td>52%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-Time Resident Average Household Size (persons)</td>
<td>2.65</td>
<td>2.45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-Time Resident Average Household Size (persons)</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-Time Residents (100% of Total)</td>
<td>133</td>
<td>69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Part-Time Residents (5% of Total)</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Full-Time Resident Population - End of Period</strong></td>
<td>265</td>
<td>398</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Part-Time Resident Population - End of Period</strong></td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total On-Peak Population</strong></td>
<td>265</td>
<td>398</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Resident Household Income (1)**

| | Average Annual End of Period | Total During Period | | | |
|------------------------------|--------------------------|---------------------|-----------------|---------------|
| **Average Annual End of Period** | $8,088,500 | $12,057,750 | $13,057,750 | $70,336,873 |
| **Total During Period** | $20,096,250 | $30,240,625 | | |

**Total Population Expenditures (2)**

| | Average Annual End of Period | Total During Period | | | |
|------------------------------|--------------------------|---------------------|-----------------|---------------|
| **Average Annual End of Period** | $3,617,325 | $5,455,988 | $6,455,988 | $28,466,988 |
| **Total During Period** | $9,040,075 | $13,281,275 | | |

(1) Average resident households at 100% of Area median income of $55,250 in 2020; or $80,385.

(2) For full-time residents assume 10% of gross income for taxes, 30% for housing costs and 15% for utilities/maintenance. Leaving 45% of gross income as net disposable.

For non-full time resident estimated disposable expenditure at average meal spending per visit per day of $218.

Source: CBRE

### TABLE A-6

**SUMMARY OF ECONOMIC IMPACTS ASSOCIATED WITH DEVELOPMENT**

All Amounts Expressed In Constant 2020 Dollars

<table>
<thead>
<tr>
<th>Development and Lease Period</th>
<th>2021 to 2025</th>
<th>2026 to 2030</th>
<th>Totals During Build-Out</th>
<th>Stabilized Annuality</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction Activity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Wages</td>
<td>$27,606,400</td>
<td>$9,865,417</td>
<td>$37,471,816</td>
<td></td>
</tr>
<tr>
<td>Supplier Profits</td>
<td>$3,604,973</td>
<td>$1,002,328</td>
<td>$4,607,301</td>
<td></td>
</tr>
<tr>
<td>Other Construction Costs</td>
<td>$58,913,000</td>
<td>$14,190,643</td>
<td>$73,103,643</td>
<td></td>
</tr>
<tr>
<td><strong>Total Construction Impact</strong></td>
<td>$90,124,375</td>
<td>$25,058,208</td>
<td>$115,182,583</td>
<td></td>
</tr>
<tr>
<td>Maintenance &amp; Common Element Wages</td>
<td>$726,180</td>
<td>$1,977,060</td>
<td>$2,697,240</td>
<td>$1,244,880</td>
</tr>
<tr>
<td>Off-Site Wages</td>
<td>$8,266,828</td>
<td>$3,250,790</td>
<td>$11,787,618</td>
<td>$4,920,900</td>
</tr>
<tr>
<td>Total Project Population Spending</td>
<td>$9,043,313</td>
<td>$25,251,725</td>
<td>$34,295,038</td>
<td>$5,435,988</td>
</tr>
<tr>
<td>Home Maintenance &amp; Repairs (1)</td>
<td>$1,500,000</td>
<td>$750,000</td>
<td>$2,250,000</td>
<td>$1,200,000</td>
</tr>
<tr>
<td><strong>Total Base Economic Impact</strong></td>
<td>$109,660,695</td>
<td>$56,621,333</td>
<td>$166,282,028</td>
<td>$8,282,948</td>
</tr>
</tbody>
</table>

(1) Estimated at average of $500 per home per month.

Source: CBRE
### Table A-7
**Estimates of Total Economic Impact from Subject Construction Using Inter-County Input-Output Model “Type II” Multipliers**

<table>
<thead>
<tr>
<th></th>
<th>Development and Lease Period</th>
<th>Totals During</th>
<th>Stabilized</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
<td>2021 to 2025</td>
<td>2026 to 2030</td>
<td>Build-Out</td>
</tr>
<tr>
<td><strong>Construction Costs</strong></td>
<td>$90,124,375</td>
<td>$25,058,208</td>
<td>$115,182,583</td>
</tr>
<tr>
<td>1. Economic Output Multiplier</td>
<td>2.03</td>
<td>2.03</td>
<td>2.03</td>
</tr>
<tr>
<td>Total State Economic Output</td>
<td>$182,952,481</td>
<td>$50,868,163</td>
<td>$233,820,644</td>
</tr>
<tr>
<td>2. Earnings Multiplier</td>
<td>0.68</td>
<td>0.68</td>
<td>0.68</td>
</tr>
<tr>
<td>Total Increase in State Earnings</td>
<td>$61,284,575</td>
<td>$17,039,582</td>
<td>$78,324,157</td>
</tr>
<tr>
<td>3. State Tax Multipliers</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>Total Increase in State Taxes</td>
<td>$9,228,736</td>
<td>$2,565,961</td>
<td>$11,794,697</td>
</tr>
<tr>
<td>Total State Jobs Created</td>
<td>1,288,888</td>
<td>358,358</td>
<td>1,647,172</td>
</tr>
<tr>
<td><strong>Construction Employment</strong></td>
<td>351</td>
<td>125</td>
<td>476</td>
</tr>
<tr>
<td>5. Direct-Eff Job Multipliers</td>
<td>2.04</td>
<td>2.04</td>
<td>2.04</td>
</tr>
<tr>
<td>Total Direct Jobs Created</td>
<td>715.2</td>
<td>255.6</td>
<td>970.8</td>
</tr>
<tr>
<td><strong>Construction Wages</strong></td>
<td>$37,406,400</td>
<td>$9,865,417</td>
<td>$37,471,816</td>
</tr>
<tr>
<td>Total Increase in Direct Earnings</td>
<td>$44,722,368</td>
<td>$15,561,975</td>
<td>$60,704,343</td>
</tr>
</tbody>
</table>

Source: "2012 Hawaii Inter-County Input-Output Study" (approved August 2016), and CBRE

### Table A-8
**Estimates of Total Economic Impact from Subject Operations Using Inter-County Input-Output Model “Type II” Multipliers for “Services”**

<table>
<thead>
<tr>
<th></th>
<th>Development Year</th>
<th>Totals During</th>
<th>Stabilized</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
<td>2021 to 2025</td>
<td>2026 to 2030</td>
<td>Build-Out</td>
</tr>
<tr>
<td>Household Spending &amp; Maintenance</td>
<td>$10,543,313</td>
<td>$26,071,275</td>
<td>$36,614,568</td>
</tr>
<tr>
<td>1. Economic Output Multiplier</td>
<td>1.95</td>
<td>1.95</td>
<td>1.95</td>
</tr>
<tr>
<td>Total State Economic Output</td>
<td>$20,259,459</td>
<td>$50,383,986</td>
<td>$71,399,446</td>
</tr>
<tr>
<td>2. Earnings Multiplier</td>
<td>0.53</td>
<td>0.53</td>
<td>0.53</td>
</tr>
<tr>
<td>Total Increase in State Earnings</td>
<td>$5,587,956</td>
<td>$13,817,776</td>
<td>$19,405,731</td>
</tr>
<tr>
<td>3. State Tax Multipliers</td>
<td>0.06</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Total Increase in State Taxes</td>
<td>$600,240</td>
<td>$1,499,098</td>
<td>$2,105,399</td>
</tr>
<tr>
<td>4. Total Job Multipliers</td>
<td>15.00</td>
<td>15.00</td>
<td>15.00</td>
</tr>
<tr>
<td>Total State Jobs Created</td>
<td>158.1</td>
<td>391.1</td>
<td>549.3</td>
</tr>
<tr>
<td><strong>Operating Employment</strong></td>
<td>10.7</td>
<td>24.0</td>
<td>34.7</td>
</tr>
<tr>
<td>5. Direct-Eff Job Multipliers</td>
<td>1.57</td>
<td>1.57</td>
<td>1.57</td>
</tr>
<tr>
<td>Total Direct Jobs Created</td>
<td>16.7</td>
<td>37.7</td>
<td>54.4</td>
</tr>
<tr>
<td><strong>Operating Wages</strong></td>
<td>$907,725</td>
<td>$2,469,825</td>
<td>$3,571,550</td>
</tr>
<tr>
<td>6. Direct-Eff Earnings</td>
<td>1.74</td>
<td>1.74</td>
<td>1.74</td>
</tr>
<tr>
<td>Total Increase in Direct Earnings</td>
<td>$1,579,442</td>
<td>$4,287,056</td>
<td>$5,866,497</td>
</tr>
</tbody>
</table>

Source: "2012 Hawaii Inter-County Input-Output Study" (approved August 2016), and CBRE
| TABLE B-3: QUANTIFICATION OF PUBLIC FISCAL BENEFITS TO COUNTY AND STATE FROM HOUSING DEVELOPMENT |
| All Amounts Expressed in Constant 2000 Dollars |

### Public Benefits (Revenue)

#### 1. COUNTY REAL PROPERTY TAXES

- **Assessed Value:**
  - Finished Market Value End of Period: 50
  - Finished Market Value End of Period: 34

- **Real Property Taxes:**
  - Value (100% of Finished Market Value End of Period): $15,351,550
  - Total Assessed Value: $18,169,670
  - Total Real Property Taxes: $5,118,169

#### 2. STATE INCOME TAXES

- **Total Gross Public Revenues:**
  - Total: $5,118,169
  - Total: $5,118,169

- **Total State Income Tax:**
  - $5,118,169

### Addendum C

**PUBLIC FISCAL BENEFIT ASSESSMENT TABLES**
### TABLE B.1

**QUANTIFICATION OF PUBLIC FISCAL BENEFITS TO COUNTY AND STATE FROM HOKUAO 2011 DEVELOPMENT**

All Amounts Expressed in Constant 2020 Dollars

<table>
<thead>
<tr>
<th>Development Period</th>
<th>Development and Lease Period</th>
<th>Totals During Build-Out Period</th>
<th>Stabilized Annually After Build-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021 to 2025</td>
<td>2016 to 2020</td>
<td>2021 to 2025</td>
<td>2016 to 2020</td>
</tr>
</tbody>
</table>

#### PUBLIC BENEFITS (Revenues)

1. **COUNTRY REAL PROPERTY TAXES**

   **Assessed Value**

<table>
<thead>
<tr>
<th>Item</th>
<th>Period 2021-2025</th>
<th>Period 2016-2020</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finished Market Homes End of Period</td>
<td>74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finished Workforce Homes End of Period</td>
<td>76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacant Land (50.3 acres) / Finished Lots Prior to Leasing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market Homes (Exempt), Total Assessed Value w/o Exemptions</td>
<td>$18,335,986</td>
<td>$22,256,649</td>
<td></td>
</tr>
<tr>
<td>Workforce Homes (Exempt), Total Assessed Value w/o Exemptions</td>
<td>$99,333,240</td>
<td>$60,005,567</td>
<td></td>
</tr>
<tr>
<td>Total Assessed Value</td>
<td>$117,669,226</td>
<td>$82,262,216</td>
<td></td>
</tr>
</tbody>
</table>

   **Real Property Taxes**

<table>
<thead>
<tr>
<th>Item</th>
<th>Period 2021-2025</th>
<th>Period 2016-2020</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacant Land / Finished Lots</td>
<td>$23,473</td>
<td>$57,789</td>
<td>$81,262</td>
</tr>
<tr>
<td>Market Homes (Exempt), Total Assessed Value w/o Exemptions</td>
<td>$511,361</td>
<td>$1,133,550</td>
<td>$1,645,911</td>
</tr>
<tr>
<td>Workforce Homes (Exempt), Total Assessed Value w/o Exemptions</td>
<td>$449,821</td>
<td>$273,491</td>
<td>$723,312</td>
</tr>
<tr>
<td>Total Real Property Taxes</td>
<td>$1,104,656</td>
<td>$2,673,317</td>
<td>$3,777,973</td>
</tr>
</tbody>
</table>

   **Source:** CBRE

### TABLE B.2

**QUANTIFICATION OF PUBLIC FISCAL BENEFITS TO COUNTY AND STATE FROM HOKUAO DEVELOPMENT**

All Amounts Expressed in Constant 2020 Dollars

<table>
<thead>
<tr>
<th>Development Period</th>
<th>Development and Lease Period</th>
<th>Totals During Build-Out Period</th>
<th>Stabilized Annually After Build-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>2021 to 2025</td>
<td>2016 to 2020</td>
<td>2021 to 2025</td>
<td>2016 to 2020</td>
</tr>
</tbody>
</table>

#### PUBLIC BENEFITS (Revenues)

1. **COUNTRY REAL PROPERTY TAXES**

   **Assessed Value**

<table>
<thead>
<tr>
<th>Item</th>
<th>Period 2021-2025</th>
<th>Period 2016-2020</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finished Market Homes End of Period</td>
<td>74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finished Workforce Homes End of Period</td>
<td>76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacant Land (50.3 acres) / Finished Lots Prior to Leasing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market Homes (Exempt), Total Assessed Value w/o Exemptions</td>
<td>$18,335,986</td>
<td>$22,256,649</td>
<td></td>
</tr>
<tr>
<td>Workforce Homes (Exempt), Total Assessed Value w/o Exemptions</td>
<td>$99,333,240</td>
<td>$60,005,567</td>
<td></td>
</tr>
<tr>
<td>Total Assessed Value</td>
<td>$117,669,226</td>
<td>$82,262,216</td>
<td></td>
</tr>
</tbody>
</table>

   **Real Property Taxes**

<table>
<thead>
<tr>
<th>Item</th>
<th>Period 2021-2025</th>
<th>Period 2016-2020</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vacant Land / Finished Lots</td>
<td>$23,473</td>
<td>$57,789</td>
<td>$81,262</td>
</tr>
<tr>
<td>Market Homes (Exempt), Total Assessed Value w/o Exemptions</td>
<td>$511,361</td>
<td>$1,133,550</td>
<td>$1,645,911</td>
</tr>
<tr>
<td>Workforce Homes (Exempt), Total Assessed Value w/o Exemptions</td>
<td>$449,821</td>
<td>$273,491</td>
<td>$723,312</td>
</tr>
<tr>
<td>Total Real Property Taxes</td>
<td>$1,104,656</td>
<td>$2,673,317</td>
<td>$3,777,973</td>
</tr>
</tbody>
</table>

   **Source:** CBRE
### Table II-3

**Quantification of Public Fiscal Benefits to County and State from Hokuao Development**

All Amounts Expressed in Constant 2020 Dollars

<table>
<thead>
<tr>
<th>Development Period</th>
<th>2021 to 2025</th>
<th>2026 to 2030</th>
<th>Totals During Build-Out Period</th>
<th>Stabilized Annuity After Build-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Includes All State Taxes Only</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. STATE INCOME TAXES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxable Personal Income (includes 100% Population)</td>
<td>$56,695,658</td>
<td>$65,979,891</td>
<td>$122,293,549</td>
<td>$2,862,735</td>
</tr>
<tr>
<td>Taxable Corporate Profits</td>
<td>$10,893,452</td>
<td>$5,445,267</td>
<td>$16,351,719</td>
<td>$898,995</td>
</tr>
<tr>
<td>Personal Taxes Paid</td>
<td>$2,891,479</td>
<td>$3,246,492</td>
<td>$6,137,971</td>
<td>$143,999</td>
</tr>
<tr>
<td>Corporate Taxes Paid</td>
<td>$6,793,352</td>
<td>$34,461</td>
<td>$71,254</td>
<td>$46,468</td>
</tr>
<tr>
<td><strong>TOTAL STATE INCOME TAXES</strong></td>
<td></td>
<td></td>
<td>$3,370,793</td>
<td>$6,396,744</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$181,444</td>
</tr>
<tr>
<td><strong>4. STATE GROSS EXCISE TAX</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxable Transactions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction &amp; Maintenance Contracts</td>
<td>$64,017,975</td>
<td>$18,942,792</td>
<td>$77,560,767</td>
<td>$2,980,000</td>
</tr>
<tr>
<td>Worker Disproportionate Income Purchases</td>
<td>$30,873,038</td>
<td>$10,264,306</td>
<td>$41,139,344</td>
<td>$1,516,940</td>
</tr>
<tr>
<td>De Facto Population Disproportionate Expenditures</td>
<td>$9,043,313</td>
<td>$2,231,275</td>
<td>$11,274,588</td>
<td>$5,423,988</td>
</tr>
<tr>
<td><strong>TOTAL STATE EXCISE TAX</strong></td>
<td></td>
<td></td>
<td>$149,934,325</td>
<td>$88,292,948</td>
</tr>
</tbody>
</table>

### Table II-4

**Quantification of Public Fiscal Benefits to County and State from Hokuao Development**

All Amounts Expressed in Constant 2020 Dollars

<table>
<thead>
<tr>
<th>Development Period</th>
<th>2021 to 2025</th>
<th>2026 to 2030</th>
<th>Totals During Build-Out Period</th>
<th>Stabilized Annuity After Build-Out</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Includes All County and State Taxes Only</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL GROSS PUBLIC REVENUES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Property Taxes to County of Maui</td>
<td>$1,094,596</td>
<td>$1,088,667</td>
<td>$2,183,263</td>
<td>$646,532</td>
</tr>
<tr>
<td>Adjustment for Other Proportioned Taxes (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
</tr>
<tr>
<td>Adjudged Maui County Revenues</td>
<td>$2,086,496</td>
<td>$2,084,660</td>
<td>$4,171,156</td>
<td>$1,116,304</td>
</tr>
<tr>
<td>Gross In lieu Fees (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Revenues</strong></td>
<td>$3,181,092</td>
<td>$3,173,327</td>
<td>$6,354,419</td>
<td>$1,116,304</td>
</tr>
<tr>
<td>To State (Income Taxes and GFT)</td>
<td>$7,000,765</td>
<td>$5,869,047</td>
<td>$12,869,812</td>
<td>$577,570</td>
</tr>
<tr>
<td>Adjustment for Other Proportioned Taxes (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.35</td>
<td>1.35</td>
<td>1.35</td>
<td>1.35</td>
</tr>
<tr>
<td>Adjusted State Revenues</td>
<td>$10,678,183</td>
<td>$10,716,140</td>
<td>$21,394,323</td>
<td>$712,200</td>
</tr>
<tr>
<td>Gross In lieu Fees</td>
<td>$800,000</td>
<td>$800,000</td>
<td>$1,600,000</td>
<td>$1,600,000</td>
</tr>
<tr>
<td><strong>Total State of Hawai‘i Revenues</strong></td>
<td>$11,478,183</td>
<td>$11,516,140</td>
<td>$23,044,323</td>
<td>$712,200</td>
</tr>
<tr>
<td><strong>AGGREGATE TAX REVENUES</strong></td>
<td>$14,134,672</td>
<td>$11,751,619</td>
<td>$25,886,351</td>
<td>$3,239,525</td>
</tr>
</tbody>
</table>

---

1. Real property taxes comprised 49.2 percent and 39.3 percent of Total Revenues for the County of Maui in 2020 and 2021 fiscal years, respectively, averaging about 49 percent. Economic activity generates other revenue items of 60 percent or additional 150 percent above real property taxes.

2. For DOE estimated at $5,898 per home.

3. In recent fiscal years, Gross Sales and Income Taxes have averaged about 74 percent of total State revenues; other revenue items 26 percent, or 35 percent above income and gross sales taxes.

Source: CBEE
July 31, 2020

Aloha Ladies and Gentlemen,

The purpose of this survey is to measure opinion among respected members of the Lanai community, which is a component of our market research.

This survey consists of 9 multiple-choice questions, each with a comment box to the right. A potential master plan of the Hokuao residential subdivision is shown on the following page so you can refamiliarize yourself with the project.

CBRE is committed to keeping respondents’ identities anonymous. The data will be compiled and maybe used in public submittals or market research reports.

We appreciate you taking your valuable time and we hope to hear from you soon.

Mahalo

---

Tom Holliday, CRE, FRICS
Director
Phone: (808) 541-5120
Email: Tom.Holliday@cbre.com

Benjamin Holliday
Senior Valuation Associate
Phone: (808) 497-1006
Email: Benjamin.Holliday@cbre.com
CBRE SURVEY REGARDING THE PROPOSED HOKUAO SUBDIVISION

1. I'm familiar with the proposed Hokuao subdivision.
   - Strongly Agree
   - Agree
   - Undecided/Uncertain
   - Disagree
   - Strongly Disagree
   Additional Comments:

2. The proposed Hokuao project will help meet the housing needs of the Lanai community.
   - Strongly Agree
   - Agree
   - Undecided/Uncertain
   - Disagree
   - Strongly Disagree
   Additional Comments:

3. The Hokuao project is supported by the community at-large.
   - Strongly Agree
   - Agree
   - Undecided/Uncertain
   - Disagree
   - Strongly Disagree
   Additional Comments:

4. There will be strong demand for the Hokuao affordable/workforce-priced homes.
   - Strongly Agree
   - Agree
   - Undecided/Uncertain
   - Disagree
   - Strongly Disagree
   Additional Comments:

5. There will be strong demand for the Hokuao market-priced homes.
   - Strongly Agree
   - Agree
   - Undecided/Uncertain
   - Disagree
   - Strongly Disagree
   Additional Comments:

6. Hokuao homes should not be allowed for use as a short-term vacation rental.
   - Strongly Agree
   - Agree
   - Undecided/Uncertain
   - Disagree
   - Strongly Disagree
   Additional Comments:

7. The Hokuao project is viewed as an environmentally friendly project.
   - Strongly Agree
   - Agree
   - Undecided/Uncertain
   - Disagree
   - Strongly Disagree
   Additional Comments:

8. I or my family would consider moving into a project such as Hokuao.
   - Strongly Agree
   - Agree
   - Undecided/Uncertain
   - Disagree
   - Strongly Disagree
   Additional Comments:

9. Hokuao can be model for future development on Lanai.
   - Strongly Agree
   - Agree
   - Undecided/Uncertain
   - Disagree
   - Strongly Disagree
   Additional Comments:

We appreciate you taking the time to complete the survey!

Instructions for submitting the survey are on the following page.
Instructions for submitting the survey:

1. Select the purple “submit form” button located at the top of the screen.

2. A pop-up window titled “send form” will appear asking you to input your email address and name. After entering the information hit send.

3. The final pop-up window titled “send email” will appear. We recommend you select “default email application” and hit continue.

If you have any issues with submitting the form, feel free to email the completed PDF to:

Benjamin.Holliday@cbre.com

---

Addendums E

QUALIFICATIONS
PROFESSIONAL QUALIFICATIONS OF THOMAS W. HOLLIDAY, CRE, FRICS

**Business Affiliation**
- **Director** | The Hallstrom Team | CBRE, Inc.
  Valuation & Advisory Services
  Honolulu, Hawaii (2015 – Present)
- **Senior Analyst/ Supervisor** | The Hallstrom Group, Inc.
  Honolulu, Hawaii (1980 – 2014)
- **Former Staff Appraiser** | Davis-Baker Appraisal Co.
  Avalon, Santa Catalina Island, California (1977 -1979)

**International Designation and Membership**
- CRE Designation (2015) - The Counselors of Real Estate
- FRICS Designation (2016) – Fellow of the Royal Institution of Chartered Surveyors

**Education/Qualifications**
- California State University, Fullerton
  (Communications/Journalism)
- More than 600 Hawaii Hotel/Hospitality Valuation and Consulting Assignments
- More than 150 Market Studies, Economic Impact Analyses and Public Fiscal Assessments for Proposed Projects and Entitlement Purposes
- Qualified expert witness testimony before State of Hawaii Land Use Commission, County Planning Commissions, County Councils and various state and county boards and agencies since 1983.
- Only certified real estate economist by County of Kauai for workforce housing assessments.
- Numerous SREA, Appraisal Institute and RICS Courses
- Numerous professional seminars and clinics.

On January 1, 1991, the American Institute of Real Estate Appraisers (AIREA) and the Society of Real Estate Appraisers (SREA) consolidated, forming the Appraisal Institute (AI).

**Recent Assignments**
- Market Study, Economic Impact Analyses and Public Costs/Benefits (Fiscal Impact) Assessments
  **Oahu**
  - OHA Kakaako Makai (Mixed-Use Project)
  - Howard Hughes/Ward Kewalo Basin (Retail Project)
  - Marriott Waikiki Parking Lot (Hotel/ Timeshare Project)
  - Residence Inn Kapolei (Hotel)
  - Turtle Bay Resort (Destination Resort Community)
  - Waikapu Country Town (Mixed-Use Community)
  - Oahu Community Correctional Center Relocation
  - Oahu Tourism Spending/Tax Impact Analysis
  - Waikapu Country Town (Mixed-Use Community)

**Maui County**
- Waikapu Country Town (Mixed-Use Community)
- Lanai City Expansion (Mixed-Use/201H Community)
- Polanui Garden (201H Residential Community)
- Molokai Ranch Holdings (Mixed-Use)
- Makila Rural Subdivision (201H Residential Community)
- Makila Kai (201H Residential Community)
- Maui Research & Tech Park (Mixed-Use Community)
- Maui Lani (Mixed-Use Community)
- Honuaula (Mixed-Use Community)
- Makena Beach Resort
- Maui Business Park, Phase II (Industrial/Commercial)
- Kapalua Mauka (Master Planned Community)
- Haliimaile (Mixed-Use Master Planned Community)
- Pulelehua (Master Planned Community)
- Westin Kaanapali Ocean Villas Expansion (Resort/ Timeshare)

**Kauai**
- Princeville Lodge (Hotel)
- Princeville Phase II (Destination Resort Community)
- Hanalei Plantation Workforce Housing (Resort)
- Lime Ola (Residential Community)
- Coco Palms (Hotel)
- Sheraton Kauai Workforce Housing (Resort)
- Coconut Coast Tourism and Hotel Analysis
- Hanalei Plantation Resort (Resort/ Residential)
- Kukuiula (Resort/Residential)
- Waipono/Puhi (Mixed-Use Planned Development)
- Elaie Commercial Expansion (Commercial)
- Village at Poipu (Resort/Residential)
- Ocean Bay Plantation (Resort/Residential)
Professional Qualifications of Thomas W. Holliday (continued)

- Major Neighbor Island Valuation Assignments
  - Mauna Lani Bay Hotel
  - Courtyard Kahului Airport Hotel
  - Maui Oceanfront Days Inn
  - Holiday Inn Express – Kona Hotel (proposed)
  - Keauhou Beach Hotel
  - Courtyard King Kamehameha Kona Beach Hotel
  - Aloha Beach Resort
  - Coco Palms Resort
  - Grand Hyatt Kauai
  - Islander on the Beach
  - Waimea Plantation Cottages
  - Coconut Beach Resort
  - Sheraton Maui Hotel
  - Outrigger Wailea Resort Hotel
  - Maui Lu Hotel
  - Coconut Grove Condominiums
  - Palaua Bay Holdings
  - Wailea Ranch
  - Maui Coast Hotel
  - Westin Maui Hotel
  - Maui Marriott Hotel
  - Waiehu Beach
  - Kapalua Bay Hotel and The Shops at Kapalua

Email Address: Tom.Holliday@cbre.com

---

PROFESSIONAL QUALIFICATIONS OF BENJAMIN J. HOLLIDAY

**Business Affiliation**

Sr. Valuation Associate | CBRE, Inc.
Valuation & Advisory Services
Honolulu, Hawaii (2018 – Present)

Intern | The Hallstrom Group | CBRE, Inc.
Valuation & Advisory Services
Honolulu, Hawaii (2017 – 2018)

**Education**

B.A. in Economics (2018), University of Hawaii at Manoa

Appraisal Institute Courses:
- Basic Appraisal Principles, 2018
- Basic Appraisal Procedures, 2018
- Supervisor Appraiser/Trainee Appraiser Course, 2018
- National Uniform Standards of Professional Practice, 2019
- Small Hotel/Motel Valuation, 2019
- Hawaii Banks’ Appraisal Perspective and Expectations, 2019
- Business Practice and Ethics, 2020

**Association Memberships**

Practicing Affiliate – Appraisal Institute (2019 – Present)

**Certification**

Hawaii Certified Appraiser Trainee
License No. REAT-1349
Exp. Date: December 31, 2021

**Contact**

Email: Benjamin.Holliday@cbre.com
Phone: (808) 497-1006
PRELIMINARY ENGINEERING REPORT INCLUDING TRAFFIC IMPACT ANALYSIS REPORT
PRELIMINARY ENGINEERING REPORT

HÔKŪAO 201H HOUSING PROJECT

Lanai City, Lanai, Hawaii

TMK: (2) 4–9–002:061 por.,
TMK: (2) 4–9–014:001por.,
TMK: (2) 4–9–014:009 por., and
TMK: (2) 4–9–014:011 por.

JANUARY 28, 2019

1. GENERAL

1.1 Background

The proposed Hōkūao 201H Housing Project comprises approximately 50 acres of land in the Kamoku Ahupuaa of Lana‘i Island. The irregularly shaped project area is located immediately west of and downhill from Lana‘i City center. The site is bounded on the

The parcels comprising the proposed Hōkūao Housing project area are owned by Lana‘i Resorts, LLC.

The project is sited close to Dole Park to take advantage of its walkable proximity to shops, groceries, educational, and entertainment venues. The project visually and physically connects to the town via 9th Street and 12th Avenue road extensions, continuing the existing street grid pattern into the new development. 9th Street will also have a wide concrete bike/walk path connecting the community to Fraser Avenue.
Along the Northeast boundary bordering the school fields, the project provides a one-acre park, a 1,500 square foot pavilion, comfort stations, and 100 parking stalls for use by the facility and as overflow parking for events at Lana'i School field.

The Hōkūao project proposes construction of 200 single family homes, comprised of 102 affordable homes exclusively for purchase by buyers falling within the HUD 2018 low-income guidelines, and 98 market-rate homes. All lots will typically be 6,000 sf minimum, with a few 6,100 sf lots on irregularly shaped corners as shown on Figure 1-2.

Most of the project area’s topography consists of flat to gently sloping open, patchy forest and scrub lands. An existing drainage swale on the western boundary of the site carries storm water away from the existing town and community center. On the western flank, the project sets back from the existing wastewater treatment plant with a 600 foot buffer between the closest lot and the WWRF boundary.
This Preliminary Engineering Report provides a summary of the traffic, water, wastewater and electrical/telecommunications demands and storm water runoff impacts due to the proposed improvements. The report will identify impacts of the proposed improvements on the existing offsite regional roadway, water, wastewater, drainage and electrical/communication facilities.

1.2 Objectives and Scope

This Preliminary Engineering Report provides a summary of the traffic, water, wastewater and electrical/telecommunications demands and storm water runoff impacts due to the proposed improvements. The report will identify impacts of the proposed improvements on the existing offsite regional roadway, water, wastewater, drainage and electrical/communication facilities.
2. EXISTING CONDITIONS

2.1 Site Characteristics

The study area (project) is in Lāna‘i City and includes the undeveloped lands and abandoned pineapple fields, Pulama Lāna‘i Nursery and community gardens and an abandoned power plant.

2.2 Topography and Soil

Most of the project area topography consists of flat to gently sloping open, patchy forest and scrub lands as shown on Figure 2-1. The approximate range of ground slopes and elevations, estimated from a previous aerial topography map, is 3% to 20% and ~1520 ft. to ~1610 ft. msl.

Based on the U.S. Soil Conservation Service Soil Survey (1972), the majority of existing soils within the project site are classified as Waihuna Clay (WoA). Waihuna Clay has slopes that range from 0%-3%. This type of soil generally has a surface layer, about 18-inches thick, of dark brown, very sticky and very plastic clay. The lower layer can vary to more than 50-inches thick and consists of dark brown, very stick and very plastic clay and silty clay that has sub angular blocky structure. Permeability is moderately slow, runoff is slow, and erosion hazard is no more than slight. The soil is strongly acid in the surface layer as a result of pineapple culture, but it is neutral to medium acid in the rest of the profile. It is prone to cracking when the soil dries.

The eastern and western portions of the site are classified as Lahaina Silty Clay (LaB). Slopes range from 3%-7%, with a surface layer of dark reddish-brown, silty clay, about 15-inches thick. Permeability is moderate, runoff is slow, and erosion hazard is slight. The soil is medium acid in the surface layer and slightly acid to medium acid in the subsoil.

Minute portions of the northern eastern and central part of the site are classified as Lahaina Silty Clay 0%-3% (LaA) and Lahaina Silty Clay 7%-15% (LaC). These soils have characteristics similar to Lahaina Silty Clay (LaB). On the portions with slopes ranging from 0%-3%, the soil runoff is slow and the erosion hazard is no more than slight. On the portions with slopes ranging from 7%-15%, the runoff is medium and the erosion hazard is moderate. The soils map indicating the various types of soils within the project limits is shown on Figure 2-2.

2.3 Climate

The project site is located in central Lāna‘i, and receives a moderate amount of rainfall each year. The average annual rainfall is approximately 34 inches. The wettest month is January, with an average monthly total of approximately 5 inches. The driest month is August, with an average total of 1.5 inches. The average annual air temperature is approximately 69 degrees F.

2.4 Existing Roadway System

The existing roadways in the vicinity of the project include Kaumalapau Highway (State Department of Transportation, DOT), Fraser Avenue (County), 9th St. (County), and 12th St. (County) as shown on Figure 2-3. The existing traffic conditions are also discussed in the attached Traffic Impact Analysis (Attachment 1).

2.5 Existing Water System

The Lanai Water Company (LWC) privately owns the domestic water system servicing the proposed. The existing regional schematic water system consists of a 12-inch waterline on Frasier Avenue.

The water for this system is provided by existing groundwater sources and the water quality has met all State of Hawaii regulations for drinking water. All water quality monitoring required by the State of Hawaii Department of Health, Safe Drinking Water Branch, Annual Consumer Confidence Reports are provided to all customers.

2.5.1 Existing Water Demands

The site includes the Pulama Lāna‘i Nursery and community gardens which are the only users of water on the site. The nursery and community gardens will be relocated south of the project site.

2.5.2 Existing Water Source and Storage

The water system for Lanai is owned and operated by the Lanai Water Company and is divided into nine (9) aquifer systems for the island. The Project falls within the Leeward Aquifer.
Water feeding the area is pumped primarily from Well No. 3, 6 and 8, which are located to the east of the project site, on the slopes of Lanaihale. The pumped water is stored in a 0.75 million gallon (MG) Koele Tank and the 2 MG tank. Water pressure exceeds 80 psi in some areas of this system, and individual pressure reducing valves are required. Fire flows are adequate for all service areas. The existing water system and regional schematic water system are shown on Figure 2-4 and Figure 2-5.
2.6 Existing Wastewater System

The existing wastewater system flows through or adjacent to the proposed project to the wastewater treatment plant. The existing wastewater system is shown on Figure 2-6.

2.6.1 Existing Wastewater Demands

The project site does not presently generate any wastewater demand.

2.6.2 Existing Wastewater Treatment

Based on as-built plans of the Lanai Sewerage System and Waialua Annex Subdivision, sewer mains are located in Fraser Ave., as well as the County’s major sewer collector lines which are located through the proposed project. Existing 10-inch and 12-inch sewer lines route sewage from the existing residential subdivision along 5th Street to the 15-inch interceptor sewer which discharges to the wastewater reclamation facility west of the project site. The existing main along Fraser Avenue consists of an 8" pipe of unidentified material, and the collector lines are a 10" vitrified clay pipe, and a 12" pipe of unidentified material.

The 8" main serves the portion of Lanai City below Ilima Ave., between 8th and 12th streets. The 10" collector line serves the entire half of Lanai City to the north of 7th street. The 12" collector line serves the western portion of Lanai City, below Fraser Ave. The collector lines merge and flow to the Lanai Wastewater Reclamation Facility (WWRF). The existing 10-inch and 12-inch collector lines will need to be relocated within proposed street right of ways and connected back to the 15-inch interceptor sewer going to the WWRF. Easements within privately owned residential lots will not be accepted by the County.

Per the County’s Department of Environmental Management, Wastewater Reclamation Division, the capacity of the Lanai WWRF is 0.50 million gallons per day (mgd). The actual average daily flow is approximately 0.315 mgd, and allocations totaling 0.395 have been granted to existing development. The project is located just north of the boundary of the WWRF.
2.7 Existing Storm Water Runoff Patterns

Runoff from the project area generally sheet flows west towards the Lanai City WWRF and then south towards Kaumalapau Highway. Runoff from portions of the project flows north towards 5th Street. The Koele and Lanai City drainage systems mauka of the project area convey storm runoff away from the project. The Federal Emergency Management Agency has designated the area as Zone X, Area of Minimal Flood Hazard as shown in Figure 2-7.

2.7.1 Existing Regional Drainage System

Based on the Lanai City DMP and Koele DMP, there are three major sub watersheds that contribute flows to Kapano Gulch, Kapano/Lanai City, Kapano, and Kaumalapau sub watersheds and consists of drainage areas greater than 100 acres and were studied for impacts to Lanai City and other downstream areas.

The Kapano/Lanai City sub watershed shown as Watershed Designation 2 on Figure 2-8, has an area of 161 acres that drains into an interceptor ditch along the boundary between Lanai City and Koele Resort. The interceptor ditch starts at 6th Street, runs above Queens Street, across 9th Street and the mauka extension of Kaumalapau Road, and eventually drains into Kapano Gulch just above Lanai City.

The Kapano sub watershed shown as Watershed Designation 3 has an area of 386 acres and makes up Kapano Gulch. It begins approximately 1.6 miles mauka of the project site, and drains into the Palawai Basin near the southern end of Lanai City. The length to width ratio for Kapano Gulch is approximately 1.7. The Kaumalapau sub watershed shown as Watershed Designation 6 has an area of 105 acres, and lies between Dole Park and Kaumalapau Road.

2.7.2 Existing Drainage System

As described in the Lanai City Drainage Master Plan, runoff from the land mauka of the project is conveyed by drain pipes and along Frasier Avenue, and streets parallel to Frasier Avenue, to the ditch along Kaumalapau Road that turns south, mauka of Manele Road, and which flows to Kapano Gulch. Kapano Gulch runs along the south side of Lanai City and drains into two dry, abandoned reservoirs before entering Palawai Basin through a series of abandoned irrigation ditches.

The Palawai Basin is a large plateau area, approximately 4.5 miles in diameter, which floods for prolonged periods of time during the rainy season. Runoff from the site generally sheet flows to the south-southwest, following the existing ground slope towards the WWRF and then towards Kaumalapau Highway. The northern areas flow towards 5th Street. The existing drain areas and drainage system are shown on Figure 2-9 and 2-10.

2.8 Existing Electrical and Telecommunications System

The sole electric utility serving the island of Lanai is Maui Electric Company which operates and is regulated under a tariff approved by the State Public Utilities Commission (PUC). Similarly, Hawaiian Telecom (HTCO) operates and is regulated under a tariff approved by the PUC and was the sole provider of telecommunications services until the advent of cable television. Subsequently, Spectrum (fka Oceanic Time Warner Cable), which is not regulated by the State PUC but is a franchisee of the Department of Commerce and Consumer Affairs (DCCA), has become a competitor to HTCO and, similar to HTCO, can offer broadband, cable television and telephone signals.

2.8.1 Existing Power Generation

Maui Electric Co.’s (MECO) existing generation system, on the Island of Lanai, is currently capable of providing approximately 9.4 Megawatts (Mw) of power (based on MECO’s 30 January 2018 Availability of Supply letter). In 2017, peak demand on the Island of Lanai, as indicated in their letter, was 5.4 Mw.

2.8.2 Existing Electrical and Telecommunications Distribution System

Under rights granted under the Kingdom of Hawaii, in MECO’s case, and during the government of the Territory of Hawaii, in HTCO’s case, the infrastructure of both these companies may occupy public rights-of-ways. It has come to be generally accepted that the term “infrastructure” includes both overhead and underground facilities. Hawaii Revised Statute Article 440G-8.2, established the ability for cable franchisees to occupy, subject to the rules and regulations imposed on the PUC-regulated utilities, to occupy public rights-of-ways.

On Lanai, the majority of the land and roadways are privately owned. The utility companies have received grants of easement from the landowner, formerly Lana'i Company and presently Pulama Lana’i, for some of their joint utility poleline
installations on Lanai and utilize existing roadways in a manner similar to County-
dedicable roadways as shown on Figure 2-11. It should be noted that some of
these grants of easement contain a “one-time” relocation clause, which obligates
the respective utility companies to relocate the existing overhead facilities, at their
cost, in exchange for a new perpetual grant-of-easement. It should further be
noted that as of mid-October 2018, under a PUC Decision and Order (D&O), with
the exception of the Island of Kauai, ownership of existing joint pole facilities was
concentrated into the respective electrical utility companies serving those Islands.
Existing utility pole lines that support only telecommunication cables are still owned
by HTCO. Under the same PUC D&O, all franchised telecommunications
companies desiring to attach to existing or new, overhead utility pole facilities
would now lease attachment space from the respective electric utility companies
instead of becoming joint pole owners.
To obtain approval to attach to existing telecommunication-only utility pole lines,
Spectrum must lease space from HTCO, as the utility pole owner.
MECO’s, HTCO’s, and Spectrum’s existing facilities serving Lanai consist mainly
of aerial cables attached to overhead utility pole lines along most of the roadways
in the Lanai City.

2.8.3 Existing Electrical Substation
A MECO 12.47-2.4 kV substation and incoming and outgoing overhead lines are
currently situated within the proposed subdivision footprint. This substation and
the 2.4 kV overhead lines currently provide service to the existing Lanai City
residences and must be relocated outside of the proposed subdivision prior to
development occurring.
3. APPROACH AND CRITERIA

This report analyzes the estimated increase in traffic, water, wastewater and electrical demand and drainage requirements due to the proposed residential housing. The proposed increases for water are not reduced by the historical information to for the nursery and community gardens which will be relocated. The existing nursery and community gardens are metered.

Infrastructure is typically designed for maximum estimated usage. The proposed improvements studied in this report consist of 200 single family housing units of which 102 are affordable homes and a 1-acre park.

3.1 Traffic

The criteria for the Traffic analysis are provided in the attached Traffic Impact Analysis (Attachment 1).

3.1.1 Traffic Level of Service

Level of Service (LOS) is a qualitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A to congested conditions at LOS F. The Highway Capacity Manual (HCM), 6th Edition, includes methods for calculating volume to capacity ratios, delays, and corresponding Levels of Service that were utilized in this study.

3.1.2 Vehicular Level of Service for Signalized Intersections (HCM 6th Edition)

Level of service for vehicles at signalized intersections is directly related to delay values and is assigned on that basis. Level of Service is a measure of the acceptability of delay values to motorists at a given intersection. The criteria are given in the table below.

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Control Delay per Vehicle (sec./veh.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>&lt; 10.0</td>
</tr>
<tr>
<td>B</td>
<td>&gt;10.0 and ≤ 20.0</td>
</tr>
<tr>
<td>C</td>
<td>&gt;20.0 and ≤ 35.0</td>
</tr>
<tr>
<td>D</td>
<td>&gt;35.0 and ≤ 55.0</td>
</tr>
</tbody>
</table>

3.2 Water

Proposed water demand estimates and water system design will be derived from the County of Maui’s Department of Water Supply Water System Standards (Reference 7). Conformance with the County standards provides accepted criteria for water system planning and design, although the water system, inclusive of water source, storage, and piping, will remain privately owned and will not be subject to all County requirements.

---

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

3.1.3 Vehicular Level of Service for Unsignalized Intersections (HCM 6th Edition)

The level of service criteria for vehicles at unsignalized intersections is defined as the average control delay, in seconds per vehicle.

LOS delay threshold values are lower for two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections than those of signalized intersections. This is because more vehicles pass through signalized intersections, and therefore, drivers expect and tolerate greater delays. While the criteria for level of service for TWSC and AWSC intersections are the same, procedures to calculate the average total delay may differ.

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Average Control Delay (sec/veh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>≤ 10</td>
</tr>
<tr>
<td>B</td>
<td>&gt;10 and ≤ 15</td>
</tr>
<tr>
<td>C</td>
<td>&gt;15 and ≤ 25</td>
</tr>
<tr>
<td>D</td>
<td>&gt;25 and ≤ 35</td>
</tr>
<tr>
<td>E</td>
<td>&gt;35 and ≤ 50</td>
</tr>
<tr>
<td>F</td>
<td>&gt; 50</td>
</tr>
</tbody>
</table>

---
3.2.1 Water Demand Criteria

The water demand criteria from the County of Maui Water Supply Standards is provided in Table 3-1 and a summary of the water demand criteria is presented in Table 3-2.

<table>
<thead>
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<th>Table 3-1 County of Maui Water Supply Standards</th>
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</thead>
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<tr>
<td>Flow Parameter</td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>Average Daily Demand</td>
</tr>
<tr>
<td>RESIDENTIAL:</td>
</tr>
<tr>
<td>Single Family or Duplex</td>
</tr>
<tr>
<td>Multi-Family Low Rise</td>
</tr>
<tr>
<td>Multi-Family High Rise</td>
</tr>
<tr>
<td>COMMERCIAL:</td>
</tr>
<tr>
<td>Commercial Only</td>
</tr>
<tr>
<td>Commercial Industrial Mix</td>
</tr>
<tr>
<td>Commercial/Residential Mix</td>
</tr>
<tr>
<td>REPORT (C = residential load for Maui only)</td>
</tr>
<tr>
<td>LEGIT INDUSTRY:</td>
</tr>
<tr>
<td>SCHOOLS, PARKS</td>
</tr>
<tr>
<td>AGRICULTURE:</td>
</tr>
</tbody>
</table>

* - Where two or more figures are listed for the same zoning, the daily demand resulting in higher consumption use shall govern the design unless specified otherwise.
(1) - Subject to special review and control by the Manager.

3.3 Wastewater

The proposed wastewater demand estimates and wastewater system design will be derived from the County of Maui’s Water Reclamation Division Wastewater (WRD) Flow Standards (Reference 6), or WRD approved Sewer Studies for similar facilities where practicable.

3.3.1 Wastewater Demand Criteria

A summary of the wastewater demand criteria is presented in Table 3-3.

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<thead>
<tr>
<th>Table 3-3: Wastewater Demand Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Parameter</td>
</tr>
<tr>
<td>--------------------------------------</td>
</tr>
<tr>
<td>Average Daily Wastewater Demand by Capita</td>
</tr>
<tr>
<td>Single Family or Duplex (@ 4cpu)</td>
</tr>
<tr>
<td>Park (@ 4 cps)</td>
</tr>
</tbody>
</table>

Legend

- gpd/capita = gal / day / capita
- cpu = capita / unit
- cps = capita / parking stall
- WRD = "County of Maui Standards of the Water Reclamation Division"

1 Per capita usage set at 80 for single family or duplex based on County of Maui Standards of the Water Reclamation Division (Standards use 4 capita per single family or duplex unit which equates to 320 gallons per day per unit). Per capita usage set at 5 for park and capita per car set at 4 based on the approved Central Maui Regional Park Sewer Study (the park study used 4 capita per vehicle which equated to 20 gallons per day per parking stall and 50% usage at any given time).

3.4 Drainage Hydrology and Hydraulics

The hydrologic and hydraulic criteria used in this report conform to the requirements of the Rules for the Design of Storm Drainage Facilities in the County of Maui (County Drainage Standards).

3.4.1 Hydrology

1 Single family or Duplex demands set at 600 gpd/unit and Park set at 1,700 gpd/acre per (County of Maui Department of Water Supply Standards).
The hydrologic criteria used in this report is described in 15-04-05 Hydrologic Criteria of the County Drainage Standards. Table 3-4 describes the Storm Recurrence Criteria of the County Drainage Standards and Table 3-5 describes the runoff coefficients used.

A composite runoff coefficient (C) is calculated by taking the weighted average of the impervious and pervious land areas within the study area for both, the existing and proposed conditions. The composite runoff coefficient will be used to calculate the runoff value in both conditions. The increase in runoff will be derived from the difference between the existing and proposed conditions (primarily due to an increase in impervious area in the proposed condition). For the purpose of calculating increases in runoff in the immediate onsite drainage areas, the composite C method will be more conservative than applying the published minimum runoff coefficients for built-up areas from Table 3 of the County Drainage Standards.

### Table 3-4: Storm Recurrence Criteria

<table>
<thead>
<tr>
<th>Drain Area</th>
<th>Storm Recurrence</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite Drain Area (&lt; 100 acres)</td>
<td>10-Year, 1-Hour</td>
<td>Rational Method</td>
</tr>
<tr>
<td>Regional Drain Area (&gt; 100 acres)</td>
<td>100-Year, 24-Hour</td>
<td>NRCS Hydrograph Method</td>
</tr>
</tbody>
</table>

### Table 3-5: Runoff Coefficient

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Runoff Coefficient (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unimproved Areas</td>
<td>0.30</td>
</tr>
<tr>
<td>Commercial</td>
<td>0.85</td>
</tr>
<tr>
<td>Residential Areas</td>
<td>0.50</td>
</tr>
<tr>
<td>Roadways</td>
<td>0.95</td>
</tr>
</tbody>
</table>

3.5 Electrical/Telecommunications/Street Lighting

3.5.1 Electrical/Telecommunications

The electrical criteria used in this report conform to the planning practices of the Maui Electric Company and Hawaiian Telcom.

3.5.2 Street Lighting

Illumination for the roadways will be designed to meet County of Maui requirements and Illuminating Engineering Society (IES) RP-8 criteria.
4. PROPOSED CONDITIONS

4.1 General

The Hōkūao project proposes construction of 200 single family homes, comprised of 102 affordable homes and 98 market-rate homes and a 1-acre park, a future 1,500 square foot pavilion with 100-parking stalls. All lots will typically be 6,000 sf minimum, with a few 6,100 sf lots on irregularly shaped corners. The proposed improvements studied herein include new roadway, water, sewer, drainage and electrical/telecommunication infrastructure to serve the project.

4.1.1 Affordable Housing

The proposed project includes 102 affordable homes exclusively for purchase by buyers falling within the HUD 2018 low-income guidelines.

4.1.2 Design Character

The character of the homes will reflect the existing design vernacular of Lana'i City. House size will be between 900 and 1500 sf; with hipped or gable roofs, covered front lanais, board & batten siding, large trim profiles, and other design details matching historic Lanai buildings. The houses will also have enclosed garages and driveway to minimize street parking.

4.2 Traffic

4.2.1 Proposed Traffic Conditions

The Project entails the development of 200 residential units, one-acre park, 1,500 square foot pavilion, comfort station, and 100 parking stalls. Of the 200 single-family homes, 133 will be comprised of affordable homes and 67 will be comprised of market-rate homes. As a conservative measure, a 1-acre park will be assumed to include the amenities identified. Vehicular traffic to the Project will be provided by two (2) existing accesses along Fraser Avenue at 9th Street and at 12th Street. The Project is anticipated to generate approximately 147(221) AM(PM) trips and study intersections are forecast to operate at conditions similar to Base Year 2024 during both peak hours with all manual turning movements operating at LOS C or better during the AM and PM peak hours of traffic.

<table>
<thead>
<tr>
<th>Use Type</th>
<th>Number of Units or Acres</th>
<th>Demand Per Unit or Acre (gpd)</th>
<th>Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Units</td>
<td>200</td>
<td>600</td>
<td>120,000</td>
</tr>
<tr>
<td>Park</td>
<td>1.0</td>
<td>1,700</td>
<td>1,700</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>121,700</td>
</tr>
</tbody>
</table>

4.3 Water

4.3.1 Proposed Water Demands

Based on the County of Maui Department of Water Supply Standards of 600 gallons per day per single family unit and 1,700 gallons per acre for a park, the proposed average daily domestic water demand for the 200 single family units and the 1-acre park with future 1,500 square foot pavilion with comfort stations and parking is estimated to be 121,700 GPD.

4.3.2 Proposed Water System

The existing domestic water system will provide water service to the project through a new connection to the 12-inch water main on Frasier Avenue. Proposed water distribution mains along the new roads will be 8-inch to 12-inch in diameter to ensure adequate fire protection flows can be provided. Water pressure exceeds 80 psi in some areas of this system and individual pressure reducing valves are required. The proposed water system improvements shown on Figure 4-1.

4.3.3 Impacts to Regional Water Facilities

The estimated total water demand of the project is 121,700 GPD. The LWC has indicated in the attached letter dated ____ in Appendix 3, that the project will have a long-term, reliable supply of water in accordance with Chapter 14.12, Water Availability, Maui Code, upon completion of new source development. The Lanai...
Company is in the process of permitting the development of Well #7 which is anticipated to be the source of water for the project."
4.4 Wastewater

4.4.1 Proposed Wastewater Demands

Based on the proposed 200 single family unit and a 1-acre park with the future 1,500 square foot pavilion with comfort stations and 100 parking stalls, using the design standard of 4 persons per single family unit at 80 gallons per capita per day and 20 gallons per parking stall, the proposed average wastewater demand generated by the project is estimated at 0.064 MGD for the single-family units and 0.02 MGD for the park or 0.066 MGD. This estimate is used for the hydraulic calculations.

The 20 gallons per parking stall used to estimate the wastewater demand was approved by the County of Maui for the Central Maui Regional Park (CMRP) and is based on 4 persons per vehicle and 5 gallons per capita. The CMRP also estimated that no more than 50% of the parking would be in use at any time so a 50% reduction in wastewater demand was allowed. As most of the parking is for non-park use, a conservative average wastewater demand for the park is 0.001 MGD at the treatment plant is estimated at 0.065 MGD.

4.4.2 Proposed Wastewater System

The new onsite wastewater system will collect wastewater generated by the new homes and convey the wastewater to the existing Lanai City WWRF. The new wastewater collection system will be designed for the residential units and the future park, pavilion and parking stalls and constructed within the new roads and is shown on Figure 4-2.

4.4.3 Impacts to Regional Wastewater Facilities

The wastewater demand of the project is estimated to be 0.065 MGD of which 0.064 MGD is for the proposed housing demand and 0.001 MGD is for the 1-acre park demand. The Preliminary Engineering Report Lanai City Auxiliary Wastewater Treatment Facility report done in 1993 by Belt Collins & Associates states that the Lanai City Wastewater Treatment Plant was designed to treat wastewater generated by Lanai City and the Koele Project District. The WWRF is currently servicing an average daily flow of approximately 0.315 mgd. Allocations totaling 0.395 mgd have been granted to existing development. The proposed
development will yield an average daily flow of less than 0.07 mgd, therefore there is currently sufficient capacity at the WWRF to serve the project.
4.5 Estimated Runoff

The proposed improvements will terrace the land to maintain characteristics which are very similar to the existing conditions. The general terrain of the developed condition will generally conform to the existing terrain, which slopes toward the south, and the tributary drainage area will remain the same as the existing. The proposed 200 unit subdivision with retention basins will cause no significant change to the existing storm water runoff. The proposed tributary drainage area is shown on Figure 4-5.

Runoff generated by the project will remain tributary to the low sump area next to the WWRF. To provide storm water quality treatment, runoff will continue to be directed into grassed swales or 2 large detention basins prior to discharge off the property.

4.5.1 Proposed Drainage System

Surface drainage improvements will consist of shallow cutoff swales between the new residential units and Frasier Avenue to capture as much runoff as possible and direct the flow around the project or into new project drainage systems. Roadway drains will be provided along the new roadways towards the proposed retention basins. The proposed drainage system for the project is shown on Figure 4-6.

4.5.2 Erosion Control Measures

During grading and construction measures will be taken to prevent erosion and soil from the leaving the site. Special precaution will be taken to protect the downstream lands from the project sites as well as the existing WWRF to the west. All exposed and graded areas within the project site will be covered with pavements and grass to prevent soil erosion.
4.5.3 Impacts to Regional Drainage Facilities

With regard to the 50-year, 1-hour storm, the calculated increase in peak flow is 32.38 cubic feet per second (cfs) to the north towards the extension of 5th Street and Iwiolé Gulch, 25.52 cfs mauka of the WWRF and 39.87 cfs towards Kaumalapau Highway due to the proposed improvements. Three retention basins will mitigate the increase in runoff and flow and will have no impact on existing regional drainage infrastructure. Other than the WWRF, there are no downstream properties that would be adversely impacted by the resulting increases in runoff. A new swale will direct runoff away from the WWRF.

A summary of the calculated existing and proposed 50-year runoff, increase in runoff and retention basin volume required is provided in the Table 4-2 and Table 4-3 below.

<table>
<thead>
<tr>
<th>Drainage Area</th>
<th>Existing Runoff (50-year) cfs</th>
<th>Prop. Runoff (50-year) cfs</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>To the north</td>
<td>21.43</td>
<td>53.81</td>
<td>32.38</td>
</tr>
<tr>
<td>To the WWRF Swale</td>
<td>27.77</td>
<td>53.29</td>
<td>25.52</td>
</tr>
<tr>
<td>To Kaumalapau Hwy.</td>
<td>40.76</td>
<td>80.83</td>
<td>39.87</td>
</tr>
</tbody>
</table>

Table 4-3 Retention Basin Volume

<table>
<thead>
<tr>
<th>Drainage Area</th>
<th>Retention Basin Volume cubic-feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basin No. 1 - To the north</td>
<td>58,284</td>
</tr>
<tr>
<td>Basin No. 2 - To WWRF Swale</td>
<td>45,936</td>
</tr>
<tr>
<td>Basin No. 3 - To Kaumalapau Hwy.</td>
<td>71,766</td>
</tr>
</tbody>
</table>
4.6 Proposed Electrical/Telecom System

4.6.1 Proposed Electrical Demands
The total anticipated electrical demand load for the proposed Lanai 200 Subdivision Development is approximately 1,000 kilo-Volt Amperes (kVA) or 1.0 MVA and is based on a diversified peak demand load of 5 kVA per residential unit. Based on current technologies and cabling policies, HTCO and/or Spectrum would likely provide fiber optic cable service to the building from their overhead facilities in the vicinity of Lana'i City.

4.6.2 Off-site Electrical and Telecommunications
MECO’s on-island distribution system consists of both 2.4 kV and 12.47 kV primary overhead and underground lines. The proposed subdivision would be connected to MECO’s 12.47 kV distribution system. Although MECO’s Lanai generating facilities have sufficient capacity to support the development, the existing 12.47 kV overhead lines may require upgrades. MECO has further indicated that should this project trigger the required upgrades, some or all of the cost for the upgrades may need be allocated to this development. MECO cannot indicate what the budget costs might be without further design on their part.

Both HTCO’s and Charter’s on-island distribution system consists of cables attached to the joint utility pole lines or, if underground, cables routed through duct systems for owned and maintained by the respective utility company. The cable types consist of copper, twisted pair, coaxial and fiber optic cables. Based on their current practice, both HTCO and Charter will likely extend fiber optic cable infrastructure to provide service to this development. Due to the anticipated revenue anticipated and based on their respective tariff and franchise rules, it is not anticipated that this development would bear any cost for off-site improvements of either HTCO or Charter facilities.

4.6.3 On-site Electrical and Telecommunications
Based on preliminary information received from Pulama Lana'i underground utility infrastructure is proposed for service to the single-family lots and ancillary buildings as shown on Figure 4-7. It should be noted MECO would require that pad-mounted transformers be installed and may require the installation of one or more
pad-mounted switchgears to provide sectionalizing of their underground circuits. If necessary HTCO and/or Spectrum may request a hub equipment site which is approximately 8’ x 8’ in size. MECO’s underground infrastructure would consist of a combination of 2”, 3”, 4” and 5” PVC conduits, encased in concrete jackets and concrete handholes in sizes varying from 2’ x 4’ to 6’ x 11’ which act as cable pulling and splicing points and transformer and lot service vaults. HTCO’s and Spectrum’s underground infrastructure would consist of a combination of 2” and 4” conduits with handholes varying in size from 2’ x 4’ to 5’ x 10.5’ which act as cable pulling and splicing points and lot service vaults.

4.6.4 Existing Substation Relocation

A proposed site for the relocated substation has been submitted to MECO and a budget cost for the relocation has been provided by MECO to Pulama Lāna‘i. The overhead poles lines, for the most part, are covered by a “one-time relocation” clause included in the original Lāna‘i Company grant of easement to MECO. Proposed alignments for the 12.47 kV lines and a temporary alignment for the 2.4 kV line is proposed to facilitate subdivision roadway construction. Eventually, the 2.4 kV lines are intended to be placed underground within the proposed subdivision as shown on Figure 4-8. MECO will require a new grant of easement for the relocated 12.47 kV lines. As a possible alternative, MECO is evaluating whether to up-convert the existing Lāna‘i City distribution system to 12.47 kV which would eliminate the need for the substation relocation and temporary overhead 2.4 kV relocation.

4.6.5 Street Lighting

Because MECO owns and maintains the street lights on public rights-of-ways within Maui County, it will need to be determined whether MECO would also provide the street lights for this project or whether the project contractor would provide these street lights. If provided under the construction contracts, luminaires selected will be specified with conformance with Act 287 and be designed to minimize glare and provide illumination levels in conformance with the above stated criteria and/or other requirements imposed by the environmental permitting documents.

5. REFERENCES


5. Rules for the Design of Storm Drainage Facilities in the County of Maui, Department of Public Works and Waste Management, County of Maui.


ATTACHMENT 1
Traffic Impact Assessment

November 2, 2018

Prepared for:
R.M. Towill Corporation
2024 N King Street
Honolulu, HI 96819
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## TRAFFIC IMPACT ANALYSIS REPORT – LANAI CITY EXPANSION
Lanai City, Lanai, Hawaii

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**FINAL DRAFT**

Prepared for

R.M. Towill Corporation

Prepared by

Austin, Tsutsumi & Associates, Inc.
Civil Engineers • Surveyors
Honolulu • Wailuku • Hilo, Hawaii

November 2, 2018
This report documents the findings of a traffic study conducted by Aust in, Tsutsumi, and Associates, Inc. (ATA) to evaluate the traffic impacts resulting from the proposed Lanai City Expansion (hereinafter referred to as the “Project”) located in Lanai City, Lanai, Hawaii.

The Project is located in Lanai City on the island of Lanai on parcels of land more specifically identified as TMK: (1) 4-9-0140:9000. The project site is bordered by Fraser Avenue to the east, 12th Street to the south, the Department of Public Works office and Existing Wastewater Treatment Plant to the west, and 9th Street to the north. See Figure 1.1 for Project location.

The project proposes to construct a residential development of 200 single family units, one-acre park, 1,500 square foot pavilion, comfort station, and 100 parking stalls for Lanai City. Of the 200 single-family homes, 133 will be comprised of affordable homes and 67 will be comprised of market-rate homes. As a conservative measure, a 1.1-acre park will be assumed to include the amenities identified. Vehicular traffic to the Project will be provided by two (2) existing accesses along Fraser Avenue on 9th Street and 12th Street. The Project is anticipated to be completed by the Year 2024. See Figure 1.2 for Project Site Plan.

1. ***INTRODUCTION***

This study will address the following:

- Assess existing traffic operating conditions during the weekday AM and PM peak hours of traffic within the study area.
- Traffic Projections for Base Year 2024 (without the Project).
- Estimate the vehicular trips that will be generated by the Project.

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**FINAL DRAFT**

**TRAFFIC IMPACT ANALYSIS REPORT**

**LANAI CITY EXPANSION**

Lanai City, Lanai, Hawaii

---
Traffic projections for the Project for Future Year 2024 (with project).

Recommendations for roadway improvements or other mitigative measures, as appropriate, to reduce or eliminate the adverse impacts resulting from traffic generated by the Project.

Recommendations for intersection improvements or other mitigative measures, as appropriate, to reduce or eliminate the impacts resulting from the Project including conceptual intersection options such as roundabouts.

1.4 Analysis Methodology

Level of Service (LOS) is a qualitative measure used to describe the conditions of traffic flow at intersections, with values ranging from free-flow conditions at LOS A to congested conditions at LOS F. The Highway Capacity Manual (HCM), 6th Edition, includes methods for calculating volume to capacity ratios, delays, and corresponding Levels of Service that were utilized in this study. See Appendix B for Level of Service Criteria.

Analyses for the study intersections were performed using the traffic analysis software Synchro, which is able to prepare reports based on the methodologies described in the HCM. These reports contain control delay results as based on intersection lane geometry, signal timing, and hourly traffic volumes. Based on the vehicular delay at each intersection, a LOS is assigned to each approach and intersection movement as a qualitative measure of performance. These results, as confirmed or refined by field observations, constitute the technical analysis that will form the basis of the recommendations outlined in this report.
The following are brief descriptions of the existing roadways studied within the vicinity of the Project:

**Kaumalapau Highway** is an east-west, two-way, two-lane roadway that runs perpendicular to Fraser Avenue. This roadway begins to the west at the Fuel Depot and terminates to the east at its intersection with Lanai Avenue/Queens Street. The speed limit along Kaumalapau Highway is 45 mph near Lanai City and changes to 30 mph to the east, after the Lanai Airport.

**Fraser Avenue** is a north-south, two-way, two-lane roadway in the vicinity of the study intersections and provides access through Lanai City. This roadway begins to the south at a T-intersection with Kaumalapau Highway and terminates to the north as an outlet. The posted speed limit along this roadway in the vicinity of the Project is 20 miles per hour (mph). This roadway serves as one of the main roadways through the city and provides access to Lanai Elementary and High School, churches, park, and other smaller streets that have access to restaurants and retail.

**9th Street** is an east-west, two-way, two-lane roadway that runs perpendicular to Fraser Avenue. This roadway begins to the west at a T-intersection with Awalua Avenue and terminates to the east at a T-intersection with Kaunaoa Drive. The posted speed limit was not observed along the roadway.

**10th Street** is an east-west, two-way, two-lane roadway that runs perpendicular to Fraser Avenue. This roadway begins to the west at a T-intersection with Fraser Avenue and terminates to the east at a T-intersection with Queens Street. The posted speed limit was not observed along the roadway.

**12th Street** is an east-west, two-way, two-lane roadway that runs perpendicular to Fraser Avenue. This roadway begins to the west at a T-intersection with Fraser Avenue and terminates to the east as a T-intersection with Lanai Avenue and terminates to the east as a T-intersection with Queens Street. The posted speed limit was not observed along the roadway.

**13th Street** is an east-west, two-way, two-lane roadway that runs perpendicular to Fraser Avenue. This roadway begins to the west at a T-intersection with Fraser Avenue and terminates to the east at a T-intersection with Lanai Avenue. The posted speed limit was not observed along the roadway.

**Manele Road** is a north-south, two-way, two-lane roadway. This roadway begins at its intersection with Kaumalapau Highway and terminates to the south at the Manele Small Boat Harbor. The posted speed limit on Manele Road is 35 mph.
2.2 Sustainable Transportation

2.2.1 Complete Streets
While transportation planning has traditionally focused on automobile travel, recent “Complete Streets” policies also recognize the numerous benefits of encouraging the use of alternative modes of transportation. “Complete Streets” policies encourage the provision of equitable, accessible, and safe transportation for all modes.

Hawaii State Senate Bill 718 (2009) required that the Hawaii Department of Transportation (HDOT) and the County transportation departments:

“…adopt a complete streets policy that seeks to reasonably accommodate convenient access and mobility for all users of the public highways within their respective jurisdictions…”

2.2.2 Pedestrian Accessibility
Within the Project vicinity, sidewalks are provided along both sides of Fraser Avenue, 5th Street, and sidewalks along one side of Lanai Avenue, 7th Street, and 8th Street. The sidewalks along Fraser and Lanai Avenue provide access to retail, restaurants, church, and schools. See Figure 2.1 for the existing pedestrian facilities.

2.2.3 Bicycle Accessibility
There are no existing bike lanes within the Project vicinity; however, proposed bike lanes within the Hawaii Bike Plan will be shown in Figure 2.2.

2.2.4 Public Transit
There is currently no public transportation on the island of Lanai.

Private transportation shuttles are offered from the airport, to the car rental, and to the hotels, based on reservation.

2.3 Existing Traffic Volumes
Manual turning movement traffic counts and field observations were conducted at the following study intersections on Tuesday, July 9, 2016 and Wednesday, July 10, 2016.

- 9th Street/Fraser Avenue (Unsignalized)
- 10th Street/Fraser Avenue (Unsignalized)
- 12th Street/ Fraser Avenue (Unsignalized)
- 13th Street/ Fraser Avenue (Unsignalized)
- Fraser Avenue/Kaumalapau Highway (Unsignalized)
- Kaumalapau highway/Manele Road (Unsignalized)

Based on the traffic count data, the weekday AM and PM peak hours of traffic were determined to occur between 7:00 AM and 8:00 AM and between 2:00 PM to 3:00 PM, respectively. During the traffic count, the Four Seasons Resort Lanai, The Lodge at Koele was closed for renovations; therefore, traffic that would be generated by the resort was not accounted for in the traffic count. The traffic count data is provided in Appendix A.

2.4 Existing Observations and Analysis

2.4.1 Intersection Observations and Analysis
All intersections currently operate at LOS B or better during the AM and PM Peak hour of traffic. No significant delays or queuing were observed at any of the intersections during the peak hours of traffic.
Table 2.1: Existing 2016 Level of Service Summary

<table>
<thead>
<tr>
<th>Intersection</th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HCM Delay</td>
<td>v/c Ratio</td>
</tr>
<tr>
<td>1. Fraser Ave. &amp; 9th St.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NB LT</td>
<td>0.0</td>
<td>0.00</td>
</tr>
<tr>
<td>EB LT / THRT</td>
<td>10.3</td>
<td>0.01</td>
</tr>
<tr>
<td>WB LT / THRT</td>
<td>9.9</td>
<td>0.04</td>
</tr>
<tr>
<td>SB LT</td>
<td>7.4</td>
<td>0.01</td>
</tr>
<tr>
<td>2. Fraser Ave. &amp; 10th St.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WB LT / TH</td>
<td>8.8</td>
<td>0.01</td>
</tr>
<tr>
<td>SB LT</td>
<td>7.4</td>
<td>0.01</td>
</tr>
<tr>
<td>3. Fraser Ave. &amp; 12th St.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NB LT</td>
<td>7.4</td>
<td>0.00</td>
</tr>
<tr>
<td>EB LT / THRT</td>
<td>9.6</td>
<td>0.01</td>
</tr>
<tr>
<td>WB LT / THRT</td>
<td>9.2</td>
<td>0.01</td>
</tr>
<tr>
<td>SB LT</td>
<td>7.4</td>
<td>0.00</td>
</tr>
<tr>
<td>4. Fraser Ave. &amp; 13th St.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WB LT / TH</td>
<td>9.1</td>
<td>0.02</td>
</tr>
<tr>
<td>SB LT</td>
<td>7.4</td>
<td>0.01</td>
</tr>
<tr>
<td>5. Kaumalapau Hwy &amp; Fraser Ave.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EB LT</td>
<td>7.6</td>
<td>0.04</td>
</tr>
<tr>
<td>SB LTRT</td>
<td>9.5</td>
<td>0.11</td>
</tr>
<tr>
<td>6. Manele St. &amp; Kaumalapau Hwy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NB LT / THRT</td>
<td>8.8</td>
<td>0.06</td>
</tr>
<tr>
<td>EB LT</td>
<td>0.0</td>
<td>0.00</td>
</tr>
<tr>
<td>WB LT</td>
<td>7.5</td>
<td>0.09</td>
</tr>
<tr>
<td>SB LT / THRT</td>
<td>0.0</td>
<td>0.00</td>
</tr>
</tbody>
</table>
3. BASE YEAR 2024 TRAFFIC CONDITIONS

The Year 2024 was selected to reflect the Project completion year. The Base Year 2024 scenario represents the traffic conditions within the study area without the Project. Traffic projections were formulated by applying a defacto growth rate to the existing 2016 traffic count volumes as well as trips generated by known future developments in the vicinity of the Project.

3.1 Defacto Growth Rate

The population on the island of Lanai is currently about 3,100 residents. According to the Lanai Community Plan Update published by the County of Maui Planning Department in December 2013, the anticipated growth of Lanai’s economy may require its population to nearly double in size to about 6,000 residents. This planning document was published as a guide for decision making and implementation through 2025. In order for Lanai’s population to reach 6,000 by year 2025, the island would experience an average growth rate of approximately 5.7 percent per year. Therefore, this growth rate was applied on all movements to represent the anticipated growth.

3.2 Traffic Forecasts for Known Developments

By the year 2024, other known developments are anticipated to generate vehicle trips and impact the study intersections. As mentioned in section 2.3, the Four Seasons Resort Lanai, The Lodge at Koele was closed for renovation at the time of the traffic count. As the resort is assumed to resume normal operations by Year 2024, it is included in the Base Year 2024 projections.

- The Four Seasons Resort Lanai, The Lodge at Koele is located along Keomuku Highway northeast of the Project. The development plans to renovate 88 hotel units, which is expected to be completed and occupied in 2017. The vehicle trips shown in Table 4.1 were generated using the Institute of Traffic Engineers (ITE) Trip Generation Manual, 10th Edition, and was included in the Base Year 2024 traffic projections.

Table 3.1: Four Seasons Resort Lanai Trip Generation Rates

<table>
<thead>
<tr>
<th>Land Use (ITE Code)</th>
<th>Independent Variable</th>
<th>Weekday AM Peak Hour</th>
<th>Weekday PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Trip Rate</td>
<td>% Enter</td>
</tr>
<tr>
<td>Resort Hotel (330)</td>
<td>Rooms</td>
<td>[a]</td>
<td>72%</td>
</tr>
</tbody>
</table>

Notes: [a] T = 0.38 (X) - 28.58

Table 3.2: Total Trips Generated by Known Developments in Project Vicinity

<table>
<thead>
<tr>
<th>Development</th>
<th>AM Peak Hour</th>
<th>PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Enter</td>
<td>Exit</td>
</tr>
<tr>
<td>Four Seasons Resort Lanai, The Lodge at Koele</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

3.3 Base Year 2024 Analysis

All study intersections are forecast to operate similar to existing conditions. All intersection movements will continue to operate at LOS B or better during the AM and PM peak hours of traffic.

Figure 3.1 illustrates the Base Year 2024 forecast traffic volumes and LOS for the study intersection movements. Table 3.1 summarizes the Base Year 2024 LOS at the study intersections compared to existing conditions. LOS worksheets are provided in Appendix C.
Table 3.3: Existing and Base Year 2024 Level of Service Summary

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Existing Conditions</th>
<th>Base Year 2024</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM HCM</td>
<td>VR</td>
</tr>
<tr>
<td></td>
<td>AM HCM</td>
<td>VR</td>
</tr>
<tr>
<td></td>
<td>AM HCM</td>
<td>VR</td>
</tr>
</tbody>
</table>

Diagram of the area with specific points and directions.
4. FUTURE YEAR 2024 TRAFFIC CONDITIONS

The Future Year 2024 scenario represents the traffic conditions within the Project study area with the full build-out of the Project.

4.1 Background

The project proposes to construct a residential development of 200 single family units, one-acre park, 1,500 square foot pavilion, comfort station, and 100 parking stalls for Lanai City. Of the 200 single-family homes, 133 will be comprised of affordable homes and 67 will be comprised of market-rate homes. As a conservative measure, a 1.1-acre park will be assumed to include the amenities identified. Vehicular traffic to the Project will be provided by two (2) existing accesses along Fraser Avenue at 9th Street and at 12th Street. The Project is anticipated to be completed by Year 2024.

4.2 Travel Demand Estimations

4.2.1 Trip Generation

The Institute of Transportation Engineers (ITE) publishes a book based on empirical data compiled from a body of more than 4,250 trip generation studies submitted by public agencies, developers, consulting firms, and associations. This publication, titled Trip Generation Manual, 10th Edition, provides trip rates and/or formulae based on graphs that correlate vehicular trips with independent variables.

The Project is forecast to generate approximately 147(221) trips during the AM(PM) peak hours of traffic.

See Tables 4.1 and 4.2 for Trip Generation formulae and projections for the Project.

Table 4.1: Project Trip Generation Rates

<table>
<thead>
<tr>
<th>Land Use (ITE Code)</th>
<th>Independent Variable</th>
<th>Trip Rate</th>
<th>% Enter</th>
<th>Trip Rate</th>
<th>% Enter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Family Detached Housing</td>
<td>200 DU</td>
<td>[a] 25%</td>
<td>[b] 63%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(210)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>County Park (411)</td>
<td>1.1 Acre</td>
<td>0.02 59%</td>
<td>[c] 55%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Acreage includes 1,500 sf pavilion to be conservative.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2: Project-Generated Trips

<table>
<thead>
<tr>
<th>Land Use (ITE Code)</th>
<th>Independent Variable</th>
<th>Weekday AM Peak Hour</th>
<th>Weekday PM Peak Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Enter (vph)</td>
<td>Exit (vph)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total (vph)</td>
<td>Enter (vph)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Exit (vph)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Total (vph)</td>
</tr>
<tr>
<td>Single-Family Detached Housing</td>
<td>200 DU</td>
<td>37</td>
<td>110</td>
</tr>
<tr>
<td>(210)</td>
<td></td>
<td>147</td>
<td>125</td>
</tr>
<tr>
<td>County Park (411)</td>
<td>1.1 Acre</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>147</td>
<td>137</td>
</tr>
<tr>
<td></td>
<td></td>
<td>64</td>
<td>221</td>
</tr>
</tbody>
</table>

Note:
[a] T = 0.71(X) + 4.80
[b] Ln(T) = 0.96*Ln(X) + 0.20
[c] T = 0.06(X) + 22.60

4.2.2 Trip Distribution & Assignment

Trips generated by the Project were assigned throughout the study area based upon existing travel patterns. The traffic generated by the Project was added to the forecast Base Year 2024 traffic volumes within the vicinity of the Project to constitute the traffic volumes for the Future Year 2024 traffic conditions. Figure 4.1 illustrates the Project-generated trip distribution.

4.3 Future Year 2024 Analysis

Upon completion of the Project, all study intersections are forecast to operate similar to Base Year 2024 traffic conditions, with all manual turning movements operating at LOS C or better during the AM and PM peak hours of traffic.

See Figure 4.2 for the Future Year 2024 with Project traffic volumes and LOS. Table 4.3 summarizes the Existing, Base Year 2024, and Future Year 2024 with Project LOS at the study intersections. LOS worksheets are provided in Appendix C.
The project proposes to construct a residential development of 200 single family units, one-acre park, 1,500 square foot pavilion, comfort station, and 100 parking stalls for Lanai City. Of the 200 single-family homes, 133 will be comprised of affordable homes and 67 will be comprised of market-rate homes. As a conservative measure, a 1.1-acre park will be assumed to include the amenities identified. The proposed development is expected to be completed and fully occupied Year 2024.

5. CONCLUSIONS AND RECOMMENDATIONS

The project proposes to construct a residential development of 200 single family units, one-acre park, 1,500 square foot pavilion, comfort station, and 100 parking stalls for Lanai City. Of the 200 single-family homes, 133 will be comprised of affordable homes and 67 will be comprised of market-rate homes. As a conservative measure, a 1.1-acre park will be assumed to include the amenities identified. The proposed development is expected to be completed and fully occupied Year 2024.

5.1 Existing Conditions

All movements at each intersection currently operate at overall LOS B or better during the AM and PM peak hours of traffic. No major delays or queues were observed at the unsignalized intersections.

5.2 Base Year 2024

By Year 2024, traffic growth in the study area was estimated for Year 2024 by using the Lanai Community Plan Update published by the County of Maui Planning Department in December 2013, which resulted in an anticipated growth rate of approximately 5.7 per year to reach 6,000 residents by 2025. The Four Seasons Resort Lanai, The Lodge at Koele, is assumed to be completed with their renovation project by Year 2024 and will thus be occupied and operational in the Base Year 2024 scenario.

All study intersections are forecast to operate with LOS similar to existing conditions, with all movements operating at LOS B or better during the AM and PM peak hour of traffic.

5.3 Future Year 2024

The Project entails the development of 200 residential units, one-acre park, 1,500 square foot pavilion, comfort station, and 100 parking stalls. Of the 200 single-family homes, 133 will be comprised of affordable homes and 67 will be comprised of market-rate homes. As a conservative measure, a 1.1-acre park will be assumed to include the amenities identified. Vehicular traffic to the Project will be provided by two (2) existing accesses along Fraser Avenue at 9th Street and at 12th Street. The Project is anticipated to generate approximately 147(221) AM(PM) trips and study intersections are forecast to operate at conditions similar to Base Year 2024 during both peak hours with all manual turning movements operating at LOS C or better during the AM and PM peak hours of traffic.

5.4 Recommendations

No intersection improvements are recommended as a result of the Project.

Table 4.3: Existing, Base Year 2024 and Year 2024 with Project Level of Service Summary

<table>
<thead>
<tr>
<th>Intersection</th>
<th>AM HCM Delay Ratio</th>
<th>LOS</th>
<th>AM HCM Delay Ratio</th>
<th>LOS</th>
<th>AM HCM Delay Ratio</th>
<th>LOS</th>
<th>AM HCM Delay Ratio</th>
<th>LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraser Ave &amp; 9th St</td>
<td>0.0</td>
<td>0.00 A</td>
<td>7.4</td>
<td>0.00 A</td>
<td>7.6</td>
<td>0.03 A</td>
<td>7.5</td>
<td>0.01 A</td>
</tr>
<tr>
<td>KTH</td>
<td>19.3</td>
<td>0.01 B</td>
<td>16.5</td>
<td>0.02 B</td>
<td>11.0</td>
<td>0.03 B</td>
<td>11.2</td>
<td>0.03 B</td>
</tr>
<tr>
<td>WB LT</td>
<td>19.3</td>
<td>0.01 B</td>
<td>16.5</td>
<td>0.02 B</td>
<td>11.0</td>
<td>0.03 B</td>
<td>11.2</td>
<td>0.03 B</td>
</tr>
<tr>
<td>Fraser Ave &amp; 12th St</td>
<td>6.6</td>
<td>0.01 A</td>
<td>7.4</td>
<td>0.00 A</td>
<td>7.5</td>
<td>0.01 A</td>
<td>7.5</td>
<td>0.01 A</td>
</tr>
<tr>
<td>KTH</td>
<td>7.4</td>
<td>0.00 A</td>
<td>7.4</td>
<td>0.00 A</td>
<td>7.5</td>
<td>0.00 A</td>
<td>7.6</td>
<td>0.00 A</td>
</tr>
<tr>
<td>WB LT</td>
<td>7.4</td>
<td>0.00 A</td>
<td>7.4</td>
<td>0.00 A</td>
<td>7.5</td>
<td>0.00 A</td>
<td>7.5</td>
<td>0.00 A</td>
</tr>
<tr>
<td>Island Hwy &amp; Fraser Ave</td>
<td>9.1</td>
<td>0.02 A</td>
<td>9.1</td>
<td>0.02 A</td>
<td>9.6</td>
<td>0.03 A</td>
<td>9.7</td>
<td>0.05 A</td>
</tr>
<tr>
<td>KTH</td>
<td>7.4</td>
<td>0.00 A</td>
<td>7.4</td>
<td>0.00 A</td>
<td>7.5</td>
<td>0.01 A</td>
<td>7.5</td>
<td>0.01 A</td>
</tr>
<tr>
<td>WB LT</td>
<td>7.4</td>
<td>0.00 A</td>
<td>7.4</td>
<td>0.00 A</td>
<td>7.5</td>
<td>0.00 A</td>
<td>7.6</td>
<td>0.00 A</td>
</tr>
</tbody>
</table>

By Year 2024, traffic growth in the study area was estimated for Year 2024 by using the Lanai Community Plan Update published by the County of Maui Planning Department in December 2013, which resulted in an anticipated growth rate of approximately 5.7 per year to reach 6,000 residents by 2025. The Four Seasons Resort Lanai, The Lodge at Koele, is assumed to be completed with their renovation project by Year 2024 and will thus be occupied and operational in the Base Year 2024 scenario.

All study intersections are forecast to operate with LOS similar to existing conditions, with all movements operating at LOS B or better during the AM and PM peak hour of traffic.

5.3 Future Year 2024

The Project entails the development of 200 residential units, one-acre park, 1,500 square foot pavilion, comfort station, and 100 parking stalls. Of the 200 single-family homes, 133 will be comprised of affordable homes and 67 will be comprised of market-rate homes. As a conservative measure, a 1.1-acre park will be assumed to include the amenities identified. Vehicular traffic to the Project will be provided by two (2) existing accesses along Fraser Avenue at 9th Street and at 12th Street. The Project is anticipated to generate approximately 147(221) AM(PM) trips and study intersections are forecast to operate at conditions similar to Base Year 2024 during both peak hours with all manual turning movements operating at LOS C or better during the AM and PM peak hours of traffic.

5.4 Recommendations

No intersection improvements are recommended as a result of the Project.

21
6. REFERENCES

# APPENDIX A

## TRAFFIC COUNT DATA

File Name: AM_Fraser Ave - 9th St  
Site Code: 00000000  
Start Date: 8/10/2016  
Page No: 1

<table>
<thead>
<tr>
<th>Groups Printed: Class 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>06:45 AM</td>
</tr>
<tr>
<td><strong>FRASER AVE Southbound</strong></td>
</tr>
<tr>
<td>Start Time</td>
</tr>
<tr>
<td>06:45 AM</td>
</tr>
<tr>
<td>07:00 AM</td>
</tr>
<tr>
<td>07:15 AM</td>
</tr>
<tr>
<td>07:30 AM</td>
</tr>
<tr>
<td>07:45 AM</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>06:00 AM</td>
</tr>
<tr>
<td>07:30 AM</td>
</tr>
<tr>
<td>08:00 AM</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
</tr>
<tr>
<td>Apprch %</td>
</tr>
<tr>
<td>Total %</td>
</tr>
</tbody>
</table>

---

AUSTIN TSUTSUMI & ASSOCIATES  
501 Sumner Street, Suite 521  
Honolulu, HI 96817-5031  
Phone: (808) 533-3646  
Fax: (808) 526-1267
### Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1

**Peak Hour for Entire Intersection Begins at 07:00 AM**

<table>
<thead>
<tr>
<th>Time</th>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Peds In</th>
<th>Peds Out</th>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Peds In</th>
<th>Peds Out</th>
<th>Int. Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>07:00 AM</td>
<td>32</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>07:15 AM</td>
<td>23</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
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<td>07:30 AM</td>
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<td>0</td>
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<td>0</td>
<td>1</td>
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<td>0</td>
</tr>
<tr>
<td>07:45 AM</td>
<td>29</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>103</td>
<td>7</td>
<td>0</td>
<td>12</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>21</td>
</tr>
</tbody>
</table>

**Peak Hour Begins at 07:00 AM**

### Grand Total

<table>
<thead>
<tr>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Peds In</th>
<th>Peds Out</th>
<th>Int. Total</th>
</tr>
</thead>
<tbody>
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<td>12</td>
<td>2</td>
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**Unshifted**

<table>
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<tr>
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<th>Peds In</th>
<th>Peds Out</th>
<th>Int. Total</th>
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<tbody>
<tr>
<td>0</td>
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<td>2</td>
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<tr>
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**% Unshifted**

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<th>Peds Out</th>
<th>Int. Total</th>
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### Groups Printed- Unshifted - Bank 1

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**Peak Hour Data**

Peak Hour Begins at 07:00 AM

---

**North**

---

**Southwest**

---

**South**

---

**Southwest**

---

**Southwest**

---
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1
Peak Hour for Entire Intersection Begins at 07:00 AM

<table>
<thead>
<tr>
<th>Start Time</th>
<th>FRASER AVE Southbound</th>
<th>12TH ST Westbound</th>
<th>FRASER AVE Northbound</th>
<th>Eastbound</th>
</tr>
</thead>
<tbody>
<tr>
<td>06:45 AM</td>
<td>0 23 1 0 24</td>
<td>2 0 0 0 2</td>
<td>2 0 5 0 0 5</td>
<td>0 0 0 0 6 6 37</td>
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<tr>
<td>07:00 AM</td>
<td>0 26 0 0 26</td>
<td>2 0 0 0 2</td>
<td>2 0 19 0 0 19</td>
<td>0 0 0 0 9 9 56</td>
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<tr>
<td>07:15 AM</td>
<td>0 28 1 0 29</td>
<td>2 0 1 0 3</td>
<td>1 37 0 0 38</td>
<td>0 0 0 0 8 8 78</td>
</tr>
<tr>
<td>07:30 AM</td>
<td>0 26 6 0 31</td>
<td>2 0 0 0 2</td>
<td>4 1 12 0 1 14</td>
<td>0 0 0 0 0 0 49</td>
</tr>
</tbody>
</table>

| Total Unshifted | 0 103 | 7 | 0 116 | 8 | 0 | 1 2 | 11 | 2 73 | 0 1 76 | 0 0 0 0 23 | 23 | 220 |
| % In Unshifted | 9 8.6 | 5.4 | 0 19.2 | 3.5 | 96.1 | 0 1.2 | 0 0 0 0 100 |

<table>
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<tr>
<th>Time</th>
<th>08:00 AM</th>
<th>08:15 AM</th>
<th>08:30 AM</th>
<th>09:00 AM</th>
<th>09:15 AM</th>
<th>09:30 AM</th>
<th>10:00 AM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Right</td>
<td>Thru</td>
<td>Left</td>
<td>Peds</td>
<td>Right</td>
<td>Thru</td>
</tr>
<tr>
<td>08:00 AM</td>
<td>26 1 1 1 0 22 1 0 2 2 1 59</td>
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<td></td>
</tr>
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<td>08:15 AM</td>
<td>2 18 0 0 2 1 1 17 1 0 0 1 3 47</td>
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<td></td>
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<td></td>
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<tr>
<td>08:30 AM</td>
<td>0 14 1 0 0 6 2 0 3 3 2 34</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>09:00 AM</td>
<td>187 3 2 6 3 5 5 0 126 5 2 9 7 35</td>
<td>416</td>
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<tr>
<td>09:15 AM</td>
<td>4.5 93 1.5 1 31.6 15.8 26.3 26.3 3.6 91.3 3.6 1.4 15.5 12.1 121 60.3</td>
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</tr>
<tr>
<td>09:30 AM</td>
<td>2.2 46 0.7 0.5 1.4 0.7 1.2 1.2 1.2 33.3 1.2 0.6 2.2 1.7 17.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Unshifted | 9 187 3 2 6 3 5 5 0 126 5 2 9 7 35 |
| % Unshifted | 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 |

| % Bank 1 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
| % % Bank 1 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 |
### Peak Hour Analysis

**Peak Hour for Entire Intersection Begins at 07:00 AM**

<table>
<thead>
<tr>
<th>Start Time</th>
<th>FRASER AVE Southbound</th>
<th>12TH ST Westbound</th>
<th>FRASER AVE Northbound</th>
<th>12TH ST Eastbound</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right</td>
<td>Thru</td>
<td>Left</td>
<td>Peds</td>
</tr>
<tr>
<td>07:00 AM</td>
<td>0</td>
<td>26</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>07:15 AM</td>
<td>0</td>
<td>1010</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>07:30 AM</td>
<td>0</td>
<td>4020</td>
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<tr>
<td>07:45 AM</td>
<td>0</td>
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<table>
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<th>FRASER AVE Southbound</th>
<th>12TH ST Westbound</th>
<th>FRASER AVE Northbound</th>
<th>12TH ST Eastbound</th>
</tr>
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<tbody>
<tr>
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<td>0</td>
<td>1030</td>
<td>2</td>
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</tr>
<tr>
<td>08:15 AM</td>
<td>0</td>
<td>2000</td>
<td>0</td>
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</tr>
<tr>
<td>08:30 AM</td>
<td>0</td>
<td>1010</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Grand Total**

| Apprch % | 0     | 58.3 | 41.7 | 0    | 0     | 0    | 0    | 0    | 6    | 94   | 0    | 0    | 0    | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 345 |

**Total %**

| 0     | 50.1 | 4.3  | 2.9  | 0    | 0     | 0    | 0    | 0    | 2.3  | 36.2 | 0    | 0    | 0    | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 362 |
## Peak Hour Data

### FRASER AVE

- **Southbound**: 07:00 AM
- **Westbound**: 07:30 AM
- **Northbound**: 07:00 AM
- **Eastbound**: 07:00 AM

### KAUMALAPAU HWY

- **Southbound**: 07:00 AM
- **Westbound**: 07:00 AM
- **Northbound**: 07:00 AM
- **Eastbound**: 07:00 AM

### Peak Hour Begins at 07:00 AM Class 1

<table>
<thead>
<tr>
<th>Start Time</th>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Peds</th>
<th>Total</th>
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<th>Left Thru</th>
<th>Peds</th>
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</thead>
<tbody>
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<td>21</td>
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</tr>
<tr>
<td>07:15 AM</td>
<td>21 0</td>
<td>3 0</td>
<td>0</td>
<td>24</td>
<td>2 0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>07:30 AM</td>
<td>19 0</td>
<td>1 0</td>
<td>0</td>
<td>20</td>
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<td>0</td>
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</tr>
<tr>
<td>07:45 AM</td>
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<td>25</td>
<td>2 0</td>
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</tbody>
</table>

### Total %

- **FRASER AVE Southbound**: 0.6%
- **FRASER AVE Westbound**: 11.6%
- **FRASER AVE Northbound**: 0%
- **FRASER AVE Eastbound**: 0%

- **KAUMALAPAU HWY Southbound**: 88.4%
- **KAUMALAPAU HWY Westbound**: 0%
- **KAUMALAPAU HWY Northbound**: 0%
- **KAUMALAPAU HWY Eastbound**: 0%

### Unshifted

- **Grand Total**: 147 0 24 0 126 0 0 126
- **Approx %**: 85.5 0 11.6 88.4 0 100 0 100
- **Total %**: 77.5 0 4.5 0.2 43 11.5 0 100

### Peak Hour Analysis From 06:45 AM to 07:45 AM - Peak 1 of 1

- **Peak Hour for Entire Intersection Begins at 07:00 AM**

<table>
<thead>
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<th>Start Time</th>
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<th>Left Thru</th>
<th>Peds</th>
<th>Total</th>
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<td>0</td>
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<td>3 0</td>
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<td>24</td>
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<td>0</td>
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<tr>
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<td>25</td>
<td>2 0</td>
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</tbody>
</table>

### Total %

- **FRASER AVE Southbound**: 100%
- **FRASER AVE Westbound**: 100%
- **FRASER AVE Northbound**: 100%
- **FRASER AVE Eastbound**: 100%

### % Unshifted

- **Grand Total**: 147 0 24 0 126 0 0 126
- **Approx %**: 85.5 0 11.6 88.4 0 100 0 100
- **Total %**: 77.5 0 4.5 0.2 43 11.5 0 100

### % Bank 1

- **Grand Total**: 0 0 0 0 0 0 0 0
- **Approx %**: 0 0 0 0 0 0 0 0
- **Total %**: 0 0 0 0 0 0 0 0

---

**AUSTIN TSUTSUMI & ASSOCIATES**

501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
Phone: (808) 533-3646   Fax: (808) 526-1267
## Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1

### Peak Hour for Entire Intersection Begins at 07:00 AM

<table>
<thead>
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<th>Right</th>
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### Total Volume

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### Apprch %

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### PHF

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<td>0.000</td>
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<td>0.000</td>
</tr>
</tbody>
</table>

---

### Peak Hour Data

- **Peak Hour Begins at 07:00 AM**
- **Unshifted Bank 1**
### MANELE RD
#### Southbound
- **Start Time**
- **Right**
- **Thru**
- **Left**
- **Peds**
- **Total**

#### KAUMALAPAU HWY
- **Westbound**
- **Start Time**
- **Right**
- **Thru**
- **Left**
- **Peds**
- **Total**

#### MANELE RD
- **Northbound**
- **Start Time**
- **Right**
- **Thru**
- **Left**
- **Peds**
- **Total**

#### KAUMALAPAU HWY
- **Eastbound**
- **Start Time**
- **Right**
- **Thru**
- **Left**
- **Peds**
- **Total**

#### Peak Hour Data

<table>
<thead>
<tr>
<th>Time</th>
<th>Right</th>
<th>Thru</th>
<th>Left</th>
<th>Peds</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>07:00 AM</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>07:15 AM</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>07:30 AM</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>07:45 AM</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>10</td>
</tr>
</tbody>
</table>

#### Total Volume
- **Right**: 2
- **Thru**: 4
- **Left**: 2
- **Peds**: 0
- **Total**: 8

#### % App. Total
- **Right**: 25%
- **Thru**: 50%
- **Left**: 25%
- **Peds**: 0%
- **Total**: 46%

#### PHF
- **Right**: 0.500
- **Thru**: 0.500
- **Left**: 0.500
- **Peds**: 0.000

#### FRASER AVE
#### Southbound
- **Start Time**
- **Right**
- **Thru**
- **Left**
- **Peds**
- **Total**

#### 10TH ST
- **Westbound**
- **Start Time**
- **Right**
- **Thru**
- **Left**
- **Peds**
- **Total**

#### FRASER AVE
- **Northbound**
- **Start Time**
- **Right**
- **Thru**
- **Left**
- **Peds**
- **Total**

#### Eastbound
- **Start Time**
- **Right**
- **Thru**
- **Left**
- **Peds**
- **Total**

#### Peak Hour Data

<table>
<thead>
<tr>
<th>Time</th>
<th>Right</th>
<th>Thru</th>
<th>Left</th>
<th>Peds</th>
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<tbody>
<tr>
<td>01:30 PM</td>
<td>0</td>
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<tr>
<td>01:45 PM</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02:00 PM</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>02:15 PM</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02:30 PM</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>02:45 PM</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Total
- **Right**: 1
- **Thru**: 80
- **Left**: 7
- **Peds**: 1
- **Total**: 88

#### Apprch %
- **Right**: 0.2
- **Thru**: 90.6
- **Left**: 8.7
- **Peds**: 0.3

#### Total %
- **Right**: 100%
- **Thru**: 41.2%
- **Left**: 4%
- **Peds**: 0.2%

#### % Unshifted
- **Right**: 100%
- **Thru**: 100%
- **Left**: 100%
- **Peds**: 100%

#### % Bank 1
- **Right**: 0%
- **Thru**: 0%
- **Left**: 0%
- **Peds**: 0%
### Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1

**Peak Hour Begins at 02:00 PM**

<table>
<thead>
<tr>
<th>Time</th>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Peds</th>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Right Peds</th>
<th>Left Peds</th>
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<td>0</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>02:15 PM</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>02:30 PM</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>02:45 PM</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Total Volume: 0 76 11 1 88 4 0 1 2 7 7 89 0 15 91 0 0 12 12 198

% App. Total: 0 86.4 12.5 1.1 57.1 0 14.3 28.6 7.7 78 0 40 0 14.3 28.6 7.7 78

PHF: 0.000 0.679 0.458 0.250 0.733 0.333 0.000 0.250 0.250 0.438 0.438 0.784 0.000 0.250 0.689 0.000 0.000 0.000 0.250 0.250 0.635

---

**FRASER AVE**

**Southbound**

- Right Thru: 0
- Left Thru: 76
- Left Peds: 11
- Total: 88

**Northbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 12
- Total: 12

---

**10TH ST**

**Westbound**

- Right Thru: 4
- Left Thru: 0
- Left Peds: 2
- Total: 6

**Eastbound**

- Right Thru: 0
- Left Thru: 69
- Left Peds: 15
- Total: 84

---

**9TH ST**

**Westbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 12
- Total: 12

**Eastbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 12
- Total: 12

---

**9TH ST**

**Northbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 0
- Total: 0

**Southbound**

- Right Thru: 0
- Left Thru: 69
- Left Peds: 15
- Total: 84

---

**FRASER AVE**

**Southbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 0
- Total: 0

**Northbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 0
- Total: 0

---

**9TH ST**

**Westbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 0
- Total: 0

**Eastbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 0
- Total: 0

---

**FRASER AVE**

**Southbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 0
- Total: 0

**Northbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 0
- Total: 0

---

**9TH ST**

**Westbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 0
- Total: 0

**Eastbound**

- Right Thru: 0
- Left Thru: 0
- Left Peds: 0
- Total: 0
FRASER AVE Southbound     9TH ST Westbound     FRASER AVE Northbound     9TH ST Eastbound

<table>
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<tr>
<th>Start Time</th>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Peds</th>
<th>Right Thru</th>
<th>Left Thru</th>
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<th>Peds</th>
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</table>

Peak Hour Data

Grand Total

<table>
<thead>
<tr>
<th>Peak Hour Begins at 02:00 PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Bank 1</td>
</tr>
</tbody>
</table>

AUSTIN TSUTSUMI & ASSOCIATES
501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
Phone: (808) 533-3646   Fax: (808) 526-1267
### Peak Hour Analysis From 02:00 PM to 02:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 02:00 PM

<table>
<thead>
<tr>
<th>Start Time</th>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Ped</th>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Ped</th>
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</thead>
<tbody>
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<td>68</td>
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<td>83</td>
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<td>136</td>
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Total Volume

<table>
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<tr>
<th>Time</th>
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<th>Ped</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>02:00 PM</td>
<td>108</td>
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<td>8</td>
<td>146</td>
</tr>
<tr>
<td>02:15 PM</td>
<td>128</td>
<td>40</td>
<td>8</td>
<td>176</td>
</tr>
<tr>
<td>02:30 PM</td>
<td>148</td>
<td>50</td>
<td>8</td>
<td>206</td>
</tr>
<tr>
<td>02:45 PM</td>
<td>168</td>
<td>60</td>
<td>8</td>
<td>236</td>
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</table>

Total

<table>
<thead>
<tr>
<th>Time</th>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Ped</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>02:00 PM</td>
<td>108</td>
<td>30</td>
<td>8</td>
<td>146</td>
</tr>
<tr>
<td>02:15 PM</td>
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<td>176</td>
</tr>
<tr>
<td>02:30 PM</td>
<td>148</td>
<td>50</td>
<td>8</td>
<td>206</td>
</tr>
<tr>
<td>02:45 PM</td>
<td>168</td>
<td>60</td>
<td>8</td>
<td>236</td>
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</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Ped</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>02:00 PM</td>
<td>108</td>
<td>30</td>
<td>8</td>
<td>146</td>
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<td>176</td>
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<tr>
<td>02:30 PM</td>
<td>148</td>
<td>50</td>
<td>8</td>
<td>206</td>
</tr>
<tr>
<td>02:45 PM</td>
<td>168</td>
<td>60</td>
<td>8</td>
<td>236</td>
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### Total Volume

<table>
<thead>
<tr>
<th>Time</th>
<th>Right Thru</th>
<th>Left Thru</th>
<th>Ped</th>
<th>Total</th>
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<tbody>
<tr>
<td>Total</td>
<td>148</td>
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### % App. Total

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<tbody>
<tr>
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</table>

### PHF

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<th>PHF</th>
</tr>
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</tr>
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<td>0.739</td>
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<tr>
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<td>0.929</td>
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</tbody>
</table>

---

**AUSTIN TSUTSUMI & ASSOCIATES**

501 Sumner Street, Suite 521
Honolulu, HI 96817-5031
Phone: (808) 533-3646   Fax: (808) 526-1267
### Fraser Ave - Kaumalapau Hwy

**Start Date:** 8/9/2016

#### Peak Hour Analysis

**Peak Hour Begins at 02:00 PM**

<table>
<thead>
<tr>
<th>Start Time</th>
<th>Right</th>
<th>Thru</th>
<th>Left</th>
<th>Ped.</th>
<th>Right</th>
<th>Thru</th>
<th>Left</th>
<th>Ped.</th>
<th>Right</th>
<th>Thru</th>
<th>Left</th>
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**Grand Total**

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**Approach %**

- Northbound: 12.5%
- Southbound: 75.3%
- Westbound: 6.9%

**Total %**

- 75.3%
- 24.7%
- 6.9%

**Peak Hour Begins at 02:00 PM**

**Unshifted Bank 1**

---

### Manele Rd - Kaumalapau Hwy

**Start Date:** 8/9/2016

#### Peak Hour Analysis

**Peak Hour Begins at 02:00 PM**

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<td>01:45 PM</td>
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**Grand Total**

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**Approach %**

- Northbound: 12.5%
- Southbound: 25%
- Westbound: 62.5%

**Total %**

- 12.5%
- 25%
- 62.5%
**APPENDIX B**

**LEVEL OF SERVICE CRITERIA**
ENCLOSURE B – LEVEL OF SERVICE (LOS) CRITERIA

VEHICULAR LEVEL OF SERVICE FOR SIGNALIZED INTERSECTIONS (HCM 6th Edition)

Level of service for vehicles at signalized intersections is directly related to delay values and is assigned on that basis. Level of Service is a measure of the acceptability of delay values to motorists at a given intersection. The criteria are given in the table below.

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Control Delay per Vehicle (sec/veh.)</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>&lt; 10.0</td>
</tr>
<tr>
<td>B</td>
<td>&gt;10.0 and ≤20.0</td>
</tr>
<tr>
<td>C</td>
<td>&gt;20.0 and ≤35.0</td>
</tr>
<tr>
<td>D</td>
<td>&gt;35.0 and ≤55.0</td>
</tr>
<tr>
<td>E</td>
<td>&gt;55.0 and ≤80.0</td>
</tr>
<tr>
<td>F</td>
<td>&gt; 80.0</td>
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</table>

Delay is a complex measure, and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the v/c ratio for the lane group or approach in question.

VEHICULAR LEVEL OF SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS (HCM 6th Edition)

The level of service criteria for vehicles at unsignalized intersections is defined as the average control delay, in seconds per vehicle.

LOS delay threshold values are lower for two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections than those of signalized intersections. This is because more vehicles pass through signalized intersections, and therefore, drivers expect and tolerate greater delays. While the criteria for level of service for TWSC and AWSC intersections are the same, procedures to calculate the average total delay may differ.

<table>
<thead>
<tr>
<th>Level of Service</th>
<th>Average Control Delay (sec/veh)</th>
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<tbody>
<tr>
<td>A</td>
<td>≤ 10</td>
</tr>
<tr>
<td>B</td>
<td>&gt;10 and ≤15</td>
</tr>
<tr>
<td>C</td>
<td>&gt;15 and ≤25</td>
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<tr>
<td>D</td>
<td>&gt;25 and ≤35</td>
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<tr>
<td>E</td>
<td>&gt;35 and ≤50</td>
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<tr>
<td>F</td>
<td>&gt; 50</td>
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APPENDIX C
LEVEL OF SERVICE CALCULATIONS

• Existing AM Conditions

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<th>EBR</th>
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<th>WBT</th>
<th>WBR</th>
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<th>NBT</th>
<th>NBR</th>
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<th>Minor Lane/Major Mvmt</th>
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<th>SBT</th>
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</thead>
<tbody>
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<td>HCM Lane LOS</td>
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### Intersection

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<th>WBR</th>
<th>NBT</th>
<th>NBR</th>
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<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Traffic Vol, veh/h**: 1 8 73 2 7 103

**Future Vol, veh/h**: 1 8 73 2 7 103

**Conflicting Peds, #/hr**: 0 0 0 0 0 0 0

**Sign Control**: Stop Free Free Stop Stop

**RT Channelized**: - None - None - None - None

**Veh in Median Storage, #**: 0 - 0 - 0 - 0 - 0

**Grade, %**: 0 - 0 - 0 - 0 - 0 - 0 - 0

**Peak Hour Factor**: 92 92 92 92 92 92 92 92 92 92 92 92

**Heavy Vehicles, %**: 22 22 22 22 22 22 22 22 22 22 22 22

**Mvmt Flow**: 1 9 79 2 8 112

---

### Approach

<table>
<thead>
<tr>
<th>Movement</th>
<th>WB</th>
<th>NS</th>
<th>SB</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Capacity (veh/h)**: 1486 789 865 1522

**HCM Lane V/C Ratio**: 0.01 0.005

**HCM Control Delay (s)**: 8.8 7.4 0

**HCM Lane LOS**: A

**HCM 96th %tile (veh)**: 0 0 0

---

### Intersection 2

| Movement  | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|           |     |     |     |     |     |     |     |     |     |     |     |     |     |

**Traffic Vol, veh/h**: 2 4 3 2 1 4 1 4 1 68 3 1 95 2

**Future Vol, veh/h**: 2 4 3 2 1 4 1 68 3 1 95 2

**Conflicting Peds, #/hr**: 0 0 0 0 0 0 0 0 0 0 0 0 0 0

**Sign Control**: Stop Stop Stop Stop Stop Stop

**RT Channelized**: - - None - None - None - None

**Veh in Median Storage, #**: 0 - 0 - 0 - 0 - 0 - 0

**Grade, %**: 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0

**Peak Hour Factor**: 92 92 92 92 92 92 92 92 92 92 92 92 92 92 92

**Heavy Vehicles, %**: 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2

**Mvmt Flow**: 2 4 3 2 1 4 1 74 3 1 103 2
### HCM 6th TWSC
5: Fraser Ave. & 13th St.
10/30/2018

#### Intersection

**Int Delay, s/veh** 0.9

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<tr>
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<th>NBT</th>
<th>NBR</th>
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### HCM 6th TWSC
6: Kaumalapau Hwy & Fraser Ave.
10/30/2018

#### Intersection

**Int Delay, s/veh** 4.3

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### Approach

- **WB**
  - Int Delay, s/veh 4.7
  - **HCM LOS** A
- **NB**
  - Int Delay, s/veh 0.4
  - **HCM LOS** A
  - **Major Lane/Mvmt**
    - Capacity (veh/h) 1464
    - HCM Lane V/C Ratio 0.005
    - HCM Lane Delay (s) 9.1
    - HCM LOS A
    - HCM 95th %tile Q(veh) 0.1
- **SB**
  - Int Delay, s/veh 0.5
  - **HCM LOS** A
  - **Major Lane/Mvmt**
    - Capacity (veh/h) 1464
    - HCM Lane V/C Ratio 0.005
    - HCM Lane Delay (s) 9.1
    - HCM LOS A
    - HCM 95th %tile Q(veh) 0.1

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### Baseline

#### Synchro 9 Report
Page 4

#### Baseline

#### Synchro 9 Report
Page 5
### Intersection

**Intersection Delay, s/veh**: 5.6

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#### Approach

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#### HCM LOS

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### Intersection

#### Int Delay, s/veh

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#### Traffic Vol, veh/h

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#### Mvmt Flow

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**Int Delay, s/veh** 1.4

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**Conflicting Peds, #/hr** 0

**Sign Control**
- Stop
- Stop
- Stop
- Stop
- Stop
- Stop
- Free
- Free
- Free
- Free
- Free
- Free

**RT Channelized**
- None
- None
- None
- None
- None
- None

**Storage Length**
- 0

**Grade, %**
- 0

**Peak Hour Factor**
- 92
- 92
- 92
- 92
- 92
- 92
- 92
- 92
- 92
- 92
- 92
- 92

**Heavy Vehicles, %**
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2

**Mvmt Flow**
- 10
- 225420
- 7
- 96
- 96
- 873
- 8
- 67

**Conflicting Flow All**
- 181
- 181
- 90
- 181
- 82
- 93
- 0
- 85
- 0
- 0

**Stage 1**
- 96
- 96
- 82
- 82

**Stage 2**
- 85
- 85
- 96
- 99

**Critical Hdwy**
- 7.12
- 6.02
- 6.22
- 7.12
- 6.52
- 6.22

**Critical Hdwy Stg 1**
- 6.12
- 5.52
- 6.12
- 5.52

**Critical Hdwy Stg 2**
- 6.12
- 5.52
- 6.12
- 5.52

**Follow-up Hdwy**
- 3.518
- 4.018
- 3.518
- 4.018
- 3.518
- 2.218

**Pot Cap-1 Maneuver**
- 781
- 713
- 968
- 782
- 713
- 978
- 1501

**Stage 1**
- 911
- 815

**Stage 2**
- 923
- 824

**Platoon blocked, %**
- -

**Mov Cap-1 Maneuver**
- 775
- 712

**Mov Cap-2 Maneuver**
- 775
- 712

**Stage 1**
- 911
- 813

**Stage 2**
- 916
- 824

**Approach**

<table>
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**HCM Control Delay, s**
- 9.7
- 9.7
- 0
- 0.3

**HCM LOS**
- A
- A

**Minor Lane/Major Mvmt**

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**Capacity (veh/h)**
- 1501

**HCM Lane V/C Ratio**
- -
- 0.018
- 0.015
- 0.002

**HCM Control Delay (s)**
- 9.7
- 9.7
- 7.4
- 0

**HCM Lane LOS**
- A
- A
- A
- A

**HCM 95th %tile Q(veh)**
- 0.1
- 0
- 0

---

### Intersection

**Int Delay, s/veh** 1.3

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**Conflicting Peds, #/hr**
- 0
- 0
- 0
- 0
- 0
- 0

**Sign Control**
- Stop
- Stop
- Stop
- Stop
- Stop
- Stop
- Free
- Free
- Free
- Free
- Free
- Free

**RT Channelized**
- None
- None
- None
- None
- None
- None

**Storage Length**
- 0

**Veh in Median Storage, #**
- 0

**Grade, %**
- 0

**Peak Hour Factor**
- 92
- 92
- 92
- 92
- 92
- 92
- 92
- 92
- 92
- 92

**Heavy Vehicles, %**
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2

**Mvmt Flow**
- 11
- 11
- 68
- 9
- 5
- 74

**Conflicting Flow All**
- 157
- 73
- 0
- 0
- 77
- 0

**Stage 1**
- 73
- 73
- -
- -

**Stage 2**
- 84
- 84
- -
- -

**Critical Hdwy**
- 6.42
- 6.22
- -
- -

**Critical Hdwy Stg 1**
- 5.42
- -
- -

**Critical Hdwy Stg 2**
- 5.42
- -
- -

**Follow-up Hdwy**
- 3.518
- 4.018
- -
- -

**Pot Cap-1 Maneuver**
- 834
- 989
- -
- 1522

**Stage 1**
- 950
- -
- -

**Stage 2**
- 939
- -
- -

**Platoon blocked, %**
- -
- -
- -

**Mov Cap-1 Maneuver**
- 831
- 989
- -
- 1522

**Mov Cap-2 Maneuver**
- 831
- 989
- -
- 1522

**Stage 1**
- 947
- -
- -

**Stage 2**
- 939
- -
- -

**Approach**

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**HCM Control Delay, s**
- 9.1
- 9.1
- 0.3

**HCM LOS**
- A

**Minor Lane/Major Mvmt**

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**Capacity (veh/h)**
- -
- -

**HCM Lane V/C Ratio**
- -
- -

**HCM Control Delay (s)**
- -
- -

**HCM Lane LOS**
- A
- A
- A

**HCM 95th %tile Q(veh)**
- -
- -

---
**HCM 2010 TWSC**  
6: Kaumalapau Hwy & Fraser Ave.  
10/30/2018

### Intersection

**Int Delay, s/veh** 4.4

#### Movement

<table>
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<th>Lane Configurations</th>
<th>Traffic Vol, veh/h</th>
<th>Future Vol, veh/h</th>
<th>Conflicting Peds, #/hr</th>
<th>Storage Length</th>
<th>Veh in Median Storage, #</th>
<th>Grade, %</th>
<th>Peak Hour Factor</th>
<th>Heavy Vehicles, %</th>
<th>Mvmt Flow</th>
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<td>57 74 54 4 20 61</td>
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<td>-</td>
<td>-</td>
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#### Traffic Volume

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<td>Conflicting Peds, #/hr</td>
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#### Sign Control

- Free
- Free
- Free
- Stop
- Stop

#### Storage Length

- -
- -
- -
- -
- -
- -

#### Veh in Median Storage

- 0
- 0
- 0
- 0
- 0
- 0

#### Grade

- 0
- 0
- 0
- 0
- 0
- 0

#### Peak Hour Factor

92
92
92
92
92
92

#### Heavy Vehicles

- 2
- 2
- 2
- 2
- 2
- 2

#### Mvmt Flow

- 62
- 80
- 59
- 4
- 22
- 66

### Major/Minor

#### Movement

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<tr>
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#### Sign Control

- Free
- Free
- Free
- Free
- Stop
- Stop
- Stop
- Stop
- Stop

#### Storage Length

- -
- -
- -
- -
- -
- -
- -
- -
- -

#### Veh in Median Storage

- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0

#### Grade

- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0

#### Peak Hour Factor

92
92
92
92
92
92

#### Heavy Vehicles

- 2
- 2
- 2
- 2
- 2
- 2

#### Mvmt Flow

- 57
- 38
- 41
- 31
- 2
- 13
- 1
- 89
- 7
- 1
- 1

### Approach

#### EB WB SB

| EB WB SB | 3.2 0 9.4 |

#### HCM Control Delay

| EB WB SB | 3.2 0 9.4 |

#### HCM LOS

A

---

**HCM 2010 TWSC**  
7: Manele St. & Kaumalapau Hwy  
10/30/2018

### Intersection

**Int Delay, s/veh** 6.2

#### Movement

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#### Sign Control

- Free
- Free
- Free
- Free
- Stop
- Stop
- Stop
- Stop
- Stop

#### Storage Length

- -
- -
- -
- -
- -
- -
- -
- -
- -

#### Veh in Median Storage

- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0

#### Grade

- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0

#### Peak Hour Factor

92
92
92
92
92
92
92
92
92
92
92

#### Heavy Vehicles

- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2

#### Mvmt Flow

- 57
- 41
- 88
- 31
- 2
- 14
- 1
- 89
- 8
- 1
- 1

### Major/Minor

#### Movement

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#### Sign Control

- Free
- Free
- Free
- Free
- Free
- Stop
- Stop
- Stop
- Stop
- Stop

#### Storage Length

- -
- -
- -
- -
- -
- -
- -
- -
- -

#### Veh in Median Storage

- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0

#### Grade

- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0
- 0

#### Peak Hour Factor

92
92
92
92
92
92
92
92
92
92
92

#### Heavy Vehicles

- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2
- 2

#### Mvmt Flow

- 5 38
- 4 41
- 8 88
- 3 31
- 1 13
- 0 2
- 1 14
- 1 89
- 1 8
- 1 1

### Approach

#### EB WB SB

| EB WB SB | 3.2 0 9.4 |

#### HCM Control Delay

| EB WB SB | 3.2 0 9.4 |

#### HCM LOS

A

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**Baseline**  
Synchro 9 Report  
Page 5

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**Baseline**  
Synchro 9 Report  
Page 6
APPENDIX C
LEVEL OF SERVICE CALCULATIONS

- Base Year 2024 without Project AM Peak Conditions

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**Int Delay, s/veh**: 0.9

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| Movement Flow | 5  | 16 | 125 | 5  | 16 | 174 |

#### Approach

**WB** | **NB** | **SB**
---|---|---
HCM Control Delay, s: 9.4 | 0 | 0

**HCM LOS**

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### Intersection

**Int Delay, s/veh**: 1.5

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| Movement Flow | 5  | 11 | 5  | 5  | 5  | 110 | 5  | 5  | 120 | 5  | 5  | 163 |

#### Approach

**FS** | **WB** | **NB** | **SB**
---|---|---|---
HCM Control Delay, s: 10.7 | 10 | 0.3 | 0.2

**HCM LOS**

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Major/Mvmt

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APPENDIX C

LEVEL OF SERVICE CALCULATIONS

- Base Year 2024 without Project PM Peak Conditions
### Intersection

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### Pot Cap-1 Maneuver

| Mov Cap-1 Maneuver | 561 | 559 | 916 | 577 |
| Stage 1 | 797 | 718 | 860 | 778 |
| Stage 2 | 805 | 769 | 752 | 717 |

### Platoon blocked, %

| Mov Cap-1 Maneuver | 679 | 922 |
| Stage 1 | 884 |

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### Synchro 9 Report

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### Intersection

**HCM 6th TWSC**  
3: Fraser Ave. & 12th St.  
10/30/2018

**Intersection**  
Int Delay, s/veh 1.9

**Movement**  
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#### Lane Configurations

**Traffic Vol, veh/h**  
- Future: 15 5 10 5 5 115 10 5 125 10

**Sign Control**  
- Stop

**RT Channelized**  
- None

**Veh in Median Storage, #**  
- 0

**Grade, %**  
- 0

**Peak Hour Factor**  
- 92

**Heavy Vehicles, %**  
- 22

**Mvmt Flow**  
- 16 5 11 11 5 136 11

#### Critical Hdwy


#### Critical Hdwy Stg 1

- Stage 1: 6.12 5.52 6.12 5.52

#### Critical Hdwy Stg 2

- Stage 1: 6.12 5.52

#### Follow-up Hdwy

- Stage 1: 3.518 3.318 3.518

#### Pot Cap-1 Maneuver

- Stage 1: 651 614 906

#### Platoon blocked, %

- -

**Approach**

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**HCM LOS**

| B | B |

**Minor Lane/Major Mvmt**

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**Capacity (veh/h)**

| 1435 |

**HCM Lane V/C Ratio**

| 0.004 |

**HCM Control Delay (s)**

| 7.5 |

#### Approach

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**HCM LOS**

| A | A |

**Minor Lane/Major Mvmt**

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**Capacity (veh/h)**

| 1435 |

**HCM Lane V/C Ratio**

| 0.003 |

**HCM Control Delay (s)**

| 9.7 |

**HCM LOS**

| A | A | A | A |

**HCM 96th %tile Q(veh)**

| 0.2 |

---

### Intersection

**HCM 6th TWSC**  
4: Fraser Ave. & 13th St.  
10/30/2018

**Intersection**  
Int Delay, s/veh 1.7

**Movement**  
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#### Lane Configurations

**Traffic Vol, veh/h**  
- Future: 20 20 100 15 10 110

**Sign Control**  
- Stop

**RT Channelized**  
- None

**Veh in Median Storage, #**  
- 0

**Grade, %**  
- 0

**Peak Hour Factor**  
- 92

**Heavy Vehicles, %**  
- 22

**Mvmt Flow**  
- 22 22 109 116 1120

#### Critical Hdwy

- Stage 1: 6.42 6.22 6.42

#### Critical Hdwy Stg 1

- Stage 1: 5.42

#### Critical Hdwy Stg 2

- Stage 1: 5.42

#### Follow-up Hdwy

- Stage 1: 3.518 3.318

#### Pot Cap-1 Maneuver

- Stage 1: 730 935

#### Platoon blocked, %

- -

**Approach**

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**HCM LOS**

| A |

**Minor Lane/Major Mvmt**

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**Capacity (veh/h)**

| 1435 |

**HCM Lane V/C Ratio**

| 0.004 |

**HCM Control Delay (s)**

| 7.5 |

**HCM LOS**

| A | A | A |

**HCM 96th %tile Q(veh)**

| 0.2 |

---
### Intersection

**Int Delay, s/veh:** 4.5

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### Intersection

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LEVEL OF SERVICE CALCULATIONS

- Future Year 2024 with Project AM Peak Conditions

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### Intersection 1: Fraser Ave. & 10th St.

- **Int Delay, s/veh**: 0.8
- **Movement**
  - Lane Configurations
    - Traffic Vol, veh/h: 5 15 135 5 15 215
    - Future Vol, veh/h: 5 15 135 5 15 215
    - Conflicting Peds, #/hr: 0 0 0 0 0 0
    - Sign Control: Stop Stop Free Free Free Free
    - RT Channelized: None None None None None None
    - Storage Length: 0 0 0 0 0 0
    - Grade: % 0 0 0 0 0 0
    - Peak Hour Factor: 92
    - Heavy Vehicles, %: 22
    - Mvmt Flow: 5 16 147 5 16 234
    - Approach WB NB SB
      - HCM Control Delay, s: 9.7
      - HCM LOS: A
      - Minor Lane/Major Mvmt
        - Capacity (veh/h): 791 1429
        - HCM Lane V/C Ratio: 0.027 0.011
        - HCM Control Delay (s): 9.7 7.5
        - HCM LOS: A A
        - HCM 96th %tile Q(veh): 0.1 0

### Intersection 2: Fraser Ave. & 12th St.

- **Int Delay, s/veh**: 1.7
- **Movement**
  - Lane Configurations
    - Traffic Vol, veh/h: 10 10 15 5 5 15 5 5 200 5 5 200 5 5
    - Future Vol, veh/h: 10 10 15 5 5 15 5 5 200 5 5 200 5 5
    - Conflicting Peds, #/hr: 0 0 0 0 0 0 0 0 0 0 0 0 0
    - Sign Control: Stop Stop Stop Stop Stop Stop Stop Stop Stop Stop Stop Stop Stop
    - RT Channelized: None None None None None None None None None None None None None
    - Storage Length: None None None None None None None None None None None None None
    - Grade: % 0 0 0 0 0 0 0 0 0 0 0 0 0
    - Peak Hour Factor: 92
    - Heavy Vehicles, %: 22
    - Mvmt Flow: 11 11 16 5 11 5 11 5 136 5 11 5 136 5 5 217 5
    - Approach EB WB NB SB
      - HCM Control Delay, s: 11
      - HCM LOS: B
      - Minor Lane/Major Mvmt
        - Capacity (veh/h): 643 682 1442
        - HCM Lane V/C Ratio: 0.004 0.032 0.004
        - HCM Control Delay (s): 11
        - HCM LOS: B A A A
        - HCM 96th %tile Q(veh): 0.2 0 0

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**Baseline**

- **Synchro 9 Report**
- **Page 2**
### Intersection

**Int Delay, s/veh:**

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#### Major/Minor

| Conflicting Flow All | 402 | 147 | 0 | 0 | 0 | 152 | 0 |
| Stage 1 | 147 | - | - | - | - | - | - |
| Stage 2 | 255 | - | - | - | - | - | - |
| Critical Hdwy | 6.42 | 6.22 | - | - | - | 4.12 | - |
| Critical Hdwy Stg 1 | 5.42 | - | - | - | - | - | - |
| Critical Hdwy Stg 2 | 5.42 | - | - | - | - | - | - |
| Follow-up Hdwy | 3.318 | 3.318 | - | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 604 | 900 | - | - | - | 1429 | - |
| Stage 1 | 880 | - | - | - | - | - | - |
| Stage 2 | 788 | - | - | - | - | - | - |
| Platoon blocked, % | - | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 596 | 900 | - | - | - | 1429 | - |
| Mov Cap-2 Maneuver | 596 | - | - | - | - | - | - |
| Stage 1 | 869 | - | - | - | - | - | - |
| Stage 2 | 788 | - | - | - | - | - | - |

#### Approach

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**HCM LOS:** B

### Major/Lane/Motor

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### Intersection

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#### Major/Minor

| Conflicting Flow All | 201 | 0 | 0 | 0 | 0 | 478 | 190 |
| Stage 1 | - | - | - | - | - | - | 190 |
| Stage 2 | - | - | - | - | - | - | 288 |
| Critical Hdwy | 4.12 | - | - | - | - | 6.42 | 6.22 |
| Critical Hdwy Stg 1 | - | - | - | - | - | 5.42 | - |
| Critical Hdwy Stg 2 | - | - | - | - | - | 5.42 | - |
| Follow-up Hdwy | 3.318 | 3.318 | - | - | - | 2.218 | - |
| Pot Cap-1 Maneuver | 1371 | - | - | - | - | 546 | 852 |
| Stage 1 | - | - | - | - | - | 842 | - |
| Stage 2 | - | - | - | - | - | 761 | - |
| Platoon blocked, % | - | - | - | - | - | - | - |
| Mov Cap-1 Maneuver | 1371 | - | - | - | - | 499 | 852 |
| Mov Cap-2 Maneuver | 1371 | - | - | - | - | 499 | - |
| Stage 1 | - | - | - | - | - | 770 | - |
| Stage 2 | - | - | - | - | - | 761 | - |

#### Approach

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**Lane Configurations**

| Traffic Vol, veh/h | 5 | 50 | 10 | 245 | 90 | 15 | 5 | 5 | 105 | 5 | 10 | 5 |
| Sign Control | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| Storage Length | - | - | - | - | - | - | - | - | - | - | - | - |
| Veh in Median Storage, # | - | - | - | - | - | - | - | - | - | - | - | - |
| Grade, % | - | - | - | - | - | - | - | - | - | - | - | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

**HCM 9th %ile (veh/h)**

| Traffic Vol, veh/h | 5 | 50 | 10 | 245 | 90 | 15 | 5 | 5 | 105 | 5 | 10 | 5 |
| Veh in Median Storage, # | - | - | - | - | - | - | - | - | - | - | - | - |
| Grade, % | - | - | - | - | - | - | - | - | - | - | - | - |
| Peak Hour Factor | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 | 92 |
| Heavy Vehicles, % | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |

**Approach**

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**Results Summary**

- Future Year 2024 with Project PM Peak Conditions

---

**APPENDIX C**

**LEVEL OF SERVICE CALCULATIONS**

- Future Year 2024 with Project PM Peak Conditions
### Intersection:

**HCM 6th TWSC**

**1: Fraser Ave. & 9th St.**

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**HCM 6th TWSC**

**2: Fraser Ave. & 10th St.**

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### Notes:

- **Baseline**
- **Synchro 9 Report**
### Intersection 3: Fraser Ave. & 12th St.

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#### Approach

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### Intersection 1: Kaumalapau Hwy & Fraser Ave.

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### Intersection 2: Manele St. & Kaumalapau Hwy

**Int Delay, s/veh:** 7

| Movement | EBL | EBT | EBR | WBF | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **Traffic Vol, veh/h:** | 10 | 95 | 10 | 170 | 85 | 5 | 20 | 5 | 195 | 15 | 5 |
| **Future Vol, veh/h:** | 10 | 95 | 10 | 170 | 85 | 5 | 20 | 5 | 195 | 15 | 5 |
| **Conflicting Peds, #/hr:** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Sign Control:** | Free | Free | Free | Free | Free | Free | Stop | Stop | Stop | Stop | Stop | Stop |
| **RT Channelized:** | - | None | - | None | - | None | - | None | - | None | - | None |
| **Grade, %:** | 0 | 0 | 0 | 0 |
| **Peak Hour Factor:** | 92 | 92 | 92 | 92 | 92 | 92 |
| **Veh in Median Storage, #:** | 0 | 0 | 0 | 0 |
| **Veh in Median Storage, %:** | 0 | 0 | 0 | 0 |
| **Heavy Vehicles, %:** | 2 | 2 | 2 | 2 |
| **Mvmt Flow:** | 11 | 103 | 11 | 185 | 92 | 5 | 22 | 5 | 212 | 16 | 5 |

---

### Intersection 3: Manele St. & Kaumalapau Hwy

**Int Delay, s/veh:** 6

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<td>None</td>
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<tr>
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<td>2</td>
<td>2</td>
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**Minor Lane/Major Movmt:**

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<td>A</td>
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### Intersection 4: Manele St. & Kaumalapau Hwy

**Int Delay, s/veh:** 5

| Movement | EBL | EBT | EBR | WBF | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **Traffic Vol, veh/h:** | 10 | 95 | 10 | 170 | 85 | 5 | 20 | 5 | 195 | 15 | 5 | 5 |
| **Future Vol, veh/h:** | 10 | 95 | 10 | 170 | 85 | 5 | 20 | 5 | 195 | 15 | 5 | 5 |
| **Conflicting Peds, #/hr:** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Sign Control:** | Free | Free | Free | Free | Free |
| **RT Channelized:** | None | None | None | None |
| **Grade, %:** | 0 | 0 | 0 | 0 |
| **Peak Hour Factor:** | 92 | 92 | 92 | 92 | 92 | 92 |
| **Veh in Median Storage, #:** | 0 | 0 | 0 | 0 |
| **Veh in Median Storage, %:** | 0 | 0 | 0 | 0 |
| **Heavy Vehicles, %:** | 2 | 2 | 2 | 2 |
| **Mvmt Flow:** | 11 | 103 | 11 | 185 | 92 | 5 | 22 | 5 | 212 | 16 | 5 |

**Minor Lane/Major Movmt:**

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<th>EBL</th>
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<th>WBR</th>
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<td>A</td>
<td>-</td>
<td>C</td>
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<td>-</td>
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APPENDIX A
Wastewater Demand Calculations
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<th>SMH</th>
<th>Flow Carry Over</th>
<th>I/I</th>
<th>Dry Avg</th>
<th>Wet Avg</th>
<th>Additional Peak</th>
<th>Hyd. Rad</th>
<th>Zone Point</th>
<th>Units</th>
<th>Land Lots</th>
<th>Cap.</th>
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APPENDIX B

Drainage Calculations

1. Purpose: Determine existing peak flow for Lanai City 200 Unit Subdivision.

2. Reference: "Rules for the Design of Storm Drainage Facilities in the County of Maui", Department of Public Works, County of Maui, 7/14/1995

3. Hydrologic Criteria
   A. Recurrence Interval, Tm
      i. For overall peak flow: Drainage Area <= 100 acres, Tm = 10 years, 1 hour storm
      ii. For on-site peak flow for basin sizing: Drainage Area <= 100 acres, Tm = 50 years, 1 hour storm
   B. Runoff Quantity --> Rational Method

4. Solution
   A. Rational Method
      \[ Q = C \times I \times A \]
      \[ Q = \text{flow rate in cubic feet per second (cfs)} \]
      \[ C = \text{runoff coefficient} \]
      \[ I = \text{rainfall intensity in (in/hr) for a duration equal to the time of concentration} \]
      \[ A = \text{drainage area in acres} \]
   B. 1 Hour Rainfall (from Plate 6)
   C. Runoff Coefficient (C) from Table 2
   D. Drainage Area and Weighted C (refer to Figure 1)

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### F. Peak Flow (Q) (cfs) at Recurrence Interval, 10 years

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<th>A (ac)</th>
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### D. Weighted Runoff Coefficient (C)

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### I. On-site Increase in Q (cfs) at Recurrence Interval, 10 years

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### H. Peak Flow Q (cfs) at Recurrence Interval, 50 years

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### I. On-site Increase in Q (cfs) at Recurrence Interval, 50 years

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### J. On-site Increase in Q (cfs) at Recurrence Interval, 50 years

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### K. Basin Sizing

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<td>1</td>
<td>15.74</td>
<td>32.73</td>
<td>728</td>
<td>95</td>
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<td>45,634</td>
<td>945</td>
<td>85</td>
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4.7 Water Resources & Wastewater

This section discusses the water resources and wastewater management practices in the region and in the subject property area and the potential impacts of the project on those resources, and mitigation measures the project will employ to mitigate those potential impacts.

4.7.1 Environmental Setting

R. M. Towill Corporation prepared a preliminary engineering report for the project. The following water and wastewater matters are from that report, as well as other sources, as noted. It should be noted that at the time the preliminary engineering report was written (Exhibit G), the Lāna‘i project was intended to be a 200-unit 2014 housing development. Since then the unit count has decreased to a 150-unit 201H housing development, nonetheless the footprint of the development has remained the same. The estimated water and wastewater amounts should be lower, and the recommendations proposed remain valid.

Water Sources

The following is from the Lāna‘i Water Use and Development Plan (2011.) Lāna‘i lies in the rain-shadow of Maui and Molokai. The island has no major surface water sources. The sustainable yield (SY) of Lāna‘i is estimated at 6 million gallons per day (“MGD”). Virtually all of this is located in the Central aquifer sector which is divided into two aquifer systems with 3 MGD each. Withdrawals come primarily from eight wells, with the exception of about 2,000 GPD. The Commission on Water Resource Management (CWRM) in 2019 reviewed all the Hawai‘i Counties’ SY and increased/decreased/no change as a result of further water analysis entitled Robust Analytical Modeling (RAM). On Lāna‘i they allowed for the possibility that there are seven additional aquifers that could provide water to Lāna‘i with up to a SY of 36M GPD. Further research is needed and then accepted by CWRM to change the SY from 6 MGD. The following notes the Predicted Sustainable Yields Ranges Considered by CWRM (Sustainable Yield [SY]) in Million Gallons Per Day (MGD) (Water Resources Protection Plan 2019 Update (page 75)):

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<tbody>
<tr>
<td>Lāna‘i</td>
<td>Windward</td>
<td>3.0</td>
<td>3</td>
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<td>~</td>
<td>3 - 12</td>
<td>3</td>
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<tr>
<td></td>
<td>Leeward</td>
<td>3.0</td>
<td>3</td>
<td>~</td>
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<td>3 - 6</td>
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<td>Mahana Sector</td>
<td>Hauola</td>
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<td>~</td>
<td>~</td>
<td>~</td>
<td>~ - 3</td>
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<td>~</td>
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<td>~</td>
<td>~ - 2</td>
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<td>~</td>
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<td>Lealia</td>
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<td>~</td>
<td>1</td>
<td>~</td>
<td>~ - 1</td>
<td>0</td>
<td>~0</td>
</tr>
<tr>
<td>Kanao Sector</td>
<td>Mānele</td>
<td>~</td>
<td>~</td>
<td>1</td>
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<td>~ - 1</td>
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General Comments & Historical Background on Changes to Aquifer System Boundaries and Sustainable Yield:

(1) Corrected minimum for 2008 WRPP SY based on 2017 review of RAM SY, recharge that should have been used in 2008, or mathematical errors

(2) RAM or RAM 2 methodology using updated best information available for recharge estimates. In cases where multiple valid studies were published ranges of SY are shown.

(3) 2019 SY Range - The bounds of the sustainable yield range were set based on the minimum and maximum estimates resulting from the comparison between the green columns: corrected RAM 2008, RAM + Updated best available Information, and RAM 2 + Updated best available Information.

(4) The Sustainable Yield values

The following illustrates the existing water service on the Island.

Schematic Layout of Lāna‘i Water Systems

The Lāna‘i Water Company privately owns the domestic water system on Lāna‘i.

The water for this system is provided by existing groundwater sources and the water quality has met all State of Hawai‘i regulations for drinking water. All water quality monitoring required by the State of Hawai‘i Department of Health, Safe Drinking Water Branch, Annual Consumer Confidence Reports are available to all customers on the Lāna‘i Water Company Website.
The water system for Lāna‘i is divided into nine (9) aquifer systems for the island. The Project falls within the Leeward Aquifer; however, water to support the project is intended to come from the Leeward and Windward aquifers.

Some Key Points on the Lāna‘i Water System as Noted Primarily from the Lāna‘i Water Use and Development Plan (2011)

Lāna‘i has five water supply systems, including two public drinking water systems, two reclaimed water systems, and a brackish water system. All are owned and operated by wholly owned subsidiaries of Pūlama Lāna‘i.

The following information is from the Lāna‘i Water Use and Development Plan (2011); there have been changes in certain operations and uses (i.e. Mānele was renovated and has changes in operations, Kō‘e‘le Lodge has been renovated and the Kō‘e‘le golf course is not in operation), but the summary gives a good contextual background of the systems, as indicated in the CWRM-approved Plan:

- Lāna‘i Water Systems
  - Two drinking water systems
    - Lāna‘i City to Kaumālapa‘u (PWS 237)
      The system has five available wells for service, three tanks and roughly thirty-five miles of potable line. Source for this system is/can be drawn from three wells:
        - Well 2/Shaft 3 is a potable source, and was once a major source of the pineapple plantation’s irrigation water.
        - Well 3 is located such that it has the most flexibility of any source in the system, but it was most recently used primarily as backup for the Mānele system, serving as a secondary backup for the City, Kō‘e‘le and related areas.
        - Well 4 services the mauka region.
        - Well 6 is a major source for this system.
        - Well 7 has never been in regular use but is considered a future source.
        - Well 8 is located above the City and the former Kō‘e‘le Golf Course.
      - Total Installed Capacity 2.416-MGD
        - Installed Capacity of Potable Sources 2.016-MGD
        - Average Fresh Water Use 0.523 metered/0.605 pumped
        - Average Reclaimed Use 0.209-MGD Kō‘e‘le Golf Course
        - Capacity of Reclaimed Water Facilities 0.400-MGD
        - Average Effluent Production 0.235-MGD
        - Potable Storage 2.786-MGD
        - Non Potable Storage 16.8 active/22.8-MGD total
  - Two reclaimed water systems used for irrigation
    - One brackish water system used for irrigation

- Mānele, Hulopo‘e and the Pālalawai Irrigation Grid (PWS 238)
  - The Mānele Water System may be served by several wells, five tanks and roughly thirty-five miles of potable waterlines.
    - Wells 2 and 4 are the primary wells for this system
    - Well 5 has not seen much use and is considered a potential backup or future source for the Mānele area.
    - Well 6 is currently a major source serving this system.
      - Total Installed Capacity 4.518-MGD
        - Installed Capacity of Potable in Use 3.024-MGD
        - Average Potable Use 0.375 metered/0.683 pumped
        - Average Brackish Use 0.760 metered/0.944 pumped
        - Average Reclaimed Use 0.073-MGD
        - Capacity of Brackish Sources in Use 1.354-MGD
        - Capacity of Reclaimed Water Facilities 0.140-MGD
        - Average Effluent Production 0.073-MGD
        - Potable Storage 2.000-MGD
        - Non Potable Storage 17.85 active/19.35-MGD total
  - Two reclaimed water systems used for irrigation
    - One brackish water system used for irrigation

Collectively, these systems include about 79-miles of active pipe, 35-MG of storage, of which about 4.8-MG is potable, and about 6.394-MGD installed well capacity of which 5.04 is potable.

No surface water sources remain on Lāna‘i, although historical evidence points to the fact that the island once had springs, streams and even taro lo‘i. Lāna‘i has 13-ahu pu‘a. Of one hundred and ten kuleana claims made within these ahupua‘a, fifty-six were awarded.

Fresh water is found only in high level dikes confined compartments in the Central Sector. The hydrogeology of Lāna‘i is unusual in various respects, among them the predominance of high level water:
  - High-level water is found within 3.8-miles of the coast all around the island.
  - Numerous dikes and fault boundaries divide the main aquifer into many smaller, relatively independent compartments bounded by vertical walls of lower permeability.
  - Only the Central Aquifer sector is believed to contain fresh water.

Estimates of sustainable yield on the island have varied from about 5- to 10-MGD, with the current regulatory sustainable yield estimate at 6-MGD.

The island’s entire sustainable yield of 6-MGD is found in the Central Sector.
  - The Central Sector is divided into two aquifer systems, the Leeward and the Windward, with 3-MGD sustainable yield in each.
• There are currently 7 pumped sources, with one pumped at only 2,000-GPD.
  o Average day capacity of potable systems in use, by System Standards, equates to about 2.24-MGD.

• According to the Lāna‘i Water Company Periodic Water Report, the current moving average pumping is 1,643-MGD (2020 PWR).
  o All pumping sources, but one, are currently located in the Leeward aquifer system, with about 85% of total pumping coming from the Leeward aquifer system.

In general, each island is divided into regions that reflect broad hydrogeological similarities while maintaining hydrographic, topographic, and historical boundaries where possible. Smaller sub-regions are then delineated based on hydraulic continuity and related characteristics. In general, these units allow for optimized spreading of island-wide pumpage on an aquifer-system-area scale.

An aquifer coding system is used to reference and describe the ground water hydrologic units delineated by CWRM. It is established to provide a consistent method by which to reference and describe ground water resources, and to assist in various water planning efforts. The coding system was first initiated by the State Department of Health in response to directives from the U.S. Environmental Protection Agency.

Since then, boundary delineations of ground-water hydrologic units were manually drawn or retraced by the DLNR Division of Water and Land Development (DOWALD) General Flood Control Plan of Hawai‘i (1983), the State Department of Health (1987), and the Commission on Water Resource Management (1990), (CWRM)

On January 22, 2014, the Commission required all wells in the State of Hawai‘i to report monthly ground water use including quantity pumped, chloride (and/or conductivity) concentrations, temperature, and (pump off) water-level data (CWRM)

Lāna‘i Water Use and Development Plan (WUDP) (2011)

In 1990 each county in the State of Hawai‘i prepared and adopted its initial Water Use and Development Plans (WUDP). These WUDPs were incorporated by the Commission on Water Resources Management (CWRM) into the Hawai‘i State Water Plan.

The State Water Code and the Maui County Charter, Chapter 11, Section 8-11.23(3) mandate that County WUDPs be consistent with County land use plans and policies. The 2030 Maui County General Plan is comprised of the Countywide Policy Plan (2011), Maui Island Plan (MIP, 2012) and the Community Plans adopted in various years.

The plans provide direction for future growth, the economy, and social and environmental decisions and establishes a Directed Growth Strategy. The WUDP does not propose alterations to proposed land use and development patterns established by the General Plan.

The original WUDP for Maui County was adopted by County ordinance and by CWRM in 1990. An update adopted by Maui County Council in 2010 was not approved by CWRM, primarily because it was limited in scope to the MDWS District rather than all water uses and needs.

The Lāna‘i WUDP was updated in 2011 and the Molokai WUDP will be updated following adoption of this Maui Island WUDP. (Maui County WUDP Update, 2018)

Water Management Areas

Water Management Areas are special areas where additional Commission regulation is required. This additional regulation is for owners of water sources (such as wells owners) who must obtain water use permits to withdraw water for various uses. Fundamentally, individual water management areas coincide with individual hydrologic unit areas.
Science is the foundation of the Water Commission’s water management area designation decision-making. State Law (HRS 6174C-41) notes that designation of water management areas shall occur “when it can be reasonably determined, after conducting scientific investigations and research, that the water resources in an area may be threatened by existing or proposed withdrawals”.

State Water Management Area designation is not a simple or routine process. It is complicated, expensive and has an uncertain outcome. Compounding the problem, Water Use Permits are subject to Contested Case Hearings. Lāna’i is not a Designated Water Management Area.

**Designated Water Management Areas**

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**Lāna’i Water Management Area Matters**

The Lāna’i Island WUDP notes Lāna’i’s “faces several regulatory challenges.”

Resolving a petition filed in 1989, the CWRM in 1990 decided not to designate any of Lāna’i’s aquifers as groundwater management areas. In lieu of designation the CWRM required ongoing monitoring, preparation of a water shortage plan and annual information status hearings. The CWRM also set conditions that would trigger reconsideration of groundwater management area designation.

“The Commission of Water Resource Management (CWRM) decided in January 1990 to authorize the Chairperson to reinitiate water management area proceedings if the static water level of any production well should fall below one half its original level above sea level. It granted the same authorization should any source of supply in the Company’s plans fail to materialize but full land development continues.”

“In March of 1991, another trigger was set, to reinitiate designation proceedings should total pumpage exceed 4.3-MGD. Even without these triggers, the State may initiate designation proceedings when the withdrawal from any aquifer reaches 90% of its sustainable yield, which in the case of Lāna’i’s aquifer systems would be 2.7-MGD each in the Windward and Leeward systems of the island’s Central Aquifer sector.”

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If a State Water Management Area designation is granted:

- Existing permittees (well owners) must apply for a Water Use Permit from the State - even the County’s Department of Water Supply. No one is grandfathered in.
- There is no guarantee that any existing water user will be issued a State Water Use Permit, including the existing water company providing water to others.
- Well owners do not know what level of water use will be permitted to them.
- Well owners may receive an allocation that is lower than their present use. (In that case, water companies are obligated to provide water to existing customers, before it can consider providing water to future users.)
- The Water Commission will resolve all “existing” water uses before it will process any “new” water uses.
- Every Water Use Permit in the designation process is subject to a Contested Case Hearing.

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Lāna’i Aquifers and Wells (Lāna’i Island WUDP 2011)

“In response to such challenges, a resource development strategy, including sufficient conservation and new supply resources to meet expected water demand for the 2030 planning horizon, was developed. ... If conservation and leak reduction targets are achieved, this strategy would result in pumpage between 3.3-MGD and 3.66-MGD in the year 2030 assuming expected levels of water demand and build-out of projects with existing entitlements.” (CWRM 1990).
“Without implementation of the identified conservation measures, pumpage could exceed the 4.3-MGD trigger for proceedings by the State Commission on Water Resource Management (CWRM) to designate Lāna‘i as a groundwater management area. Measures for watershed protection and source protection are identified, as well as recommendations for changes to monitoring and data management.

Status of CWRM decisions on March 29, 1990 and April 16, 1997 (as of February 14, 2019 Public Meeting)

The following summary was part of a CWRM public information meeting presentation on Lāna‘i on February 14, 2019. It notes the conditions and status of each related to prior CWRM decisions on March 29, 1990 and April 16, 1997. Summary:

- Monitoring of Ground Water conditions is acceptable
- All conditions of non-designation decisions have been met
- Acceptance of Lāna‘i’s WUDP meets intent of LWAC

Note that Lāna‘i’s Water Company is in full compliance with all conditions noted in the CWRM actions.

The following lists (numerically/alphabetically) various conditions associated with the prior CWRM analysis on whether a Water Management Area should be implemented on Lāna‘i. Below each is the CWRM statements of response to each condition (bullet points) for each condition. This information was part of the public update presentation CWRM staff conducted on Lāna‘i on February 14, 2019.

Assessment of March 29, 1990 CWRM Non-Designation of Lāna‘i Groundwater Management Area

Decision Conditions:

1. Require Lāna‘i Company to immediately commence monthly reporting of water use to the Commission, under the authority of Chapter 5174C-83, HRS, which would include pumpage, water level, temperature, and chloride measurements from all wells and shafts.
   - Lāna‘i Co. reports every 4 weeks which results in a 13-period reporting frequency. This is in compliance with the frequency portion of condition 1. Overall, condition 1 is followed.

2. In addition to monthly water use reporting and pursuant to Secs. 174C-43 & 44, HRS, require Lāna‘i Company to monitor the hydrologic situation so that if and when ground-water withdrawals reach the 80-percent-of-sustainable-yield rate, the Company can expeditiously institute public informational meetings in collaboration with the Commission to discuss mitigative measures.
   - Monthly water use reports provide the means for monitoring hydrologic conditions.
   - Condition was mainly to notify the public of 174C-43 & 44 concerning the requirement of public involvement for mitigative actions when 80 percent sustainable yield actual use is occurring. Based on current public involvement with the Lāna‘i Water Subcommittee monitoring this condition is followed.

3. Require Lāna‘i Co. to formulate a water shortage plan that would outline actions to be taken by the Company in the event a water shortage situation occurs. This plan shall be approved by the Commission and shall be used in regulating water use on Lāna‘i if the Commission should exercise its declaratory powers of a water emergency pursuant to Section 174C-62(g) of the State Water Code. A draft of this plan should be available for public and Commission review no later than the beginning of October 1990 and shall be approved by the Commission no later than January 1991.
   - Should be incorporated in the Water Use and Development Plan update.

4. That the Commission hold annual public informational meetings on Lāna‘i during the month of October to furnish and receive information regarding the island’s water conditions. The public shall be duly notified of such meetings.
   - Public informational meetings have been held annually since 1990, usually in October.
   - The last informational meeting was held on January 18, 2001. Since then, the Lāna‘i Water Advisory Committee has been formed, which relieved the Commission of public information meetings per the Commission’s 1997 reconsideration of designation.

5. Authorize the Chairperson to re-institute water-management-area designation proceedings and, hence, re-evaluations of ground-water conditions on the island if and when:
   a. The static water-level of any production well falls below one-half its original elevation above mean sea level, or
   b. Any non-potable alternative source of supply contained in the Company’s water development plan fails to materialize and full land development continues as scheduled.
   c. Items 1, 2, and 3 are not fulfilled by Lāna‘i Company.
   d. When actual water use exceeds 4.3 MGD.
   - No part of condition 5 has materialized to warrant chairperson action. For clarification, item 5.b. referred to non-potable alternatives of wastewater reuse and wells 12 & 13 at the time of designation and full (both existing and future) land development continued. Since 1990, pineapple has been phased-out resulting in less than the full development scenario and a much reduced water consumption. Nevertheless, alternative water projects are continuing. Kō‘ele & Māele G.C.s now use treated effluent.
   - Should be incorporated in the Water Use and Development Plan update.

Assessment of April 16, 1997 Non-Designation of Lāna‘i/Groundwater Management Area

Decision:

1. Deny without prejudice the petition to designate the island of Lāna‘i as a ground water management area.

2. Continue to conduct annual public informational hearing in October to monitor conditions until the formation of a permanent advisory group to monitor implementation of the Lāna‘i Working Group Report.
   - Formation of the Lāna‘i Water Advisory Committee (LWAC) satisfies this condition.

3. Accept the LWGR as a guide for decision making until the Lāna‘i WUDP is adopted by the Maui County Council by ordinance.
   - WUDP adopted August 15, 2012

4. Request the County to provide quarterly progress reports on the formation of the ongoing community-based advisory committee, and the adoption process of the Lāna‘i Community Plan and Lāna‘i WUDP.
   - Formation of the Lāna‘i Water Advisory Committee satisfies this condition.

5. Request Lāna‘i Company quarterly progress reports on its watershed management activities.
   - Submitted to LWAC on fencing and hunting issues which satisfies this condition. October 2018 Pūlāna Watershed Report submitted to DLNR DOFAW. 2019 an island-wide Natural Resources Management Plan expected.
6. Request the LUC to provide regular updates as to the status of Lānaʻi-related issues before the LUC, including a copy of court decisions that may affect these issues.
   - Should be incorporated in the Water Use and Development Plan update.

Ground Water Pumping and Reporting

Under the Hawaiʻi Administrative Rules Title 13 Chapter 168 Subtitle 7, the collection & submittal of monthly water use reporting, including pumpage, chloride concentrations, temperature, and (pump off) water level data, is required.

The 12-Month Moving Average (12-MAV) is used to smooth out short-term fluctuations and highlight longer-term trends or cycles in pumpage. To determine the 12-MAV for a selected month: the pumpage in million gallons per day (MGD) for the selected month is added to the pumpage in MGD for the previous 11 months then this total is divided by 12 (or averaged) which gives the 12-MAV for the selected month.

The reported 12-month moving average of pumping from Lānaʻi wells in 2018 were 1.527-MGD (as of December 2018) and 1.555-MGD (in August 2019). In a May 21, 2018 letter to Kurt Matsumoto, Chief Operating Officer of Pūlama Lānaʻi, Water Commission Deputy Director, Jeff Pearson, noted

“The Commission also continues its active monitoring involvement through monthly water use reports, where Lānaʻi Water Company Inc. has always shown exemplary reporting. As such, Lānaʻi is the only island we can confidently post total historical island-wide pumpage against Lānaʻi’s sustainable yield to show that the resource is not threatened.

If more data is desired to be posted we can do that; however, it should be understood that pumpage within the adopted estimates of sustainable yield indicates that the public trust resource is not threatened.”

As noted in the following, Lānaʻi is the only Island with regular reporting (WRPP 2019; page 14).

The following notes the monthly pumpage and 12-month moving average for Lānaʻi wells from 1926 through early 2018:

Monthly Pumpage (blue) – 12-month moving average (green) and Sustainable Yield (red) for Lānaʻi wells (CWRM) (Note peak withdrawal years in the 1950s to early 1990s were during the pineapple cultivation on the island.)

The following summarize existing demands as of December 2016 in relation to aquifer system area sustainable yields for the Island of Lānaʻi. Water use is based on reported pumpage as of December 31, 2016, unless otherwise noted. Aquifer sustainable yields are those noted in the 2019 update of the WRPP (2016 data). (WRPP 2019 Appendix H)
Hōkūao Water Demand Estimated below 121,700 GPD

The R. M. Towill Corporation Preliminary Engineering Report for the Hōkūao 201H Housing Project included information related to the water demands and supply for the project.

The “Water System Standards” for the four respective counties in Hawai‘i estimates that the Average Daily Demand for water per residential unit (whether single-family or multi-family) in Hawai‘i County is 400-gallons per unit; Kauai – 500-gals/unit; Maui – 600-gals/unit and Oahu – 500-gals/unit).

Conformance with the County standards provides accepted criteria for water system planning and design, although the water system, inclusive of water source, storage, and piping, will remain privately-owned and will not be subject to all County requirements.

Using the County of Maui Department of Water Supply Standards of 600 gallons per day per single family unit and 1,700 gallons per acre for a park as guides, the proposed average daily domestic water demand for the 200 single family units and the 1-acre park with future 1,500 square foot pavilion with comfort stations and parking is estimated to be 121,700 GPD. As previously mentioned, the project has been adjusted to 150 homes versus the 200 homes that the calculations were based on, that being said, the estimated water demand is expected to be lower than the calculated 121,700 GPD.

The estimated total water demand of the project is lower than 121,700 GPD. The Lāna‘i Water Company has indicated that:

“the project will have a long-term, reliable supply of water in accordance with Chapter 14.12, Water Availability, Maui Code, upon completion of new source development.”

“The Lāna‘i Company is in the process of permitting the development of Well #7 which is anticipated to be the source of water for the project.”

This estimated demand plus recent 12-month moving average for the entire island of 1.468 MGD (Mar 2019) results in total estimated overall usage of approximately 1.590 MGD.

There is Adequate Water Supply for Hōkūao 201H Housing Project

Well 7 was drilled in 1987, it will be the water source for the Hōkūao project. Well 7 is at ground level of 2,100 feet; the well depth is 1650 feet.

The well is expected to average sustainable pumping of 300,000 GPD; as noted in the following, the estimated water demand is lower than 121,700 GPD. The project fits within the Lāna‘i WUDP.

Well 7 has never been in regular use. Activating and using Well 7 has been identified as the planned source for domestic water needs at Hōkūao 201H Housing Project.

This is consistent with the Lāna‘i WUDP that included in its examination of new supply resource options the recommissioning of Well 7 in the Leeward Aquifer.

As noted in the Lāna‘i WUDP, “Well 7 could provide both reliability and improved distribution of withdrawals on the north end of the Leeward aquifer. Well 7 has the advantage of being situated such that, with transmission improvements, it could serve either Lāna‘i City or the Irrigation Grid.”

Proposed Water Supply and Distribution System

The Lāna‘i Water Company privately owns the domestic water system servicing the proposed. The existing regional schematic water system consists of a 12-inch waterline on Fraser Avenue.

The existing domestic water system will provide water service to the project through a new connection to the 12-inch water main on Fraser Avenue.

Proposed water distribution mains along the new roads will be 8-inch to 12-inch in diameter to ensure adequate fire protection flows can be provided. Water pressure exceeds 80 psi in some areas of this system and individual pressure reducing valves are required.
Wastewater

Lānaʻi's municipal wastewater collection system is situated in and around Lānaʻi City, as illustrated in the following map (R. M. Towill Corporation.)

Based on as-built plans of the Lānaʻi Sewerage System and Waialua Annex Subdivision, sewer mains are located in Fraser Ave., as well as the County's major sewer collector lines which are located through the proposed project. Existing 10-inch and 12-inch sewer lines route sewage from the existing residential subdivision along Fifth Street to the 15-inch interceptor sewer which discharges to the wastewater reclamation facility west of the project site.

The existing main along Fraser Avenue consists of an 8” pipe of unidentified material, and the collector lines are a 10” vitrified clay pipe, and a 12” pipe of unidentified material. The 8” main serves the portion of Lānaʻi City below Iliena Ave., between Eighth and Twelfth streets. The 10” collector line services the entire half of Lānaʻi City to the north of Seventh street. The 12” collector line serves the western portion of Lānaʻi City, below Fraser Ave. The collector lines merge and flow to the Lānaʻi Wastewater Reclamation Facility (WWRF).

The existing 10-inch and 12-inch collector lines will need to be relocated within proposed street right of ways and connected back to the 15-inch interceptor sewer going to the WWRF. Easements within privately owned residential lots will not be accepted by the County.

Per the County's Department of Environmental Management, Wastewater Reclamation Division, the capacity of the Lānaʻi WWRF is 0.50 million gallons per day (MGD). The actual average daily flow is
approximately 0.315 MGD, and additional allocations totaling 0.080 MGD have been granted to existing development, for a total allocation of 0.395 MGD. The project is located just north of the boundary of the WWRF.

Pulama Lānai will conform with the requirements of Department of Health and County of Maui as it relates to installation, inspection and maintenance of individual wastewater systems in handling wastewater on the site.

4.7.2 Potential Environmental Impact & Mitigation Measures Water

Based on the County of Maui Department of Water Supply Standards of 600 gallons per day per single family unit and 1,700 gallons per acre for a park, the proposed average daily domestic water demand for the 200 single family units and the 1-acre park with future 1,500 square foot pavilion with comfort stations and parking is estimated to be 121,700 GPD. As previously mentioned, the project has been adjusted to 150 homes versus the 200 homes that the calculations were based on, that being said, the estimated water demand is expected to be lower than the calculated 121,700 GPD.

The estimated total water demand of the project is lower than 121,700 GPD. The LWc has noted that “the project will have a long-term, reliable supply of water in accordance with Chapter 14.12 Water Availability, Maui Code, upon completion of new source development. The Lānai Company is in the process of permitting the development of Well #7 which is anticipated to be the source of water for the project.”

Regulatory Provisions Call for Timely Action in the Event Issues are Noted

The Commission on Water Resource Management uses regulatory controls to implement its policies and Hawai‘i Water Plan requirements for well development and water use. Regulations are also used to protect ground water quantity and quality, optimize ground water availability, and obtain maximum reasonable-beneficial uses.

State law address designation of water management areas as noted in the following (§174C-41):

§174C-41 Designation of water management area.

(a) When it can be reasonably determined, after conducting scientific investigations and research, that the water resources in an area may be threatened by existing or proposed withdrawals or diversions of water, the commission shall designate the area for the purpose of establishing administrative control over the withdrawals and diversions of ground and surface waters in the area to ensure reasonable-beneficial use of the water resources in the public interest.

(b) The designation of a water management area by the commission may be initiated upon recommendation by the chairperson or by written petition. It shall be the duty of the chairperson to make recommendations when it is desirable or necessary to designate an area and there is factual data for a decision by the commission. The chairperson, after consultation with the appropriate county council, county mayor, and county water board, shall act upon the petition by making a recommendation for or against the proposed designation to the commission within sixty days after receipt of the petition or such additional time as may be reasonably necessary to determine that there is factual data to warrant the proposed designation.

(c) Designated ground water areas established under chapter 177, the Ground-Water Use Act, and remaining in effect on July 1, 1987, shall continue as water management areas.


The purpose of this chapter is to provide for the designation and regulation of hydrologic areas where water resources are being threatened by existing or proposed withdrawals or diversions of water, water quality problems, or serious disputes. It shall be the duty of the commission to designate areas for the purpose of establishing administrative control over the withdrawals and diversions of ground and surface water in threatened areas to ensure the most beneficial use, development, or management of the water resources in the interest of the people of the state.

Ground water criteria for designation, as stated in the rules, are:

§13-171-7 Ground water criteria for designation. In designating an area for ground water use regulation, the commission shall consider the following:

(1) Whether an increase in water use or authorized planned use may cause the maximum rate of withdrawal from the ground water source to reach ninety percent of the sustainable yield of the proposed water management area;

(2) That the rates, times, spatial patterns, or depths of existing withdrawals of ground water are endangering the stability or optimum development of the ground water body due to upcoming or encroachment of salt water;

(3) That the chloride contents of existing wells are increasing to levels which materially reduce the value of their existing uses;

(4) Whether excessive preventable waste of water is occurring;

(5) There is an actual or threatened water quality degradation as determined by the department of health;

(6) Serious disputes respecting the use of ground water resources are occurring;

(7) Whether regulation is necessary to preserve the diminishing ground water supply for future needs, as evidenced by excessively declining ground water levels; or

(8) Whether water development projects that have received any federal, state, or county approval may result, in the opinion of the commission, in one of the above conditions.

Notwithstanding an imminent designation of a water management area conditioned on a rise in the rate of ground water withdrawal to a level of ninety percent of the area’s sustainable yield, the commission, when such level reaches the eighty percent level of the sustainable yield, may invite the participation of water users in the affected area to an informational hearing for the purposes of assessing the ground water situation and devising mitigative measures. (HAR §13-171-7)

Preliminary Precautionary Steps Prior to Designation

As noted in the law and rules, certain preliminary precautionary steps may be taken as monitoring of production of wells indicate any issues/concerns related to pumpage approaching the Sustainable Yield.
Full buildout of the proposed 200-acre Mānele Basin Industrial Park will be developed incrementally over a period of 30-years (not all at once.) So, there is time to monitor as the incremental development moves forward.

The 90% threshold does not automatically trigger designation; it triggers the commission to consider impacts.

The rules also note that the commission may invite the participation of water users in the affected area to an informational hearing for the purposes of assessing the ground water situation and devising mitigative measures when the level of pumping reaches the eighty percent level of the sustainable yield. So, in the event pumping approaches these levels, there is ample time to address the matter.

Other Near-term Anticipated Water Demands on Lāna‘i

A couple proposed projects pending approval and final decisions for implementation relate to the Mānele Basin Industrial Park and Amendment to the Kō‘ele Project District.

Water Demand for the Mānele Basin Industrial Park

Water for the existing industrial uses adjoining the proposed 200-acre Mānele Basin Industrial Park is currently provided by the Mānele Water System which is owned, operated and maintained by the Lāna‘i Water Company. The system, sourced by Wells No. 2 (State Well No. 5-4953-001) and 4 (State Well No. 5-4952-002), currently services Mānele, Hulu‘ope and the Pālāwai Irrigation Grid.

Well No. 2 has a pump capacity of 500 gallons per minute (gpm) or an average day capacity of 320,000 GPD based on an operating time of 16 hours. According to the 2011 Lāna‘i Water Use and Development Plan, the well can be outfitted with a pump with a capacity of up to 1,200 gpm or an average day capacity of 768,000 GPD.

Well No. 4 has a pump capacity of 900 gpm or an average day capacity of 576,000 GPD.

The existing average daily water usage from the Mānele Water System is currently estimated at 418,000 GPD. The operation of Sensei Farms is anticipated to increase water usage to approximately 469,000 GPD at full operation.

The Water System Standards requires sources be able to meet maximum day demand with an operating time of 16 hours, assuming that the largest pumping unit is down. Since Well No. 2 has the larger pump capacity of the two wells, available source capacity for the system is governed by Well No. 4. Based on the existing water use, an average day capacity of 107,000 GPD is available to initially support the development of the 200-acre Industrial Park.

According to the Lāna‘i Water Company Periodic Water Report, the current moving average pumping is 1,643-MGD (2020 PWR).

Water from the wells is either stored in the existing 0.5 million gallon ("MG") Hi‘i Tank or 1.0 MG concrete Hi‘i Reservoir or fed directly into the distribution system depending on need. The 0.5-MG Hi‘i Tank (elevation 1823 feet) serves as the water distribution storage tank for Mānele, Hulu‘ope and the Pālāwai Irrigation Grid. The 1,000,000 gallon Hi‘i Reservoir (elevation 1823 feet) primarily serves as storage for the two well water sources to supply water into the distribution system.

The existing Mānele Water System consists of 10-inch, 12-inch and 16-inch transmission mains. The Mānele Water System is interconnected with the Lāna‘i City Water System. During emergencies, the Lāna‘i City System can supply water to the Mānele Water System by opening a valve.

A 12 - 16-inch high density polyethylene transmission mains transport water from the 0.5-MG Hi‘i Tank into the Mānele Water System. The 12-inch main splits at a junction to serve both Mānele and Pālāwai Irrigation Grid.

To Mānele and Hulu‘ope – From the junction, the 12-inch line feeds into three pressure breaker storage tanks that service Mānele.

To Pālāwai Irrigation Grid – From the junction, the waterline upsizes to a 16-inch main that delivers water to the Pālāwai Irrigation Grid area. The existing 12-inch Pressure Reducing Valve (PRV) downstream of the junction reduces the pressure in the waterline to 95 psi.

Since development plans for the Industrial Park are not yet available, proposed water use for buildout of the Industrial Park is based on the proposed land use and an estimated developable area for each parcel. The developable area of each parcel estimates that up to 70 percent of the total parcel area will require water; the remaining 30 percent will consist of areas with no water use such as roads and parking areas.

In accordance with the Water System Standards, available source capacity is governed by the well with the smallest pumping unit. Well No. 2 can be outfitted with a pump with a capacity of up to 1,200 gallons per minute (gpm) while Well No. 4 has a pump capacity of 900 gpm. Since Well No. 4 has the smaller pump capacity, available source capacity for the water system is governed by Well No. 4, which has an average day pumping capacity of 576,000 GPD, which is equivalent to a maximum day pumping capacity of 864,000 GPD. Once this capacity is used/committed, construction of a new well will be required.

Water to support the project is intended to come from the Leeward and Windward aquifers. As noted, full buildout of the proposed 200-acre Mānele Basin Industrial Park will be developed incrementally over a period of 30-years (not all at once.)

The proposed average day demand for full buildout of the Industrial Park, including existing use is 1,309,000 GPD. The existing water system does not have adequate source capacity and reservoir storage to support full buildout of the Industrial Park. In addition, the transmission mains do not meet Water System Standards for fire flow protection.

The following improvements will be required to support full buildout of the Industrial Park:

- Drilling of a new source or multiple sources to obtain a total minimum pump capacity of 1,546 gpm.
- Construction of a new storage tank with a minimum capacity of 500,000 gallons.
- Upsizing of an existing 12-inch water main between Hi‘i Tank and the Pālāwai Pressure Reducing Valve to a 16-inch main or installation of a parallel 6-inch water main to meet fire flow requirements. Alternatively, the construction of a new storage tank could provide fire flow protection in additional to storage capacity.
- Construction of new 16-inch distribution mains to provide service to currently undeveloped areas.

The intent is to use available water capacity to handle the initial needs. As needs increase over time and the development of industrial park expands, then new wells will be drilled in the Leeward and Windward aquifers.
Well Pump Sizing
i. Existing average day capacity = 576,000 GPD
   Existing maximum day capacity = 864,000 GPD

ii. Full buildout average day demand = 1,309,000 GPD
   Full buildout maximum day demand = 1,963,500 GPD

iii. Additional average day capacity required = 733,000 GPD
    Additional maximum day capacity required = 1,099,500 GPD
    1,099,500 gallons / 16 hours / 60 min = 1,146 gpm
    Total required pump capacity = 1,146 gpm

Full buildout of the Industrial Park will require the development of a new well or multiple wells with a total minimum total capacity of 1,146 gpm.

The Lāna‘i Water Use and Development Plan (WUDP) discusses the following options for development of a new well to meet future water demand requirements:

i. Drill a Leeward high level well between Hi‘i Tank and Well 3 (Windward wells are also considered)
ii. Well 7 is currently out of service. Recommissioning the well would provide reliability for both the Lāna‘i City system and the Irrigation Grid.
iii. Install a permanent interconnection with the Lāna‘i City System.

Reservoir Capacity
i. Case A: Meet maximum day demand in 24-hours
   Capacity required = 1,963,500 gallons

   Case B: Meet maximum day + fire flow, reservoir % full
   Max day rate = 1,963,500 GPD / 1364 gpm
   Fire flow = 2,500 gpm

   Max day rate + Fire flow for 120 minutes
   = 3,864 gpm x 120 min
   = 463,680 gallons

   Size required = 463,680 * ¾ = 347,760 gallons

   Case A governs:
   Minimum Reservoir Capacity = 2,000,000 gallons
   Existing Reservoir Capacity = 1,500,000 gallons

   Additional Storage Required = 500,000 gallons

Construction of a new storage tank for the Industrial Park could also satisfy fire protection requirements for the Industrial Park. In order to provide service to the Industrial Park, the tank would need to be located at a minimum elevation of 1,414 feet.

Presently, Pūlama Lāna‘i is under contract with Brown and Caldwell to do the preliminary engineering on the transmission line. In addition, a proposal is being submitted for a 1.5-MG storage tank on Hi‘i. (0.5-MG for this project and 1MG for abandoning the old underground storage).

Water Demand for the Kō‘ele Project District Amendment

Pūlama Lāna‘i is also proposing to make amendments to the existing Kō‘ele Project District. The purpose and intent of the Project District remain unchanged; its existing and continued purpose and intent are to provide for a flexible and creative approach to development at Kō‘ele that is complementary and supportive of services offered in the adjoining Lāna‘i City.

The Project District calls for a low-density residential and recreational development with hotel facilities in an upland rural setting that considers physical, environmental, social and economic factors in a comprehensive manner.

The proposed amended Project District will provide housing and recreational opportunities to island residents. Uses include, but are not limited to, single-family residential, multifamily residential, hotel, open space, park, golf course and resort commercial.

The existing Kō‘ele Project District is a 618-acre area, located just north and east of Lāna‘i City, between the elevations of 1,700’ and 1,800’. At full build-out, under existing provisions, the Project District would have 535 single family units, 156 multifamily units, 253 hotel units, 11.5 acres of park, 1-acre of public facility space, 12 acres of open space and 332.4 acres in golf course use.

The proposed Kō‘ele Project District Amendment will result in a 564-acre land area. At full build-out, under proposed provisions, the Project District would have a maximum of 18 single family units, 53 multifamily units, 137 hotel units, 271.7 acres of park, 89.5 acres of open space, 78 acre golf course and 5.7 acres of resort commercial uses.

The following shows a comparison of land use allocations between the existing approved land uses and the land use allocations in the Proposed Action.

<table>
<thead>
<tr>
<th>Type of Use</th>
<th>Existing Land Area</th>
<th>Proposed Land Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Family</td>
<td>214.0-acres</td>
<td>9.9-acres</td>
</tr>
<tr>
<td>Multifamily</td>
<td>26.0-acres</td>
<td>18.7-acres</td>
</tr>
<tr>
<td>Hotel</td>
<td>21.1-acres</td>
<td>39.1-acres</td>
</tr>
<tr>
<td>Open space</td>
<td>12.0-acres</td>
<td>89.5-acres</td>
</tr>
<tr>
<td>Public</td>
<td>1.0-acres</td>
<td>0.0-acres</td>
</tr>
<tr>
<td>Park</td>
<td>11.5-acres</td>
<td>271.7-acres</td>
</tr>
<tr>
<td>Golf course</td>
<td>332.4-acres</td>
<td>78.0-acres</td>
</tr>
<tr>
<td>Resort Commercial</td>
<td>0.0-acres</td>
<td>57.2-acres</td>
</tr>
<tr>
<td>Total</td>
<td>618.0-acres</td>
<td>564.0-acres</td>
</tr>
</tbody>
</table>

Outcomes of some of the proposed changes include:
- Overall land area is reduced from 618-acres to 564-acres
- Maximum Density (Units per Acre) reduced for Single Family, Multifamily and Hotel
- Maximum Units Allowed reduced for Single Family, Multifamily and Hotel
Single Family Residential
- Land area for Single Family Residential is reduced from 214-acres to 9.8-acres
- Maximum Density for Single Family Residential reduced from 2.5-units/ac to 2-units/ac
- Maximum Units Allowed for Single Family from 535-units to 20-units

Multifamily Residential
- Land area for Multifamily Residential is reduced from 26.0-acres to 18.7-acres
- Maximum Density for Multifamily Residential is reduced from 6-units/ac to 3-units/ac
- Maximum Units Allowed for Multifamily is reduced from 156-units to 56-units

Hotel
- Land area for Hotel increases from 21.3-acres to 39.1-acres
- Maximum Density for Hotel is reduced from 12-units/ac to 3.5-units/ac
- Maximum Units Allowed for Hotel is reduced from 253-units to 137-units

The R. M. Towill Corporation Preliminary Engineering Report for the Kō‘ele Project District Amendment included information related to the water demands and supply for the project. Overall, the proposed Kō‘ele Project District will cause a reduction in water demand, compared to the existing Kō‘ele Project District, as a result of a reduction in developable land and reduction in densities. The calculated water demands for the existing and proposed, in full buildout condition, are summarized below (RM Towill Preliminary Engineering Report).

### Water Demand Summary

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Existing Koele PD Average Daily Demand (gpd)</th>
<th>Proposed Koele PD Average Daily Demand (gpd) *</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hotel</td>
<td>185,000</td>
<td>162,782</td>
</tr>
<tr>
<td>2. Multi-Family Residential</td>
<td>54,000</td>
<td>31,800</td>
</tr>
<tr>
<td>3. Single-Family Residential</td>
<td>153,000</td>
<td>10,800</td>
</tr>
<tr>
<td>4. Park</td>
<td>19,550</td>
<td>750</td>
</tr>
<tr>
<td>5. Open Space</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6. Golf Course *</td>
<td>20,750</td>
<td>20,000</td>
</tr>
<tr>
<td>7. Public</td>
<td>1,700</td>
<td>N/A</td>
</tr>
<tr>
<td>8. Resort/Commercial</td>
<td>N/A</td>
<td>20,260</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>434,000</td>
<td>246,392</td>
</tr>
</tbody>
</table>

* a. Proposed demands are based on Poluama Lāna‘i program which limits unit counts and developed area.

* b. Clubhouse and Cavendish only. The Experience at Koele irrigation provided by effluent.

Mānele Project District Decreasing Water Demand for Residential Uses

The Mānele Project District Phase I was conceived as an 869-acre area located at sea level on the southeastern shore of Lāna‘i. At full build-out, this Project District would have 282-single family units, 184 multi-family units, 500 Hotel units, 5.25-acres of commercial space, 66.33-acres of park, 2-acres of public facility space, 152.02-acres of open space, and a 172-acre golf course. (Lāna‘i WUDP-468)

According to the Mānele Project District ordinance (19.70.0900), the initial land use categories and maximum acreages for various land use categories within Mānele Project District are:

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Maximum Acreage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential (SF)</td>
<td>328.80 acres</td>
</tr>
<tr>
<td>Multi-family</td>
<td>55.00 acres</td>
</tr>
<tr>
<td>Commercial</td>
<td>5.25 acres</td>
</tr>
<tr>
<td>Hotel</td>
<td>56.60 acres</td>
</tr>
<tr>
<td>Park</td>
<td>66.33 acres</td>
</tr>
<tr>
<td>Open space</td>
<td>152.02 acres</td>
</tr>
<tr>
<td>Golf course</td>
<td>172.00 acres</td>
</tr>
<tr>
<td>Roads</td>
<td>32.00 acres</td>
</tr>
</tbody>
</table>

The Ordinance also notes the maximum permitted density for various land use categories; the computed total number of units for residential uses (single-family and multi-family) and hotel are noted below:

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Acres</th>
<th>Density (Units per Acre)</th>
<th>Maximum Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family</td>
<td>328.8</td>
<td>0.8576</td>
<td>282</td>
</tr>
<tr>
<td>Multi-family</td>
<td>55</td>
<td>3.34</td>
<td>184</td>
</tr>
<tr>
<td>Hotel</td>
<td>56.6</td>
<td>10</td>
<td>566</td>
</tr>
</tbody>
</table>

Although these maximum single-family and multi-family unit counts had been conceived in the initial Project District approval in 1986, in 1995; the Lāna‘i Planning Commission approved a total of 166-single family and 54-multi-family units at Mānele. Since then, the residential unit maximum has been renewed every five years to retain the 166-single family/54-multi-family count.

By December 2017, only a total of 40-single family lots had been developed and 53-multi-family units had been constructed.

At that time, the Lāna‘i Planning Commission approved a request by Pālama Lāna‘i to reduce a total maximum allowable units in the Project District to 80-single family residential lots (the 40-existing and allowing only another 40-single family lots).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family</td>
<td>282</td>
<td>166</td>
</tr>
<tr>
<td>Multi-family</td>
<td>184</td>
<td>54</td>
</tr>
</tbody>
</table>

With the amendment to the Kō‘ele Project District, the additional water demand (beyond existing withdrawals) is estimated to be 106,260-GPD (74,000 GPD for Hotel, 12,000 GPD for Multi-Family Residential and 20,260 GPD for Resort Commercial.)
This reduction in allowable units significantly reduces the water demand within the Mānele Project District.

Using the County of Maui Department of Water Supply Standards of 600-gallons per day per single family unit, rather than an overall water demand based on the previously allowed number of units (99,600-GPD as suggested in the Lāna‘i WUDP (166-units at 600-GPDI)), the added demand for Water at Mānele Project District for the residential uses is only an additional 24,000-GPD.

This is a reduction in overall water demand of 75,600-GPD that had been estimated and reflected in the Lāna‘i WUDP.

This is significantly less than the anticipated water demands previously contemplated in the Lāna‘i WUDP and other planning documents. However, it is not clear when the additional residential units will move forward, as there remain unsold properties at Mānele.

Existing Moving Average Well Pumping (August 2019) and Existing/Proposed Uses of Water

The following listing notes the different water sources (both brackish and drinking) and moving average pumping (gallons per day - GPD) submitted to and reviewed by CWRM as of August 2019, as well as a summary of the total existing and proposed uses of water on Lāna‘i.

**Leeward (SY 3-MGD)**

Existing Use

<table>
<thead>
<tr>
<th>Well</th>
<th>GPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 1</td>
<td>109,675</td>
</tr>
<tr>
<td>Well 9</td>
<td>0</td>
</tr>
<tr>
<td>Well 14</td>
<td>100,108</td>
</tr>
<tr>
<td>Well 15</td>
<td>370,825</td>
</tr>
</tbody>
</table>

Subtotal Brackish: 580,608

Drinking (Lanai Water Co data - 08/22/19)

<table>
<thead>
<tr>
<th>Well</th>
<th>GPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well 2/Shaft 3</td>
<td>194,983</td>
</tr>
<tr>
<td>Well 3</td>
<td>148,006</td>
</tr>
<tr>
<td>Well 4</td>
<td>256,894</td>
</tr>
<tr>
<td>Well 7</td>
<td>0</td>
</tr>
<tr>
<td>Well 8</td>
<td>227,291</td>
</tr>
</tbody>
</table>

Subtotal Drinking: 827,174

Existing Use (Leeward): 1,407,782

Subtotal Proposed (Leeward): 319,160

Total Leeward (Existing & Proposed): 1,726,942

**Windward (SY 3-MGD)**

Drinking

Well 6: 147,480

% of SY: 4.92%

Existing Use (Windward): 147,480

Proposed Use (Leeward & Windward)

Miki Industrial (Existing Capacity & New Wells over 30-years): 1,309,000

Subtotal Proposed (Leeward & Windward): 1,309,000

Comparison of Existing and Proposed to Overall SY of 6-MGD

Subtotal Existing Use (Leeward & Windward): 1,555,262

% of SY: 25.92%

Subtotal Proposed Use (Leeward): 319,160

% of SY: 5.32%

Subtotal Proposed Use (Leeward & Windward): 1,309,000

% of SY: 21.82%

Anticipated Total (Leeward & Windward): 3,183,422

% of SY: 53.06%

Notes:

* Per the Kōʻeʻe Project District Amendment Preliminary Engineering Report, the Existing Kōʻeʻe Project District (existing and proposed uses) has an average daily demand of 434,000-GPD. Under the Kōʻeʻe Project District Amendment, permitted densities and unit counts for a variety of uses (hotel, single family and multi-family) are significantly reduced. This results in an estimated reduction in the estimated water demand for uses in the project district to a total estimated demand (existing and proposed uses) of 246,392-GPD (an overall reduction of 187,608-GPD).

** Per the DHHL State Water Projects Plan Update (2017) (page 4-25). “The potable water requirement for the Lāna‘i City tract is 0.0672 MGD, all from Residential land use. The tract is within the service area of the existing water system managed by the Lāna‘i Water Company; however, with the new ownership of the island, it is unclear how the existing municipal operations will be affected. The DHHL development is not scheduled until the final year in the 20-year timeline; therefore, it is recommended that DHHL monitor the operational situation and establish contact if changes are made.”
Addressing Water Demands for Other Proposed Developments

The Lāna‘i Community Plan, approved in 2016, identifies a number of additional proposed projects across the island. Some of these are noted in the following chart and summaries from that plan follow the chart:

<table>
<thead>
<tr>
<th>Table 3.3: Lāna‘i Community Plan Area by Growth Area and Land Use Designations</th>
<th>Land Use Designations</th>
<th>Public/Quasi-Public Areas</th>
<th>Park</th>
<th>Rural</th>
<th>Total Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth Area</td>
<td>Mixed-Use Residential</td>
<td>Hotel</td>
<td>Airport</td>
<td>Light Industrial</td>
<td>Heavy Industrial</td>
</tr>
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<tr>
<td>Lāna‘i City Expansion*</td>
<td>546</td>
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<td>Town Center</td>
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<td>Total Area</td>
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<td>Keaumūlæpæ’s Mixed-Use Residential</td>
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<td>Total Area</td>
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<td>119</td>
<td>539</td>
<td>548</td>
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*Note: Indicates project to incorporate County Affordable Housing Project into new land use designations

Chart noting Land Uses identified in the Lāna‘i Community Plan (9-7)

Mixed-Use Residential – Lāna‘i City Expansion

This area will consist of approximately 546-acres on the west end of the existing town. It will include part of the County’s affordable housing lands and extend south, below Ninth Street, to include the land area of the current WWTF. The WWTF will possibly be moved north of Pālamanu Gulch.

The Lāna‘i City Expansion will be a mixed-use residential project, which includes primarily residential development, with neighborhood parks, commercial/business, and public/quasi-public development. Street pattern and housing form will be similar to the historic areas of Lāna‘i City.

Land for some of the housing is proposed for exchange by Pūlama Lāna‘i for land within the County’s affordable housing project, which currently has a 73-acre site.

If approved, this will allow construction of mixed-use housing to occur at an earlier date and, over time, will blend the affordable housing with other housing throughout the area, resulting in a mixed-income housing community.

Extensions of Fifth Street and Ninth Street will intersect with a new bypass road that will cross the Keaumūlæpæ’s Highway and loop north then east to end at the corner of Lāna‘i Avenue and Kaeoiku Road. (Lāna‘i Community Plan; 9-5)

Note, related to the status of the proposed County Affordable Housing Project:

Per the Unilateral Agreement for Conditional Zoning, dated February 1992, Castle & Cooke deeded 115-acres of land for affordable housing to the County.

Approximately 73-acres is now identified for an Affordable Housing project (42-acres are for DOE as a school expansion area). It is identified a Tax Map Key; (2) 4-9-002.05B. It remains in the same vacant land condition as in 1992.

In January 2010, a Final Environmental Assessment was prepared that noted that the project was proposed to include approximately 412-residential units – 293-house lots and 173-multifamily units - and two parks.

It was estimated that the proposed project would need approximately 0.278-MGD from the Lāna‘i Water Company.

A November 26, 2015 Hawaii News Now report noted that the “affordable housing project planned for the island of Lāna‘i has stalled...” The project stalled because the county would have to spend $7 million just to build sewer and water lines to the property, a huge expense, before any buildings were built.”

An October 15, 2018 meeting was held on Lāna‘i, with the County proposing to change the configuration to multiple phases in slightly different locations, with the first phase being 32-single family lots and 24-multi-family units. The single-family lots would be available for construction by the purchaser.

A 201H application is needed to be initiated with the new proposal. The County estimated that the funds for the project could be raised over the next few years. This did not receive favorable response from the Lāna‘i community. It is not clear when the project will move forward.

University

Approximately 524 acres are proposed for a new university and research institute on the western edge of the Lāna‘i City Expansion. The proposed acreage reflects the intent to reserve enough space to achieve an attractive campus design. (Lāna‘i Community Plan; 9-6)

Note, related to the status of the suggested University on Lāna‘i:

Other than references in the Lāna‘i Community Plan and prior (2013) references to Larry Ellison and the Lanai Community Plan Advisory Committee, “The planned Lanai campus, which would be located just south of Lanai City is years down the line”. It is not clear what the project scale will be and when the project will move forward.

Tennis Academy Park

The tennis academy is proposed on approximately 50-acres of park land in the central education and recreation core. The concept is modeled after similar programs that train professional tennis players.

The academy will have dormitory housing nearby and complete tennis facilities. Students will come from around the world to train for international level competition. (Lāna‘i Community Plan; 9-5 & 6)
Note, related to the status of the suggested Tennis Academy:

Other than references in the Lāna‘i Community Plan and prior (2015) references to Larry Ellison, there have been no additional, timely information on the proposed project. The land area where the Tennis Academy was to be placed is now part of the area where the Hōkūlāo housing project is located.

There is no other land area indicated for the Tennis Academy. It is not clear what the project scale will be and when the project will move forward.

Gateway Park

This 16-acre site will expand the existing undeveloped park at the junction of Mānele Road and Kaumālāpua‘u Highway. The park will provide an attractive gateway entrance to Lāna‘i City. (Lāna‘i Community Plan; 9-6)

Note, related to the status of the suggested Gateway Park

A 10-acre site at the corner of the Mānele and Kaumālāpua‘u roads was transferred to DHHL from DLNR, and is planned by DHHL to be a commercial area. There has not been any progress on this project.

Rural Residential

A rural residential area is proposed adjacent to Kō‘ele stables. The 50-acre area is located between Keomoku Road and Kōpolihua Road. It will be served by a proposed extension of Fraser Avenue for additional road access.

This area is intended to provide larger lots than the lots within Lāna‘i City, and to allow farming. Lot sizes could range from 0.5 acre to 10 acres or more under the County’s current zoning code for rural lands. (Lāna‘i Community Plan; 9-8)

Note, related to the status of the suggested Rural Residential:

A 9.5-acre portion of this area is included in the Kō‘ele Project District amendment and will not be used as rural residential. It is not clear what the project scale will be and when the project will move forward.

Film Studio

Twenty-two acres of light industrial land will be used for film studio facilities. The warehouse-type structures will be sited to prevent the buildings from being visible from Mānele Road.

Note, related to the status of the suggested Film Studio:

It is not clear what the project scale will be and when the project will move forward.

Lāna‘i Airport

“The projected airport requirement increases gradually, reaching 2,900 in the year 2015 and 3,900 in the year 2020. In calendar year 2008, consumption at the Department of Transportation’s airport meter averaged 1,502 GPD. There is also a meter at the airport tank. Total consumption between the

Note, related to the status of the suggested Tennis Academy:

two meters was 5,624 in 2008, and has exceeded 6,000 GPD in past.” (Lāna‘i WUDP; 4-67)

Mixed-Use Residential – Mānele Mauka

The conceptual plan proposes approximately one hundred and five acres, with approximately eighty-three acres for primarily residential use, with some commercial uses and amenities, such as neighborhood parks and a community center.

Mānele Mauka will be a compact walkable neighborhood with single-family and multifamily units and a variety of housing types, including housing for seniors. Mānele Mauka is located south of the junction of Mānele Road and Kaupili Road, with open agricultural lands bordering both roads to retain views. Road access will initially be via Mānele Road and Kaupili Road; Hulopoo Drive will be opened at a later time to connect to the Mānele PD. (Lāna‘i Community Plan; 9-8)

Note, related to the status of the suggested Mānele Mauka:

Other than references in the Lāna‘i Community Plan and prior (2013) references to Larry Ellison, there have been no additional, timely information on the proposed project. It is not clear when the project will move forward.

Kaumālāpua‘u Harbor Mixed-Use Residential

The concept proposes creating a mixed-use residential area on approximately 50-acres of land above the harbor and south of Kaumālāpua‘u Highway. There will be ocean-view residential lots, limited neighborhood service commercial uses, a community garden/farm, and neighborhood parks. The development will be sited to reduce visibility of buildings from the highway and to retain view corridors from the highway to the coast.

Note, related to the status of the suggested Kaumālāpua‘u Harbor Mixed-Use Residential:

It is not clear what the project scale will be and when the project will move forward.

A general note on “Mixed-use Residential” as noted in different uses noted above – this land use type is not presently noted in Maui County Zoning Ordinances. Prior to any planning, permitting or construction that could occur, a new Zoning Ordinance would need to be proposed and approved by Maui County.

Uses noted in Lāna‘i Community Plan and Lāna‘i WUDP

Lāna‘i Agricultural Park

On July 15, 1994, Pūlāma Lāna‘i entered into an agreement leasing 100-acres of land for 55 years at a nominal lease rate of $100 per year for use as the Lāna‘i Agricultural Park. The lease states that the State “shall have the right to purchase from the public utility and to use up to, but not more than 0.20 MGD on the average annual basis.”

An Amendment of lease states that, notwithstanding this quoted sentence of the Lease, “the parties further agree that additional water will be allocated to the agricultural park in the future, but that the need for such additional water will be the [State’s] responsibility to justify and that any costs incurred for this additional water will be borne by the [State].” There has not been any further change in status since the amendment.” (2017 Annual Report from Pūlāma Lāna‘i to the Land Use Commission Docket.
Note, related to the status of the Lāna’i Agricultural Park:
In its May 2017 review of the possible demand for agricultural lots, the Department of
Agriculture apparently concluded that there had not been any substantial change from its
position in November, 2006, that there was insufficient interest to go forward with the
agricultural park.

Mānele Harbor

The combined potable and non-potable estimates for Mānele Harbor, in the amount of 5,000 GPD,
are lower than the average use of 21,179 in 2008.

Lāna’i Water Use and Development Plan Identifies Various Means to Meet Future Water Demands

The Lāna’i Water Use and Development Plan anticipates a number of actions to meet the water needs on the
island.

The Island of Lāna’i has a total sustainable yield of 6 million gallons per day (MGD). Virtually all of the
island’s available ground water resources are confined to dike compartments in the Central Aquifer
Sector Area, which is divided into two aquifer system areas having sustainable yields of 3 MGD each
Recharge is highly dependent on the forested mauka watershed, with a significant amount deriving
from fog drip.

Although historical evidence suggests the existence of perennial streams, no surface water sources
currently exist on the island. Lāna’i has two drinking water systems, one brackish water system used
for irrigation, and two recycled water systems, also used for irrigation. …
Future water demands were assessed based on the estimated rate of increase in demand predicted by
economic and demographic considerations through 2030 and based on build-out of known projects
and projects with Phase II approval.

The resource development strategy includes new ground water source development, water reuse
expansion, and desalination, in addition to both supply-side and demand-side conservation. (CWRM
Staff Submittal August 15, 2012)

Water Supply Options

The Lāna’i Water Use and Development Plan includes a list of potential supply options sufficient to meet the
forecast land uses. These sources include recommissioning old wells, drilling new wells, desalination and other
source options. (Information from Chapter 5 of the Lāna’i WUDP follows.)

New supply resource options that were examined include:
• High level potable well near Well 5 in the Leeward Aquifer
• Well 2-8 at the site of Shaft 3 in the Leeward Aquifer
• Recommissioning Well 7 in the Leeward Aquifer
• New wells in the Windward Aquifer at Mala’au
• Recommissioning the Maunalei Shaft and Tunnels in the Windward Aquifer

• New wells in the Windward Aquifer at or near the Maunalei Shaft and Tunnel sites
  o Two (2) new wells using existing transmission
  o Three (3) new wells using existing transmission
• New wells in the Windward Aquifer at Kuakui
  o Assuming that these wells can tie into Maunalei Wells transmission
  o Assuming new transmission had to be constructed
• New wells in the Windward Aquifer at Kehewai Ridge
  o At 2,250’ elevation
• New Brackish Well 15 in the Leeward Aquifer
  o Used without additional desalination
  o Used with desalination
• “General” Desalination Options
  o Brackish to potable
  o Seawater to potable
  o Seawater to brackish for irrigation

Supply Side Efficiency Options include:
• Loss Reduction - Repair of Pālāwai Grid Pipes
• Loss Reduction - Cover for the 15 MG Brackish Reservoir
  o Floating cover
  o Aluminum cover
  o Hypalon balls
• Expanded use of Lāna’i City Reclaimed Water
  o Lāna’i City to Miki Basin
  o Lāna’i City to Mānele
• Lāna’i City to Mānele via Miki Basin

In discussing new wells, the WUDP notes that new wells “could be developed to provide additional water
supply for Lāna’i. Aside from additional supply, benefits provided by additional wells would include improved
geographical distribution of well pumping, increased production redundancy for system reliability, and
potentially increased flexibility of operations.”

With respect to Leeward versus Windward well development strategies, the Lāna’i WUDP (2011) notes the
need to “Plan and ultimately develop operable groundwater sources in the Windward aquifer to distribute
groundwater pumping and provide resources, as necessary, to provide for system growth beyond the capacity of the Leeward aquifer.” (Lāna’i WUDP, 31)
“Increased production of potable water for human consumption means there could be adequate water supply for the re-introduction of agricultural operations. Potable water can be saved by using brackish and treated water for the irrigation of the golf courses and resort landscaping.” (Lāna‘i Community Plan, 2-7)

In 2013, Pūlama Lāna‘i submitted an application for “a reverse osmosis desalination water treatment facility located on property described as Tax Map Key (TMK) (2) 4-9-002:001 (por.) The request was for a “proposed Reverse Osmosis (“RO”) Well No. 3 (source well), water transmission lines, and access roads.”

The information here comes primarily from the Lāna‘i Planning Commission FOF, COL and Decision and Order, signed January 21, 2015. The State Special Use Permit covers an area less than 15 acres; as such, the Lāna‘i Planning Commission has the authority to act on the application.

In 2014, announcements were made that a state-of-the-art, multi-million dollar Hawaii desalination plant, which will supplement the island of Lāna‘i’s existing water supply and enhance its groundwater reserves, is scheduled to begin in 2014-15 with plans to provide five million gallons of water per day.

The first phase of the project will provide 2.5 million gallons of fresh water each day, according to Pūlama Lāna‘i, the operations firm owned by the billionaire technology mogul, who bought 98 percent of the Pineapple Island in 2012.

The facility, which will be located about one-half mile above The Challenge at Mānele Bay golf course, where test tells are currently being drilled, will be built by IDE.

The Israel-based firm has installed 400 desalination facilities in 40 countries.

Desalination turns salt water into fresh water that’s suitable for drinking. (Pacific Business News, February 27, 2014)

In 2015, the Lāna‘i Planning Commission found “that the uses proposed in the Project District Application are “accessory uses” as defined in MCC § 19.04.04, being incidental and subordinate to the principal uses of the land, which is single-family residential, multifamily residential, hotel, commercial, park, golf course, open space, and public. The Commission further finds that the proposed uses are located on the same zoning lots as the principal uses.”

The Commission further found that “The proposed project could prove to be a dependable alternative water supply that reduces the island’s reliance on the High Level Aquifer, and could positively contribute to the availability of potable and non-potable water on the island and meeting the anticipated long-term water demand.”

“The project could have a beneficial impact on agricultural production and land in that a portion of the water produced by the project will be used for irrigation and agriculture in the Pālāwai Basin”.

“Groundwater on Lāna‘i occurs in two (2) different modes: high level and basal. The island of Lāna‘i’s primary current water source is a High Level Aquifer located in the central section of the island and extending across the Pālāwai Basin. The total sustainable yield from the High Level Aquifer is 6 million gallons per day. Basal groundwater exists in the areas between the High Level Aquifer and the shoreline.”

Desalination

The Lāna‘i Water Use and Development Plan notes that “Desalination of seawater offers essentially unlimited ultimate source capacity but is more expensive than other available options.” (Lāna‘i WUDP, 5-38)

“Desalination facilities can reduce the chloride level of brackish water to potable drinking standards. The cost of desalination is very dependent on the amount of required reduction in chloride level. Desalinating a brackish water source that is close to potable standards is much less expensive than desalination of seawater.” (Lāna‘i WUDP, 5-36)

The Lāna‘i Community Plan notes that “The new landowner is exploring the option of developing desalination plants that would create potable water out of saltwater. Producing potable water through desalination would greatly decrease the potential of over-pumping the aquifer.”
"Basal groundwater is a lens of brackish water floating on denser saline groundwater beneath it. The proposed project's source wells draw water from below the basal groundwater lens at a depth of 50-145 feet below sea level."

"The proposed desalination water treatment facility's groundwater supply wells are located approximately six-tenths (6/10) of a mile from the coastline. The project will not draw water from the High Level Aquifer and is not anticipated to have an adverse impact on hydrogeologic conditions and features."

"Disposal of the hypersaline concentrate ("brine") from the reverse osmosis process occurs in two deep disposal wells, at a depth of 160 to 300 feet below sea level."

"The brine, being 1.8 times saltier than sea water, is denser than the receiving saline groundwater and will sink deeper as it travels seaward and is anticipated to discharge approximately 2 miles offshore at an ocean floor depth of approximately 650 feet. At the point that the brine comingles with the open ocean water, it will be approximately the same salinity level as the receiving water."

"The Planning Department recommended approval of the Project District Application and recommended approval of the [Special Use Permit] SUP Application, subject to 22 conditions."

In review of the application, "The Planning Department recommended a 30 year Special Use Permit time limit based on the anticipated useful life of the desalination plant, and stated that this was consistent with other long-term projects granted extended permit time limits although no other 30-year permit was identified."

"The Applicant [Pûlama Lûnû] testified that the 30 year limit was necessary due to the significant financial cost of the project, and that any shorter time period would render the project unfeasible."

"The project was designed to meet long-term needs for potable and non-potable water on the island of Lûnû, as identified in the 2011 Lûnû Water Use and Development Plan."

However, "The [Lûnû Planning] Commission found that the SUP 30-year time limit recommended by the Department and proposed by the Applicant was too long and further that the Commission should review requests for time extensions beyond the initial permit term."

"The Commission found that the Special Use Permit should not be 30 years due to the Commission's desire to review the project's operational status and the island's economy, after the project had been in operation for a period of time and prior to any extension of the SUP."

The Lûnû Planning Commission granted the Special Use Permit, however, rather than a 30-year term, the "Special Use Permit shall be valid until June 17, 2029" (for 15-years).

In addition, the Lûnû Planning Commission imposed an additional condition (condition 23) that states, "Once the desalination plant is operational no High Level Aquifer water will be pumped to or used in the Mûnele Project District except in the event of an emergency as determined by the Lûnû's Water Company and the Lûnû's Water Advisory Committee, and then only for human consumption." (Lûnû Planning Commission Pûlama Lûnû Desalination FOF, COL and D&B, January 21, 2015)

"[Construction of the planned desalination plant was halted on September 12 (2014).]" (Daily Mail, September 25, 2014).

In follow-up media reports, Lûnû Planning Commission Chairman John Ornellas said Pûlama Lûnû sought a special use permit for the desalination plant last year.

"We spent four months reviewing it," he said.

But the commission concluded that instead of a 30-year permit for the plant, it would grant 15 years, Ornellas said. The permit was approved, and he said commission members heard later that they were being “blamed” for “Pûlama shutting down the desal plant.” ...

Kurt Matsumoto, chief operating officer of Pûlama Lûnû, said ... that the company had not given up on development of a desalination plant, but its plans were being reassessed in light of the planning commission’s actions in June. He said the company had invested substantially toward developing the plant.” (Mau News, January 20, 2015)

Water Conservation Measures

Efficient use of water and reductions in supply system leakage are essential to reduce waste of Lûnû’s limited water resources. The following are stated provisions from the WUDP and the Lûnû Water Company (LWC) responses and status of these provisions (indented bullet) (2016):

- Lûnû’s water and wastewater utilities should implement water recycling and water conservation programs targeting landscape and indoor water uses to substantially reduce water consumption to the extent allowed by the Public Utilities Commission.
  - All wastewater on the island is currently reclaimed from the two wastewater plants.

LWC currently promotes conservation messages on its website and in public meetings.

A more extensive conservation program is being developed and LWC is working on implementation of the plan. HRWA (Hawaii Rural Water Association) staff assisted with a residential "Direct Install" program to replace all existing, non-conserving toilets, showerheads and faucet aerators and clothes washers on the island.

Reduction in water use will also be promoted by the use of native species requiring less irrigation. These plant types will be promoted in the community.

Lûnû’s Water Company has completed a 100% replacement program for all water meters on Lûnû with the installation of Smart Meters. These meters allow 15 minute increment readings for all meters, and have an App that consumers can use to see their usage. The system also provides notifications to LWC and the consumer if there appears to be a leak.

This will induce conservation as customers see what their water use and change behaviors to more efficiently use their water. A pilot program was started at the end of 2015 and is now complete.
• The County and public utilities should implement education and supporting measures to encourage planting of low-water-use plants for new and existing landscaping.
  - LWC currently promotes conservation messages on their website and in advertisements in the Lâna’i monthly newspaper. Several xeriscaping projects have been implemented in the Mânele area on roadside irrigation and LWC is working with homeowners and associations in the reduction of water use, install drip irrigation, and plant xeriscaping where appropriate. LWC encourages best practices in irrigation conservation for all our customers, homes, hotels, commercial space, etc.

• Lâna’i’s public water utility should reduce unaccounted for water to reasonable levels including implementation of the following measures:
  - Replace and/or repair deteriorating or leaking supply pipes including replacement of deteriorated Pâlâwai grid pipeline
    - LWC has replaced the entire section from Hâi to Mâki pipeline with a new PVC pipe.
  - LWC has also budgeted amounts for future years to replace sections of pipe each year. Some of these funds are part of the approved PUC agreement and the $10 million in funds for infrastructure improvements committed to by Pûlama Lâna’i. A report is filed regularly with the PUC.
  - Implement programmatic leak detection and repair programs
    - LWC has implemented an unaccounted for water program to find unmetered water and leaks. Utilizing data, leak detection equipment, meter information, meter installations, and monitoring water lines, we have reduced unaccounted for water.
    - Also, by reducing the pressure in the Pâlâwai Ag system utilizing a pressure reducing valve (PRV) station, we have significantly reduced the leaks in that area. We call on all departments and residents to report leaks or water loss.
    - These actions have reduced the overall unaccounted for water on the island between pumping and billing from 28.36% in 2008 as reported in the WUDP to 17% in recent years and now down to approximately 15%. The WUDP calls for a reasonable goal of 15% and a better goal of 12%. We continue to look for leaks and unmetered water.
  - Install floating ball or blanket type cover on existing 15MG brackish water reservoir
    - This is part of the PUC funding and the options of a solid cover versus the proposed floating balls are being explored.
    - LWC conducted a test of a Monolayer technology to inhibit water evaporation but the results were in the 7-9% reduction range and not as much as hoped for (30-40%).

Notes on Other Water Savings Efforts

In March 2017 changes were made to the Mânele Hotel which reduced the overall number of rooms (by combining rooms to become suites).

Likewise, the proposed irrigation and pool water in the refreshed areas went from 26,717 to 22,715-GPD.

“With respect to the development and utilization of alternative non-potable water sources (brackish water and reclaimed sewage effluent), [Pûlama Lâna’i] has developed a high capacity system for Golf Course irrigation. [Pûlama Lâna’i] has developed a non-potable water system for irrigation purposes that utilizes brackish well-water and stores this non-potable water in a 15-million gallon open reservoir.”

“[Pûlama Lâna’i] also utilizes reclaimed water from the Mânele Wastewater Treatment Plant for Golf Course irrigation, which provides “R-1” quality water and produces between 60,000 and 120,000 gallons per day (approximate) of reclaimed water (with an expanded capacity of 140,000 gallons per day). The County of Maui concluded that Petitioner has developed an adequate brackish and non-potable water system for the Golf Course.” (2017 Annual Report to LUC)

In addition, in August, 2017, the Mânele Golf Course started the project to replace the irrigation lines in the golf course. This has resulted in an average of 10,668-GPD reduction from the average brackish pumpage of 42,975-in August, 2017. This does not include the R1 water from the Mânele Waste Water Treatment facility.

Ongoing Measures to Reduce/Monitor Water Use on Lâna’i

Pûlama Lâna’i has made significant progress in reduction of leaks, conservation efforts and changes to existing projects resulting in reduced water demands and usage.

In addition to the reduced scale, densities and number of units called for in the proposed amended Kô’ele Project District noted above, during the recent refresh at Mânele, there was also a reduced number of hotel units at Mânele Hotel.

Likewise, at Mânele, Pûlama Lâna’i reduced the irrigation and pool water usage for the pool area changes. They changed types of plantings and left large areas to be in a natural state, rather than grass; so there is no irrigation needed. The pool area uses artificial turf rather than grass. And Mânele went with two pools, rather than the proposed three.

Wastewater

On the western flank, the project sets back from the existing wastewater treatment plant with a 600 foot buffer between the closest lot and the WWTP edge.

The proposed wastewater demand estimates and wastewater system design were derived from the County of Maui’s Water Reclamation Division Wastewater (WRD) Flow Standards (Reference 6), or WRD approved Sewer Studies for similar facilities where practicable.

Per capita usage set at 80 GPD for single family or duplex based on County of Maui Standards of the Water Reclamation Division (Standards use 4 capita per single family or duplex unit which equates to 320 gallons per day per unit). Per capita usage set at 5 for park and capita per car set at 4 based on the approved Central Maui Regional Park Sewer Study (the park study used 4 capita per vehicle which equated to 20 gallons per day per parking stall and 50% usage at any given time).
Based on the proposed 200 single family unit and a 1-acre park with the future 1,500 square foot pavilion with comfort stations and 60-parking stalls, using the design standard of 4 persons per single family unit at 80 gallons per capita per day and 20 gallons per parking stall, the proposed average wastewater demand generated by the project is estimated at 0.064 MGD for the single-family units and 0.02 MGD for the park or 0.066 MGD. This estimate is used for the hydraulic calculations.

As previously mentioned, the project has been adjusted to 150 homes versus the 200 homes that the calculations were based on, that being said, the estimated waterwater MGD is expected to be lower than the calculated 0.064 MGD.

The 20 gallons per parking stall used to estimate the wastewater demand was approved by the County of Maui for the Central Maui Regional Park (CMRP) and is based on 4 persons per vehicle and 5 gallons per capita. The CMRP also estimated that no more than 50% of the parking would be in use at any time so a 50% reduction in wastewater demand was allowed. As most of the parking is for non-park use, a conservative average wastewater demand for the park is 0.001 MGD at the treatment plant is estimated at 0.065 MGD.

The new onsite wastewater system will collect wastewater generated by the new homes and convey the wastewater to the existing Lāna`i Wastewater Reclamation Facility. The new wastewater collection system will be designed for the residential units and the future park, pavilion and parking stalls and constructed within the new roads.

The wastewater demand of the project is estimated to be lower than 0.065 MGD of which 0.064 MGD is for the proposed housing demand and 0.001 MGD is for the 1-acre park demand. The Preliminary Engineering Report Lāna`i City Auxiliary Wastewater Treatment Facility report done in 1993 by Belt Collins & Associates states that the Lāna`i City Wastewater Treatment Plant was designed to treat wastewater generated by Lāna`i City and the Koele Project District.

The Lāna`i Wastewater Reclamation Facility is currently servicing an average daily flow of approximately 0.315 MGD. Additional development allocations totaling 0.080 MGD have been granted.

The proposed development will yield an average daily flow of less than .070 MGD, for a total average daily flow of 0.465 MGD, therefore there is currently sufficient capacity at the WWRF to serve the project.

4.7.3 Level of Impact after Mitigation

Pūlāma Lāna`i will conform with the requirements of the Commission on Water Resource Management, Department of Health, County of Maui and other regulatory entities as it relates to installation, inspection and maintenance of water and wastewater systems associated with the project.

The impact of the proposed is on water and wastewater improvements will have a less than significant impact.
HAWAI‘I STATE PLAN-
ASSESSMENT OF
PROJECT APPLICABILITY
TO GOALS, OBJECTIVES,
AND POLICIES

APPENDIX J-1
A. HAWAII STATE PLAN

Chapter 226, HRS, also known as the Hawaii State Plan, is a long-range comprehensive plan which serves as a guide for the future long-term development of the State by identifying goals, objectives, policies, and priorities, as well as implementation mechanisms. The Plan consists of three parts: Part I includes the Overall Theme, Goals, Objectives, and Policies; Part II includes Planning, Coordination, and Implementation; and Part III establishes Priority Guidelines. Inasmuch as Part II of the State Plan covers its administrative structure and implementation procedures, discussion of the proposed project’s applicability to Part II is not appropriate. Below is an analysis of the project’s applicability to Part I and Part III of the Hawaii State Plan.

Hawaii State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies

Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

HRS 226-1: Findings and Purpose

HRS 226-2: Definitions

HRS 226-4: State Goals

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

1. A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii’s present and future generations.
2. A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.
3. Physical, social, and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.

Analysis: Residential development of Hōkūloa 20TH Housing at Lāna'i City will support the State economy, provide housing opportunities and enhance the social stability and well-being for the people of Lāna'i.

Chapter 226-5: Objective and Policies for Population

Objective: It shall be the objective in planning for the State’s population to guide population growth to be consistent with the achievement of physical, economic and social objectives contained in this chapter.

Policies:

1. Manage population growth statewide in a manner that increases opportunities for Hawaii’s people to pursue their physical, social, and economic aspirations while recognizing the unique needs of each county.
2. Promote an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.
3. Promote increased opportunities for Hawaii’s people to pursue their socio-economic aspirations and mobility.
4. Encourage research activities and public awareness programs to foster an understanding of Hawai’i’s limited capacity to accommodate population needs and to address concerns resulting from an increase in Hawaii’s population.
5. Encourage federal actions and coordination among major governmental agencies to provide a more balanced distribution of immigrants among the states, provided that such actions do not prevent the reunion of immediate family members.
6. Pursue an increase in federal assistance for states with a greater proportion of foreign immigrants relative to their state’s population.
7. Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.

Analysis: Residential development of Hōkūloa 20TH Housing at Lāna'i City will support the State economy, provide housing opportunities and enhance the social stability and well-being for the people of Lāna'i.
### Chapter 226-7 Objectives and policies for the economy — agriculture.

**Objectives:** Planning for the State’s economy with regard to agriculture shall be directed towards achievement of the following objectives:

1. **Viability of Hawai‘i’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 Hawai‘i’s strategic, economic, and social well-being.**
4. **Establish a clear direction for Hawai‘i’s agriculture through stakeholder commitment and advocacy.**
5. **Encourage agriculture by making the best use of natural resources.**
6. **Provide the governor and the legislature with information and options needed for prudent decision-making for the development of agriculture.**
7. **Establish strong relationships between the agricultural and visitor industries for mutual marketing benefits.**
8. **Foster increased public awareness and understanding of the contributions and benefits of agriculture as a major sector of Hawai‘i’s economy.**
9. **Strengthen diversified agriculture by developing an effective promotion, marketing, and distribution system between Hawai‘i’s food producers and consumers in the State, nation, and world.**
10. **Support research and development activities that strengthen economic productivity in agriculture, stimulate greater efficiency, and enhance the development of new products and agricultural by-products.**
11. **Enhance agricultural growth by providing public incentives and encouraging private initiatives.**
12. **Assure the availability of agriculturally suitable lands with adequate water to accommodate present and future needs.**
13. **Increase the attractiveness and opportunities for an agricultural education and livelihood.**
14. **In addition to the State’s priority on food, expand Hawai‘i’s agricultural base by promoting growth and development of flowers, tropical fruits and plants, livestock, feed grains, forestry, food crops, aquaculture, and other potential enterprises.**
15. **Promote economically competitive activities that increase Hawai‘i’s agricultural self-sufficiency, including the increased purchase and use of Hawai‘i-grown food and food products by residents, businesses, and governmental bodies as defined under section 103D–104.**
16. **Promote and assist in the establishment of sound financial programs for diversified agriculture.**

**Policies:**

1. **Institute and support programs and activities to assist the entry of displaced agricultural workers into alternative agricultural or other employment.**
2. **Facilitate the transition of agricultural lands in economically unfeasible agricultural production to economically viable agricultural uses.**
3. **Perpetuate, promote, and increase use of traditional Hawaiian farming systems, such as the use of loko i’a, `uala, and irrigated loi, and growth of traditional Hawaiian crops, such as kalo, `uala, and `ulu.**
4. **Increase and develop small-scale farms.**

### Chapter 226-8 Objective and policies for the economy — visitor industry.

**Objective:** Planning for the State’s economy with regard to the visitor industry shall be directed towards the achievement of the objective of a visitor industry that constitutes a major component of steady growth for Hawai‘i’s economy.

**Policies:**

1. **Support and assist in the promotion of Hawai‘i’s visitor attractions and facilities.**
2. **Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawai‘i’s people.**
3. **Improve the quality of existing visitor destination areas by utilizing Hawai‘i’s strengths in science and technology.**
4. **Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.**
5. **Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawai‘i’s people.**
6. **Provide opportunities for Hawai‘i’s people to obtain job training and education that will allow for upward mobility within the visitor industry.**
7. **Foster a recognition of the contribution of the visitor industry to Hawai‘i’s economy and the need to perpetuate the aloha spirit.**
8. **Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawai‘i’s cultures and values.**

### Chapter 226-9 Objective and policies for the economy — federal expenditures.

**Objective:** Planning for the State’s economy with regard to federal expenditures shall be directed towards achievement of the objective of a stable federal revenue base as an integral component of Hawai‘i’s economy.

**Policies:**

1. **Encourage the sustained flow of federal expenditures in Hawai‘i that generates long-term government civilian employment.**
2. **Promote Hawai‘i’s supportive role in national defense, in a manner consistent with Hawai‘i’s social, environmental, and cultural goals by building upon dual-use and defense applications to develop thriving ocean engineering, aerospace research and development, and related dual-use technology sectors in Hawai‘i’s economy.**
3. **Promote the development of federally supported activities in Hawai‘i that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawai‘i’s environment.**
4. **Increase opportunities for entry and advancement of Hawai‘i’s people into federal government service.**
Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies

Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

<table>
<thead>
<tr>
<th>Objective</th>
<th>DA</th>
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<tbody>
<tr>
<td>(14) Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawai'i's social, economic, physical, and environmental objectives;</td>
<td>✓</td>
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<tr>
<td>(15) Increase research and development of businesses and services in the telecommunications and information industries;</td>
<td>✓</td>
<td></td>
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<tr>
<td>(16) Foster the research and development of nonfossil fuel and energy efficient modes of transportation; and</td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>(17) Recognize and promote health care and health care information technology as growth industries;</td>
<td>✓</td>
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Analysis: Residential development of Hōkūloa 20TH Housing at Lāna'i City will not involve the expenditure of Federal funds.

Chapter 226-11 Objectives and policies for the physical environment –– land based, shoreline, and marine resources.

Objectives: Planning for the State's physical environment with regard to land-based, shoreline, and marine resources shall be directed towards achievement of the following objectives:

<table>
<thead>
<tr>
<th>Policy</th>
<th>DA</th>
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<tbody>
<tr>
<td>(1) Prudent use of Hawai'i's land-based, shoreline, and marine resources.</td>
<td>✓</td>
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<td></td>
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<tr>
<td>(2) Effective protection of Hawai'i's unique and fragile environmental resources.</td>
<td>✓</td>
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Policies:

(1) Exercise an overall conservation ethic in the use of Hawai'i's natural resources. | ✓ | | |
Chapter 226-13 Objectives and policies for the physical environment — land, air, and water quality

Objectives:
(1) Maintain and pursue of improved quality in Hawai‘i’s land, air, and water quality shall be directed towards achievement of the following objectives.
(2) Greater public awareness and appreciation of Hawai‘i’s environmental resources.

Policies:
(1) Foster educational activities that promote a better understanding of Hawai‘i’s limited environmental resources.
(3) Promote effective measures to achieve desired quality in Hawai‘i’s surface, ground, and coastal waters.
(4) Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawai‘i’s people.
(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.
(6) Encourage design and construction practices that enhance the physical beauty, and multi-cultural/historical resources of Hawai‘i.
(7) Encourage urban developments in close proximity to existing services and facilities.
(8) Foster recognition of the importance and value of the land, air, and water resources to Hawai‘i’s people, their cultures and visitors.
(9) Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.

Chapter 226-14 Objective and policies for facility systems — in general

Objectives:
Planning for the State’s facility systems in general shall be directed towards achievement of the objective of enhancement of Hawai‘i’s scenic assets, natural beauty, and physical objectives.

Policies:
(1) Promote the preservation and restoration of significant natural and historic resources.
(2) Provide incentives to maintain and enhance historic, cultural, and scenic amenities.
(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.
(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawai‘i’s ethnic and cultural heritage.
(5) Encourage the design of developments and activities that complement the natural beauty of the islands.

Analysis: The proposed use is similar to the surrounding uses. Residential development of Hōkūao 20H Housing at Lāna‘i City will provide housing opportunities, as well as recreational opportunities with a 1-acre park, a 1,500-square foot community center for use by the Lāna‘i community, and 60 parking stalls for intermittent parking (e.g., community events at the community center, guests visiting residents of the Hōkūao residential units, etc.).

Chapter 226-15 Objectives and policies for facility systems — solid and liquid waste

Objectives:
Planning for the State’s facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:
(1) Accommodate the needs of Hawai‘i’s people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.
(2) Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.
(3) Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.
(4) Provide adequate sewage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.

Policies:
(1) Encourage the adequate development of sewage facilities that complement planned growth.
(2) Provision of adequate sewage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.

Chapter 226-16 Objectives and policies for facility systems — public health and sanitation

Objectives:
Planning for facility systems in general shall be directed towards achievement of the following objectives:
(1) Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.
(2) Provision of adequate sewage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.

Policies:
(1) Encourage the adequate development of sewage facilities that complement planned growth.
Hawai‘i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives, and Policies

Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

| (2) | Promote re-use and recycling to reduce solid and liquid wastes and employ a | ✓ |
| (3) | Promote research to develop more efficient and economical treatment and | ✓ |
|     | disposal of solid and liquid wastes. | |

**Analysis:** The proposed use is similar to the surrounding uses. The proposed development includes construction of a new onsite wastewater system that will collect wastewater generated by the new homes and convey the wastewater to the existing Lāna‘i Wastewater Reclamation Facility. The new wastewater collection system will be designed for the residential units and the future park, pavilion and parking stalls, and constructed within the new roads. The applicant will conform with the requirements of the Commission on Water Resource Management, Department of Health, County of Maui, and other regulatory entities as it relates to installation, inspection and maintenance of water and wastewater systems associated with the project.

**Chapter 226-16 Objective and policies for facility systems – water.**

**Objective:** Planning for the State’s facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.

**Policies:**

(1) Coordinate development of land use activities with existing and potential water supply.

(2) Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.

(3) Reclaim and encourage the productive use of runoff water and wastewater discharges.

(4) Assist in improving the quality, efficiency, service, and storage capabilities of water systems for domestic and agricultural use.

(5) Support water supply services to areas experiencing severe critical water problems.

(6) Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.

**Analysis:** The proposed use is similar to the surrounding uses. It is anticipated that water will be serviced through connection with the Lāna‘i Water Company’s water system.

**Chapter 226-17 Objectives and policies for facility systems – transportation.**

**Objective:** Planning for the State’s facility systems with regard to transportation shall be directed towards the achievement of the following objectives:

(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.

(2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.

**Policies:**

(1) Design, program, and develop a multi-modal system in conformance with desired growth and physical development as stated in this chapter.

(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives;

(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties;

(4) Provide for improved accessibility to shipping, docking, and storage facilities;

(5) Promote a reasonable level and variety of mass transportation services that adequately meet statewide and community needs;

(6) Encourage transportation systems that serve to accommodate present and future development needs of communities.

**Hawai‘i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives, and Policies**

Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

| (7) | Encourage a variety of carriers to offer increased opportunities and advantages to interisland movement of people and goods; | ✓ |
| (8) | Increase the capacities of airport and harbor systems and support facilities to effectively accommodate transshipment and storage needs; | ✓ |
| (9) | Promote the development of transportation systems and programs which would assist statewide economic growth and diversification; | ✓ |
| (10) | Encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawai‘i’s natural environment; | ✓ |
| (11) | Encourage safe and convenient use of low-cost, energy-efficient, non-polluting means of transportation; | ✓ |
| (12) | Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives; and | ✓ |

**Analysis:** Hōkūa 201H Housing at Lāna‘i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lāna‘i City.

**Chapter 226-18 Objectives and policies for facility systems – energy.**

**Objective:** Planning for the State’s facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:

(1) Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;

(2) Increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawai‘i’s dependence on imported fuels for electrical generation and ground transportation.

(3) Greater diversification of energy generation in the face of threats to Hawai‘i’s energy supplies and systems;

(4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use; and

(5) Utility models that make the social and financial interests of Hawai‘i’s utility customers a priority.

(b) To achieve the energy objectives, it shall be the policy of this State to ensure the short- and long-term provision of adequate, reasonably priced, and dependable energy services to accommodate demand.

**Policies:**

(1) Support research and development as well as promote the use of renewable energy sources;

(2) Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;

(3) Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;

(4) Promote all cost-effective conservation of power and fuel supplies through measures, including:

(A) Development of cost-effective demand-side management programs;

(B) Education;

(C) Adoption of energy-efficient practices and technologies; and

(D) Increasing energy efficiency and decreasing energy use in public infrastructure
Hawaii State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies

**Key:** DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

#### Hawaii's State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies

**Objectives:** Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:

1. Fulfillment of basic individual health needs of the general public.
3. Elimination of health disparities by identifying and addressing social determinants of health.

**Policies:**

1. Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.
2. Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.
3. Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.
4. Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.
5. Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.
6. Encourage increased opportunities for education and training of telecommunications personnel.
7. Promote the development of indigenous geothermal energy resources that are located on public trust land as an affordable and reliable source of firm power for Hawaii's.

**Analysis:** Hōkūloa 20TH Housing at Lāna‘i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lāna‘i City. The use of renewable energy and battery storage systems as the primary energy source will not only assist in resource protection, but also serve as a demonstration for others.

Objectives:

1. Planning for the State's telecommunications facility systems shall be directed towards the achievement of dependable, efficient, and economical statewide telecommunications systems capable of supporting the needs of the people.
2. To achieve the telecommunications objective, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable telecommunications services to accommodate demand.

Policies:

1. Facilitate research and development of telecommunications systems and resources.
2. Encourage public and private sector efforts to develop means for adequate, ongoing telecommunications planning.
3. Promote efficient management and use of existing telecommunications systems and services; and
4. Facilitate the development of education and training of telecommunications personnel.

Analysis: The project site is not served by telecommunication systems, and thus, will not have a negative effect of the State's telecommunications systems.

Objectives:

1. Greater opportunities for Hawaii's people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more affordable housing is made available to very low-, low- and moderate-income segments of Hawaii's population.
2. The orderly development of residential areas sensitive to community needs and other land uses.

Policies:

1. Effectively accommodate the housing needs of Hawaii's people.
2. Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and high-growth households.
3. Increase homeownership and rental opportunities and choices in terms of quality, location, cost, densities, style, and size of housing.
4. Promote appropriate improvement, rehabilitation, and maintenance of existing housing units and residential areas.
5. Provide priority handling and processing for all state and county permits required for renewable energy projects.
6. Support research, development, demonstration, and use of energy efficiency, load management, and other demand-side management programs, practices, and technologies.
7. Promote alternate fuels and transportation energy efficiency; and
8. Support actions that reduce, avoid, or sequester Hawai'i's greenhouse gas emissions through agriculture and forestry initiatives; and
9. Support actions that reduce, avoid, or sequester Hawai'i's greenhouse gas emissions through agriculture and forestry initiatives; and
10. Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.

Analysis: Hōkūloa 20TH Housing at Lāna‘i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lāna‘i City. The project has been designed to reflect the existing architecture and sense of place of Lāna‘i City.

Chapter 226-20 Objectives and policies for socio-cultural advancement -- health.

Objectives:

1. Planning for the State's socio-cultural advancement with regard to health shall be directed towards achievement of the following objectives:
2. The orderly development of residential areas sensitive to community needs and other land uses.
3. Elimination of health disparities by identifying and addressing social determinants of health.
4. Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.
5. Encourage increased opportunities for education and training of telecommunications personnel.
6. Promote the development of indigenous geothermal energy resources that are located on public trust land as an affordable and reliable source of firm power for Hawaii's.

Policies:

1. Provide adequate and accessible services and facilities for prevention and treatment of physical and mental health problems, including substance abuse.
2. Encourage improved cooperation among public and private sectors in the provision of health care to accommodate the total health needs of individuals throughout the State.
3. Encourage public and private efforts to develop and promote statewide and local strategies to reduce health care and related insurance costs.
4. Foster an awareness of the need for personal health maintenance and preventive health care through education and other measures.
5. Provide programs, services, and activities that ensure environmentally healthful and sanitary conditions.
6. Encourage increased opportunities for education and training of telecommunications personnel.
7. Promote the development of indigenous geothermal energy resources that are located on public trust land as an affordable and reliable source of firm power for Hawaii's.

Analysis: The project site is not served by telecommunication systems, and thus, will not have a negative effect of the State's telecommunications systems.
Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies

Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

### Chapter 226-22 Objective and policies for socio-cultural advancement — education.

**Objective:** Planning for the State’s socio-cultural advancement with regard to education shall be directed towards achievement of the objective of the provision of a variety of educational opportunities to enable individuals to fulfill their needs, responsibilities, and aspirations.

**Policies:**

1. Support educational programs and activities that enhance personal development, physical fitness, recreation, and cultural pursuits of all groups.

2. Ensure the provision of adequate and accessible educational services and facilities that are designed to meet individual and community needs.

3. Provide appropriate educational opportunities for groups with special needs.

4. Promote educational programs which enhance understanding of Hawai'i's cultural heritage.

5. Provide higher educational opportunities that enable Hawai'i's people to adapt to changing employment demands.

6. Assist individuals, especially those experiencing critical employment problems or barriers, or undergoing employment transitions, by providing appropriate employment training programs and other related educational opportunities.

7. Promote programs and activities that facilitate the acquisition of basic skills, such as reading, writing, computing, listening, speaking, and reasoning.

8. Emphasize quality educational programs in Hawai'i's institutions to promote academic excellence.

9. Support research programs and activities that enhance the education programs of the State.

### Analysis:

Hōkūao 201H Housing at Lāna'i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lāna'i City.

### Chapter 226-23 Objective and policies for socio-cultural advancement — social services.

**Objective:** Planning for the State’s socio-cultural advancement with regard to social services shall be directed towards the achievement of the objective of improved public and private social services and activities that enable individuals, families, and groups to become more self-reliant and confident to improve their well-being.

**Policies:**

1. Assist individuals, especially those in need of attaining a minimally adequate standard of living and those confronted by social and economic hardship conditions, through social services and activities within the State’s fiscal capacities.

2. Promote coordination and integrative approaches among public and private agencies and programs to jointly address social problems that will enable individuals, families, and groups to deal effectively with social problems and to enhance their participation in society.

3. Facilitate the adjustment of new residents, especially recently arrived immigrants, into Hawai'i’s communities.

4. Promote alternatives to institutional care in the provision of long-term care for elder and disabled populations.

5. Support public and private efforts to prevent domestic abuse and child molestation, and assist victims of abuse and neglect.

6. Promote programs which assist people in need of family planning services to enable them to meet their needs.

### Analysis:

Hōkūao 201H Housing at Lāna'i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lāna'i City.

### Chapter 226-24 Objective and policies for socio-cultural advancement — individual rights and personal well-being.

**Objective:** Planning for the State’s socio-cultural advancement with regard to individual rights and personal well-being shall be directed towards achievement of the objective of increased opportunities and protection of individual rights to enable individuals to fulfill their socio-economic needs and aspirations.

**Policies:**

1. Provide effective services and activities that protect individuals from criminal acts and unfair practices and that alleviate the consequences of criminal acts in order to foster a safe and secure environment.

2. Uphold and protect the national and state constitutional rights of every individual.

3. Ensure access to, and availability of, legal assistance, consumer protection, and other public services which strive to attain social justice.

4. Support public and private efforts to promote the physical and mental well-being of Hawai'i's people.

5. Promote programs which assist people in need of family planning services to enable them to meet their needs.

### Analysis:

Hōkūao 201H Housing at Lāna'i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lāna'i City.

### Chapter 226-25 Objective and policies for socio-cultural advancement — culture.

**Objective:** Planning for the State’s socio-cultural advancement with regard to cultural heritage and arts shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawai'i’s people.

**Policies:**

1. Foster increased knowledge and understanding of Hawai'i's ethnic and cultural heritages and the history of Hawai'i.
Hawai‘i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies

Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

(2) Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawai‘i’s people and which are sensitive and responsive to family and community needs.

(3) Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawai‘i.

(4) Encourage the essence of the aloha spirit in people’s daily activities to promote harmonious relationships among Hawai‘i’s people and visitors.

Analysis: Hōkūao 201H Housing at Lānā‘i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lānā‘i City.

Objective: Planning for the State’s socio-cultural advancement with regard to public safety shall be directed towards the achievement of the following objectives:

(1) Assurance of public safety and adequate protection of life and property for all people.

(2) Optimum organizational readiness and capability in all phases of emergency management to maintain the strength, resources, and social and economic well-being of the community in the event of civil disruptions, wars, natural disasters, and other major disturbances.

(3) Promotion of a sense of community responsibility for the welfare and safety of Hawai‘i’s people.

Policies (Public Safety):

(1) Ensure that public safety programs are effective and responsive to community needs.

(2) Encourage increased community awareness and participation in public safety programs.

Policies (Public Safety-Criminal Justice):

(1) Support criminal justice programs aimed at preventing and curtailing criminal activities.

(2) Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.

(3) Provide a range of correctional resources which may include facilities and alternatives to traditional incarceration in order to address the varied security needs of the community and successfully reintegrate offenders into the community.

Policies (Public Safety – Emergency Management):

(1) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.

(2) Enhance the coordination between emergency management programs throughout the State.

Analysis: Hōkūao 201H Housing at Lānā‘i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lānā‘i City.

Chapter 226-27 Objectives and policies for socio-cultural advancement — government.

Objectives: Planning the State’s socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:

(1) Efficient, effective, and responsive government services at all levels in the State.

(2) Fiscal integrity, responsibility, and efficiency in the state government and county governments.

Policies:

(1) Provide for necessary public goods and services not assumed by the private sector.

(2) Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response.

Hawai‘i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies

Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

(3) Minimize the size of government to that necessary to be effective.

(4) Stimulate the responsibility in citizens to productively participate in government for a better Hawai‘i.

(5) Assure that government attitudes, actions, and services are sensitive to community needs and concerns.

(6) Provide for a balanced fiscal budget.

(7) Improve the fiscal budgeting and management system of the State.

(8) Promote the consolidation of state and county governmental functions to increase the effective and efficient delivery of government programs and services and to eliminate duplicative services wherever feasible.

Analysis: Hōkūao 201H Housing at Lānā‘i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lānā‘i City.

Chapter 226-101 Purpose. The purpose of this part is to establish overall priority guidelines to present and future population through the pursuit of desirable courses of action in seven major areas of statewide concern which merit priority attention: economic development, population growth and land resource management, affordable housing, crime and criminal justice, quality education, principles of sustainability, and climate change adaptation.

Chapter 226-103 Economic priority guidelines.

(a) Priority guidelines to stimulate economic growth and encourage business expansion and development to provide needed jobs for Hawai‘i’s people and achieve a stable and diversified economy:

(1) Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.

(A) Encourage investments which:

(i) Reflect long term commitments to the State;

(ii) Rely on economic linkages within the local economy;

(iii) Diversify the economy;

(iv) Invest interest from Hawai‘i residents;

(v) Are sensitive to community needs and priorities; and

(vi) Demonstrate a commitment to provide management opportunities to Hawai‘i residents; and

(2) Enhance the coordination between emergency management programs throughout the State.

(3) Provide a range of correctional resources which may include facilities and alternatives to traditional incarceration in order to address the varied security needs of the community and successfully reintegrate offenders into the community.

(4) Support criminal justice programs aimed at preventing and curtailing criminal activities.

(5) Develop a coordinated, systematic approach to criminal justice administration among all criminal justice agencies.

(6) Ensure that responsible organizations are in a proper state of readiness to respond to major war-related, natural, or technological disasters and civil disturbances at all times.

(7) Enhance the coordination between emergency management programs throughout the State.

Analysis: Hōkūao 201H Housing at Lānā‘i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lānā‘i City.

Chapter 226-27 Objectives and policies for socio-cultural advancement — government.

Objectives: Planning the State’s socio-cultural advancement with regard to government shall be directed towards the achievement of the following objectives:

(1) Efficient, effective, and responsive government services at all levels in the State.

(2) Fiscal integrity, responsibility, and efficiency in the state government and county governments.

Policies:

(1) Provide for necessary public goods and services not assumed by the private sector.

(2) Pursue an openness and responsiveness in government that permits the flow of public information, interaction, and response.
<table>
<thead>
<tr>
<th>Hawai'i State Plan, Chapter 226, HRS Part I</th>
<th>Overall Themes, Goals, Objectives and Policies</th>
<th>Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(1)</strong> Provide adequate agricultural lands to support the economic viability of the sugar and pineapple industries.</td>
<td></td>
<td><strong>(1)</strong> Protect agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.</td>
</tr>
<tr>
<td><strong>(2)</strong> Continue efforts to maintain federal support to provide stable sugar prices high enough to allow profitable operations in Hawai'i.</td>
<td></td>
<td><strong>(2)</strong> Support the continuation of land currently in use for diversified agriculture.</td>
</tr>
<tr>
<td><strong>(3)</strong> Support research and development, as appropriate, to improve the quality and production of sugar and pineapple crops.</td>
<td></td>
<td><strong>(3)</strong> Encourage and assist with the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.</td>
</tr>
<tr>
<td><strong>(4)</strong> Prioritize guidelines for promoting the common viability of the sugar and pineapple industries:</td>
<td></td>
<td><strong>(4)</strong> Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.</td>
</tr>
<tr>
<td><strong>(5)</strong> Streamline the processes for building and development permit and review, and telecommunication infrastructure installation approval and eliminate or consolidate other burdensome or duplicative governmental requirements imposed on business, where scientific evidence indicates that public health, safety and welfare would not be adversely affected.</td>
<td></td>
<td><strong>(5)</strong> Maintain and encourage a more favorable resort investment climate consistent with the objectives of this chapter.</td>
</tr>
<tr>
<td><strong>(6)</strong> Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:</td>
<td></td>
<td><strong>(6)</strong> Support and coordinate tourism promotion abroad to enhance Hawai'i's share of existing and potential visitor markets.</td>
</tr>
<tr>
<td><strong>(7)</strong> Continue to seek legislation to protect Hawai'i from transportation interruptions between Hawai'i and the continental United States.</td>
<td></td>
<td><strong>(7)</strong> Support and encourage, through educational and technical assistance programs and other means, expanded opportunities for employee ownership and participation in Hawai'i’s business.</td>
</tr>
<tr>
<td><strong>(8)</strong> Provide public incentives and encourage private initiative to develop and attract industries which promise long-term growth potentials and which have the following characteristics:</td>
<td></td>
<td><strong>(8)</strong> Provide retraining programs and other support services to assist entry of displaced workers into alternative employment.</td>
</tr>
<tr>
<td><strong>(9)</strong> Continue the development of agricultural parks and other programs to assist small-scale producers, manufacturers, and distributors.</td>
<td></td>
<td><strong>(9)</strong> Require agricultural uses in agricultural subdivisions and closely monitor the uses in these subdivisions.</td>
</tr>
<tr>
<td><strong>(10)</strong> Support the continuation of land currently in use for diversified agriculture.</td>
<td></td>
<td><strong>(10)</strong> Support the continuation of land currently in use for diversified agriculture.</td>
</tr>
<tr>
<td><strong>(11)</strong> Encourage and assist with the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.</td>
<td></td>
<td><strong>(11)</strong> Support the continuation of land currently in use for diversified agriculture.</td>
</tr>
<tr>
<td><strong>(12)</strong> Continue the development of agricultural parks and other programs to assist small independent farmers in securing agricultural lands and loans.</td>
<td></td>
<td><strong>(12)</strong> Support the continuation of land currently in use for diversified agriculture.</td>
</tr>
</tbody>
</table>

**(b) Priority guidelines to promote the economic health and quality of the visitor industry:**

1. Promote visitor satisfaction by fostering an environment which enhances the Aloha Spirit and minimizes inconveniences to Hawai'i's residents and visitors.

2. Encourage the development and maintenance of well-designed, adequately serviced hotels and resort destination areas which are sensitive to neighboring communities and activities and which provide for adequate shoreline setbacks and beach access.

**(b) Priority guidelines for water use and development:**

1. Maintain and improve water conservation programs to reduce the overall water consumption rate.
<table>
<thead>
<tr>
<th>Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies</th>
<th>DA</th>
<th>IA</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Encourage growth in the information industry.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiate, maintain, and improve energy conservation programs aimed at reducing energy waste and increasing public awareness of the need to conserve energy.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase the support for research and development of economically feasible research, program development, and training to provide future employment opportunities on the neighbor islands.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support the development of high technology parks on the neighbor islands.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Analysis:** Hong Kong 201H Housing at Lāna‘i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lāna‘i City.

**Chapter 220-104: Population growth and land resources priority guidelines.**

(a) Priority guidelines to effect desired statewide growth and distribution:

1. Encourage planning and resource management to ensure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawai‘i’s people.

2. Manage a growth rate for Hawai‘i’s economy that will parallel future employment needs for Hawai‘i’s people.

3. Ensure that adequate support services and facilities are provided to accommodate the desired distribution of future growth throughout the State.

4. Encourage major state and federal investments and services to promote economic development and private investment to the neighbor islands, as appropriate.

5. Support participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.

6. Support promotion activities to market Hawai‘i’s information industry services.

7. Support the development of urban areas.

8. Support the redevelopment of Kaka‘ako into a viable residential, industrial, and commercial community.

9. Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.

10. Identify critical environmental areas in Hawai‘i to include but not be limited to the following: watershed and recharge areas; wildlife habitats (on land and in the ocean); areas with endangered species of plants and wildlife; natural streams and water bodies; scenic and recreational shoreline resources; open space and natural areas; historic and cultural sites; areas particularly sensitive to reduction in water and air quality; and scenic resources.

11. Identify areas where priority should be given to preserving rural character and lifestyle.

12. Utilize Hawai‘i’s limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline, conservation lands, and other limited resources for future generations.

13. Protect and enhance Hawai‘i’s shoreline, open spaces, and scenic resources.

**Analysis:** Residential development of Hong Kong 201H Housing at Lāna‘i City conforms with the State Land Use classification of Urban. As previously noted, a DBA via the HRS 201H-38 process will be sought from the State Land Use Commission.
### Hawai'i State Plan, Chapter 226, HRS Part I. Overall Themes, Goals, Objectives and Policies

**Key:** DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

### Chapter 226-105: Crime and Criminal Justice

1. Support law enforcement activities and other criminal justice efforts that are directed to provide a safer environment. ✓

2. Target state and local resources on efforts to reduce the incidence of violent crime and on programs relating to the apprehension and prosecution of repeat offenders. ✓

3. Support community and neighborhood program initiatives that enable residents to assist law enforcement agencies in preventing criminal activities. ✓

4. Reduce overcrowding or substandard conditions in correctional facilities through a comprehensive approach among all criminal justice agencies which may include sentencing law revisions and use of alternative sanctions other than incarceration for persons who pose no danger to their community. ✓

5. Provide a range of appropriate sanctions for juvenile offenders, including community-based programs and other alternative sanctions. ✓

6. Increase public and private efforts to assist witnesses and victims of crimes and to minimize the costs of victimization. ✓

### Analysis: "Hokūao 201H Housing at Lāna‘i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lāna‘i City."

### Priority guidelines for the provision of affordable housing:

1. Seek to use marginal or nonessential agricultural land and public land to meet housing needs of low- and moderate-income and gap-group households. ✓

2. Encourage the use of alternative construction and development methods as a means of reducing production costs. ✓

3. Improve information and analysis relative to land availability and suitability for housing. ✓

4. Create incentives for development which would increase home ownership and rental opportunities for Hawai‘i’s low- and moderate-income households, gap-group households, and residents with special needs. ✓

5. Encourage continued support for government or private housing programs that provide low interest mortgages to Hawai‘i’s people for the purchase of initial owner-occupied housing. ✓

6. Encourage public and private sector cooperation in the development of rental housing alternatives. ✓

7. Encourage improved coordination between various agencies and levels of government to deal with housing policies and regulations. ✓

8. Give higher priority to the provision of quality housing that is affordable for Hawai‘i’s residents and less priority to development of housing intended primarily for individuals outside of Hawai‘i. ✓

### Analysis: "Hokūao 201H Housing at Lāna‘i City will provide much needed affordable housing, as well as market housing. It is situated adjoining the existing Lāna‘i City."

### Chapter 226-107: Quality education

### Priority guidelines to promote quality education:

1. Pursue effective programs which reflect the varied district, school, and student needs to strengthen basic skills achievement. ✓

2. Continue emphasis on general education “core” requirements to provide common background to students and essential support to other university programs. ✓

3. Initiate efforts to improve the quality of education by improving the capabilities of the education work force. ✓

### Chapter 226-108: Sustainability

### Priority guidelines and principles to promote sustainability shall include:

1. Encouraging balanced economic, social, community, and environmental priorities; ✓

2. Encouraging planning that respects and promotes living within the natural resources and limits of the State; ✓

3. Promoting a diversified and dynamic economy; ✓

4. Encouraging respect for the host culture; ✓

5. Promoting decisions based on meeting the needs of the present without compromising the needs of future generations; ✓

6. Considering the principles of the ahupua‘a system; and ✓

7. Emphasizing that everyone, including individuals, families, communities, businesses, and government, has the responsibility for achieving a sustainable Hawai‘i. ✓

### Analysis: "Pulama Lāna‘i will ensure that the residential development of Hokūao 201H Housing at Lāna‘i City, incorporate, to the extent feasible and practicable, measures to promote energy conservation, sustainable design, environmental stewardship, and protection of the area’s natural and cultural resources."

### Chapter 226-109: Climate change adaptation

### Priority guidelines and principles to promote climate change adaptation shall include:

1. Ensure that Hawai‘i’s people are educated, informed, and aware of the impacts climate change may have on their communities; ✓

2. Encourage community stewardship groups and local stakeholders to participate in planning and implementation of climate change policies; ✓

3. Invest in continued monitoring and research of Hawai‘i’s climate and the impacts of climate change on the State; ✓

4. Consider native Hawaiian traditional knowledge and practices in planning for the impacts of climate change; ✓

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<table>
<thead>
<tr>
<th>Hawai‘i State Plan, Chapter 226, HRS Part L</th>
<th>Overall Themes, Goals, Objectives and Policies</th>
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</thead>
<tbody>
<tr>
<td>Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable</td>
<td>DA</td>
</tr>
<tr>
<td>(5) Encourage the preservation and restoration of natural landscape features, such as coral reefs, beaches and dunes, forests, streams, floodplains, and wetlands, that have the inherent capacity to avoid, minimize, or mitigate the impacts of climate change;</td>
<td>✔️</td>
</tr>
<tr>
<td>(6) Explore adaptation strategies that moderate harm or exploit beneficial opportunities in response to actual or expected climate change impacts to the natural and built environments;</td>
<td></td>
</tr>
<tr>
<td>(7) Promote sector resilience in areas such as water, roads, airports, and public health, by encouraging the identification of climate change threats, assessment of potential consequences, and evaluation of adaptation options;</td>
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<tr>
<td>(8) Foster cross-jurisdictional collaboration between county, state, and federal agencies and partnerships between government and private entities and other nongovernmental entities, including nonprofit entities;</td>
<td></td>
</tr>
<tr>
<td>(9) Use management and implementation approaches that encourage the continual collection, evaluation, and integration of new information and strategies into new and existing practices, policies, and plans; and</td>
<td></td>
</tr>
<tr>
<td>(10) Encourage planning and management of the natural and built environments that effectively integrate climate change policy.</td>
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</tbody>
</table>

Analysis: The proposed Project indirectly supports the climate change priority guidelines as it will be implemented in an area that is outside of natural landscape features such as flood zones as well as the 3.2-foot projected sea level rise exposure area in order to avoid impacts related to climate change. In part, the proposed project will help demonstrate appropriate land use and development that supports the State economy and enhances the social stability and well-being for the people of Lāna‘i.
COUNTYWIDE POLICY PLAN - ASSESSMENT OF PROJECT APPLICABILITY TO GOALS, OBJECTIVES, AND POLICIES

APPENDIX J-2
A. COUNTYWIDE POLICY PLAN

The Countywide Policy Plan was adopted in March 2010 and is a comprehensive policy document for the islands of Maui County to the year 2030. The plan replaces the General Plan of the County of Maui 1990 Update and provides the policy framework for the development of the forthcoming Maui Island Plan as well as for updating the nine detailed Community Plans.

The Countywide Policy Plan provides broad goals, objectives, policies and implementing actions that portray the desired direction of the County’s future. Goals are intended to describe a desirable condition of the County by the year 2030 and are intentionally general. Objectives tend to be more specific and may be regarded as milestones to achieve the larger goals. Policies are not intended as regulations, but instead provide a general guideline for County decision makers, departments, and collaborating organizations toward the attainment of goals and objectives. Implementing actions are specific tasks, procedures, programs, or techniques that carry out policy.

Discussion of the proposed project conforms to the relevant goals, objectives, policies, and implementing actions of the Countywide Policy Plan is provided below.

### COUNTYWIDE POLICY PLAN

(Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)

<table>
<thead>
<tr>
<th>COUNTYWIDE POLICY PLAN</th>
<th>DA</th>
<th>IA</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. PROTECT THE NATURAL ENVIRONMENT</strong></td>
<td></td>
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</tr>
<tr>
<td><strong>Goal:</strong> Maui County’s natural environment and distinctive open spaces will be preserved, managed, and cared for in perpetuity.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Objective:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Improve the opportunity to experience the natural beauty and native biodiversity of the islands for present and future generations.</td>
<td>✓</td>
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<td></td>
</tr>
<tr>
<td><strong>Policies:</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>(a) Perpetuate native Hawaiian biodiversity by preventing the introduction of invasive species, containing or eliminating existing noxious pests, and protecting critical habitat areas.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Preserve and reestablish indigenous and endemic species’ habitats and their connectivity.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Restore and protect forests, wetlands, watersheds, and stream flows, and guard against wildfires, flooding, and erosion.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Protect baseline stream flows for perennial streams, and support policies that ensure adequate stream flow to support Native Hawaiian aquatic species, traditional kalo cultivation, and self-sustaining 'ahu'ula.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Protect undeveloped beaches, dunes, and coastal ecosystems, and restore natural shoreline processes.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) Protect the natural state and integrity of unique terrain, valued natural environments, and geological features.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) Preserve and provide ongoing care for important scenic vistas, view planes, landscapes, and open-space resources.</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>(h) Expand coordination with the State and nonprofit agencies and their volunteers to reduce invasive species, replant indigenous species, and identify critical habitat.</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td><strong>Implementing Actions:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Develop island-wide networks of greenways, watercourses, and habitat corridors.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Analysis:</strong> The proposed project indirectly improves the opportunity for Lāna‘i families to experience, live, and thrive in the natural beauty of our island home. This land will be managed and maintained for years to come while also providing much needed affordable housing. The project has been carefully designed taking into consideration building profiles and massing so as to not adversely impact scenic views and vistas. The proposed buildings will blend into the surrounding urban landscape. The proposed project will utilize BMPs to ensure that natural resources such as the coastal environment is not impacted by construction activities. The use of BMPs also ensures compatibility between land-based and water-based functions, resources, and ecological systems. The biological resources study conducted as part of the environmental review process represents an effort to protect any rare and endangered plant and animal species, and their habitats that may be present in the vicinity of the proposed action.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Objective:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Improve the quality of environmentally sensitive, locally valued natural resources and native ecology of each island.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Policies:</strong></td>
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<td></td>
</tr>
<tr>
<td>(a) Protect and restore nearshore reef environments and water quality.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Protect marine resources and valued wildlife.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Improve the connection between urban environments and the natural landscape, and incorporate natural features of the land into urban design.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Utilize land-conservation tools to ensure the permanence of valued open spaces.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Mitigate the negative effects of upland uses on coastal wetlands, marine life, and coral reefs.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) Strengthen coastal-zone management, re-naturalization of shorelines, where possible, and filtration or treatment of urban and agricultural runoff.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) Regulate the use and maintenance of stormwater-treatment systems that incorporate the use of native vegetation and mimicking natural systems.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) Advocate for stronger regulation of fishing, boating, cruise ship, and ecotourism activities.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Restore watersheds and aquifer-recharge areas to healthy and productive status, and increase public knowledge about the importance of watershed stewardship, water conservation, and groundwater protection.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Implementing Actions:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Develop regulations to minimize runoff of pollutants into nearshore waters and reduce nonpoint and point source pollution.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Analysis:</strong> The proposed project indirectly improves the opportunity for Lāna‘i families to experience, live, and thrive in the natural beauty of our island home. This land will be managed and maintained for years to come while also providing much needed affordable housing. The project has been carefully designed taking into consideration building profiles and massing so as to not adversely impact scenic views and vistas. The proposed buildings will blend into the surrounding urban landscape. The proposed project will utilize BMPs to ensure that natural resources such as the coastal environment is not impacted by construction activities. The use of BMPs also ensures compatibility between land-based and water-based functions, resources, and ecological systems. The biological resources study conducted as part of the environmental review process represents an effort to protect any rare and endangered plant and animal species, and their habitats that may be present in the vicinity of the proposed action.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Objective:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Improve the stewardship of the natural environment.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
COUNTYWIDE POLICY PLAN (Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)

(a) Preserve and protect natural resources with significant scenic, economic, cultural, environmental, or recreational value.
(b) Improve communication, coordination, and collaboration among government agencies, nonprofit organizations, communities, individuals, and land owners that work for the protection of the natural environment.
(c) Evaluate development to assess potential short-term and long-term impacts on land, air, aquatic, and marine environments.
(d) Improve efforts to mitigate and plan for the impact of natural disasters, human influenced emergencies, and global warming.
(e) Regulate access to sensitive ecological sites and landscapes.
(f) Reduce air, noise, light, land, and water pollution, and reduce Maui County’s contribution to global climate change.
(g) Plan and prepare for and educate visitors and residents about the possible effects of global warming.
(h) Provide public access to beaches and shorelines for recreational and cultural purposes where appropriate.
(i) Educate the construction and landscape industries and property owners about the use of best management practices to prevent erosion and nonpoint source pollution.
(j) Support the acquisition of resources with scenic, environmental, and recreational value, and encumber their use.
(k) Improve enforcement activities relating to the natural environment.
(l) For each shoreline community, identify and prioritize beach-conservation objectives, and develop action plans for their implementation.

Implementing Actions:

(a) Document, record, and monitor existing conditions, populations, and locations of flora and fauna communities.
(b) Implement Federal and State policies that require a reduction of greenhouse-gas emissions.
(c) Establish a baseline inventory of available natural resources and their respective carrying capacities.

Analysis: The proposed project indirectly improves the opportunity for Lāna‘i families to experience, live, and thrive in the natural beauty of our island home. This land will be managed and maintained for years to come while also providing much needed affordable housing. The project has been carefully designed taking into consideration building profiles and massing so as to not adversely impact scenic views and vistas. The proposed buildings will blend into the surrounding urban landscape.

The proposed project will utilize BMPs to ensure that natural resources such as the coastal environment is not impacted by construction activities. The use of BMPs also ensures compatibility between land-based and water-based functions, resources, and ecological systems. The biological resources study conducted as part of the environmental review process represents an effort to protect any rare and endangered plant and animal species, and their habitats that may be present in the vicinity of the proposed action.

Objective:

(1) Perpetuate the Hawaiian culture as a vital force in the lives of residents.

Policies:

(a) Protect and preserve access to mountain, ocean, and island resources for traditional Hawaiian cultural practices.
(b) Prohibit inappropriate development of cultural lands and sites that are important for traditional Hawaiian cultural practices, and establish mandates for the special protection of these lands in perpetuity.
(c) Promote the use of ahupua‘a or moku management practices.
(d) Encourage schools to promote broader incorporation of Hawaiian and other local cultures’ history and values lessons into curriculum.
(e) Ensure the protection of Native Hawaiian rights.
(f) Promote, encourage, and require the correct use of traditional place names, particularly in government documents, signage, and the tourism industry.

Implementing Actions:

(a) Establish alternative land use and overlay zoning designations that recognize and preserve the unique natural and cultural characteristics of each ahupua‘a or district.
(b) Develop requirements for all County applicants to perpetuate and use proper traditional place names in all applications submitted.
### COUNTYWIDE POLICY PLAN

**Key:** DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

<table>
<thead>
<tr>
<th>Objective:</th>
<th>DA</th>
<th>IA</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Emphasize respect for our island lifestyle and our unique local cultures, family, and natural environment.</td>
<td>✓</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Policies:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Acknowledge the Hawaiian culture as the host culture, and foster respect and humility among residents and visitors toward the Hawaiian people and their practices.</td>
</tr>
<tr>
<td>(b) Perpetuate a respect for diversity, and recognize the historic blending of cultures and ethnicities.</td>
</tr>
<tr>
<td>(c) Encourage the perpetuation of each culture’s unique cuisine, attire, dance, music, and folklore, and other unique island traditions and recreational activities.</td>
</tr>
<tr>
<td>(d) Recognize the interconnectedness between the natural environment and the cultural heritage of the islands.</td>
</tr>
</tbody>
</table>

### Analysis: This development is an appropriate development in an area away from culturally sensitive areas. A CIA was prepared for the proposed project as part of the environmental review process. The CIA fosters increased knowledge of native Hawaiian cultural practices, as well as the history of the project area. In this context, the proposed action advances the objective and policies related to preserving local cultures and traditions. Archaeological investigations were conducted and archaeological monitoring will be carried out during ground altering activities to ensure no historic or cultural properties are adversely impacted. Consultation is ongoing with the State Historic Preservation Division pursuant to Chapter 6E, HRS.

<table>
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<tr>
<th>Objective:</th>
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</tr>
</thead>
<tbody>
<tr>
<td>(3) Preserve for present and future generations the opportunity to know and experience the arts, culture, and history of Maui County.</td>
<td>✓</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Policies:</th>
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<tbody>
<tr>
<td>(a) Foster teaching opportunities for cultural practitioners to share their knowledge and skills.</td>
</tr>
<tr>
<td>(b) Support the development of cultural centers.</td>
</tr>
<tr>
<td>(c) Broaden opportunities for public art and the display of local artwork.</td>
</tr>
<tr>
<td>(d) Foster the Aloha Spirit by celebrating the Hawaiian host culture and other Maui County cultures through support of cultural-education programs, festivals, celebrations, and ceremonies.</td>
</tr>
</tbody>
</table>

### Analysis: This development is an appropriate development in an area away from culturally sensitive areas. A CIA was prepared for the proposed project as part of the environmental review process. The CIA fosters increased knowledge of native Hawaiian cultural practices, as well as the history of the project area. In this context, the proposed action advances the objective and policies related to preserving local cultures and traditions. Archaeological investigations were conducted and archaeological monitoring will be carried out during ground altering activities to ensure no historic or cultural properties are adversely impacted. Consultation is ongoing with the State Historic Preservation Division pursuant to Chapter 6E, HRS.

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<tbody>
<tr>
<td>(4) Preserve and restore significant historic architecture, structures, cultural sites, cultural districts, and cultural landscapes.</td>
<td>✓</td>
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</table>

<table>
<thead>
<tr>
<th>Policies:</th>
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<tbody>
<tr>
<td>(a) Support the development of island-wide historic, archaeological, and cultural resources inventories.</td>
</tr>
<tr>
<td>(b) Promote the rehabilitation and adaptive reuse of historic sites, buildings, and structures to perpetuate a traditional sense of place.</td>
</tr>
<tr>
<td>(c) Identify a sustainable rate of use and set forth specific policies to protect cultural resources.</td>
</tr>
<tr>
<td>(d) Protect and preserve lands that are culturally or historically significant.</td>
</tr>
<tr>
<td>(e) Support programs that protect, record, restore, maintain, provide education about, and interpret cultural districts, landscapes, sites, and artifacts in both natural and museum settings.</td>
</tr>
<tr>
<td>(f) Perpetuate the authentic character and historic integrity of rural communities and small towns.</td>
</tr>
<tr>
<td>(g) Seek solutions that honor the traditions and practices of the host culture while recognizing the needs of the community.</td>
</tr>
<tr>
<td>(h) Support the development of an Archaeological District Ordinance.</td>
</tr>
<tr>
<td>(i) Protect summits, slopes, and ridgelines from inappropriate development.</td>
</tr>
<tr>
<td>(j) Support the registering of important historic sites on the State and Federal historic registers.</td>
</tr>
<tr>
<td>(k) Provide opportunities for public involvement with restoration and enhancement of all types of cultural resources.</td>
</tr>
<tr>
<td>(l) Foster partnerships to identify and preserve or revitalize historic and cultural sites.</td>
</tr>
</tbody>
</table>

### Implementing Actions:

| (a) Establish incentives for the display of public art. | ✓ | |
| (b) Establish centers and programs of excellence for the perpetuation of Hawaiian arts and culture. | ✓ | |

<table>
<thead>
<tr>
<th>Implementing Actions:</th>
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<tbody>
<tr>
<td>(a) Identify, develop, map, and maintain an inventory of locally significant natural, cultural, and historical resources for protection.</td>
</tr>
<tr>
<td>(b) Prepare, continually update, and implement a cultural-management plan for cultural sites, districts, and landscapes, where appropriate.</td>
</tr>
<tr>
<td>(c) Enact an Archaeological District Ordinance.</td>
</tr>
<tr>
<td>(d) Nominate important historic sites to the State and Federal historic registers.</td>
</tr>
</tbody>
</table>
COUNTYWIDE POLICY PLAN
(Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)

Analysis: This development is an appropriate development in an area away from culturally sensitive areas. A CIA was prepared for the proposed project as part of the environmental review process. The CIA fosters increased knowledge of native Hawaiian cultural practices, as well as the history of the project area. In this context, the proposed action advances the objective and policies related to preserving local cultures and traditions.

Archaeological investigations were conducted and determined that there are no historic properties on the site. In addition, archaeological monitoring will be carried out during ground altering activities to ensure no historic or cultural properties are adversely impacted. Consultation is ongoing with the State Historic Preservation Division pursuant to Chapter 6E, HRS.

C. IMPROVE EDUCATION

Goal: Residents will have access to lifelong formal and informal educational options enabling them to realize their ambitions.

Objective:

(1) Encourage the State to attract and retain school administrators and educators of the highest quality.

Policies:

(a) Encourage the State to provide teachers with nationally competitive pay and benefit packages.

(b) Encourage the State to ensure teachers will have the teaching tools and support staff needed to provide students with an excellent education.

(c) Explore Maui County district- and school-based decision making in public education.

Analysis: Lāna‘i is not identified as part of a school impact district, however, Pūlāma Lāna‘i has completed a demand analysis and the current demand for the project can be met by existing residents of Lāna‘i. Therefore, it is not anticipated that there will be an additional strain on public school facilities from the project. Pūlāma Lāna‘i has also been a strong supporter of improving public education on the island. Since 2013, Pūlāma Lāna‘i has funded various initiatives at LHES, including but not limited to the very successful dual-credit program with UH Maui College. These cumulative annual education contributions to LHES are well in excess of a one-time student impact fee per household for the project and exceeds any assessment for school impact fee in Maui County identified school impact districts (e.g., Wailuku, Makawao, or Lahaina $/unit). The proposed project will afford many families the opportunity to be closer in proximity to the school and services that can support their educational experience.

Objective:

(2) Provide nurturing learning environments that build skills for the 21st century.

Policies:

(a) Expand professional-development opportunities in disciplines that support the economic-development goals of Maui County.

(b) Plan for demographic, social, and technological changes in a timely manner.

(c) Encourage collaborative partnerships to improve conditions of learning environments.

(d) Promote development of neighborhood schools and educational centers.

(e) Integrate schools, community parks, and playgrounds, and expand each community’s use of these facilities.

(f) Support coordination between land use and school-facility planning agencies.

(g) Encourage the upgrade and ongoing maintenance of public-school facilities.

Analysis: Lāna‘i is not identified as part of a school impact district, however, Pūlāma Lāna‘i has completed a demand analysis and the current demand for the project can be met by existing residents of Lāna‘i. Therefore, it is not anticipated that there will be an additional strain on public school facilities from the project. Pūlāma Lāna‘i has also been a strong supporter of improving public education on the island. Since 2013, Pūlāma Lāna‘i has funded various initiatives at LHES, including but not limited to the very successful dual-credit program with UH Maui College. These cumulative annual education contributions to LHES are well in excess of a one-time student impact fee per household for the project and exceeds any assessment for school impact fee for Maui County identified school impact districts (e.g., Wailuku, Makawao, or Lahaina $/unit).

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Archaeological investigations were conducted and determined that there are no historic properties on the site. In addition, archaeological monitoring will be carried out during ground altering activities to ensure no historic or cultural properties are adversely impacted. Consultation is ongoing with the State Historic Preservation Division pursuant to Chapter 6E, HRS.
### COUNTYWIDE POLICY PLAN

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<tbody>
<tr>
<td>(i) Encourage the State to integrate financial and economic literacy in elementary, secondary, and higher-education levels.</td>
<td>✓</td>
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<tr>
<td><strong>Implementing Actions:</strong></td>
<td></td>
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</tr>
<tr>
<td>(a) Encourage the State to establish a four-year university, and support the development of other higher-education institutions to enable residents to obtain bachelor degrees and postgraduate degrees in Maui County.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis: Lāna‘i is not identified as part of a school impact district, however, Pāluma Lāna‘i has completed a demand analysis and the current demand for the project can be met by existing residents of Lāna‘i. Therefore, it is not anticipated that there will be an additional strain on public school facilities from the project. Pāluma Lāna‘i has also been a strong supporter of improving public education on the island. Since 2013, Pāluma Lāna‘i has funded various initiatives at LHES, including but not limited to the very successful dual-credit program with UH Maui College. These cumulative annual education contributions to LHES are well in excess of a one-time student impact fee per household for the project and exceeds any assessment for school impact fee for Maui County identified school impact districts (e.g., Wailuku, Makawao, or Lahaina &amp; Ō‘u‘u). The proposed project will afford many families the opportunity to be closer in proximity to the schools and services that can support their educational experience.</td>
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<tr>
<td><strong>Objective:</strong></td>
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<tr>
<td>(4) Maximize community-based educational opportunities.</td>
<td>✓</td>
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<tr>
<td><strong>Policies:</strong></td>
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<tr>
<td>(a) Encourage the State and others to expand pre-school, after-school, and homebased (parent-child) learning.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(b) Support public-private partnerships to develop youth-internship, -apprenticeship, and -mentoring programs.</td>
<td>✓</td>
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<tr>
<td>(c) Support the development of a wide range of informal educational and cultural programs for all residents.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(d) Improve partnerships that utilize the skills and talents at Hawai‘i’s colleges and universities to benefit the County.</td>
<td>✓</td>
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<tr>
<td>(e) Support career-development and job-recruitment programs and centers.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(f) Attract learning institutions and specialty schools to diversify and enhance educational opportunities.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(g) Expand education of important life skills for the general public.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis: Lāna‘i is not identified as part of a school impact district, however, Pāluma Lāna‘i has completed a demand analysis and the current demand for the project can be met by existing residents of Lāna‘i. Therefore, it is not anticipated that there will be an additional strain on public school facilities from the project. Pāluma Lāna‘i has also been a strong supporter of improving public education on the island. Since 2013, Pāluma Lāna‘i has funded various initiatives at LHES, including but not limited to the very successful dual-credit program with UH Maui College. These cumulative annual education contributions to LHES are well in excess of a one-time student impact fee per household for the project and exceeds any assessment for school impact fee for Maui County identified school impact districts (e.g., Wailuku, Makawao, or Lahaina &amp; Ō‘u‘u). The proposed project will afford many families the opportunity to be closer in proximity to the schools and services that can support their educational experience.</td>
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<tr>
<td><strong>Goal:</strong></td>
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<tr>
<td>Health and social services in Maui County will fully and comprehensively serve all segments of the population.</td>
<td>✓</td>
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</table>
### COUNTYWIDE POLICY PLAN

**Key:** DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

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<tr>
<th>Objective:</th>
<th>Policies:</th>
<th>Analysis:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Assist and facilitate the State Department of Public Safety and others in efforts to strengthen programs and facilities that will improve the mental and social health of incarcerated people and assist in prison inmates’ successful transition back into Maui County communities.</td>
<td>(b) Develop and maintain a comprehensive index that will measure the health and wellness needs of families.</td>
<td>Indirectly, this proposed project will support access to services. By providing affordable housing to families in a centrally located area, they will have easier access to utilize social and healthcare services, if needed.</td>
</tr>
<tr>
<td>(b) Assist and facilitate the State Department of Public Safety and others in efforts to strengthen programs and facilities that will improve the mental and social health of incarcerated people and assist in prison inmates’ successful transition back into Maui County communities.</td>
<td>(c) Provide heliports countywide for emergency health and safety purposes.</td>
<td></td>
</tr>
<tr>
<td>(c) Develop and maintain a comprehensive index that will measure the health and wellness needs of families.</td>
<td>(d) Provide heliports countywide for emergency health and safety purposes.</td>
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</table>

**Objective:**

1. **Strengthen public-awareness programs related to healthy lifestyles and social and medical services.**

**Policies:**

- (a) Expand public awareness about personal safety and crime prevention.
- (b) Encourage residents to pursue education and training for careers in the healthcare, social services, and community-development fields.
- (c) Expand public awareness and promote programs to achieve healthy eating habits and drug-free lifestyles.

**Analysis:** Indirectly, this proposed project will support access to services. By providing affordable housing to families in a centrally located area, they will have easier access to utilize social and healthcare services, if needed.

**E. EXPAND HOUSING OPPORTUNITIES FOR RESIDENTS**

**Goal:** Quality, island-appropriate housing will be available to all residents. ✓

**Objective:**

1. **Reduce the affordable housing deficit for residents.** ✓

**Policies:**

- (a) Ensure that an adequate and permanent supply of affordable housing, both new and existing units, is made available for purchase or rental to our resident and/or workforce population, with special emphasis on providing housing for low- to moderate-income families, and ensure that all affordable housing remains affordable in perpetuity.
- (b) Seek innovative ways to lower housing costs without compromising the quality of our island lifestyle.
- (c) Seek innovative methods to secure land for the development of low- and moderate-income housing.
- (d) Provide the homeless population with emergency and transitional shelter and other supportive programs.
- (e) Provide for a range of senior-citizen and special needs housing choices on each island that affordably facilitates a continuum of care and services.
- (f) Support the Department of Hawaiian Home Lands’ development of homestead lands.
- (g) Manage property-tax burdens to protect affordable resident homeownership.
- (h) Explore taxation mechanisms to increase and maintain access to affordable housing.
- (i) Improve awareness regarding available affordable homeowner’s insurance.

**Analysis:** The proposed project provides additional affordable rental housing opportunities for Lāna‘i families in an area that is close to businesses, school, and government services. In addition, the project will be implemented in proximity to a developed area with existing infrastructure and services on Lāna‘i.

**Objective:**

2. **Increase the mix of housing types in towns and neighborhoods to promote sustainable land use planning, expand consumer choice, and protect the County’s rural and small town character.** ✓

**Policies:**

- (a) Seek innovative ways to develop ‘ohana cottages and accessory-dwelling units as affordable housing.
- (b) Design neighborhoods to foster interaction among neighbors.
- (c) Encourage a mix of social, economic, and age groups within neighborhoods.
- (d) Promote infill housing in urban areas at scales that capitalize on existing infrastructure, lower development costs, and are consistent with existing or desired patterns of development.
- (e) Encourage the building industry to use environmentally sustainable materials, technologies, and site planning.
- (f) Develop workforce housing in proximity to job centers and transit facilities.
- (g) Provide incentives to developers and owners who incorporate green building practices and energy-efficient technologies into their housing developments.

**Implementing Actions:**

- (a) Revise laws to support neighborhood designs that incorporate a mix of housing types that are appropriate for island living.

**Analysis:** The proposed project provides additional affordable rental housing opportunities for Lāna‘i families in an area that is close to businesses, school, and government services. In addition, the project will be implemented in proximity to a developed area with existing infrastructure and services on Lāna‘i.

**Objective:**

3. **Increase and maintain the affordable housing inventory.** ✓
### COUNTYWIDE POLICY PLAN

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<tbody>
<tr>
<td>(a) Recognize housing as a basic human need, and work to fulfill that need.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(b) Prioritize available infrastructure capacity for affordable housing.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(c) Improve communication, collaboration, and coordination among housing providers and social-service organizations.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(d) Study future projected housing needs, monitor economic cycles, and prepare for future conditions on each island.</td>
<td>✓</td>
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<tr>
<td>(e) Develop public-private and nonprofit partnerships that facilitate the construction of quality affordable housing.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(f) Streamline the review process for high-quality, affordable housing developments that implement the goals, objectives, and policies of the General Plan.</td>
<td>✓</td>
<td></td>
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</tr>
<tr>
<td>(g) Minimize the intrusion of housing on prime, productive, and potentially productive agricultural lands and regionally valuable agricultural lands.</td>
<td>✓</td>
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<tr>
<td>(h) Encourage long-term residential use of existing and future housing to meet residential needs.</td>
<td>✓</td>
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</tbody>
</table>

### Implementing Actions:

| (a) Develop policies to even out the peaks and valleys in Maui County’s construction-demand cycles. | ✓ | | |

### Analysis:
The proposed project provides additional affordable rental housing opportunities for Lāna’i families in an area that is close to businesses, school, and government services. In addition, the project will be implemented in proximity to a developed area with existing infrastructure and services on Lāna’i. The proposed project provides additional affordable rental housing opportunities for Lāna’i families in an area that is close to businesses, school, and government services. In addition, the project will be implemented in proximity to a developed area with existing infrastructure and services on Lāna’i.

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<tbody>
<tr>
<td>(a) Support programs that position Maui County’s agricultural products as premium export products.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(b) Prioritize the use of agricultural land to feed the local population, and promote the use of agricultural lands for sustainable and diversified agricultural activities.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(c) Capitalize on Hawai’i’s economic opportunities in the ecologically sensitive aquaculture industries.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(d) Assist farmers to help make Maui County more self-sufficient in food production.</td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>(e) Support ordinances, programs, and policies that keep agricultural land and water available and affordable to farmers.</td>
<td>✓</td>
<td></td>
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</tr>
<tr>
<td>(f) Support a tax structure that is conducive to the growth of the agricultural economy.</td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>(g) Enhance County efforts to monitor and regulate important agricultural issues.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(h) Support education, research, and facilities that strengthen the agricultural industry.</td>
<td>✓</td>
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</table>

### Objective:

(1) Promote an economic climate that will encourage diversification of the County’s economic base and a sustainable rate of economic growth.

### Policies:

| (a) Support economic decisions that create long-term benefits. | ✓ | | |
COUNTYWIDE POLICY PLAN
(Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)  DA  IA  NA
(i) Maintain the genetic integrity of existing food crops.  ✓
(ii) Encourage healthy and organic farm practices that contribute to land health and regeneration.  ✓
(iii) Support cooperatives and other types of nontraditional communal farming and efforts.  ✓
(iv) Encourage methods of monitoring and controlling genetically modified crops to prevent adverse effects.  ✓
(v) Work with the State to ease the permitting process for the revitalization of traditional fish ponds.
Implementing Actions:
(a) Redirect efforts in the Office of Economic Development to further facilitate the development of the agricultural sector and to monitor agricultural legislation and issues.  ✓
(b) Publicly identify, with signage and other means, the field locations of all genetically modified crops.  ✓
(c) Create agricultural parks in areas distant from genetically modified crops.  ✓
Analysis: During construction, the proposed project will provide job opportunities. After completion, families residing in the project will support the businesses surrounding them, thus indirectly impacting the economy in a positive way.
Objective:
(3) Support a visitor industry that respects the resident culture and the environment.  ✓
Policies:
(a) Promote traditional Hawaiian practices in visitor-related facilities and activities.  ✓
(b) Encourage and educate the visitor industry to be sensitive to island lifestyles and cultural values.  ✓
(c) Encourage a spirit of welcome for residents at visitor facilities, such as by offering kama‘aaina incentives and discount programs.  ✓
(d) Support the renovation and enhancement of existing visitor facilities.  ✓
(e) Support policies, programs, and a tax structure that redirect the benefits of the visitor industry back into the local community.  ✓
(f) Encourage resident ownership of visitor-related businesses and facilities.  ✓
(g) Develop partnerships to provide educational and training facilities to residents employed in the visitor industry.  ✓
(h) Foster an understanding of local cultures, customs, and etiquette, and emphasize the importance of the Aloha Spirit as a common good for all.  ✓
(i) Support the diversification, development, evolution, and integration of the visitor industry in a way that is compatible with the traditional, social, economic, spiritual, and environmental values of island residents  ✓
(j) Improve collaboration between the visitor industry and the other sectors of Maui County’s economy.  ✓
(k) Perpetuate an authentic image of the Hawaiian culture and history and an appropriate recognition of the host culture.  ✓
(l) Support the programs and initiatives outlined in the Maui County Tourism Strategic Plan 2006-2015.  ✓
(m) Promote water conservation, beach conservation, and open-space conservation in areas providing services for visitors.  ✓

COUNTYWIDE POLICY PLAN
(Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)  DA  IA  NA
(i) Recognize the important contributions that the visitor industry makes to the County’s economy, and support a healthy and vibrant visitor industry.  ✓
Analysis: During construction, the proposed project will provide job opportunities. After completion, families residing in the project will support the businesses surrounding them, thus indirectly impacting the economy in a positive way.
Objective:
(4) Expand economic sectors that increase living-wage job choices and are compatible with community values.  ✓
Policies:
(a) Support emerging industries, including the following:
• Health and wellness industry;
• Sports and recreation industry;
• Film and entertainment industry;
• Arts and culture industry;
• Renewable-energy industry;
• Education and training industry;
• Ecotourism industry; and
• Agritourism industry.
(b) Promote water conservation, beach conservation, and open-space conservation in areas providing services for visitors.  ✓
(c) Foster an understanding of local cultures, customs, and etiquette, and emphasize the importance of the Aloha Spirit as a common good for all.  ✓
(d) Support the diversification, development, evolution, and integration of the visitor industry in a way that is compatible with the traditional, social, economic, spiritual, and environmental values of island residents  ✓
(e) Improve collaboration between the visitor industry and the other sectors of Maui County’s economy.  ✓
(f) Perpetuate an authentic image of the Hawaiian culture and history and an appropriate recognition of the host culture.  ✓
(g) Promote the development and enhancement of cultural and natural traditions of the islands, including the following:
• Hawaiian language;
• Hawaiian culture;
• Hawaiian history; and
• Hawaiian traditions.
(h) Expand affordable access to recreational opportunities that support the local lifestyle.  ✓
Implementing Actions:
(a) Identify and reserve lands for cemeteries, and preserve existing cemeteries on all islands, appropriately accommodating varying cultural and, faith-based traditions.  ✓
Analysis: The proposed residential project will indirectly support the goal, objective, and policies of expanding access to recreational opportunities and community facilities to meet the needs of residents. The central location of the site of this project will provide easy access to existing recreational activities and community facilities. The project will also incorporate an onsite 1-acre park and multi-purpose building for residents.

Objective:
(1) Improve the quality and adequacy of community facilities.

Policies:
(a) Provide an adequate supply of dedicated shelters and facilities for disaster relief.
(b) Provide and maintain community facilities that are appropriately designed to reflect the traditions and customs of local cultures.
(c) Ensure that parks and public facilities are safe and adequately equipped for the needs of all ages and physical abilities to the extent reasonable.
(d) Maintain, enhance, expand, and provide new active and passive recreational facilities in ways that preserve the natural beauty of their locations.
(e) Redesign or retrofit public facilities to adapt to major shifts in environmental or urban conditions to the extent reasonable.

Analysis: The proposed residential project will indirectly support the goal, objective, and policies of expanding access to recreational opportunities and community facilities to meet the needs of residents. The central location of the site of this project will provide easy access to existing recreational activities and community facilities. The project will also incorporate an onsite 1-acre park and multi-purpose building for residents.

Objective:
(2) Enhance the funding, management, and planning of public facilities and park lands.

Policies:
(a) Identify and encourage the establishment of regulated and environmentally sound campgrounds.
(b) Manage park use and control access to natural resources in order to restrict sensitive places and utilize the resources in a sustainable manner.
(c) Provide public-recreational facilities that are clean and well-maintained.
(d) Develop partnerships to ensure proper stewardship of the islands' trails, public lands, and access systems.
(e) Ensure that there is an adequate supply of public restrooms in convenient locations.

Implementing Actions:
(a) Encourage the State to allow for overnight fishing along the shoreline in accordance with management plans and regulations.
(b) Develop and regularly update functional plans, including those relating to public facilities, parks, and campgrounds.
(c) Develop and adopt local level-of-service standards for public facilities and parks.
(d) Identify, acquire, and develop lands for parks, civic spaces, and public uses.

Analysis: The proposed residential project will indirectly support the goal, objective, and policies of expanding access to recreational opportunities and community facilities to meet the needs of residents. The central location of the site of this project will provide easy access to existing recreational activities and community facilities. The project will also incorporate an onsite 1-acre park and multi-purpose building for residents.

COUNTYWIDE POLICY PLAN
(Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)
### COUNTYWIDE POLICY PLAN
(Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)

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<tbody>
<tr>
<td>(a) Make walking and bicycling transportation safe and easy between and within communities.</td>
<td></td>
<td></td>
<td>✓</td>
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<tr>
<td>(b) Require development to be designed with the pedestrian in mind.</td>
<td>✓</td>
<td></td>
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</tr>
<tr>
<td>(c) Design new and retrofit existing rights-of-way with adequate sidewalks, bicycle lanes, or separated multi-use transit corridors.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(d) Support the development of a countywide network of bikeways, equestrian trails, and pedestrian paths.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Support the reestablishment of traditional trails between communities, to the ocean, and through the mountains for public use.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(f) Encourage educational programs to increase safety for pedestrians and bicyclists.</td>
<td>✓</td>
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</table>

**Implementing Actions:**

<table>
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<tbody>
<tr>
<td>(a) Design, build, and modify existing bikeways to improve safety and separation from automobiles.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(b) Increase enforcement to reduce abuse of bicycle and pedestrian lanes by motorized vehicles.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(c) Identify non-motorized transportation options as a priority for new sources of funding.</td>
<td>✓</td>
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</table>

**Analysis:** The TIAR prepared for this project determined that the impact of this project on existing and projected traffic is minimal. No significant delays or queuing were observed at any of the intersections near the project area during the peak hours of traffic. The traffic analysis noted that intersection improvements are not recommended as a result of the project.

**Objective:**

(3) Improve opportunities for affordable, efficient, safe, and reliable air transportation.

<table>
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</thead>
<tbody>
<tr>
<td>(a) Discourage private helicopter and fixed-wing landing sites to mitigate environmental and social impacts.</td>
<td>✓</td>
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<tr>
<td>(b) Encourage the use of quieter aircraft and noise-abatement procedures for arrivals and departures.</td>
<td>✓</td>
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<tr>
<td>(c) Encourage the modernization and maintenance of air-transportation facilities for general-aviation activities.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(d) Encourage a viable and competitive atmosphere for air carriers to expand service and ensure sufficient intra-County flights and affordable fares for consumers.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(e) Continue to support secondary airports, and encourage the State to provide them with adequate funding.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(f) During Community Plan updates, explore the use of the smaller airports.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(g) Encourage the State to provide efficient, adequate, and affordable parking and transit connections within and around airports.</td>
<td>✓</td>
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</tbody>
</table>

**Analysis:** The TIAR prepared for this project determined that the impact of this project on existing and projected traffic is minimal. No significant delays or queuing were observed at any of the intersections near the project area during the peak hours of traffic. The traffic analysis noted that intersection improvements are not recommended as a result of the project.

**Objective:**

(4) Improve opportunities for affordable, efficient, safe, and reliable ocean transportation.

<table>
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<th>Policies:</th>
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<tbody>
<tr>
<td>(a) Support programs and regulations that reduce the disposal of maritime waste and prevent spills into the ocean.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Encourage the upgrading of harbors to resist damage from natural hazards and disasters.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(c) Encourage the State to study the use of existing harbors and set priorities for future use.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(d) Explore all options to protect the traditional recreational uses of harbors, and mitigate harbor-upgrade impacts to recreational uses where feasible.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(e) Encourage the upgrading of harbors and the separation of cargo and bulk materials from passenger and recreational uses.</td>
<td>✓</td>
<td></td>
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<tr>
<td>(f) Encourage the State to provide for improved capacity at shipping, docking, and storage facilities.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) Encourage the State to provide adequate parking facilities and transit connections within and around harbor areas.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) Encourage the State to study the use of existing harbors and set priorities for future use.</td>
<td>✓</td>
<td></td>
<td></td>
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<tr>
<td>(i) Encourage the State to provide adequate facilities for small-boat operations, including small-boat launch ramps, according to community needs.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(j) Support the reestablishment of traditional trails between communities, to the ocean, and through the mountains for public use.</td>
<td>✓</td>
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COUNTYWIDE POLICY PLAN
(9) Establish recycling, trash-separation, and materials recovery programs and facilities to reduce the flow of waste into landfills.
(b) Study the feasibility of developing environmentally safe waste-to-energy facilities.
(c) Utilize taxes and fees as means to encourage conservation and recycling.
(d) Implement and regularly update the Integrated Solid Waste Management Plan.
(e) Phase out the use of injection wells.

Analysis: The proposed project indirectly supports the physical infrastructure objective and related policies as it is located in an area that is serviced by existing private (Lana'i Water Company) water and County wastewater infrastructure. Coordination will be undertaken with the DEM regarding wastewater connection. Construction waste will be disposed at the Lana'i Landfill or appropriate construction recycling centers located off-island. The proposed project will include site lighting that is low-energy consumptive. Homes may also include solar photovoltaic on-site generation with individual home battery storage.

Objective:
(a) Promote the use of locally renewable energy sources, and reward energy efficiency.
(b) Consider tax incentives and credits for the development of sustainable and renewable-energy sources.
(c) Develop public-private partnerships to ensure the use of renewable energy and increase energy efficiency.
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Policies:
(a) Develop a process to review all applications for desalination.
(b) Ensure that adequate supplies of water are available prior to approval of subdivision or construction documents.
(c) Ensure a reliable and affordable supply of water for productive agricultural uses.
(d) Promote the reclamation of gray water, and enable the use of reclaimed, gray, and brackish water for activities that do not require potable water.
(e) Retain and expand public control and ownership of water resources and delivery systems.
(f) Improve the management of water systems so that surface-water and groundwater resources are not degraded by overuse or pollution.
(g) Explore and promote alternative water-source-development methods.
(h) Seek reliable long-term sources of water to serve developments that achieve consistency with the appropriate Community Plans.
(i) Develop a process to review all applications for desalination.
(j) Promote the use of sustainable waste-disposal systems and comprehensive recycling programs to reduce the flow of waste into landfills.
(k) Encourage vendors and owners of automobile, appliance, and white goods to participate in the safe disposal and recycling of such goods, and ensure greater accountability for large waste producers.
(l) Develop strategies to promote public awareness to reduce pollution and litter, and encourage residents to reduce, reuse, recycle, and compost waste materials.
(m) Pursue improvements and upgrades to existing wastewater and solid-waste systems consistent with current and future plans and the County’s Capital Improvement Program.

Implementing Actions:
(a) Promote the retrofitting of existing buildings and new development to incorporate energy-saving design concepts and devices.
(b) Encourage green footprint practices.
(c) Reduce Maui County’s dependence on fossil fuels and energy imports.
(d) Support green building practices such as the construction of buildings that aim to minimize carbon dioxide production, produce renewable energy, and reduce water usage.
(e) Promote and support environmentally friendly practices in all energy sectors.

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**Objective:**

(i) Direct growth in a way that makes efficient use of existing infrastructure and to areas where there is available infrastructure capacity.

**Policies:**

(a) Develop a streamlined system for urban infill projects.

(b) Identify appropriate areas for urban expansion of existing towns where infrastructure and public facilities can be provided in a cost-effective manner.

**Analysis:** The proposed project indirectly supports the physical infrastructure objective and related policies as it is located in an area that is serviced by existing private (Lāna‘i Water Company) water and County wastewater infrastructure. Coordination will be undertaken with the DEM regarding wastewater connection. Construction waste will be disposed at the Lāna‘i Landfill or appropriate construction recycling centers located off-island. The proposed project will include site lighting that is low-energy consumptive. Homes may also include solar photovoltaic on-site generation with individual home battery storage.

**Implementing Actions:**

(a) Develop and regularly update functional plans for infrastructure systems.

(b) Develop, adopt, and regularly update local or community-sensitive level-of-service standards for infrastructure systems.

**Analysis:** The proposed project indirectly supports the physical infrastructure objective and related policies as it is located in an area that is serviced by existing private (Lāna‘i Water Company) water and County wastewater infrastructure. Coordination will be undertaken with the DEM regarding wastewater connection. Construction waste will be disposed at the Lāna‘i Landfill or appropriate construction recycling centers located off-island. The proposed project will include site lighting that is low-energy consumptive. Homes may also include solar photovoltaic on-site generation with individual home battery storage.

**Objective:**

(i) Improve land use management and implement a directed-growth strategy.

**Policies:**

(a) Establish, map, and enforce urban- and rural-growth limits.

(b) Direct urban and rural growth to designated areas.

(c) Limit the number of visitor-accommodation units and facilities in Community Plan Areas.

(d) Maintain a sustainable balance between the resident, part-time resident, and visitor populations.

(e) Encourage redevelopment and infill in existing communities on lands intended for urban use to protect productive farm land and open-space resources.

(f) Discourage new entitlements for residential, resort, or commercial development along the shoreline.

(g) Restrict development in areas that are prone to natural hazards, disasters, or sea-level rise.

(h) Enable existing and future communities to be self-sufficient through local and aggregated water and wastewater systems in urban areas if they are appropriately located.

**Implementing Actions:**

(a) Implement plans to achieve sustainable growth goals and objectives.

(b) Develop new development projects for urban and rural growth.

(c) Maintain inventories of infrastructure capacity, and project future infrastructure needs.

(d) Require social-justice and -equity issues to be considered during the infrastructure-planning process.

(e) Discourage the development of critical infrastructure systems within hazard zones and the tsunami-inundation zone to the extent practical.

(f) Ensure that infrastructure is built concurrent with or prior to development.

**Goal:** Community character, lifestyles, economies, and natural assets will be preserved by managing growth and using land in a sustainable manner.

**Objective:**

(i) Promote sustainable land use and growth management.

**Policies:**

(a) Develop a streamlining system for urban infill projects.

(b) Identify appropriate areas for urban expansion of existing towns where infrastructure and public facilities can be provided in a cost-effective manner.

**Analysis:** The proposed project indirectly supports the physical infrastructure objective and related policies as it is located in an area that is serviced by existing private (Lāna‘i Water Company) water and County wastewater infrastructure. Coordination will be undertaken with the DEM regarding wastewater connection. Construction waste will be disposed at the Lāna‘i Landfill or appropriate construction recycling centers located off-island. The proposed project will include site lighting that is low-energy consumptive. Homes may also include solar photovoltaic on-site generation with individual home battery storage.

**Implementing Actions:**

(a) Implement plans to achieve sustainable growth goals and objectives.

(b) Develop new development projects for urban and rural growth.

(c) Maintain inventories of infrastructure capacity, and project future infrastructure needs.

(d) Require social-justice and -equity issues to be considered during the infrastructure-planning process.

(e) Discourage the development of critical infrastructure systems within hazard zones and the tsunami-inundation zone to the extent practical.

(f) Ensure that infrastructure is built concurrent with or prior to development.

**Goal:** Community character, lifestyles, economies, and natural assets will be preserved by managing growth and using land in a sustainable manner.

**Objective:**

(i) Develop, adopt, and regularly update local or community-sensitive level-of-service standards for infrastructure systems.

**Policies:**

(a) Establish, map, and enforce urban- and rural-growth limits.

(b) Direct urban and rural growth to designated areas.

(c) Limit the number of visitor-accommodation units and facilities in Community Plan Areas.

(d) Maintain a sustainable balance between the resident, part-time resident, and visitor populations.

(e) Encourage redevelopment and infill in existing communities on lands intended for urban use to protect productive farm land and open-space resources.

(f) Discourage new entitlements for residential, resort, or commercial development along the shoreline.

(g) Restrict development in areas that are prone to natural hazards, disasters, or sea-level rise.

(h) Enable existing and future communities to be self-sufficient through local and aggregated water and wastewater systems in urban areas if they are appropriately located.

(i) Promote the undergrounding of utility and other distribution lines for health safety, and aesthetic reasons.

**Implementing Actions:**

(a) Regularly update urban- and rural-growth boundaries and their maps.
### COUNTYWIDE POLICY PLAN

**Key:** DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

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<thead>
<tr>
<th></th>
<th>DA</th>
<th>IA</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) Establish transfer and purchase of development rights programs.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Develop and adopt a green infrastructure plan.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Develop studies to help determine a sustainable social, environmental, and economic carrying capacity for each island.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Identify and define resort-destination areas.</td>
<td>✓</td>
<td></td>
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</tbody>
</table>

**Analysis:** The proposed project will be developed on vacant land on Lāna'i, within the "Park", "Open Space", "Mixed-Use Residential", and "Public/Quasi-Public" as designated by the Lāna'i Community Plan. The project is located in a developed area in Lāna'i City, in proximity to existing infrastructure and services. The project will be developed in an area outside of the projected 3.2-foot sea level rise exposure area.

The proposed project was designed to reflect the character of Lāna'i City including street scape and architecture of the homes. Additionally, sustainable design features are included in the proposed home design including use of natural elements (ventilation, shading, etc.) and use of ENERGY STAR appliances and energy efficient features.

### Objective:

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

**Policies:**

- (a) Provide opportunities and incentives for self-sufficient and subsistence homesteads and farms.
- (b) Where appropriate, integrate public-transit, equestrian, pedestrian, and bicycle facilities, and public rights-of-way as design elements in new and existing communities.
- (c) Identify and define resort-destination areas.
- (d) Protect Rural communities and traditional small towns by regulating the footprint, locations, site planning, and design of structures.

**Implementing Actions:**

- (a) Inventory and protect prime, productive, and potentially productive agricultural lands from competing non-agricultural uses.
- (b) Conduct agricultural-development planning to facilitate robust and sustainable agricultural activities.

**Analysis:** The proposed project will be developed on vacant land on Lāna'i, within the "Park", "Open Space", "Mixed-Use Residential", and "Public/Quasi-Public" as designated by the Lāna'i Community Plan. The project is located in a developed area in Lāna'i City, in proximity to existing infrastructure and services. The project will be developed in an area outside of the projected 3.2-foot sea level rise exposure area.

The proposed project was designed to reflect the character of Lāna'i City including street scape and architecture of the homes. Additionally, sustainable design features are included in the proposed home design including use of natural elements (ventilation, shading, etc.) and use of ENERGY STAR appliances and energy efficient features.

### Objective:

(3) Design all developments to be in harmony with the environment and to protect each community’s sense of place.

**Policies:**

- (a) Support and provide incentives for green building practices.
- (b) Encourage the incorporation of green building practices and technologies into all government facilities to the extent practicable.

### COUNTYWIDE POLICY PLAN

**Key:** DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable

<table>
<thead>
<tr>
<th></th>
<th>DA</th>
<th>IA</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>(c) Ensure that adequate recreational areas, open spaces, and public-gathering places are provided and maintained in all urban centers and neighborhoods.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Ensure business districts are distinctive, attractive, and pedestrian-friendly destinations.</td>
<td>✓</td>
<td></td>
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</tr>
<tr>
<td>(e) Use trees and other forms of landscaping along rights-of-way and within parking lots to provide shade, beauty, urban-heat reduction, and separation of pedestrians from automobile traffic in accordance with community desires.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) Where appropriate, integrate public-transit, equestrian, pedestrian, and bicycle facilities, and public rights-of-way as design elements in new and existing communities.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(g) Where appropriate, integrate public-transit, equestrian, pedestrian, and bicycle facilities, and public rights-of-way as design elements in new and existing communities.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(h) Adequately buffer and mitigate noise and air pollution in mixed-use areas to maintain residential quality of life.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Protect rural communities and traditional small towns by regulating the footprint, locations, site planning, and design of structures.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(j) Support small-town revitalization and preservation.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Analysis:** The proposed project will be developed on vacant land on Lāna'i, within the "Park", "Open Space", "Mixed-Use Residential", and "Public/Quasi-Public" as designated by the Lāna'i Community Plan. The project is located in a developed area in Lāna'i City, in proximity to existing infrastructure and services. The project will be developed in an area outside of the projected 3.2-foot sea level rise exposure area.

The proposed project was designed to reflect the character of Lāna'i City including street scape and architecture of the homes. Additionally, sustainable design features are included in the proposed home design including use of natural elements (ventilation, shading, etc.) and use of ENERGY STAR appliances and energy efficient features.

### Objective:

(4) Improve and increase efficiency in land use planning and management.

**Policies:**

- (a) Assess the cumulative impact of developments on natural ecosystems, natural resources, wildlife habitat, and surrounding uses.
- (b) Ensure that new development projects requiring discretionary permits demonstrate a community need, show consistency with the General Plan, and provide an analysis of impacts.
- (c) Encourage public and private partnerships to preserve lands of importance, develop housing, and meet the needs of residents.
- (d) Promote creative subdivision designs that implement best practices in land development, sustainable management of natural and physical resources, increased pedestrian and bicycle functionality and safety, and the principles of livable communities.
COUNTYWIDE POLICY PLAN
(Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)

| (a) Coordinate with Federal, State, and County officials in order to ensure that land use decisions are consistent with County plans and the vision local populations have for their communities. | DA | IA | NA |
| (b) Enable greater public participation in the review of subdivisions. | | | |
| (c) Improve land use decision making through the use of land- and geographic information systems. | | | |

**Implementing Actions:**

(a) Institute a time limit and sunsetting stipulations on development entitlements and their implementation.

**Analysis:**

The permitting and environmental review processes involves opportunities for the public to provide input throughout the environmental review process and the Section 201H-38, HRS, affordable housing approval process. Public meetings and requests for comments were included, pursuant to the environmental assessment review process, which provided the opportunity for public for engagement and feedback opportunities. The Lānaʻi Planning Commission provided comments on the Draft EA for the project at its January 20, 2021 meeting and the most recent community meeting on the project was held virtually on February 22, 2021.

**Objective:**

(1) Promote civic engagement.

**Policies:**

(a) Foster consensus building through in-depth, innovative, and accessible public participatory processes.

(b) Promote and ensure public participation and equal access to government information among all citizens.

(c) Encourage a broad cross-section of residents to volunteer on boards and commissions.

(d) Encourage the State to improve its community-involvement processes.

(e) Support community-based decision making.

(f) Expand advisory functions at the community level.

(g) Expand opportunities for all members of the public to participate in public meetings and forums.

(h) Facilitate the community’s ability to obtain relevant documentation.

(i) Increase voter registration and turnout.

**Implementing Actions:**

(a) Institute a time limit and sunsetting stipulations on development entitlements and their implementation.

(b) Enable greater public participation in the review of subdivisions.

(c) Improve land use decision making through the use of land- and geographic information systems.

**Analysis:**

The permitting and environmental review processes involves opportunities for the public to provide input throughout the environmental review process and the Section 201H-38, HRS, affordable housing approval process. Public meetings and requests for comments were included, pursuant to the environmental assessment review process, which provided the opportunity for public for engagement and feedback opportunities. The Lānaʻi Planning Commission provided comments on the Draft EA for the project at its January 20, 2021 meeting and the most recent community meeting on the project was held virtually on February 22, 2021.

**Objective:**

(3) Improve the efficiency, reliability, and transparency of County government’s internal processes and decision making.

**Policies:**

(a) Use advanced technology to improve efficiency.

(b) Simplify and clarify the permitting process to provide uniformity, reliability, efficiency, and transparency.

**Analysis:**

The permitting and environmental review processes involves opportunities for the public to provide input throughout the environmental review process and the Section 201H-38, HRS, affordable housing approval process. Public meetings and requests for comments were included, pursuant to the environmental assessment review process, which provided the opportunity for public for engagement and feedback opportunities. The Lānaʻi Planning Commission provided comments on the Draft EA for the project at its January 20, 2021 meeting and the most recent community meeting on the project was held virtually on February 22, 2021.
COUNTYWIDE POLICY PLAN
(Key: DA = Directly Applicable, IA = Indirectly Applicable, NA = Not Applicable)

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<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>(c) Improve communication with Lāna‘i and Moloka‘i through the expanded use of information technologies, expanded staffing, and the creation and expansion of government-service centers.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Ensure that laws, policies, and regulations are internally consistent and effective the intent of the General Plan.</td>
<td>✓</td>
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</tr>
</tbody>
</table>

**Implementing Actions:**

| (a) | Update the County Code to be consistent with the General Plan. | ✓ |
| (b) | Identify and update County regulations and procedures to increase the productivity and efficiency of County government. | ✓ |
| (c) | Develop local level-of-service standards for infrastructure, public facilities, and services. | ✓ |
| (d) | Implement plans through programs, regulations, and capital improvements in a timely manner. | ✓ |
| (e) | Expand government online services. | ✓ |

**Analysis:** The permitting and environmental review processes involves opportunities for the public to provide input throughout the environmental review process and the Section 201H-38, HRS, affordable housing approval process. Public meetings and requests for comments were included, pursuant to the environmental assessment review process, which provided the opportunity for public for engagement and feedback opportunities. The Lāna‘i Planning Commission provided comments on the Draft EA for the project at its January 20, 2021 meeting and the most recent community meeting on the project was held virtually on February 22, 2021.

**Objective:**

(4) Adequately fund in order to effectively administer, implement, and enforce the General Plan.

**Policies:**

| (a) | Adequately fund, staff, and support the timely update and implementation of planning policy, programs, functional plans, and enforcement activities. | ✓ |
| (b) | Ensure that the County’s General Plan process provides for efficient planning at the County, island, town, and neighborhood level. | ✓ |
| (c) | Encourage ongoing professional development, education, and training of County employees. | ✓ |
| (d) | Encourage competitive compensation packages for County employees to attract and retain County personnel. | ✓ |
| (e) | Enable the County government to be more responsive in implementing our General Plan and Community Plans. | ✓ |
| (f) | Review discretionary permits for compliance with the Countywide Policy Plan. | ✓ |
| (g) | Strengthen the enforcement of County, State, and Federal land use laws. | ✓ |

**Implementing Actions:**

| (a) | Establish penalties to ensure compliance with County, State, and Federal land use laws. | ✓ |

**Analysis:** The permitting and environmental review processes involves opportunities for the public to provide input throughout the environmental review process and the Section 201H-38, HRS, affordable housing approval process. Public meetings and requests for comments were included, pursuant to the environmental assessment review process, which provided the opportunity for public for engagement and feedback opportunities. The Lāna‘i Planning Commission provided comments on the Draft EA for the project at its January 20, 2021 meeting and the most recent community meeting on the project was held virtually on February 22, 2021.

**Objective:**

(5) Strive for County government to be a role model for implementing cultural and environmental policies and practices.

**Policies:**

| (a) | Educate residents on the benefits of sustainable practices. | ✓ |
| (b) | Encourage the retention and hiring of qualified professionals who can improve cultural and environmental practices. | ✓ |
| (c) | Incorporate environmentally sound and culturally appropriate practices in government operations and services. | ✓ |
| (d) | Encourage all vendors with County contracts to incorporate environmentally sound and culturally appropriate practices. | ✓ |

**Analysis:** The permitting and environmental review processes involves opportunities for the public to provide input throughout the environmental review process and the Section 201H-38, HRS, affordable housing approval process. Public meetings and requests for comments were included, pursuant to the environmental assessment review process, which provided the opportunity for public for engagement and feedback opportunities. The Lāna‘i Planning Commission provided comments on the Draft EA for the project at its January 20, 2021 meeting and the most recent community meeting on the project was held virtually on February 22, 2021.
Hōkūao 201H Residential Project Community Engagement and Support

Throughout the planning stages of the Hōkūao 201H Residential Project, there have been at least five opportunities for larger community engagement, including three Community Informational Meetings, the Draft Environmental Assessment (DEA) comment period, which incorporated an atypical Lāna‘i Planning Commission (LPC) meeting, and a Maui County Council meeting, where Bill 10 (2021), potentially impacting the Hōkūao 201H Residential Project, was discussed. These five community engagement opportunities resulted in over 200 supportive on the record testimonials for the Hōkūao 201H Residential Project at a County venue (i.e., LPC or Council Meeting), which further elaborated on the profound need for housing on Lāna‘i. The community engagement efforts and supported commentary by Lāna‘i residents are summarized in the table below and further discussed herein.

<table>
<thead>
<tr>
<th>Community Engagement Opportunity</th>
<th>Date</th>
<th>Community Touchpoints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Informational Meeting #1</td>
<td>August 1, 2016</td>
<td>102 participants</td>
</tr>
<tr>
<td>Community Informational Meeting #2</td>
<td>November 12, 2018</td>
<td>65 participants</td>
</tr>
<tr>
<td>DEA Public Comments</td>
<td>LPC Meeting: - January 20, 2021 Additional DEA supportive written comments: - January 2021</td>
<td>LPC meeting supportive testimony: - 7 written - 10 oral Supportive DEA comment: - 2 letters</td>
</tr>
<tr>
<td>Community Informational Meeting #3</td>
<td>February 22, 2021</td>
<td>96 participants</td>
</tr>
<tr>
<td>Maui County Council Meeting: Bill 10 (2021)</td>
<td>March 5, 2021</td>
<td>Supportive testimony: - 7 written - 1 written with 175 Lāna‘i resident signatures</td>
</tr>
</tbody>
</table>

Community Informational Meeting #1

The first Hōkūao Community Informational Meeting was held on August 1, 2016. There were 102 persons in attendance at an in-person meeting on Lāna‘i. A flyer was circulated via email distribution and posted around Lāna‘i City to inform the community of this meeting. During this meeting, Pālama Lāna‘i shared preliminary information about the Hōkūao project, including the location, and that 51% of the 150 homes would be affordable. Carol Reimann, the County of Maui Director of Housing and Human Concerns (DHHC) at the time, was also in attendance and discussed the County’s affordable housing project. She also introduced a survey that was meant to identify the demand for affordable housing, and encouraged everyone to participate. Director Reimann explained the Affordable Sales Prices and Affordable Median Income as it relates to a 20% down mortgage balance and monthly payment handout that was distributed at the meeting.

Community Informational Meeting #2

The second Hōkūao Community Informational Meeting was held on November 12, 2018, 65 participants attended in person on Lāna‘i. A flyer was used to inform the community of this meeting. Pālama Lāna‘i shared updated information about the project, including design details such as plantation style homes, park, and community center. The permitting process, including the Environmental Assessment and the 201H application was explained.

DEA Comment Period

The Draft Environmental Assessment (DEA) for the Hōkūao 201H Residential Project was submitted in Q4 2020 and published in the OEQC Environmental Notice on December 23, 2020, starting the statutory 30-day public review and comment period. ¹

The accepting agency for the DEA is the Department of Housing and Human Concerns (DHHC) and not the Lāna‘i Planning Commission. The Planning Department recently adopted a policy to have all DEA documents for affordable housing projects reviewed by the appropriate Planning Commission during the public comment period. As such, the Planning Department requested comments from the Lāna‘i Planning Commission on the DEA.² The DEA was included on the LPC meeting on January 20, 2021, as Agenda Item C.1.³

Seven community members submitted supportive written testimony and ten community members provided supportive oral testimony at the LPC meeting. Two additional supportive letters were submitted directly to the DHHC as part of the DEA public comment period. All written comments regarding the DEA submitted to the LPC and DHHC within the public comment period are included and addressed in the Hōkūao Final Environmental Assessment.

The number of supporting comments (e.g., written and oral) were overwhelming compared to the number opposing comments. There were a few members of the Lāna‘i community that expressed concerns with project details (e.g., location), however overwhelmingly the testimonies agreed that there was a severe shortage of housing on Lāna‘i and that the Hōkūao 201H Residential Project would address the immediate need.

Community Informational Meeting #3

The third Hōkūao Community Informational Meeting was held virtually via the BlueJeans Events platform on February 22, 2021, there were ninety six unique participants. A flyer was distributed via email and posted in Lāna‘i City to inform the community of this meeting.

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¹ The Environmental Notice, OEQC, December 23, 2020, 2020-12-23-TEN.pdf (hawaii.gov), page 3.
² Department of Planning Memo to the Lāna‘i Planning Commission, 012021_Item-C1_EAC-20-15-Hōkūao Housing Project Memo (mauicounty.gov).
The initial agenda for this meeting was set to discuss the changes from the second Community Informational Meeting, however the agenda was adjusted due to the eminent Second and Final Reading of Bill 10 (2021), which was scheduled for the Maui County Council Meeting, on March 5, 2021. In summary, Bill 10 (2021) was a bill for an ordinance amending Section 2.96.030 Section F, to increase the minimum percentage of affordable housing units for 201H projects to 75%, unless approved by council resolution, and excluded households in the "above-moderate" income category, earning between 120% and 140% AMI. Bill 10 (2021), as drafted, had unintended consequences to the Hōkūao 201H Residential Project. Pūlama Lānaʻi informed the community about Bill 10 (2021) and how it could affect the Hōkūao 201H Residential Project. Pūlama Lānaʻi also informed the community about the County of Maui’s Affordable Housing Project. Pūlama Lānaʻi encouraged residents to voice their concerns to Councilmembers at the March 5, 2021 Council Meeting regarding Bill 10 (2021)’s unintended consequences regarding affordable housing on Lānaʻi.

Maui County Council Meeting

Bill 10 (2021) was discussed at the Maui County Council Meeting on March 5, 2021. Written testimony for Bill 10 (2021) was submitted by many Lānaʻi residents and business owners. Seven letters and a petition was signed by 175 Lānaʻi residents in opposition to Bill 10 (2021), as drafted were submitted. The testimonials described the housing shortage on Lānaʻi and demonstrated strong overwhelming support for the Hōkūao 201H Residential Project as submitted to DHHC.

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