

EXHIBIT G

Agricultural Land Assessment

For

Kamehameha Schools

Proposed Important Agricultural Land

Island of O'ahu

December 11, 2014

Prepared for:
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Introduction/Purpose

To support a Petition for Declaratory Order to Designate ‘Important Agricultural Lands’ (‘IAL’), an Agricultural Lands Assessment was prepared for the proposed IAL lands on O‘ahu owned by Kamehameha Schools.

HRS § 205-44(c) provides the standards and criteria to identify IAL. HRS § 205-44(a) provides that lands identified as IAL need not meet every standard and criteria listed in HRS § 205-44(c); rather, lands meeting any of the criteria in HRS § 205-44(c) shall be given initial consideration, provided that the designation of IAL shall be made by weighing the standards and criteria with each other to meet the constitutionally mandated purposes in article XI, section 3, of the Hawaii Constitution and the objectives and policies for IAL in section 205-42 and 205-43. The standards and criteria of section 205-44(c) are as follows:

- 1) *Land currently used for agricultural production;*
- 2) *Land with soil qualities and growing conditions that support agricultural production of food, fiber, or fuel-and energy-producing crops;*
- 3) *Land identified under agricultural productivity rating systems, such as the agricultural lands of importance to the State of Hawaii (ALISH) system adopted by the board of agriculture on January 28, 1977;*
- 4) *Land types associated with traditional native Hawaiian agricultural uses, such as taro cultivation, or unique agricultural crops and uses, such as coffee, vineyards, aquaculture, and energy production;*
- 5) *Land with sufficient quantities of water to support viable agricultural production;*
- 6) *Land whose designation as important agricultural lands is consistent with general, development and community plans of the county;*
- 7) *Land that contributes to maintaining a critical land mass important to agricultural operation productivity;*
- 8) *Land with or near support infrastructure conducive to agricultural productivity, such as transportation to markets, water or power.*

Located in Kawailoa on the North Shore and Punalu‘u in Ko‘olau Loa, O‘ahu, a total of approximately 9,592.048 acres of land owned by Kamehameha Schools are proposed to be designated IAL.

In Kawailoa, the proposed IAL is comprised of the following geographic areas:

Kawailoa	Approximate Area
Kawailoa	6,488.497 Acres
Ōpae‘ula	2,682.664 Acres
Total:	9,171.161 Acres

In Punalu‘u, the proposed IAL is a contiguous land area of approximately 420.887 acres.

With a total of approximately 9,592.048 acres proposed for IAL, Exhibit A: Tax Map Key Description (under separate cover) illustrates the proposed IAL on the Tax Maps. For the purpose of this document, the proposed IAL is referenced as approximately 9,592 acres.

The following assessment provides an overview of the various characteristics of the proposed Kamehameha Schools IAL. The attached Figures 1 through 9 illustrate and quantify the land characteristics as summarized below.

Agricultural Use History

Kawailoa

The lands of Kawailoa were a major food producing area of the district of Waialua. The name Kawailoa references the importance and presence of water in the ahupua'a. In general, the coastal areas of Kawailoa were primarily used for habitation while the kula lands were used extensively for dryland agriculture. Given the geographic location and topography, the lower lands were utilized for two types of agricultural production: rain-fed dryland agriculture on the lower slope and colluvial slope cultivation on the upper slope, with both systems reliant on seasonal rainfall rather than constructed irrigation systems.

Traditional Hawaiian and historic-era agricultural sites including irrigation ditches and infrastructure are well documented within Kawailoa. Historical kuleana awards provide documentation of the land use and crops grown in Kawailoa during the Māhele times in the mid-1800s. Land uses documented in kuleana claims included lo'i (taro pond fields), 'auwai (water courses/ditches), and kula (dryland planting fields). Crops documented in the claims include taro, 'awa, hala, ipu (bitter gourd), kukui, koa, mai'a (banana), noni, olonā, kō (sugarcane), 'uala (sweet potato), and wauke.

Archaeological surveys of the Kawailoa lands have recorded traditional agricultural sites on the lower lands and gulches while the upper table lands are void of any traditional sites. Much of the upper table lands have been heavily modified during the over 150 years of sugar cultivation.

Sugar was an established agricultural crop as early as 1836. In 1867, Charles Reed Bishop purchased the sugar operations and continued sugar production with assistance of Castle & Cooke as his agents. After the sugar operations changed hands a few times, Castle & Cooke purchased the entire plantation in 1889, formed Waialua Agricultural Company later known as Waialua Sugar Company, and constructed flumes, siphons, and ditches for an extensive irrigation system that is still in use today. In the 1920s and 1930s, Waialua Sugar Company became one of the leading companies in the sugar industry.

In 1993, in response to the potential shutdown of sugar plantations statewide, Kamehameha Schools authorized a plan for possible conversion of sugar land to other agricultural uses. Two years later, Kamehameha Schools negotiated a two-year rent waiver with Waialua Sugar Company to assist them in staying in business, in exchange for ownership of all infrastructures upon lease surrender. Tuberose was the first non-sugar crop planted on the sugar land by A&K Nursery in 1996. Other non-sugar crops including seed corn and watermelon have been

introduced to the formerly sugar land since then. In 1998, Waialua Sugar Company gave a notice of voluntary surrender of 24,000 acres leased from Kamehameha Schools. In 1999, Kamehameha Schools took over operation of the area and infrastructure, which was installed between 1889 and 1950, and it continues to provide water and electrical service to Kawaioloa lands. In 1998, Kamehameha Schools approved the Ahupua‘a ‘O Kawaioloa Master Plan Concept pursuant to which it authorized 25-year cultivation agreements. A&K Nursery received the first agreement on July 1, 1999 and just completed their 15th year on June 30, 2014.

The Moku o Waialua North Shore Plan (Exhibit C) established the overall vision for the long-term management of the North Shore lands, including the agricultural use of the proposed Kawaioloa IAL. Today, consistent with the master plan, Kawaioloa lands are utilized for diversified agriculture, nursery, orchards, and pasture.

Punalu‘u

In 2005, Kamehameha Schools commissioned an Ethnohistoric Study of Punalu‘u which included the collection of archival and oral historical records. The research focused on two primary sources of information – historical literature, and the results of an oral historical interview program with kūpuna and kama‘āina, known to be familiar with the history of lands in Punalu‘u. The Ethnohistoric Study is a proactive approach toward land and resources management for Kamehameha Schools and aided in the planning efforts in Punalu‘u. In 2011, Kamehameha Schools initiated an Archaeological Reconnaissance Survey (ARS) of its agricultural lands as it started to plan for agricultural expansion. The main focus of this effort was to identify historic and cultural resources in lower Punalu‘u so that they may be identified and inventoried to assist in the planning and stewardship of these lands. In the fall of 2014, Kamehameha Schools commissioned a Cultural Impact Assessment (CIA) of Punalu‘u. The approximately 433-acre study area centered on Punalu‘u Stream, also known as Wai‘ono Stream by some, immediately mauka of Kamehameha Highway and extending back inland approximately 1.2 miles into the foothills of the Ko‘olau Mountains. The CIA report is designed to provide stakeholders with a road map for preserving and perpetuating significant cultural resources and practices in a way that is both authentic and practical.

Similar to Kawaioloa, traditional Hawaiian and historic-era agricultural sites including ditches and infrastructure are well documented in Punalu‘u. With the ARS and CIA completed, along with previous Ethnohistoric Study, more than 40 notable sites were identified including multiple heiau, traditional Hawaiian and historic-era agricultural sites including irrigation ditches and infrastructure, and traditional Hawaiian habitation and cultivation sites. As noted in these archaeological and cultural studies, the lands of Punalu‘u were one of the major food producing ahupua‘a of Ko‘olau Loa. In pre-contact times, the land supported lo‘i kalo terraces along the valley floor and dryland agricultural features along the slopes of the valley.

Historical kuleana awards also provide documentation of the land use and crops grown in Punalu‘u during the Māhele times in the mid-1800s. Land uses documented in kuleana claims included lo‘i (taro pond fields), ‘auwai (water courses/ditches), and kula (dryland planting fields). Crops documented in the claims include taro, ‘awa, hala, ipu (bitter gourd), kukui, koa, mai‘a (banana), noni, olonā, ‘uala (sweet potato), and wauke. In the 1970s, Bishop Museum archaeologists recorded pre-Contact agricultural and/or habitation complexes, comprised

variously of terraces, mounds, and walls. During the recent archaeological surveys, traditional Hawaiian and historic-era agricultural sites and features recorded include traditional and historic terraces, enclosures, walls, irrigation ditches and other infrastructure.

Until the early 1900s, rice was the dominant crop, and rice cultivation was known to exist on the entire plain between the shoreline and the mountain. From 1900s to 1970s, sugar became the leading agricultural use, and taro and pineapple were also produced with some smaller leases. Since the 1970s, agricultural use has been diversified, and today it includes aquaculture, nursery, pasture, and various other crops.

Current and Future Agricultural Operations

Kamehameha Schools' commitment to future agricultural operations is provided for in its 2009 Strategic Agricultural Plan (Exhibit B). The plan provides Kamehameha Schools' vision of "Thriving Lands and Thriving Communities" and a framework for the short- and long-term management of agricultural lands that Kamehameha Schools owns statewide. Its strategy based goals in the agricultural management framework focus on renewable energy, water resources, forestry and fiber resources, and sustainable food systems.

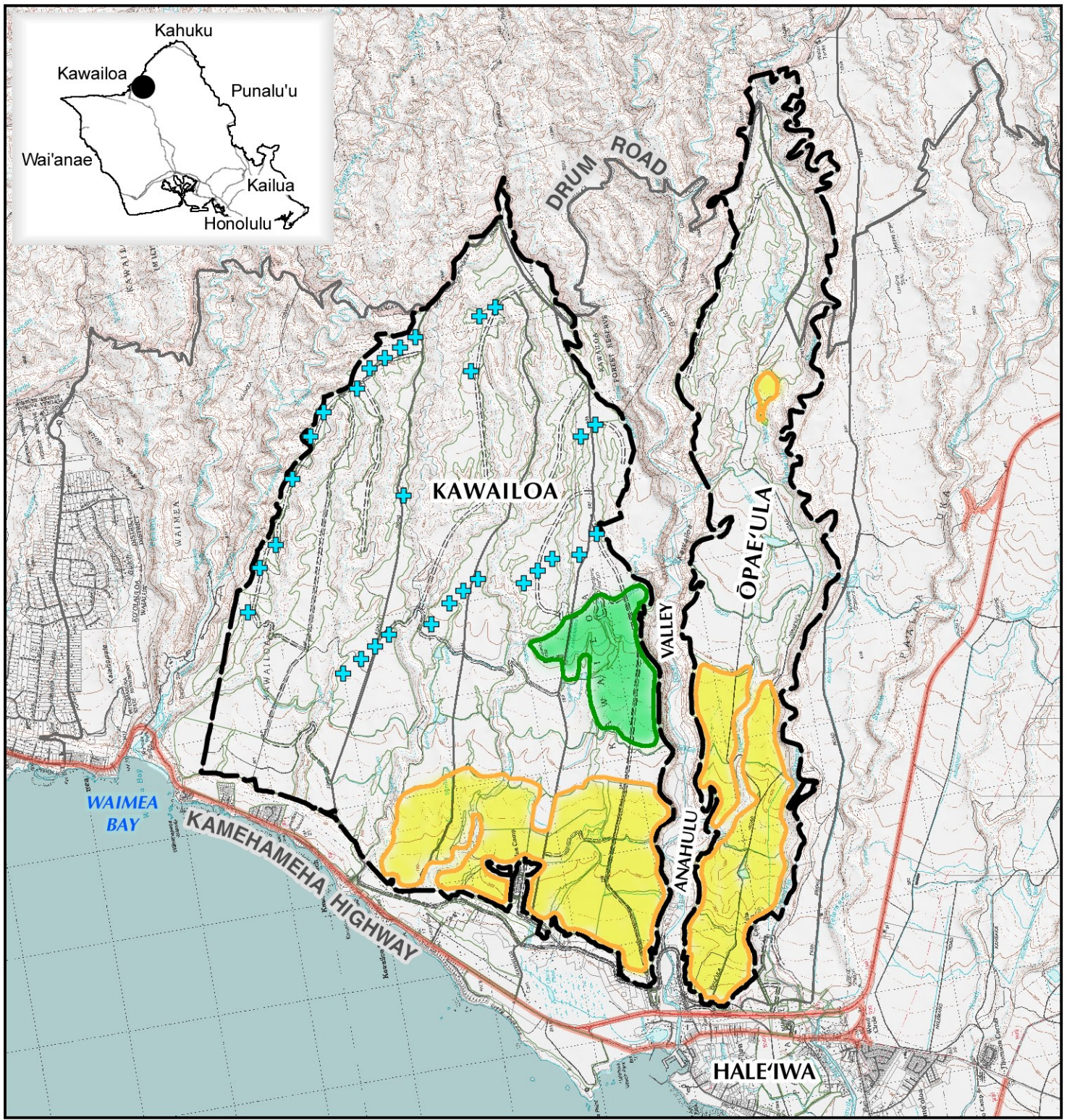
Kawailoa

Figure 1A illustrates the current agricultural uses of the proposed IAL lands in Kawailoa. Currently, most of the agricultural activities in Kawailoa are concentrated on lands below 600-foot elevation where the existing irrigation system is working and in good condition. Diversified agriculture is a primary agricultural use in the area. Approximately 722 acres of land is utilized for diversified agriculture, and the crops include seed corn, banana, taro, papaya, mango, and hydroponic lettuce. The other agricultural uses include approximately 297 acres of livestock and 0.7 acres of koa windbreak. The lands above 600-foot elevation are used primarily for renewable energy production (wind farm) including 30 wind turbines in operation.

For the future of agriculture in Kawailoa, diversified agriculture will remain the primary agricultural use as illustrated in Figure 2A. Kamehameha Schools will increase renewable energy development, starting with wind, and deliver more water by restoring and improving its 100-year-old extensive irrigation system. Approximately 500 acres are being planned for a 50 MW photovoltaic (PV) energy farm that will also include grazing by sheep as a dual use. As both water supply and energy resources increase, Kamehameha Schools will make more lands available to farmers to expand diversified agriculture and deliver more locally grown vegetables and fruits to the local markets. Also, it will be able to secure long term leases with tenants and introduce new agricultural uses, such as organic farming.

Punalu'u

In 2010, Kamehameha Schools prepared the Punalu'u Ahupua'a Plan (Exhibit D) to provide guidance in its management and stewardship of these lands. The plan provides strategies for managing agricultural, commercial, residential, and conservation assets.



DATE: 12/4/2014

LEGEND

-  Proposed IAL Designation
-  Diversified Agriculture
-  Livestock
-  Wind Turbines

FIGURE 1A
Kawailoa

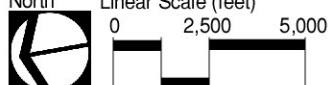

Current Agricultural Operation

KS IAL O'AHU

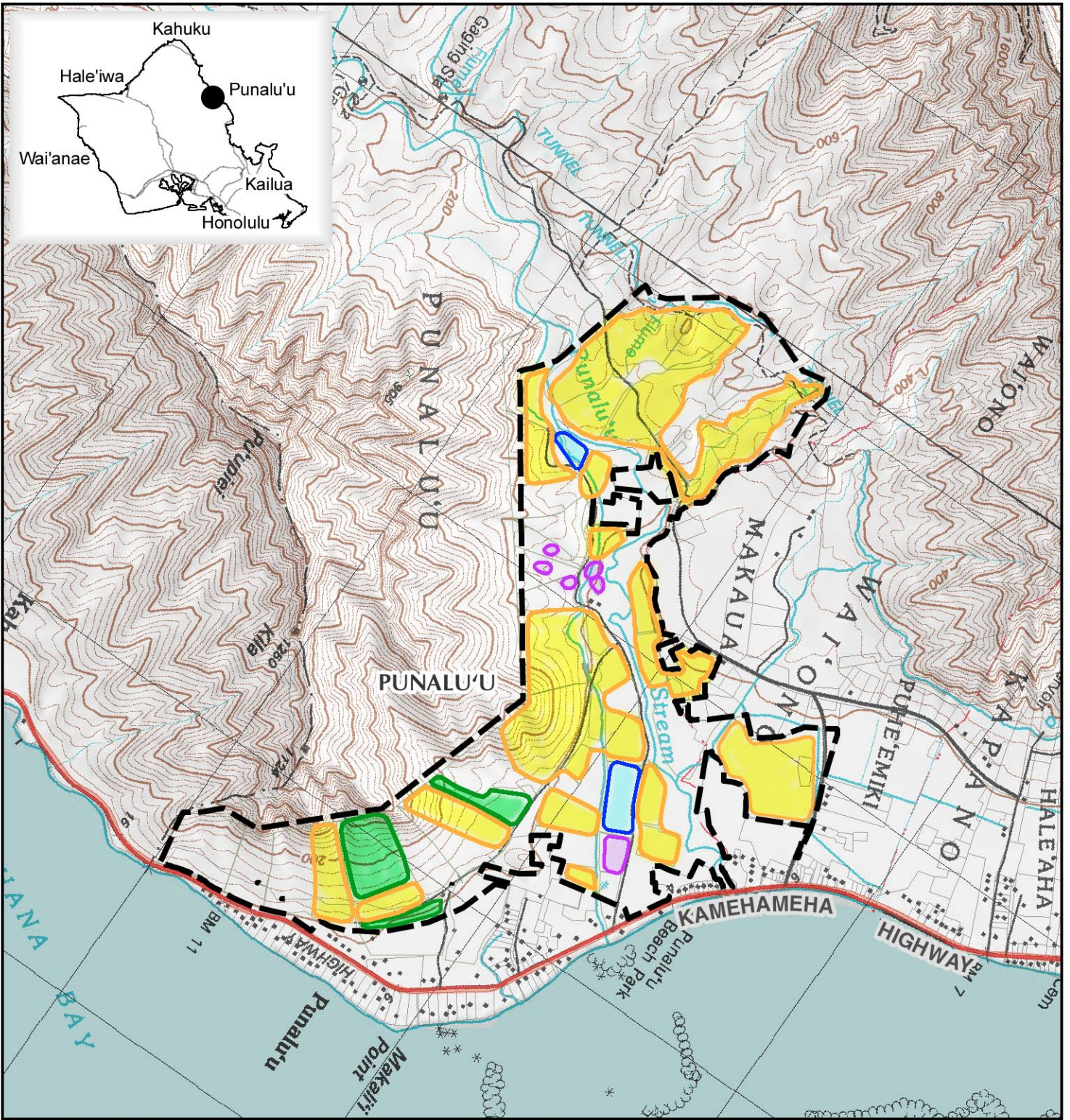
North Island of O'ahu

Linear Scale (feet)

0 2,500 5,000

Source: Kamehameha Schools (2014), U.S. Geological Survey
Disclaimer: This graphic has been prepared for general planning purposes only.



DATE: 12/4/2014

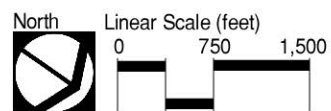
LEGEND

-  Proposed IAL Designation
-  Diversified Agriculture
-  Livestock
-  Aquaculture
-  Nursery

FIGURE 1B
Punaluu

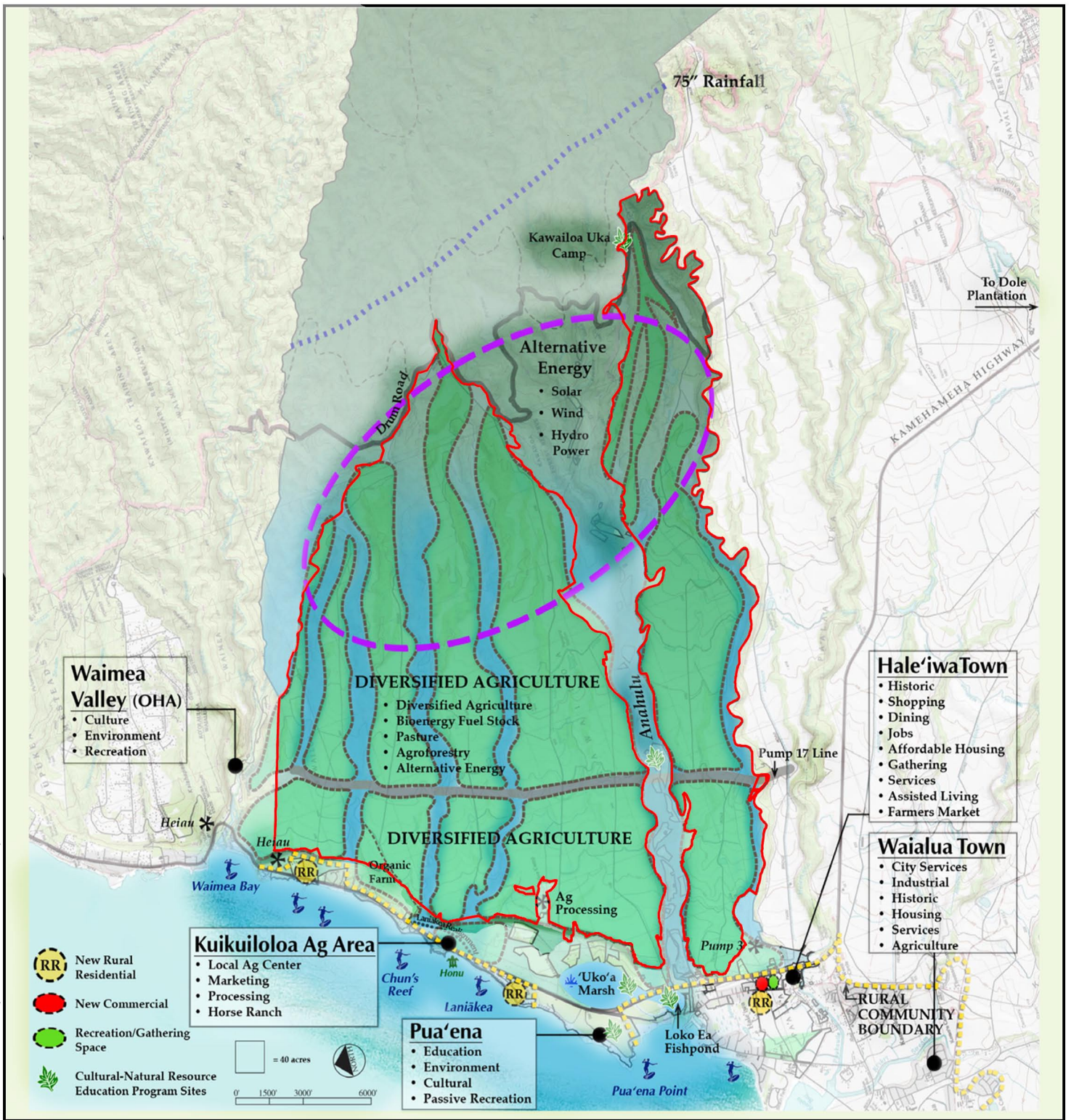
Current Agricultural Operation

KS IAL O'AHU



Island of O'ahu





DATE: 12/4/2014

LEGEND

Proposed IAL Designation

FIGURE 2A
Kawaiiloa
KS North Shore Master Plan
Plan Map

KS IAL O'AHU

Island of O'ahu

North

Linear Scale (feet)

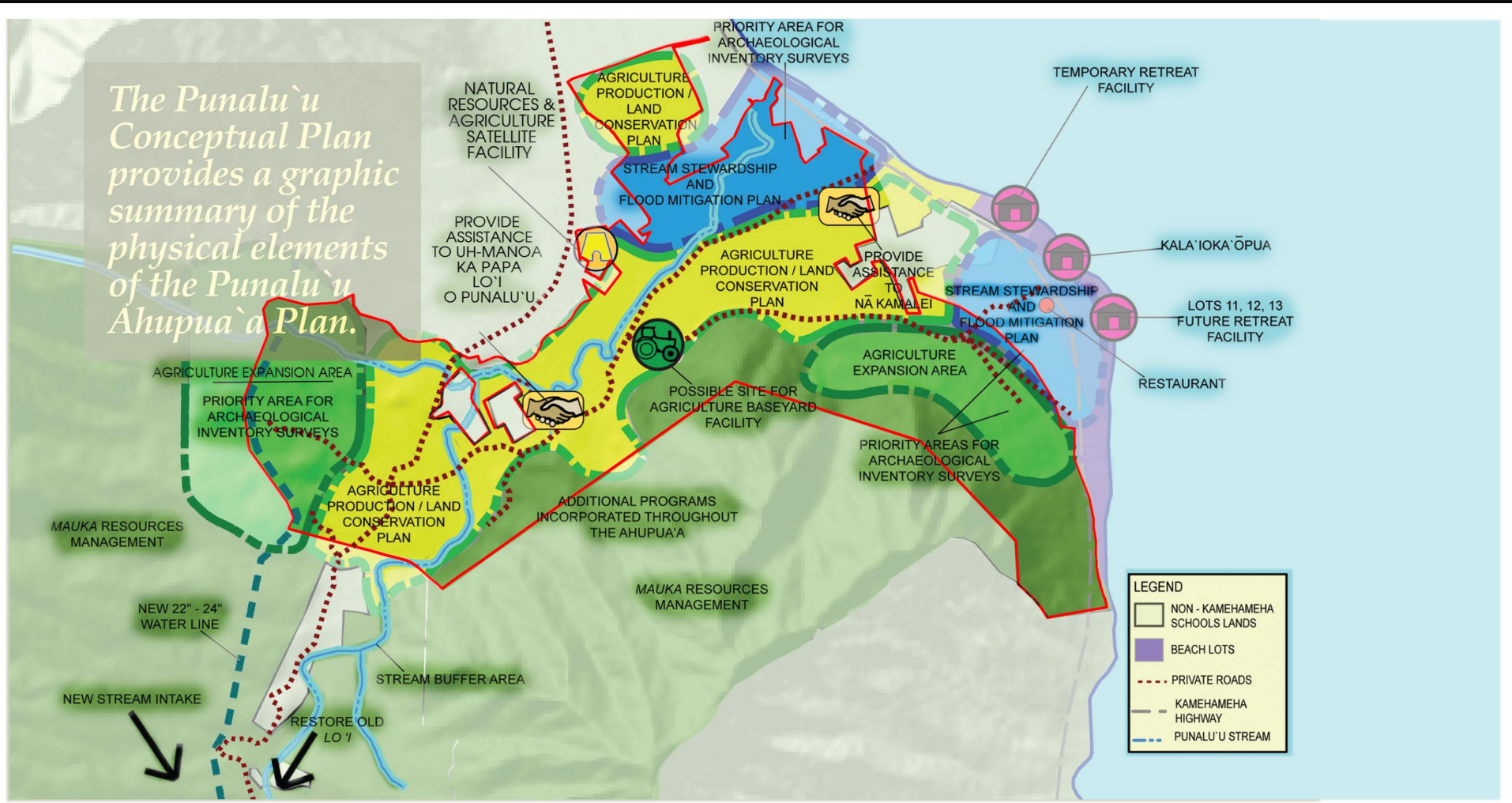
0 3,000 6,000

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Source: Kamehameha Schools (2008)
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Q:\Statewide\KS Important AG Land\Photoshop\Oahu

The Punalu'u Conceptual Plan provides a graphic summary of the physical elements of the Punalu'u Ahupua'a Plan.



DATE: 12/4/2014

LEGEND

Proposed IAL Designation

FIGURE 2B
Punalu'u
KS Punalu'u Ahupua'a Plan
Conceptual Plan
KS IAL O'AHU

North Linear Scale (feet)
0 750 1,500

Island of O'ahu

Source: Kamehameha Schools (2014)
Disclaimer: This graphic has been prepared for general planning purposes only.

Figure 1B illustrates the current agricultural uses in Punalu‘u. Similar to Kawaiiloa, Punalu‘u’s primary agricultural use is also diversified agriculture. Approximately 120 acres of land is cultivated for diversified agriculture and the crops include banana, papaya, mango, cucumber, mixed vegetable, taro, and cacao. The other agricultural uses include approximately 22 acres of livestock and 11 acres of aquaculture.

The future of agriculture in Punalu‘u is similar to Kawaiiloa. As illustrated in Figure 2B, diversified agriculture will continue to be the primary agricultural use in Punalu‘u. In the near term, Kamehameha Schools plans to complete the renovation work to the agricultural water system, develop an overall agriculture production and land conservation plan, establish longer term leases with tenants, and construct a central agricultural baseyard facility. In the future, Kamehameha Schools proposes to develop a traditional farming program and an organic farming program. For some of the agricultural lands makai of the proposed IAL, the plans also include an agricultural processing complex, renovated agricultural residences, a Farmer’s Market/Retail Facility, and on-site housing for a property manager.

Agricultural Soils Productivity Ratings

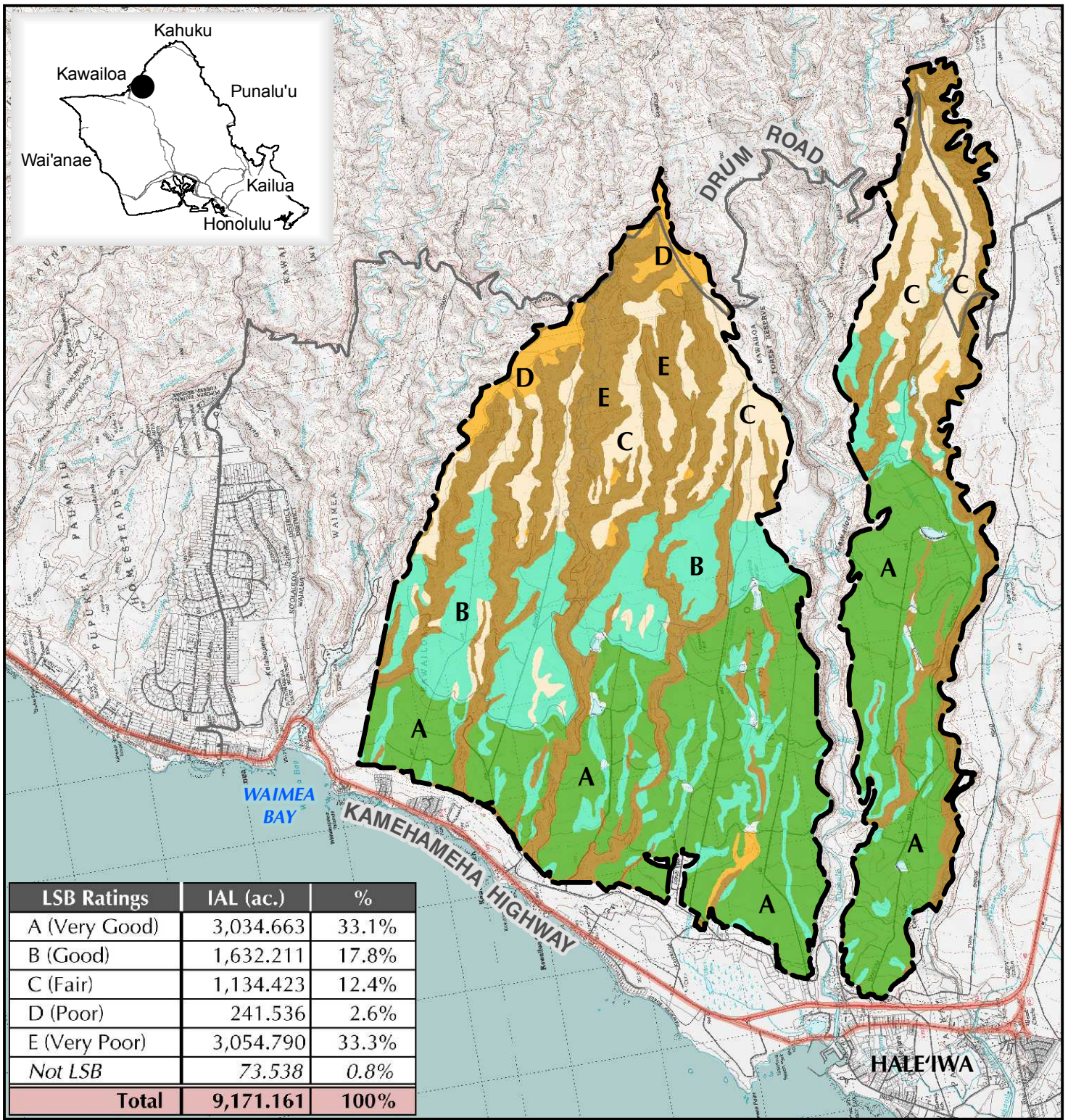
The Detailed Land Classification System and Agricultural Land Productivity Ratings by the Land Study Bureau (LSB), University of Hawai‘i are based on a five-class productivity rating system using the letters A, B, C, D, and E, with A representing the class of highest productivity and E the lowest.

In Kawaiiloa (Figure 3A), about 33.1% of the proposed IAL are rated A, 17.8% are rated B, 12.4% are rated C, 2.6% are rated D, 33.3% are rated E, and 0.8% are unrated.

In Punalu‘u (Figure 3B), there are no IAL rated A, about 9.4% of the proposed IAL are rated B, 34.7% are rated C, 12.3% are rated D, 43.5% are rated E, and 0.1% are unrated. Although the soil productivity ratings in Punalu‘u are relatively low under this classification system, Punalu‘u has been historically used for agriculture and presently is productive for diversified agriculture, aquaculture, nursery, and pasture.

The following table summarizes the productivity rating of the proposed IAL as illustrated in Figures 3A and 3B:

Productivity Rating	Kawaiiloa		Punalu‘u		Total IAL	
	Acres	% of IAL	Acres	% of IAL	Acres	% of IAL
A	3,034.663	33.1%	-	-	3,034.663	31.6%
B	1,632.211	17.8%	39.440	9.4%	1,671.651	17.4%
C	1,134.423	12.4%	146.313	34.7%	1,280.736	13.3%
D	241.536	2.6%	51.859	12.3%	293.395	3.1%
E	3,054.790	33.3%	183.257	43.5%	3,238.047	33.8%
Not LSB	73.538	0.8%	0.018	0.1%	73.556	0.8%
Totals:	9,171.161	95.6%	420.887	4.4%	9,592.048	100%



DATE: 12/11/2014

LEGEND

LSB Productivity Rating

- A - Very Good
- B - Good
- C - Fair
- D - Poor
- E - Very Poor

Proposed IAL Designation

FIGURE 3A

Kawailoa

**Land Study Bureau -
Detailed Land Classification**

KS IAL O'AHU

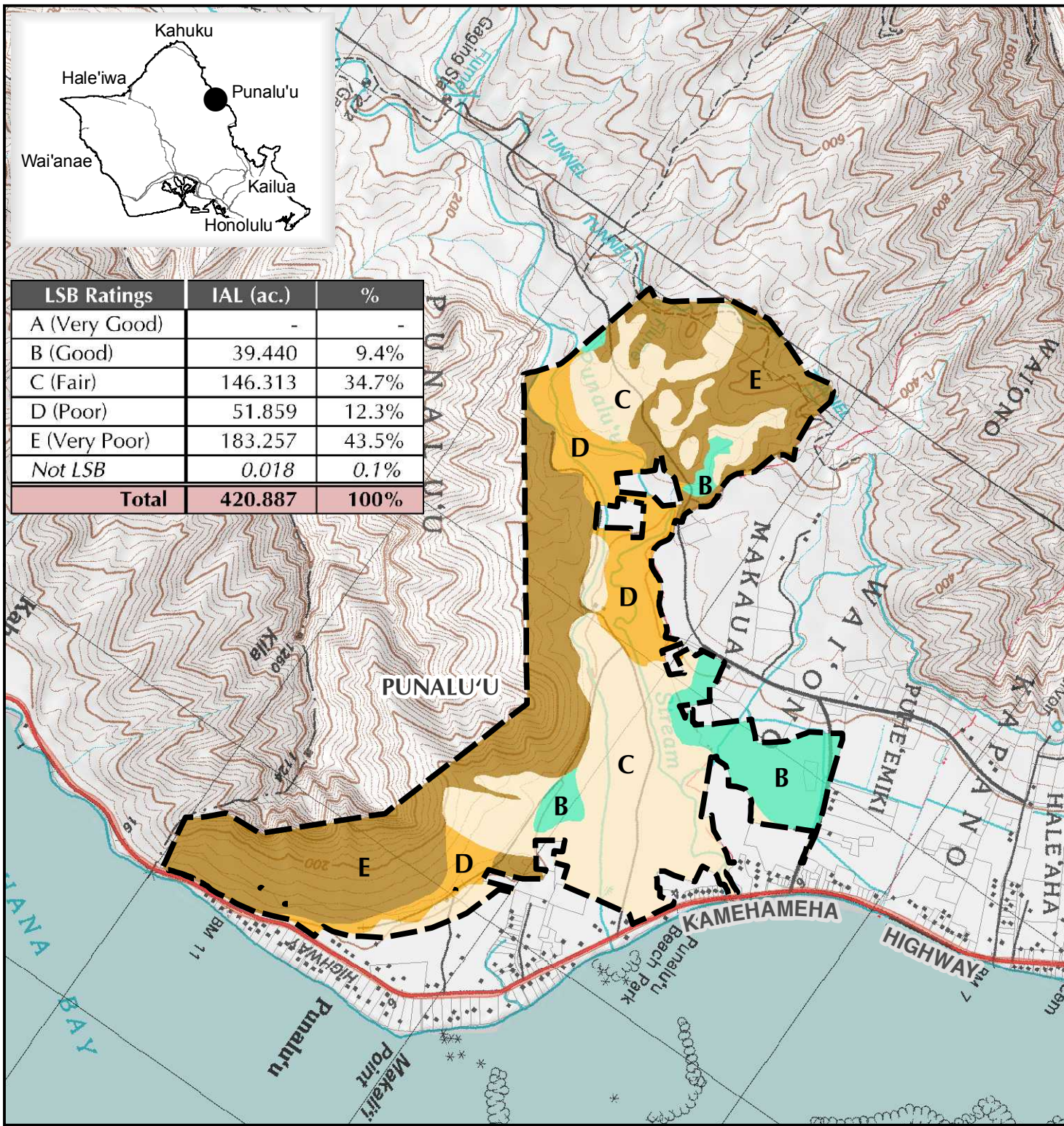
North Island of O'ahu

Linear Scale (feet)

0 2,500 5,000

PBR HAWAII & ASSOCIATES, INC.

Source: Kamehameha Schools (2014), Land Study Bureau (1972), U.S. Geological Survey
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LSB Ratings	IAL (ac.)	%
A (Very Good)	-	-
B (Good)	39.440	9.4%
C (Fair)	146.313	34.7%
D (Poor)	51.859	12.3%
E (Very Poor)	183.257	43.5%
Not LSB	0.018	0.1%
Total	420.887	100%

DATE: 12/11/2014

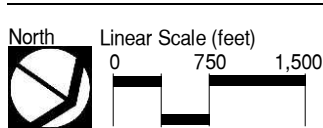
LEGEND

LSB Productivity Rating

- A - Very Good
- B - Good
- C - Fair
- D - Poor
- E - Very Poor

Proposed IAL Designation

FIGURE 3B
Punaluu
Land Study Bureau -
Detailed Land Classification
KS IAL O'AHU



Island of O'ahu



Source: Kamehameha Schools (2014), Land Study Bureau (1972), U.S. Geological Survey
 Disclaimer: This graphic has been prepared for general planning purposes only.

Solar Radiation

Solar Radiation is based on the Sunshine Maps prepared in 1985 by the State Department of Business, Economic Development and Tourism, formerly known as the State Department of Planning and Economic Development, Energy Division. The proposed IAL in Kawailoa (Figure 4A) receives an annual average of 400 to 450 calories of solar energy per square centimeter per day.

The proposed IAL in Punalu‘u (Figure 4B) receives an annual average of 300 to 350 calories of solar energy per square centimeter per day.

The level of solar radiation is very beneficial towards supporting various agricultural uses for the proposed IAL within Kawailoa and Punalu‘u.

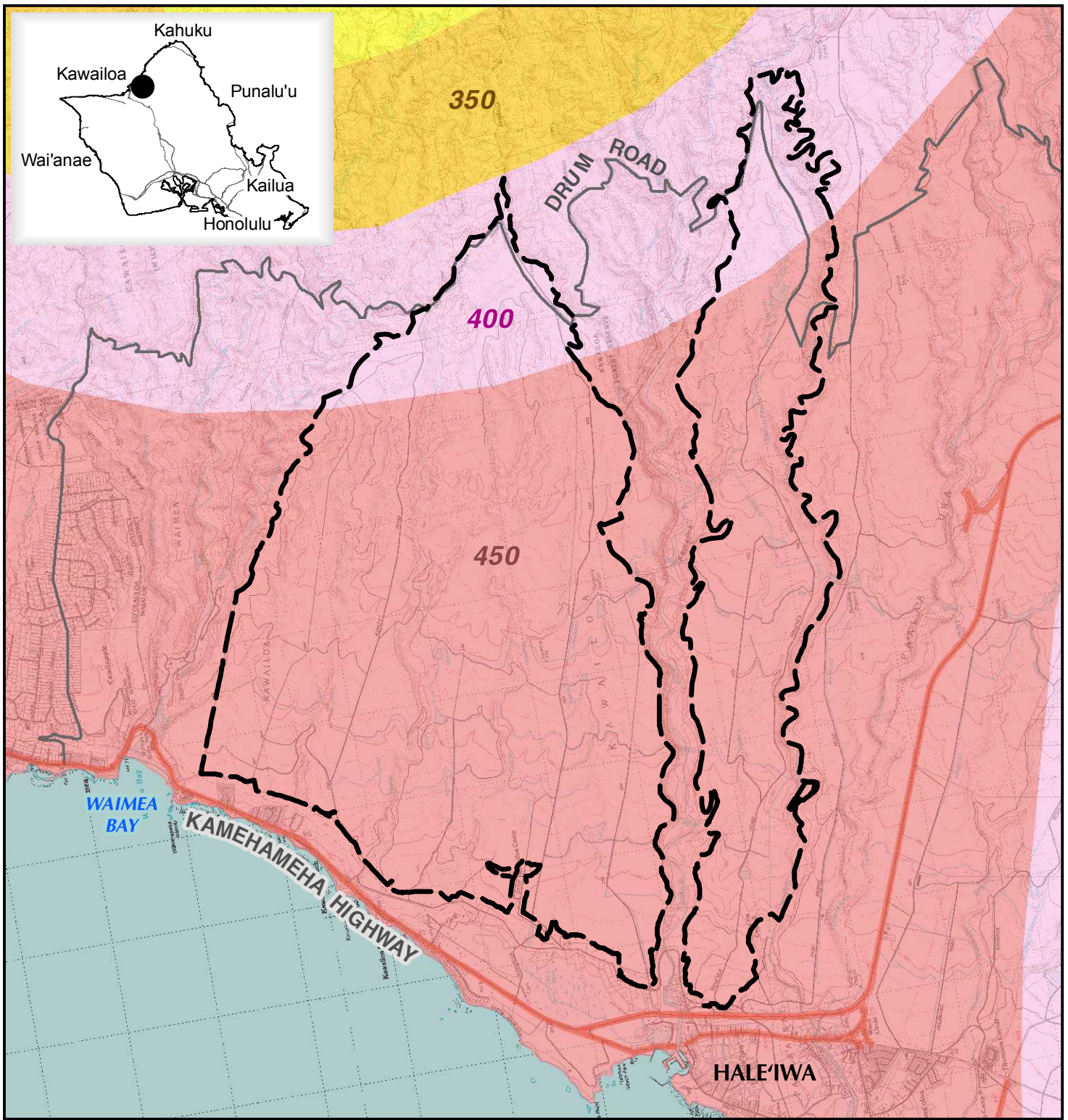
Agricultural Lands of Importance to the State of Hawai‘i (ALISH)

The Agricultural Lands of Importance to the State of Hawai‘i (ALISH) classification system were developed in 1977 by the State Department of Agriculture. The system was primarily, but not exclusively, based on the soil characteristics of lands and existing cultivation. There are three classes of ALISH lands – Prime, Unique, and Other.

Prime ALISH is land best suited for the production of food, feed, forage and fiber crops. The land has the soil quality, growing season, and moisture supply that are needed to produce high yields of crops economically when the land, including water resources, is treated and managed according to modern farming methods.

Unique ALISH is land other than Prime ALISH that is used for the production of specific high-value food crops. The land has the special combination of soil quality, growing season, temperature, humidity, sunlight, air drainage, elevation, aspect, moisture supply, or other conditions, such as nearness to market, that favor the production of a specific crop of high quality and/or high yield when the land is treated and managed according to modern farming methods. In Hawai‘i, some examples of such crops are coffee, taro, rice, watercress, and non-irrigated pineapple.

Other ALISH is land other than Prime or Unique that is of state-wide or local importance for the production of food, feed, fiber, and forage crops. The land is important to agriculture in Hawai‘i and yet it exhibits properties, such as seasonal wetness, erodibility, limited rooting zone, slope, flooding, or droughtiness, that exclude the land from Prime or Unique agricultural land use classifications. Two examples are (1) lands which do not have an adequate moisture supply to be qualified as Prime and (2) lands which have similar characteristics and properties as Unique, except that the land is not currently in use for the production of a “unique” crop. These Other lands can be farmed sufficiently by applying greater amounts of fertilizer and other soil amendments, drainage improvement, erosion control practices, and flood protection. Other ALISH land can produce fair to good crop yields when managed properly.



DATE: 12/4/2014

LEGEND

- Solar Radiation (cal/sq.cm./day)
- 300
- 350
- 400
- 450
- Proposed IAL Designation

FIGURE 4A
Kawailoa

Solar Radiation

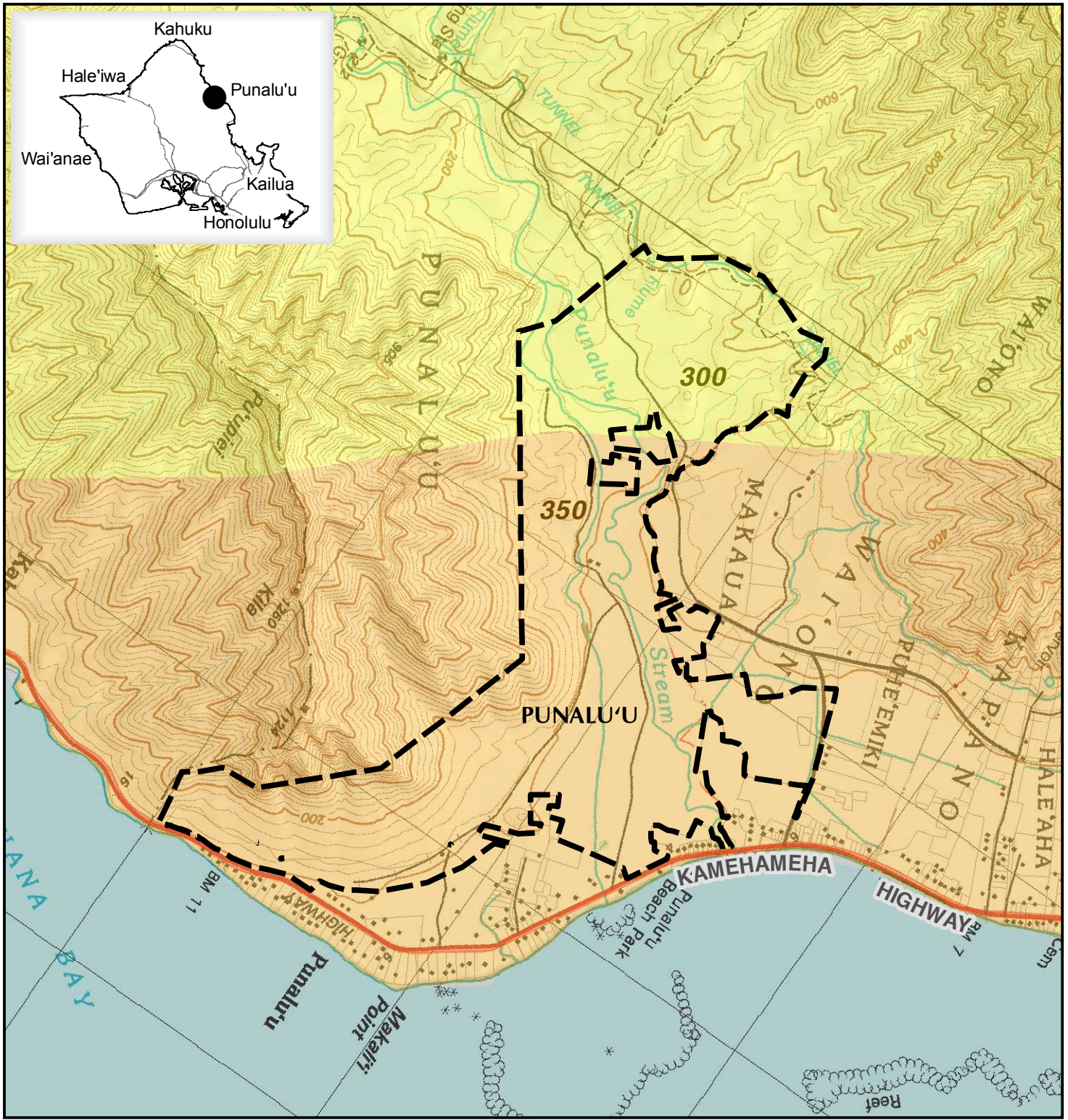
KS IAL O'AHU

North Island of O'ahu

Linear Scale (feet)

0 2,500 5,000

Source: Kamehameha Schools (2014), State Department of Planning and Economic Development, Energy Division (1985), U.S. Geological Survey
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DATE: 12/4/2014

LEGEND

Solar Radiation
(cal/sq.cm./day)

- 300
- 350

Proposed IAL Designation

Source: Kamehameha Schools (2014), State Department of Planning and Economic Development, Energy Division (1985), U.S. Geological Survey

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FIGURE 4B
Punaluu

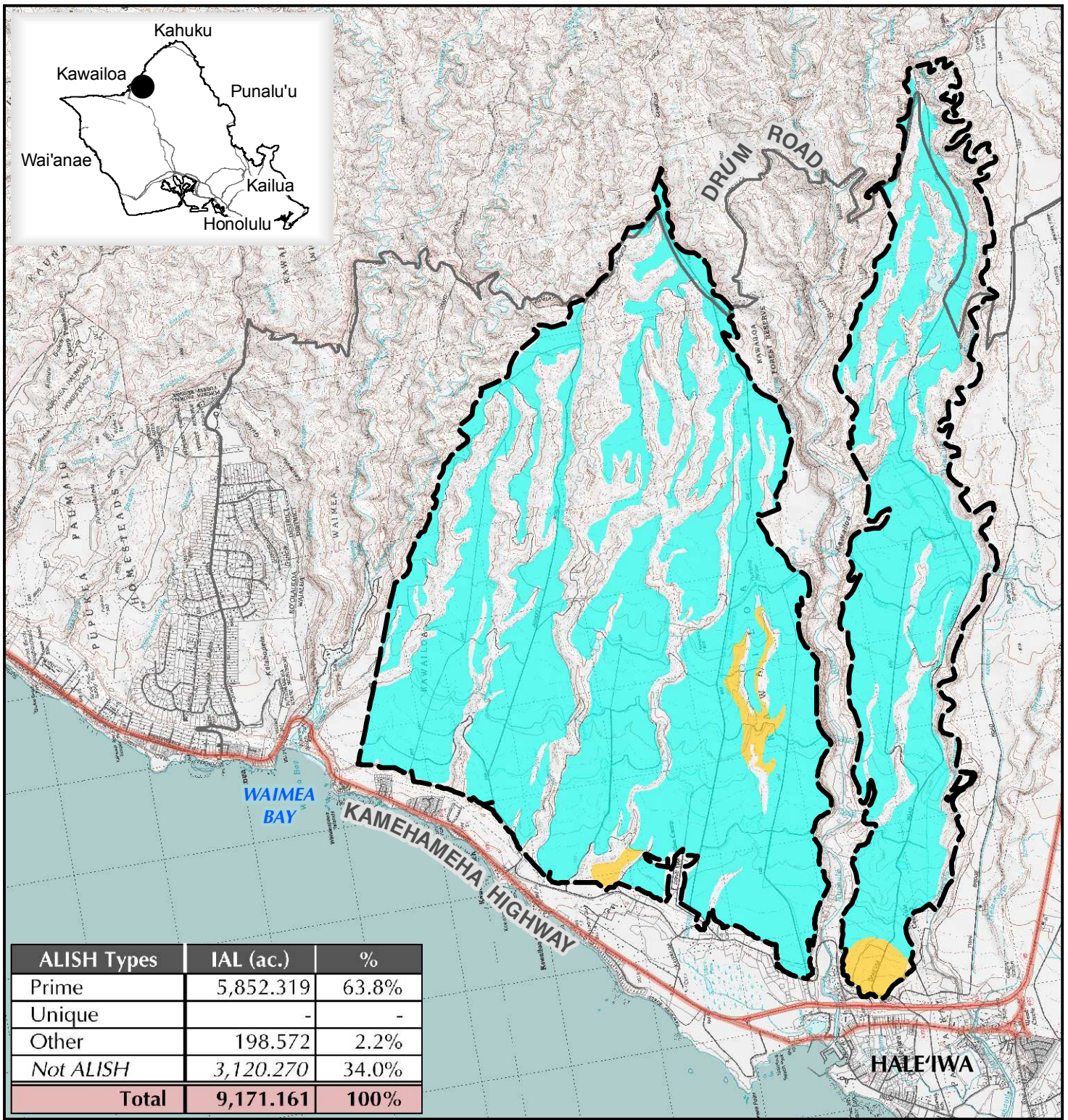
Solar Radiation

KS IAL O'AHU

North Linear Scale (feet)

0 750 1,500

Island of O'ahu



DATE: 12/12/2014

LEGEND

ALISH Types

- Prime ALISH
- Other ALISH
- Proposed IAL Designation

FIGURE 5A

Kawailoa

Agricultural Lands of Importance to the State of Hawai'i

KS IAL O'AHU

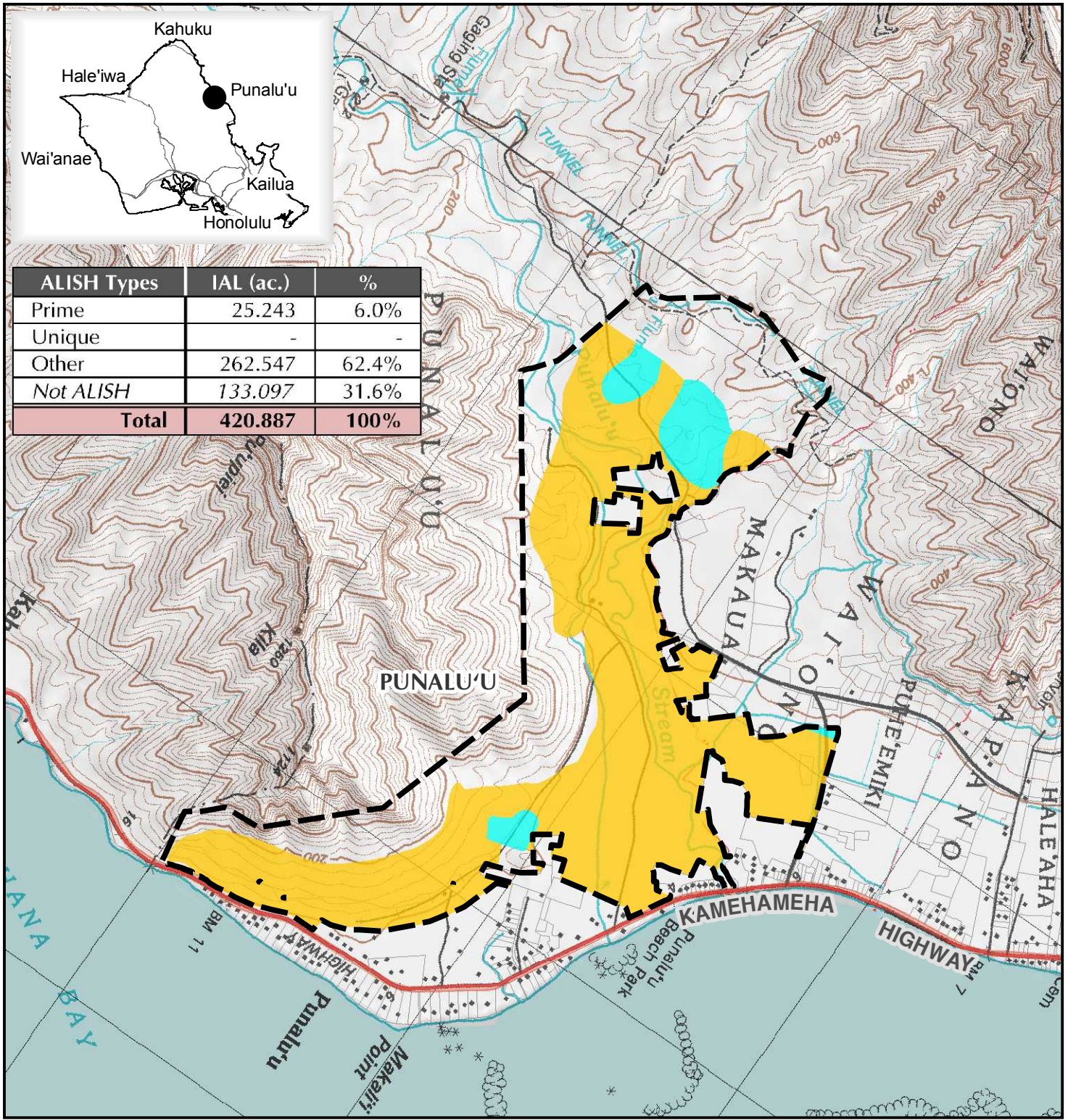
Island of O'ahu

North

Linear Scale (feet)

0 2,500 5,000

Source: Kamehameha Schools (2014), State Department of Agriculture (1977), U.S. Geological Survey
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ALISH Types	IAL (ac.)	%
Prime	25.243	6.0%
Unique	-	-
Other	262.547	62.4%
Not ALISH	133.097	31.6%
Total	420.887	100%

DATE: 12/11/2014

LEGEND

ALISH Types

- Prime ALISH
- Other ALISH

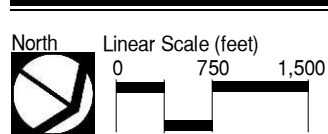
Proposed IAL Designation

FIGURE 5B

Punaluu

Agricultural Lands of Importance to the State of Hawai'i

KS IAL O'AHU



Island of O'ahu



As illustrated in Figure 5A, approximately 66.0% of the proposed IAL in Kawaihoa are classified in ALISH: 63.8% in Prime and 2.2% in Other. The balance of the proposed lands is not classified under ALISH but includes essential elements of the active agricultural operation, such as streams and drainage ways, water systems, and roadways.

In Punalu‘u (Figure 5B), approximately 68.4% of the proposed IAL are classified in ALISH: 6.0% in Prime and 62.4% in Other. The balance of the proposed lands is not classified under ALISH but most of the unclassified land is currently used for pasture and diversified agriculture.

The following table summarizes the ALISH classifications for the proposed IAL:

<i>ALISH Classifications</i>	<i>Kawaihoa</i>		<i>Punalu‘u</i>		<i>Total IAL</i>	
	<i>Acres</i>	<i>% of IAL</i>	<i>Acres</i>	<i>% of IAL</i>	<i>Acres</i>	<i>% of IAL</i>
Prime	5,852.319	63.8%	25.243	6.0%	5,877.562	61.3%
Unique	-	-	-	-	-	-
Other	198.572	2.2%	262.547	62.4%	461.119	4.8%
Not ALISH	3,120.270	34.0%	133.097	31.6%	3,253.367	33.9%
Totals:	9,171.161	95.6%	420.887	4.4%	9,592.048	100%

Agricultural Infrastructure and Water Resources

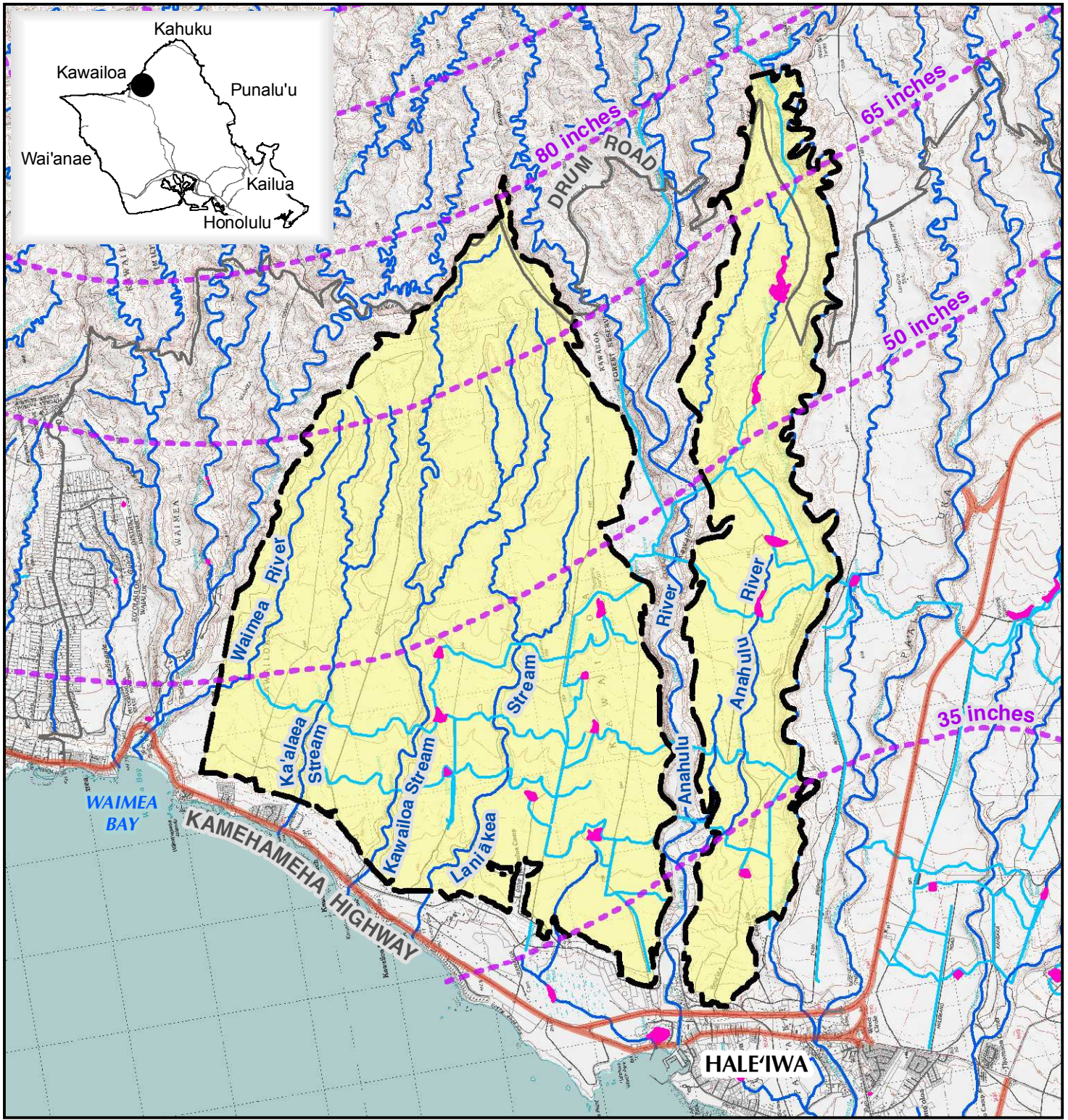
The proposed IAL in Kawaihoa and Punalu‘u have sufficient quantities of water and infrastructure to support viable agricultural production, as summarized below. In addition, Kamehameha Schools has made significant improvements to the agricultural infrastructure as noted.

Kawaihoa

As shown in Figure 6A, the proposed IAL in Kawaihoa are supported by the extensive irrigation system that was constructed by Castle & Cooke over a hundred years ago. The irrigation system interconnects Waimea River, Ka‘alaea Stream, Kawaihoa Stream, Laniākea Stream, and Anahulu River with ditches, pipelines and reservoirs. Nearly all the agricultural water can be distributed within the agricultural use areas. Kamehameha Schools has been restoring and repairing the operational but aging infrastructure in the past. Kamehameha Schools continues to make infrastructure improvements to the irrigation system and other agricultural facilities in order to support farmers and preserve the historically productive agricultural lands in Kawaihoa. In recent years, approximately \$13 million have been invested by Kamehameha Schools within Kawaihoa. The majority of this investment has been to improve the agricultural water sources and storage and distribution system to support existing and planned agricultural use. Along with the described water resources, the proposed IAL in Kawaihoa receive an average of 35 to 80 inches of rain annually.

Punalu‘u

Figure 6B shows that the proposed IAL in Punalu‘u are mainly irrigated by Punalu‘u Stream and ditches that are connected to the stream. Punalu‘u is one of three areas that Kamehameha



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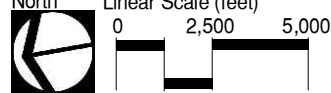

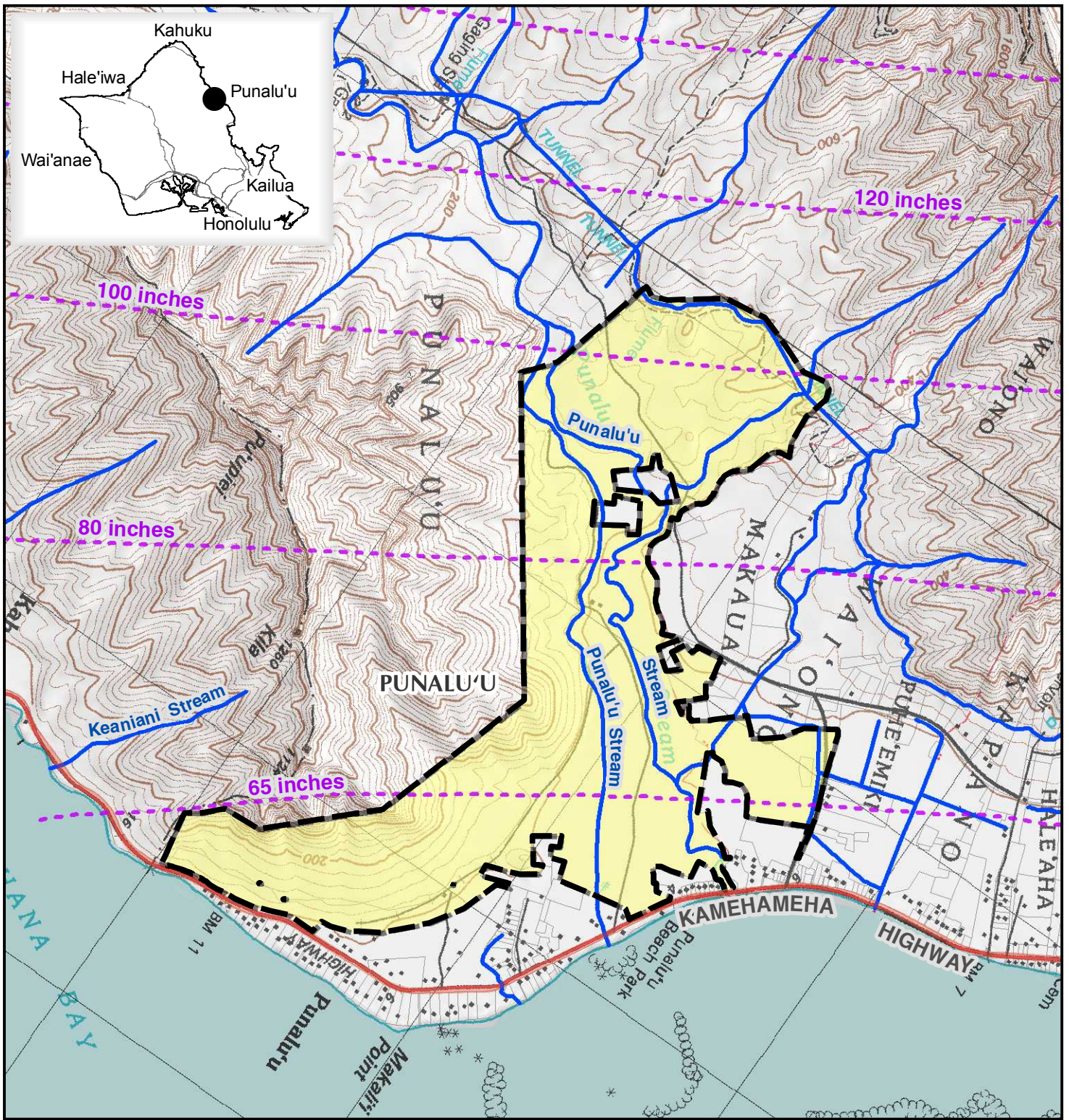
-  Proposed IAL Designation
-  Reservoirs / Ponds
-  Streams / Rivers
-  Ditches / Pipelines
-  Average Annual Rainfall (inch)

FIGURE 6A
Kawailoa
Agricultural Infrastructure and
Water Resources
KS IAL O'AHU

North Linear Scale (feet)

Island of O'ahu


Source: Kamehameha Schools (2013), National Hydrography Dataset (2012),
 Rainfall Atlas of Hawaii (2011), U.S. Geological Survey
 Disclaimer: This graphic has been prepared for general planning purposes only.



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-  Proposed IAL Designation
-  Streams / Rivers / Ditches
-  Average Annual Rainfall (inch)



FIGURE 6B
Punalu'u
Agricultural Infrastructure and
Water Resources

KS IAL O'AHU

North Island of O'ahu

Linear Scale (feet)

0 750 1,500

Source: Kamehameha Schools (2013), National Hydrography Dataset (2012),
 Rainfall Atlas of Hawaii (2011), U.S. Geological Survey
 Disclaimer: This graphic has been prepared for general planning purposes only.

Schools has prioritized for agriculture investment. Kamehameha Schools has already upgraded the existing water system by piping over 5,000 linear feet of the former Punalu‘u irrigation ditch. Kamehameha Schools is also in the process of adding 175 acres of farm lands and planning to construct storage for agricultural machinery, tools and equipment in the near future. From 2009 to 2014, approximately \$1.5 million have been invested by Kamehameha Schools in upgrading the agricultural irrigation water sources and distribution system within Punalu‘u. In addition to the above water resources, the proposed IAL in Punalu‘u receive an average of 65 to 120 inches of rain annually.

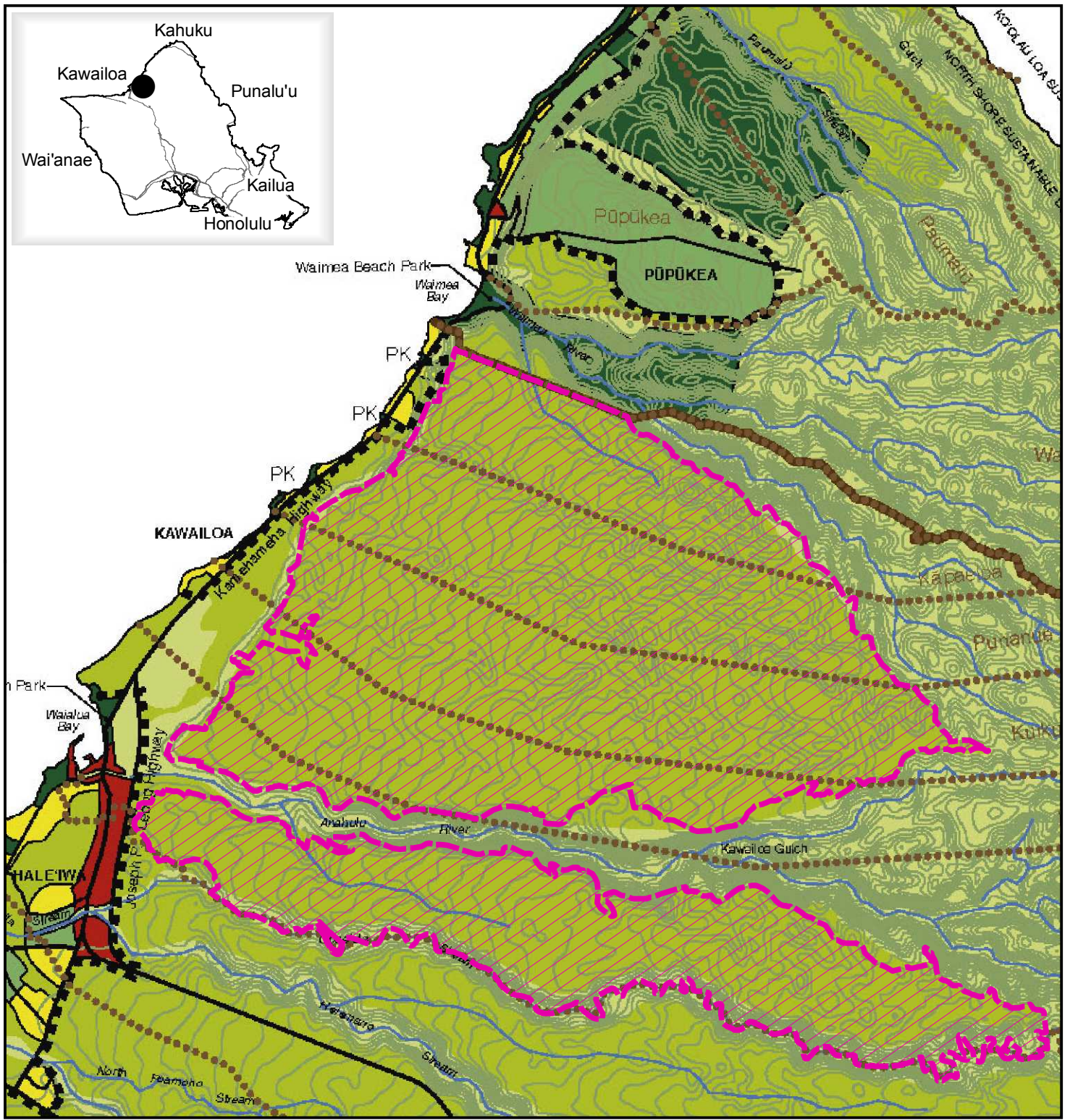
Kamehameha Schools is also undertaking significant stream restoration work for Punalu‘u Stream that involves approximately 87 acres. Kamehameha Schools plans to invest approximately \$5 million for stream restoration which is tentatively targeted for completion in 2017-2018. The stream restoration should result in the mitigation of flood impacts on riparian and coastal ecosystems, minimize disruptions to agricultural activities, enhance use of the stream for educational, community and cultural initiatives, install secondary feeder drainage ditches, and relocate the farm access road.

Sustainable Communities Plans

The Sustainable Communities Plans of the City and County of Honolulu are policy documents that are intended to guide the county’s land use approvals, infrastructure improvements, and private sector investment decisions for the enhancement and improvement of life on O‘ahu. The Island of O‘ahu is organized into eight regions. Kawaihoa is located in the North Shore region, and Punalu‘u is located in Ko‘olau Loa region. Both regions recognize and support the O‘ahu General Plan policy of sustaining their modest development patterns and rural character.

North Shore Sustainable Communities Plan was last updated in May 2011. According to the North Shore Sustainable Communities Plan Land Use Map, the Kawaihoa’s proposed IAL (Figure 7A) is mostly designated as Agriculture with some edges of gulches designated as Preservation.

Ko‘olau Loa Sustainable Communities Plan was last updated in October 1999, and the City and County of Honolulu is currently in the process of updating the plan. According to the existing 1999 Ko‘olau Loa Sustainable Communities Plan Land Use Map, Punalu‘u’s proposed IAL land (Figure 7B) is designated as Agricultural, except for the streams and the fringes of the streams, which are designated as Preservation.



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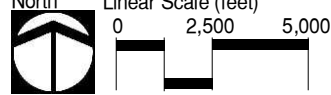

-  Proposed IAL Designation
-  Agriculture
-  Preservation
-  Country Town

FIGURE 7A
Kawailoa
North Shore Sustainable
Communities Plan Land Use Map
KS IAL O'AHU

North Island of O'ahu

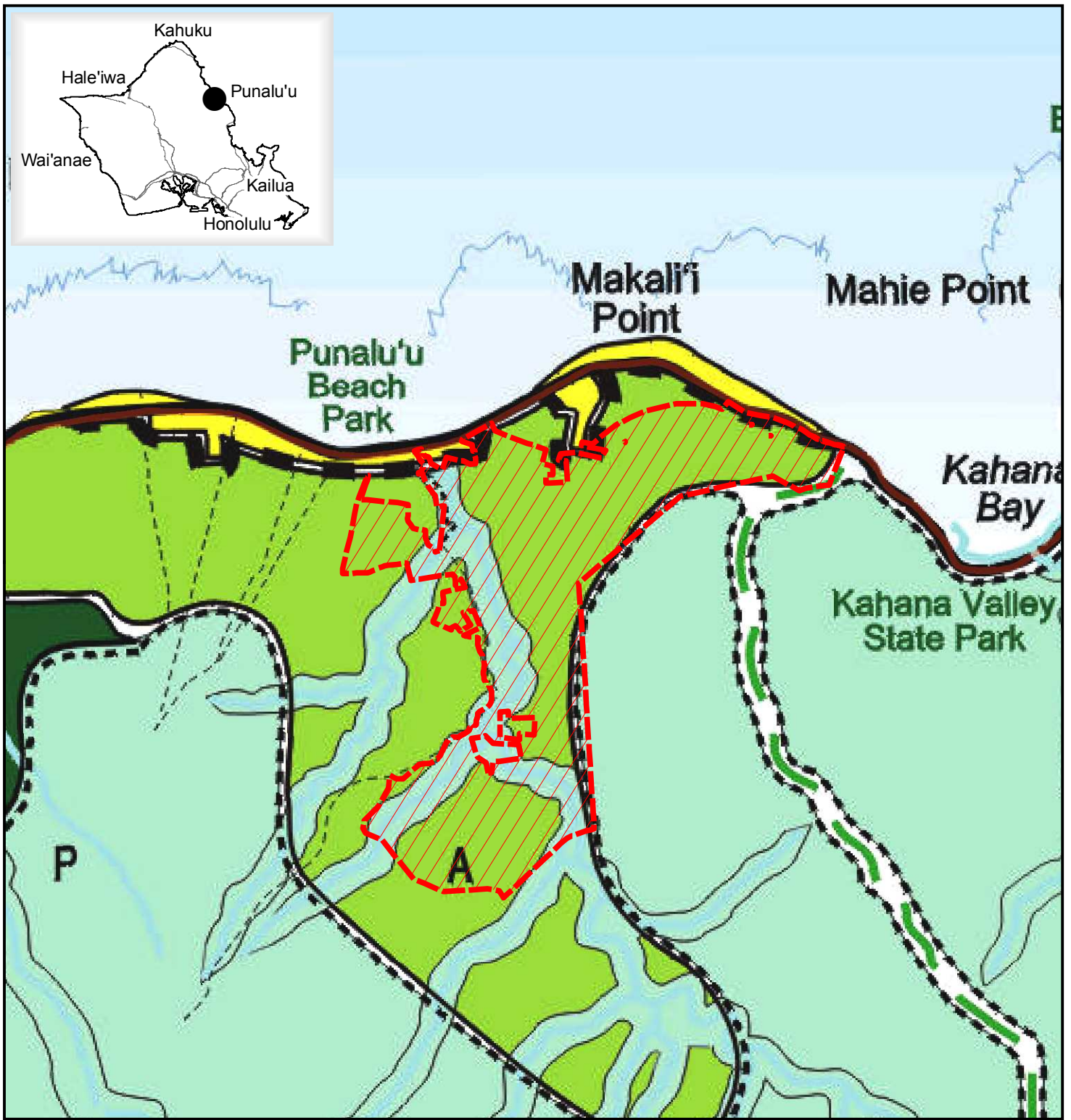
Linear Scale (feet)

0 2,500 5,000

Source: Kamehameha Schools (2013), City and County of Honolulu (2011)
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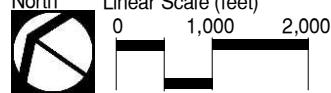

-  Proposed IAL Designation
-  Agricultural
-  Preservation
-  Rural Residential

FIGURE 7B
Punaluu
Ko'olau Loa Sustainable
Communities Plan Land Use Map
KS IAL O'AHU

North Linear Scale (feet)

Island of O'ahu


Source: Kamehameha Schools (2014), City and County of Honolulu (1999)
 Disclaimer: This graphic has been prepared for general planning purposes only.

State Land Use District Boundary Map

Referencing the 2014 State Land Use District Boundary prepared by State of Hawai‘i Land Use Commission, the proposed IAL lands are illustrated to show that all the proposed IAL lands in Kawaioloa and Punalu‘u are within the Agricultural District, as shown in Figure 8A and 8B. Where the proposed IAL lands are contiguous to the Conservation District boundary, the proposed IAL boundary follows the Conservation District boundary.

City and County of Honolulu Important Agricultural Lands Phase 1 Study

In July 2012, City and County of Honolulu (City) initiated its Important Agricultural Land Study to identify the City’s candidate lands for IAL designation. The study consists of two phases. Phase 1 was completed in April 2014.

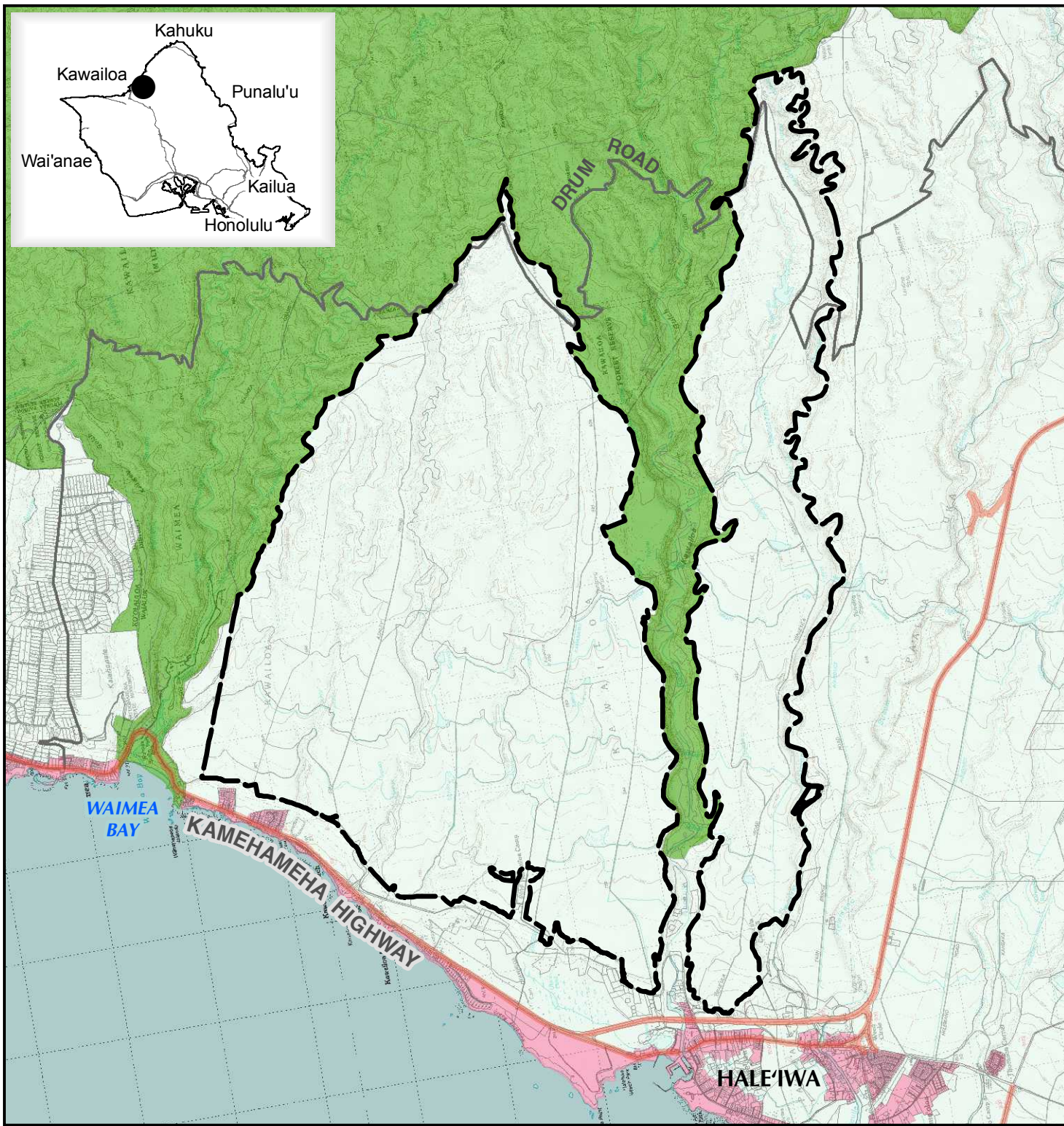
The Phase 1 tasks included defining the IAL site selection criteria, identifying available data sets to assist in mapping the defined criteria, and developing methodology for weighing or ranking the criteria. A formal public review and comment period and notification to affected land owners are not a part of the Phase 1 tasks. Although the City’s proposed IAL were not defined in the Phase 1 study, the City prepared a series of criteria maps and came up with two composite maps of the City’s top three and four priority criteria by utilizing geographic information system (GIS).

Figures 9A and 9B illustrate the consistency between the proposed IAL in Kawaioloa and Punalu‘u and the City’s priority criteria composite maps.

Kamehameha Schools proposes two IAL areas on O‘ahu; several areas in Kawaioloa comprising of approximately 9,171 acres and a contiguous area in Punalu‘u of approximately 421 acres. In Figure 9A, the City’s top three priority criteria composite map is illustrated with Kamehameha Schools’ proposed IAL lands. The City’s top three criteria are 1) currently used for agricultural production, 2) soil qualities and growing conditions, and 3) sufficient quantities of water to support viable agricultural production. The City organized all agricultural lands owned by the City and private parties on O‘ahu into three organized categories by the number of the overlapped criteria of the three.

In Figure 9B, the City’s top four priority criteria composite map is illustrated with Kamehameha Schools’ proposed IAL. In addition to the top three criteria described above, the City included one more criterion to the IAL site selection analysis, which is 4) agricultural productivity rating systems. Figure 9B shows that the same agricultural lands were broken into four categories by the number of the overlapped criteria of the four.

As illustrated in both Figures 9A and 9B, nearly all of Kamehameha Schools’ proposed IAL in Kawaioloa and Punalu‘u are highlighted on the City’s top three and four priority criteria composite maps as agricultural lands that meet one or more priority criteria. The City’s highest ranked agricultural lands that meet all three or four priority criteria in Kawaioloa and Punalu‘u are part of Kamehameha Schools’ proposed IAL.



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State Land Use Districts

- Agricultural
- Conservation
- Rural
- Urban

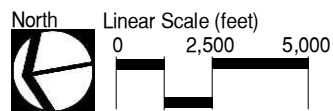
Proposed IAL Designation

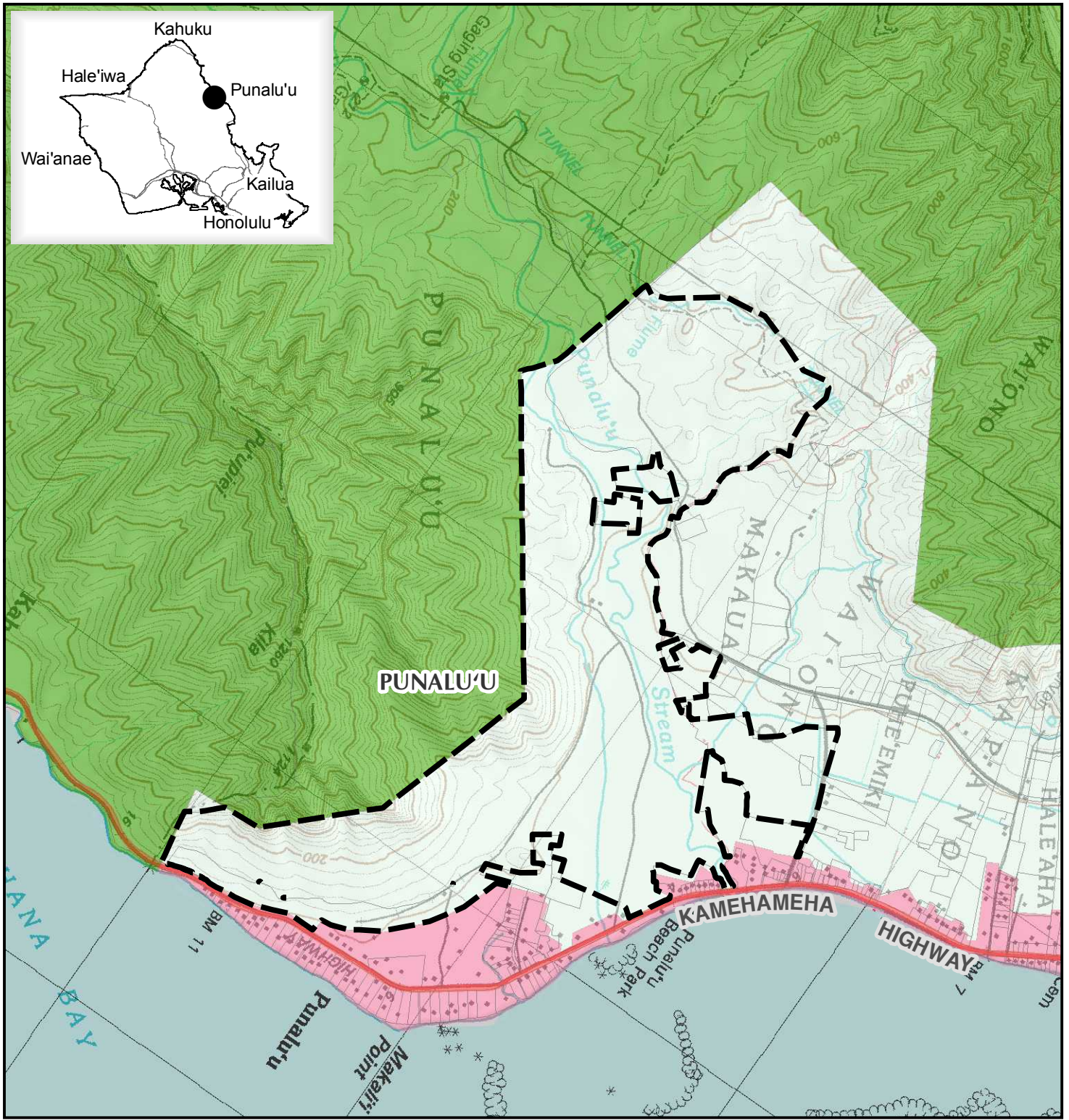
FIGURE 8A Kawailoa

State Land Use Districts

KS IAL O'AHU

Island of O'ahu





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State Land Use Districts

- Agricultural
- Conservation
- Rural
- Urban

Proposed IAL Designation

FIGURE 8B
Punaluu

State Land Use Districts

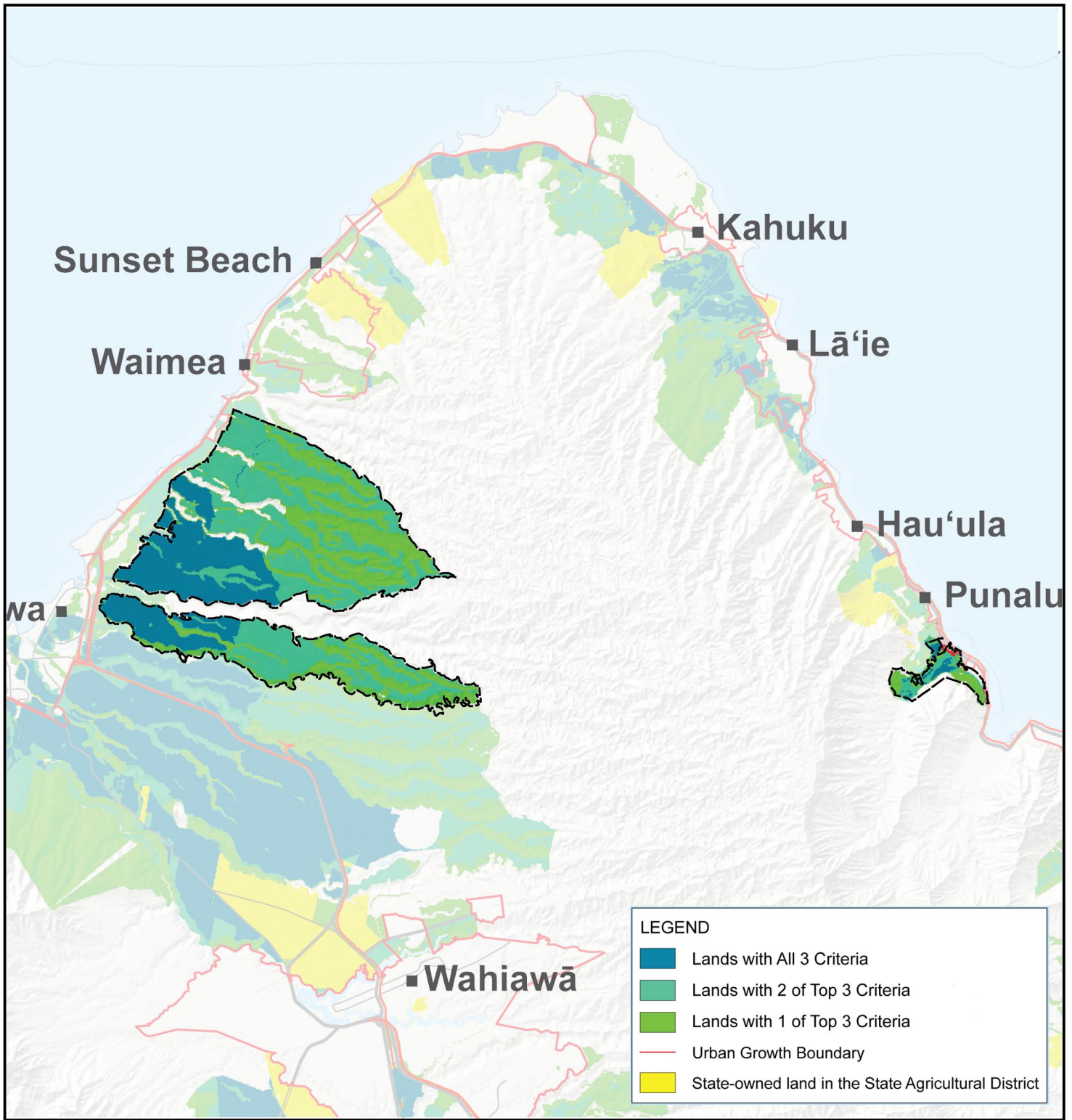
KS IAL O'AHU

North Linear Scale (feet)

0 750 1,500

Island of O'ahu

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Proposed IAL Designation

FIGURE 9A
Kawailoa and Punalu'u
City and County of Honolulu
Important Agricultural Lands with
Top Three Priority Criteria Overlay

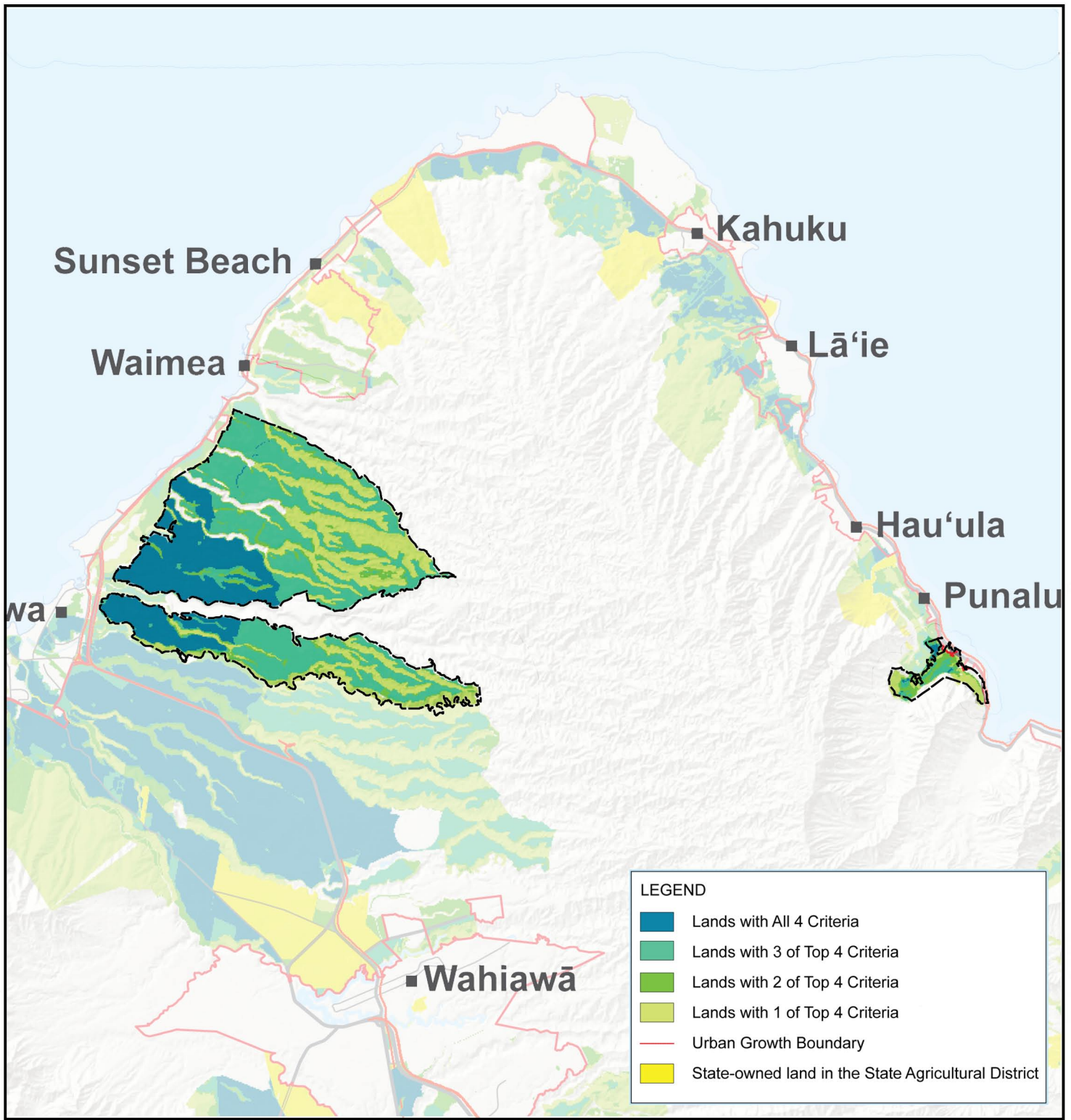
KS IAL O'AHU

North Linear Scale (feet)
 0 6,000 12,000

Island of O'ahu

Source: City and County of Honolulu (2014), Kamehameha Schools (2014)
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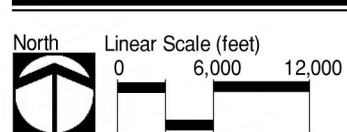
Proposed IAL Designation

FIGURE 9B

Kawailoa and Punalu'u

**City and County of Honolulu
Important Agricultural Lands with
Top Four Priority Criteria Overlay**

KS IAL O'AHU



Island of O'ahu



Source: City and County of Honolulu (2014), Kamehameha Schools (2014)
Disclaimer: This graphic has been prepared for general planning purposes only.

References

- City and County of Honolulu Department of Planning and Permitting. Web. *Development/Sustainable Communities Plan*. <http://dev.honoluluodpp.org/Planning/DevelopmentSustainableCommunitiesPlans.aspx>
- City and County of Honolulu Department of Planning and Permitting. 1999. Web. *Ko'olau Loa Sustainable Communities Plan*. <http://dev.honoluluodpp.org/Portals/0/pdfs/planning/Koolauloa/KoolauloaSCP.pdf>
- City and County of Honolulu Department of Planning and Permitting. 2011. Web. *North Shore Sustainable Communities Plan*. http://dev.honoluluodpp.org/Portals/0/pdfs/planning/NorthShore/NSSCP_May_2011.pdf
- City and County of Honolulu Department of Planning and Permitting. 2014. Web. *O'ahu Important Agricultural Lands Phase I Study*. <http://www.honoluluodpp.org/ProjectNews/tabid/77/aid/20/Default.aspx>
- Kamehameha Schools. Undated. Brochure. *Kamehameha Schools Strategic Agricultural Plan*.
- Kamehameha Schools. Undated. Brochure. *Moku O Waialua North Shore Plan. Pa'ala'a to Kāpaelo*.
- Kamehameha Schools. 2010. Brochure. *Punalu'u Ahupua'a Plan*.
- Kamehameha Schools. Undated. *Exhibit K: Kawaihoa, O'ahu*.
- Kamehameha Schools. Undated. *Exhibit L: Punalu'u - He'eia, O'ahu*.
- Kamehameha Schools. Undated. *North Shore, O'ahu - Current*.
- Kamehameha Schools. Undated. *North Shore, O'ahu – Current Chapter 3*.
- Kamehameha Schools. Undated. *Punalu'u, O'ahu - Current*.
- Kamehameha Schools. Undated. *Punalu'u, O'ahu – Current Chapter 3*.
- Wilcox, Carol. 1996. *Sugar Water: Hawaii's Plantation Ditches*. University of Hawai'i Press, Honolulu.