

**EXHIBIT D**

**AGRICULTURAL LAND ASSESSMENT**

**FOR**

**KUALOA RANCH, INC.**  
**PROPOSED IMPORTANT AGRICULTURAL LAND**

**ISLAND OF O‘AHU**

June 2018

Prepared for:  
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**Agricultural Land Assessment**  
**For**  
**Kualoa Ranch's**  
**Proposed Important Agricultural Land**  
**Island of O'ahu**

Prepared for:



Prepared by:



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**Agricultural Land Assessment for Kualoa Ranch's  
Proposed Important Agricultural Land**

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# **Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land**

## **1. Introduction/Purpose**

This Agricultural Lands Assessment: 1) is prepared in support of a Petition for Declaratory Order to Designate Important Agricultural Lands (IAL) for land on O‘ahu owned by Kualoa Ranch; and 2) provides an overview of various agricultural and other characteristics of the land that Kualoa Ranch proposes to designate as IAL.

### **Kualoa Ranch's Land and Proposed IAL Designation**

Kualoa Ranch owns approximately 3,782 acres of land on O‘ahu. Specifically, Kualoa Ranch's land is along the windward coast of O‘ahu, approximately ten miles north-northwest of Kāne‘ohe and 10 miles south-southeast of Lā‘ie. The land is within all or portions of three ahupua‘a: Kualoa, Hakipu‘u, and Ka‘a‘awa. Of Kualoa Ranch's total land, approximately: 2,302.5 acres are within the State Conservation District (Conservation District); 1,468.5 acres are within the State Agricultural District (Agricultural District); and 11 acres are within the State Urban District (Urban District).

Throughout this report the term:

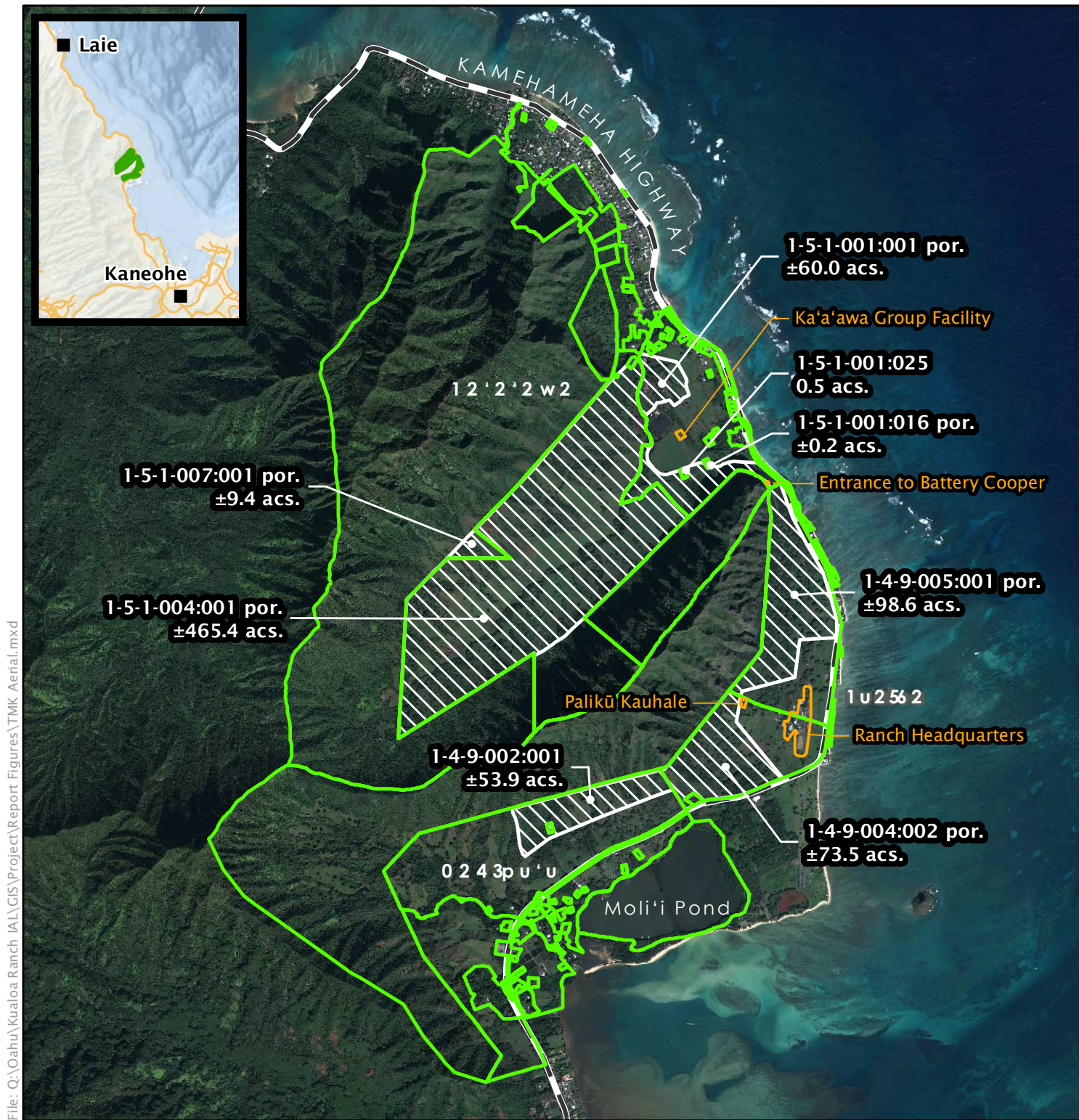
- “Kualoa Ranch” or “Ranch” refers to the entity that owns the land
- “Kualoa Ranch's Land” or “Land” refers to Kualoa Ranch's total land
- “Property” refers to the land Kualoa Ranch proposes to designate as IAL; all land proposed for IAL designation is within the Agricultural District
- “Remainder Land” refers to Kualoa Ranch's Land within the Agricultural District and Urban District that it is not proposing to designate as IAL.

Kualoa Ranch proposes to designate a majority (51.5 percent or 761.55 acres) of its combined Land in the Agricultural District and Urban District as IAL<sup>1</sup>; however, all the area proposed be designated as IAL is within the Agricultural District. The balance of the combined Land in the Agricultural District and Urban District (48.5 percent or 718 acres) (the Remainder Land) is not proposed to be designated as IAL. A large majority of the Land that Kualoa Ranch is proposing to designate as IAL is consistent with City and County of Honolulu (City) Department of Planning and Permitting's (DPP) proposed IAL designations for Kualoa Ranch's Land (see Section 12 and Figure 12 of this report for more information).

Figure 1 shows the TMK parcels and indicates the area of each parcel proposed to be designated IAL with hatch marks.

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<sup>1</sup> Section 205-49, Hawai‘i Revised Statutes, provides that a majority of a landowner's landholdings excludes lands held in the State Conservation District; therefore, the calculation of the percentage of land that Kualoa Ranch is proposing to designate IAL, compared to the percentage it is not proposing to designate IAL, is based on Kualoa Ranch's total Land in the Agricultural District and Urban District. Kualoa Ranch has no land in the Rural District.



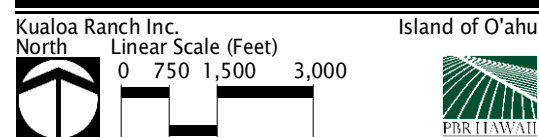
## LEGEND

- Kualoa Ranch's Land
- Proposed IAL ("Property")

Figure 1

TMK Parcels and Proposed IAL

## Kualoa Ranch IAL





## Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land

Table 1 (below) shows the Tax Map Key (TMK) number of each parcel of that Kualoa Ranch owns, the area of each parcel in the Conservation, Agricultural, and Urban districts, the area of each parcel proposed to be designated IAL, and the area of each parcel that is not proposed to be designated as IAL.

### Standards and Criteria to Identify IAL

Hawai'i Revised Statutes (HRS) §205-44(c) provides standards and criteria to identify IAL. HRS §205-44(a) provides that lands identified as IAL need not meet every standard and criteria, but rather, lands meeting any of the criteria 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: 1) the constitutionally mandated purposes in Article XI, Section 3, of the Hawai'i Constitution; and 2) the objective and policies for IAL set forth in HRS §205-42 and HRS §205-43.

The standards and criteria to identify IAL set forth in HRS §205-44(c) are:

- 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.*

The information in this assessment is provided to demonstrate that the Property is consistent with the standards and criteria to identify IAL as set forth in HRS §205-44(c).

**Table 1: TMKs and Proposed IAL Areas**

<b>Tax Map Key Parcel No.</b>	<b>Total Acres</b>	<b>Conservation District Acres</b>	<b>Agricultural District Acres</b>	<b>Urban District Acres</b>	<b>IAL Acres</b>	<b>Non-IAL Acres (Remainder Land)</b>
4-9-001:001	93.02	0.00	93.02	0.00		93.02
4-9-001:008	0.12	0.00	0.12	0.00		0.12
4-9-001:010	0.79	0.00	0.79	0.00		0.79
4-9-001:011	2.87	0.00	2.87	0.00		2.87
4-9-001:012	0.35	0.00	0.35	0.00		0.35
4-9-001:013	1.30	0.00	1.30	0.00		1.30
4-9-001:014	28.45	0.00	28.45	0.00		28.45



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<b>Tax Map Key Parcel No.</b>	<b>Total Acres</b>	<b>Conservation District Acres</b>	<b>Agricultural District Acres</b>	<b>Urban District Acres</b>	<b>IAL Acres</b>	<b>Non-IAL Acres (Remainder Land)</b>
4-9-001:018	5.39	0.00	5.39	0.00		5.39
4-9-001:019	0.10	0.00	0.10	0.00		0.10
4-9-001:029	0.19	0.00	0.194	0.00		0.19
4-9-001:031	0.25	0.00	0.25	0.00		0.25
4-9-001:032	0.74	0.00	0.74	0.00		0.74
4-9-002:001	240.04	0.00	240.04	0.00	53.92	186.12
4-9-002:002	0.50	0.00	0.50	0.00		0.50
4-9-002:003	0.15	0.00	0.15	0.00		0.15
4-9-002:005	0.20	0.00	0.20	0.00		0.20
4-9-003:001	58.40	0.00	58.40	0.00		58.40
4-9-003:005	0.75	0.00	0.75	0.00		0.75
4-9-003:012	0.25	0.00	0.25	0.00		0.25
4-9-003:013	0.32	0.00	0.32	0.00		0.32
4-9-003:014	0.03	0.00	0.03	0.00		0.03
4-9-003:015	0.25	0.00	0.25	0.00		0.25
4-9-003:016	0.50	0.00	0.50	0.00		0.50
4-9-003:020	0.20	0.00	0.20	0.00		0.20
4-9-003:027	0.38	0.00	0.38	0.00		0.38
4-9-003:032	1.95	0.00	1.95	0.00		1.95
4-9-003:043	124.10	101.92	22.19	0.00		22.19
4-9-003:045	0.50	0.00	0.50	0.00		0.50
4-9-004:002	117.48	0.00	117.48	0.00	73.48	44.00
4-9-004:009	1.58	0.00	1.58	0.00		1.58
4-9-005:001	149.45	7.92	141.53	0.00	98.63	42.90
4-9-006:001	737.50	727.95	9.55	0.00		9.55
4-9-007:005	0.06	0.00	0.00	0.06		0.06
4-9-007:006	0.19	0.00	0.00	0.19		0.19
4-9-007:007	0.35	0.00	0.00	0.35		0.35
4-9-007:009	0.24	0.00	0.00	0.24		0.24
4-9-007:010	0.11	0.00	0.00	0.11		0.11
4-9-007:011	0.11	0.00	0.00	0.11		0.11
4-9-007:012	0.12	0.00	0.00	0.12		0.12
4-9-007:013	0.12	0.00	0.00	0.12		0.12
4-9-007:014	0.12	0.00	0.00	0.12		0.12
4-9-007:015	0.09	0.00	0.00	0.09		0.09
4-9-007:016	0.10	0.00	0.00	0.10		0.10
4-9-007:017	0.01	0.00	0.00	0.01		0.01
4-9-007:019	0.02	0.00	0.00	0.02		0.02
4-9-007:020	0.18	0.00	0.00	0.18		0.18
4-9-007:021	0.28	0.00	0.00	0.28		0.28
4-9-007:022	0.15	0.00	0.00	0.15		0.15
4-9-007:023	0.21	0.00	0.00	0.21		0.21
4-9-007:024	0.13	0.00	0.00	0.13		0.13
4-9-007:026	0.80	0.00	0.00	0.80		0.80
4-9-007:027	0.18	0.00	0.00	0.18		0.18
4-9-007:028	0.24	0.00	0.00	0.24		0.24
4-9-008:014	0.16	0.00	0.00	0.16		0.16
4-9-009:006	0.12	0.00	0.00	0.12		0.12
4-9-009:007	0.76	0.00	0.00	0.76		0.76
4-9-009:008	0.12	0.00	0.00	0.12		0.12

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<b>Tax Map Key Parcel No.</b>	<b>Total Acres</b>	<b>Conservation District Acres</b>	<b>Agricultural District Acres</b>	<b>Urban District Acres</b>	<b>IAL Acres</b>	<b>Non-IAL Acres (Remainder Land)</b>
4-9-009:009	0.11	0.00	0.00	0.11		0.11
4-9-009:010	0.11	0.00	0.00	0.11		0.11
4-9-009:011	0.12	0.00	0.00	0.12		0.12
4-9-009:012	0.48	0.00	0.00	0.48		0.48
4-9-009:013	0.11	0.00	0.00	0.11		0.11
4-9-009:014	0.12	0.00	0.00	0.12		0.12
4-9-009:015	0.01	0.00	0.00	0.01		0.01
5-1-001:001	143.47	0.00	143.47	0.00	60.01	83.46
5-1-001:002	0.36	0.00	0.36	0.00		0.36
5-1-001:003	0.15	0.00	0.15	0.00		0.15
5-1-001:004	0.44	0.00	0.44	0.00		0.44
5-1-001:005	0.14	0.00	0.14	0.00		0.14
5-1-001:007	0.52	0.00	0.52	0.00		0.52
5-1-001:015	0.60	0.00	0.60	0.00		0.60
5-1-001:016	0.50	0.00	0.50	0.00	0.17	0.33
5-1-001:023	0.30	0.00	0.30	0.00		0.30
5-1-001:024	0.25	0.00	0.25	0.00		0.25
5-1-001:025	0.50	0.00	0.50	0.00	0.50	0.00
5-1-002:049	0.22	0.00	0.00	0.22		0.22
5-1-004:001	497.72	28.58	469.14	0.00	465.44	3.70
5-1-006:013	0.31	0.00	0.00	0.31		0.31
5-1-006:014	0.31	0.00	0.00	0.31		0.31
5-1-006:015	0.31	0.00	0.00	0.31		0.31
5-1-006:016	0.31	0.00	0.00	0.31		0.31
5-1-007:001	1,445.46	1416.77	28.58	0.11	9.40	19.29
5-1-007:002	34.66	0.83	33.83	0.00		33.83
5-1-007:003	18.96	18.72	0.24	0.00		0.24
5-1-008:002	49.68	0.00	49.68	0.00		49.68
5-1-008:004	3.80	0.00	3.80	0.00		3.80
5-1-008:005	0.50	0.00	0.50	0.00		0.50
5-1-008:006	3.38	0.00	3.38	0.00		3.38
5-1-008:007	1.84	0.00	1.84	0.00		1.84
5-1-010:030	0.04	0.00	0.00	0.04		0.04
5-1-010:031	0.02	0.00	0.00	0.02		0.02
5-1-011:013	0.29	0.00	0.00	0.29		0.29
5-1-011:043	0.31	0.00	0.00	0.31		0.31
5-1-011:044	0.30	0.00	0.00	0.30		0.30
5-1-012:001	0.10	0.00	0.00	0.10		0.10
5-1-013:003	0.37	0.00	0.00	0.37		0.37
5-1-013:004	0.34	0.00	0.00	0.34		0.34
5-1-013:005	0.32	0.00	0.00	0.32		0.32
5-1-013:006	0.31	0.00	0.00	0.31		0.31
5-1-013:009	0.26	0.00	0.00	0.26		0.26
5-1-014:042	0.52	0.00	0.00	0.52		0.52
5-1-014:048	0.02	0.00	0.00	0.02		0.02
<b>Total</b>	<b>3,782.01</b>	<b>±2,302.69</b>	<b>±1,468.53</b>	<b>±10.79</b>		
			<b>±1,479.32</b>		<b>±761.55</b>	<b>±717.77</b>
<b>Percentage of Total</b>			<b>100%</b>		<b>51.5%</b>	<b>48.5%</b>

## **Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land**

### **2. Agricultural Use History**

Kualoa Ranch's Lands have a long history of agricultural use. The Ranch is owned and operated by the decedents of Dr. Gerrit P. Judd, who purchased the initial portion of the Land (622 acres) from King Kamehameha III in 1850. This acquisition included ranching land and fishing rights and was followed by a significant expansion to the current 3,782 acres with the purchase of land from Queen Kalama in Hakipu'u Valley and Ka'a'awa Valley, portions of which were cultivated by Hawaiians for kalo (taro production).

For over 155 years, agriculture has served as the key component of the family-owned Kualoa Ranch. Sugarcane cultivation on the Land (including the Property) began in 1863, along with the establishment of O'ahu's first sugar mill, which operated until 1871. The short-lived sugarcane venture was followed by cattle ranching in the 1870s and pineapple cultivation in the early twentieth century. While pineapple is no longer cultivated, Kualoa Ranch continues to raise cattle and conduct other agricultural uses on the Property.

Diversified agriculture began in the 1970s with nurseries for tropical plants, fruit, vegetables, and flowering plants. Commercial aquaculture was also initiated and continues today with two modern aquaculture facilities where shrimp, prawns, catfish, and tilapia are raised. Aquaculture has been significant to the area dating back to the establishment of the Moli'i Fishpond by Hawaiians, and Kualoa Ranch continues aquaculture within the pond to this day.

### **3. Current and Future Agricultural Operations**

The Property comprises lands that either are currently in agricultural use or historically have been used for agricultural purposes. Current agricultural operations by Kualoa Ranch continue the heritage of agriculture with a mission to preserve the rural setting and promote land stewardship. The Ranch's agricultural operations comprise various agricultural uses ranging from livestock to diversified agriculture and aquaculture. The majority of the Property is devoted to pastures for the production of livestock (cattle). The Property also features aquaculture ponds, and areas for diversified food crops. In addition, the Ranch generates revenue to help sustain its agricultural operations through agricultural tourism and other activities consistent with HRS Section 205-2(d)(11).

Kualoa Ranch is one of the largest ranches on O'ahu with roughly 500 head of cattle raised on the Property and the Ranch. Livestock grazing on pasturelands comprises the majority of agricultural use on the Property (approximately 740 acres, or 97 percent of the Property), including large areas within the Hakipu'u, Kualoa, and Ka'a'awa ahupua'a. The Ranch exclusively raises grass-fed cattle and works with a local slaughterhouse and processing market to offer their beef to the public. The grazing pastures also support horses used for horseback agricultural tours of the Property.

Kualoa Ranch maintains diversified agriculture on the Property with roughly 18 acres devoted to food crops and ornamental plants and four acres for aquaculture ponds, representing 2.3 percent and 0.6 percent of the Property respectively. Crop production on the Property includes papaya,

## **Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land**

banana, taro, breadfruit, pineapple, sugar cane, coffee, jack fruit, macadamia nuts, cacao, and various ornamental plants. Food crop and ornamental plant production on the Property is conducted on land within the Ka'a'awa Valley committed to diversified agriculture. In addition, Kualoa Ranch operates modern aquaculture facilities on nearby ponds in the Ka'a'awa area of the Property. Aquaculture operations include six ponds for raising assorted fish and shellfish and currently Kualoa Ranch is raising and harvesting tilapia and fresh water prawns for sale to local markets.

The Table 2 below summarizes the agricultural uses on the Property:

**Table 2: Agricultural Uses**

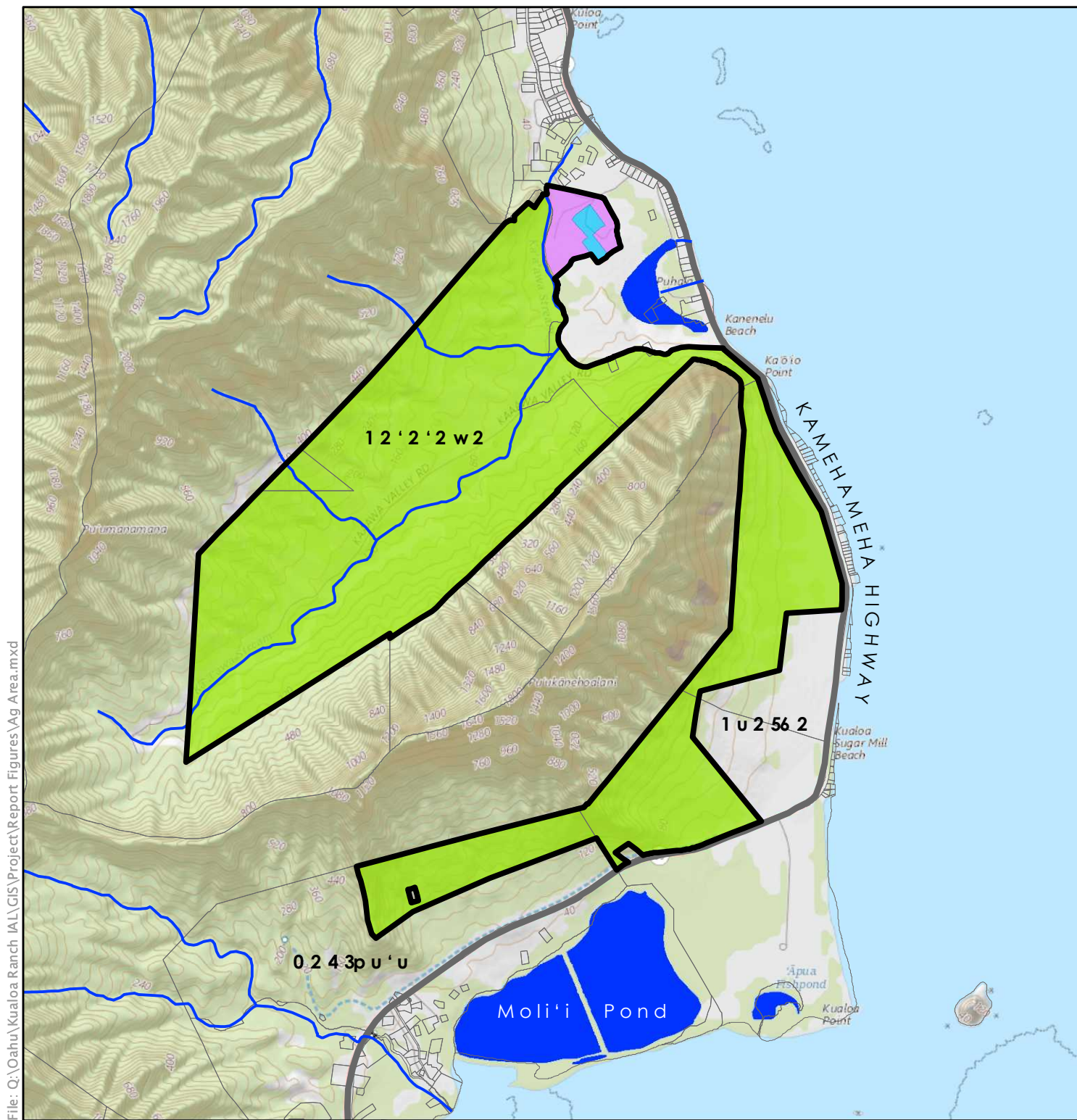
<b>Agricultural Use</b>	<b>Acres</b>	<b>Percent</b>
Diversified Agriculture	17.67	02.3%
Aquaculture	4.37	00.6%
Pasture	739.51	97.1%
<b>Total</b>	<b>761.55</b>	<b>100%</b>

Figure 2 shows the areas of the Property used for diversified agriculture crops, aquaculture ponds, and pastureland for livestock production. Figure 3 shows the Property topography and slopes. Table 3 summarizes the Property slopes; areas with relatively gentle grades are used for food crop production and aquaculture ponds; areas with relatively steeper grades are well-established pastures used for cattle ranching and horse grazing and are important parts of the overall Property for: 1) land stewardship, soil conservation, and cohesion and continuity of agricultural uses; and 2) maintaining a critical land mass important to overall agricultural operation productivity. Figure 3 also shows streams through or adjacent to the Property and in the area.

**Table 3: Slope Summary**

<b>Slope</b>	<b>Acres</b>	<b>Percent</b>
Less than 10%	180.29	23.7%
10%-20%	231.16	30.4%
20%-25%	95.35	12.5%
Greater than 25%	254.75	33.5%
<b>Total:</b>	<b>761.55</b>	<b>100%</b>

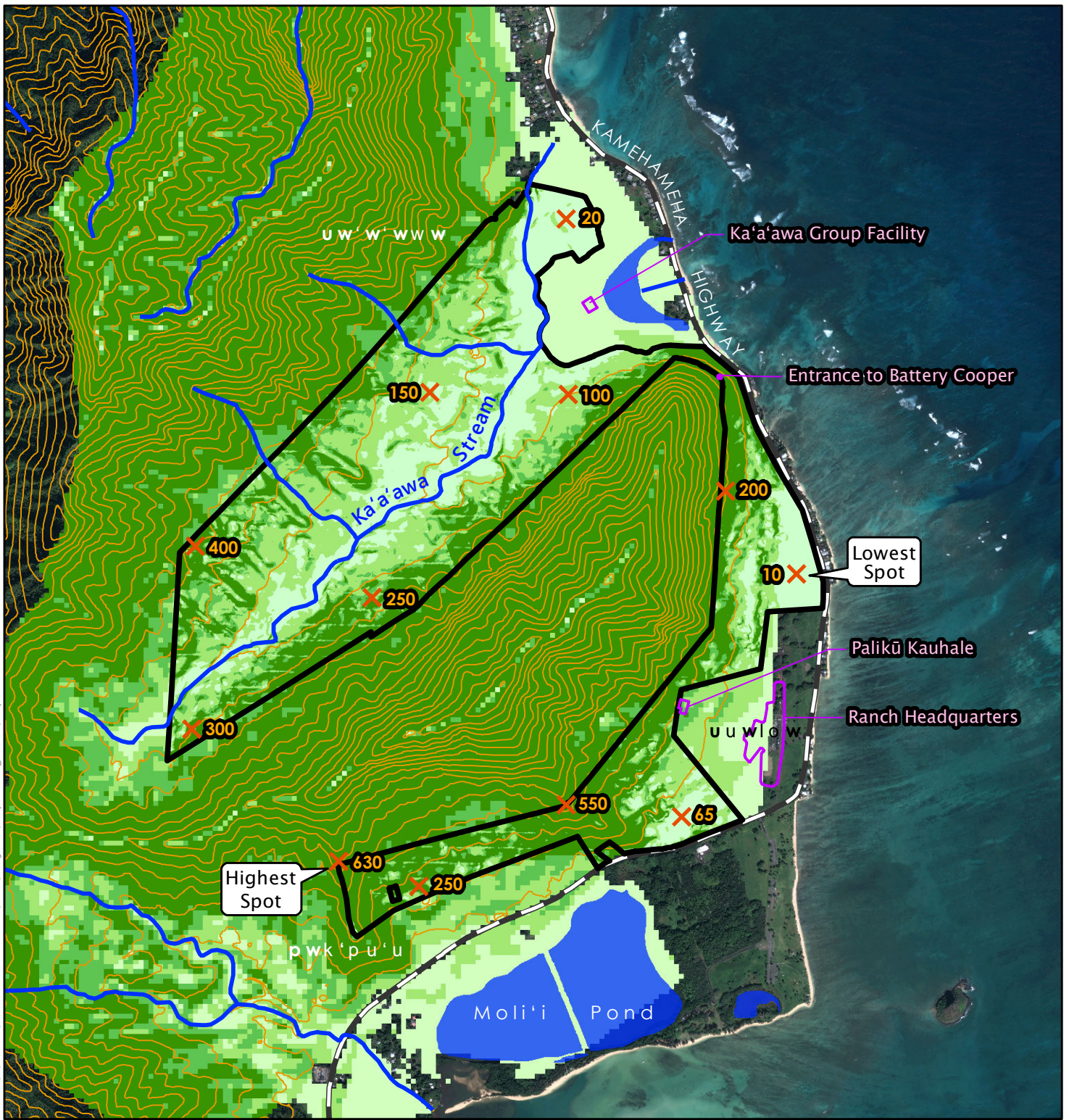
The land that Kualoa Ranch is not proposing to designate as IAL (the Remainder Land) is approximately 718 acres (48.5 percent of Kualoa Ranch's total land within the Agricultural District and Urban District). The Remainder Land within the Agricultural District contains the Ranch headquarters, offices, additional operation facilities, and agricultural uses. Kualoa intends to continue using its facilities in the Agricultural District within the Remainder Land for these uses and other uses consistent with Chapter 205, HRS. Kualoa Ranch is not seeking IAL designation for the portions of its Land in the Agricultural District and within the Remainder Land. The Remainder Land within the Urban District is not in agricultural use—it is subdivided into residential lots with homes on most of the lots.



Source: Kualoa Ranch Inc.. City & County of Honolulu. State of Hawaii. ESRI Basemap.  
Disclaimer: This graphic has been prepared for general planning purposes only.



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DATE: 6/28/2018

## LEGEND










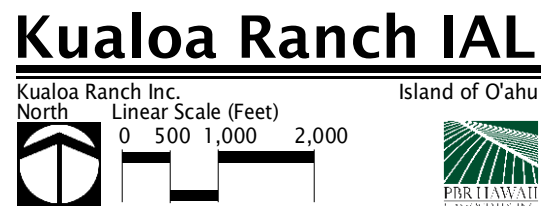
- |   |  |
|---|--|
|  Proposed IAL ("Property") |  Slope in Kualoa Ranch's Land |
|  Pond / Marsh              |  Less than 10%                |
|  Stream / Gulch            |  10 - 20%                     |
|  100-Ft Contours           |  20 - 25%                     |
|   |  Greater than 25%             |

Figure 3  
Topography and Streams



Source: NOAA (2005). City & County of Honolulu (2017). State of Hawaii (2008). USDA NRCS (2011).  
Disclaimer: This graphic has been prepared for general planning purposes only.

## **Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land**

### **4. Agricultural Soils Productivity Ratings**

The Detailed Land Classification System and Agricultural Land Productivity Ratings by the Land Study Bureau (LSB) (1972) are based on a five-class productivity rating system using the letters A, B, C, D, and E. The rating is based upon several environmental and physical qualities of the land such as soil condition, climate, surface relief, and drainage.

As shown on Figure 4 and summarized in Table 4, approximately 2.7 percent of the Property is rated B, 19 percent is rated C, 8.2 percent is rated D, and 70.1 percent is rated E (Land Study Bureau, 1972). According to the LSB, over 62 percent of the agricultural land on O‘ahu is rated E, so a high percentage of the Property being rated as E is generally consistent and proportional with the overall LSB E rating for O‘ahu agricultural land. In addition, the LSB states: “Farmers or ranchers are generally better informed than others regarding the agricultural quality of the lands they operate for the uses to which the lands are presently being put.” (Land Study Bureau, 1972). The Property historically has been used for agriculture and is presently productive for livestock production (cattle), diversified agriculture, aquaculture, and nurseries.

**Table 4: LSB Productivity Rating**

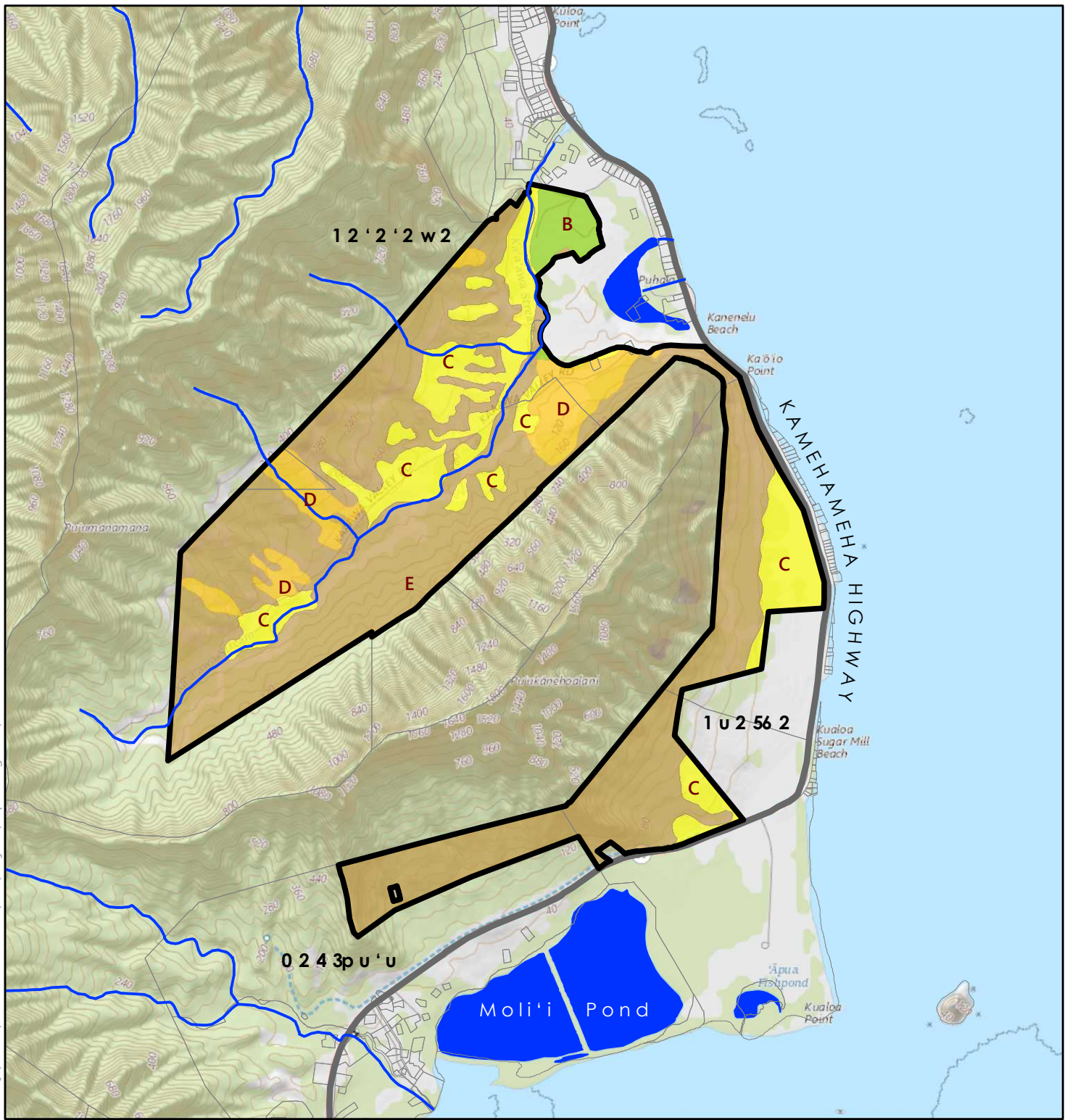
<b>Productivity Rating</b>	<b>Total IAL</b>	
	<b>Acres</b>	<b>% of IAL</b>
A	0.00	0%
B	20.17	2.7%
C	144.96	19.0%
D	62.40	8.2%
E	534.02	70.1%
<b>Total</b>	<b>761.55</b>	<b>100%</b>

### **5. 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 was developed in 1977 by the State Department of Agriculture (Hawai‘i State Department of Agriculture, 1977). The system was primarily, but not exclusively, based on the soil characteristics of lands and existing cultivation. There are three classes of land under the ALISH system: 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.





DATE: 3/20/2018

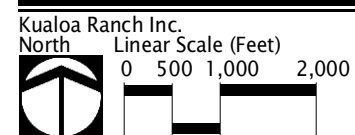
## LEGEND

	Proposed IAL		LSB Land Classification
	Pond / Marsh		A: Excellent
	Stream / Gulch		B: Good
			C: Fair
			D: Poor
			E: Very Poor
			Unclassified

Figure 4

Detailed Land Classification System (LSB)

## Kualoa Ranch IAL



Island of O'ahu



## Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land

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 (Hawai'i State Department of Agriculture, 1977).

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.

As shown on Figure 5 and summarized in Table 5, approximately 83.6 percent of the Property is classified under the ALISH system: 20.7 percent is classified as Prime and 62.9 percent is classified as Other.

**Table 5: ALISH Rating**

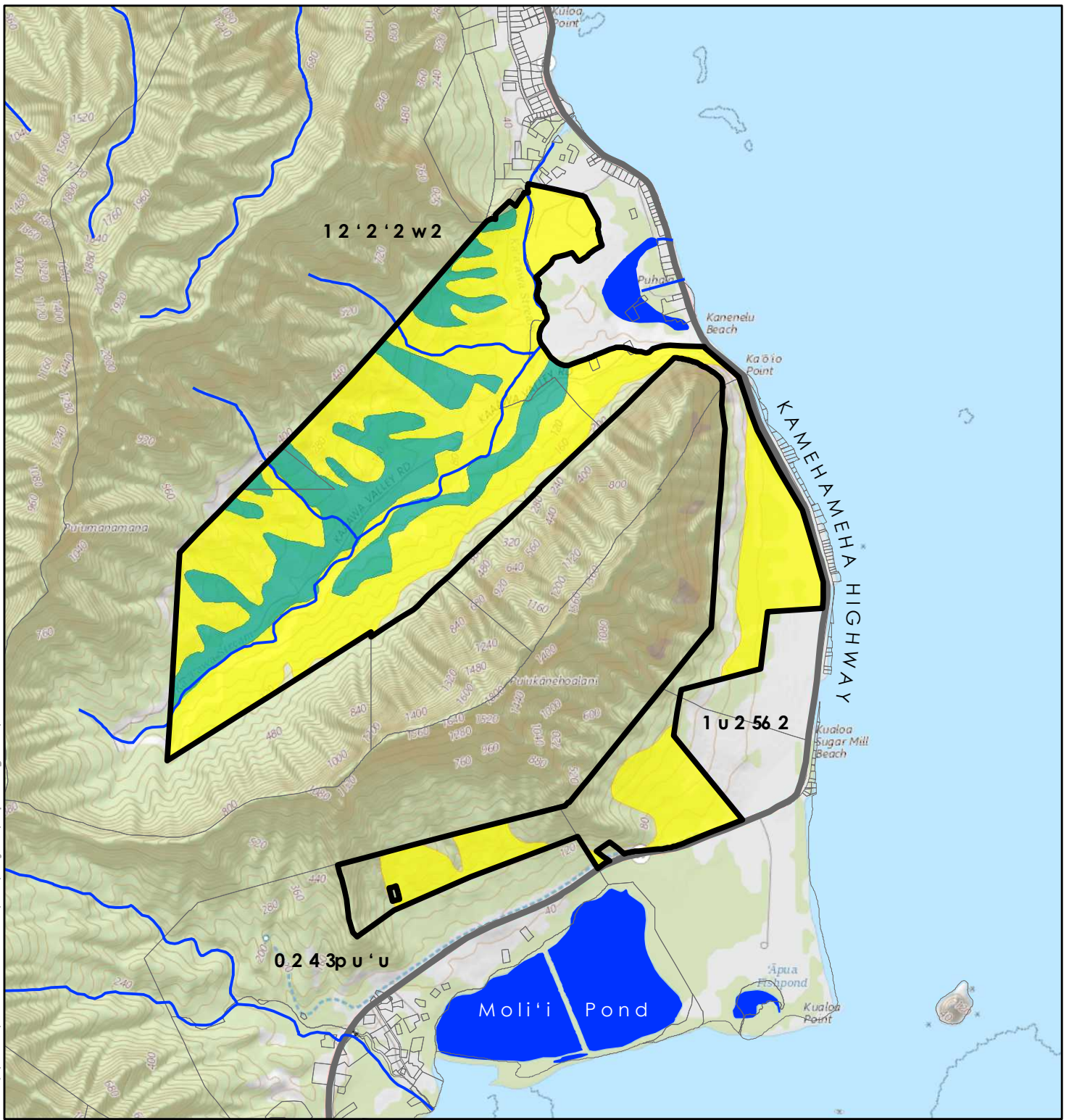
ALISH Classifications	Total IAL	
	Acres	% of IAL
Prime	157.41	20.7%
Unique	0.00	0.0%
Other	479.19	62.9%
Not ALISH	124.95	16.4%
<b>Total:</b>	<b>761.55</b>	<b>100%</b>

The balance of the Property is not classified under the ALISH system but: 1) is integral to overall use of the Property for agricultural operations and Kualoa Ranch's land stewardship; and 2) provides for a unified and defined IAL area to the edge of the Agricultural District boundary.

## 6. Solar Radiation

The Property receives sufficient solar radiation to support agricultural production. Mean annual solar radiation on the Property ranges from 196 to 163 watts per square meter per hour, based on information from the *Evapotranspiration of Hawai'i Final Report* prepared in February 2014 by Department of Geography, University of Hawai'i at Mānoa for U.S. Army Corps of Engineers Honolulu District and State of Hawai'i Commission on Water Resource Management (Giambelluca, et al., 2014). Figure 6 shows the solar radiation levels received on the Property in graphic form.





DATE: 3/20/2018

## LEGEND









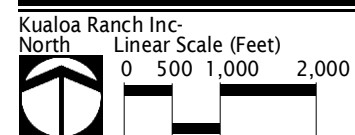
	Proposed IAL		ALISH
	Pond / Marsh		Prime ALISH
	Stream / Gulch		Unique ALISH
			Other ALISH
			Unclassified

Figure 5

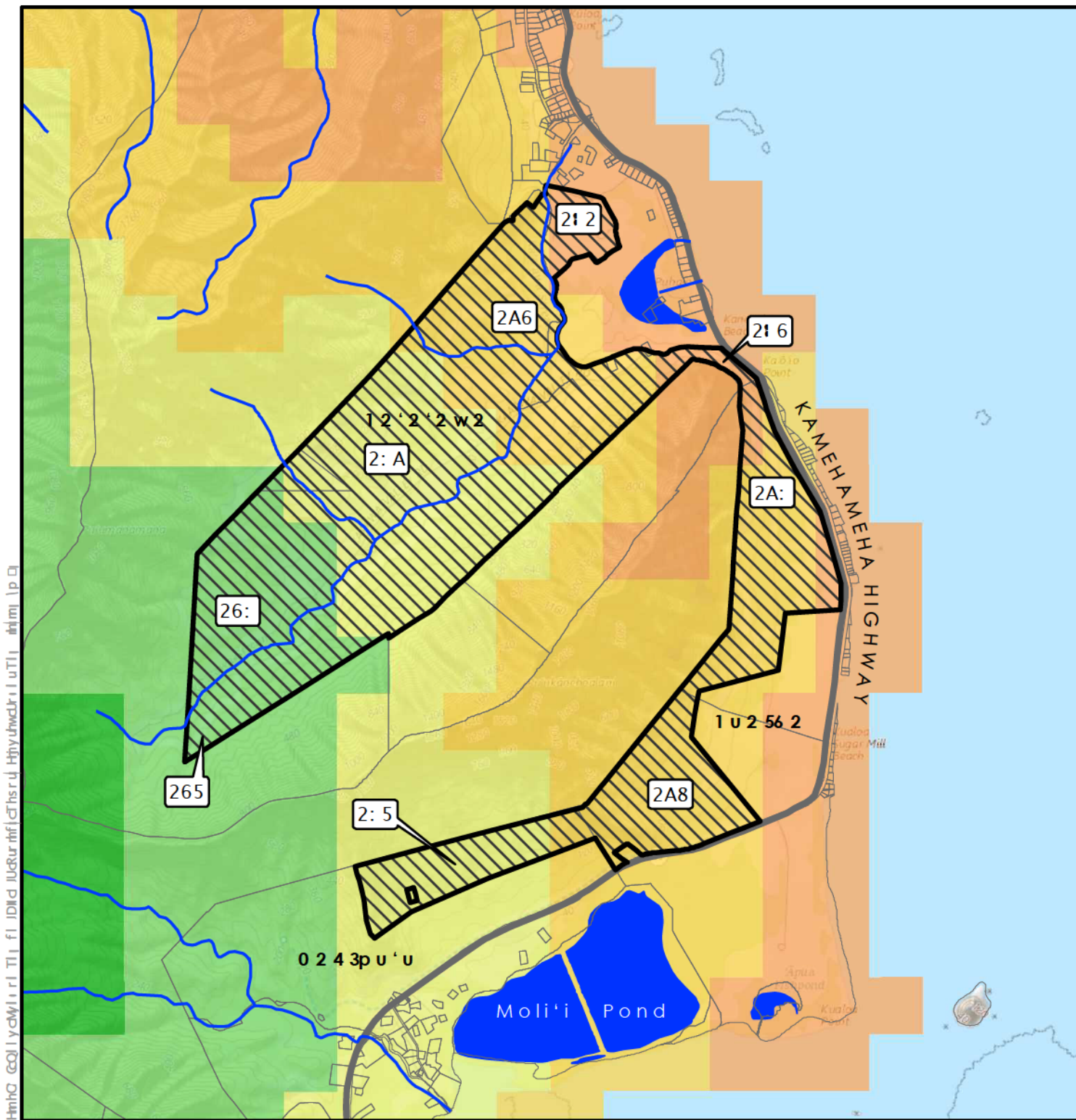
Agricultural Lands of Importance to the State of Hawai'i (ALISH)

## Kualoa Ranch IAL




Island of O'ahu





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Ohl | D | y | Ur | luTl | rh | m |  
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281- 261	2A1- 2: 1
261- 2: 1	2: 1- 311
2: 1- 2A1	311- 321

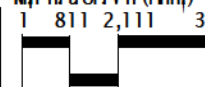
## Hjnyuh 6

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## Kualoa Ranch IAL

Myrdal Tidåll  
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UryufhCaq nwhuwi ri i i d i m d s r i u j w s n l m y ri i d i m d (3124) U i l h r i i d i m d n d d 3 r y q i d r i t r q n y o y l i m d n p h u o l n w i s l m i d w i h q s u s i u h i r u j h q h u o s d a q n j s y u s w h w a q i d l

## **Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land**

### **7. Water Resources and Agricultural Infrastructure**

The Property has sufficient quantities of water, water-related infrastructure, and other agricultural-related infrastructure to support viable agricultural production, as summarized below. Figure 7 shows the water resources and agricultural infrastructure on the Property.

#### **Water Resources**

The majority of current agricultural operations are serviced by potable water from the City and County of Honolulu Board of Water Supply (BWS). There are 30-inch and 6-inch BWS water mains that run parallel to the portion of the Property along Kamehameha Highway. The Property has access to BWS water via a water lateral and a 4-inch water line from the BWS 6-inch water main along Kamehameha Highway. Irrigation water for existing agricultural production within the Ka'a'awa Valley sites are supplied by BWS agricultural water meter.

Other portions of the Property are serviced by an existing on-site non-potable water system that draws water from Hakipu'u Stream in the Hakipu'u Valley, providing water for livestock raised in the valley. The non-potable water is collected and stored in a private water tank (6.5 feet tall and 20 feet in diameter, with a capacity of approximately 15,000 gallons) located on the Property mauka of the Ranch Headquarters (see Figure 7).

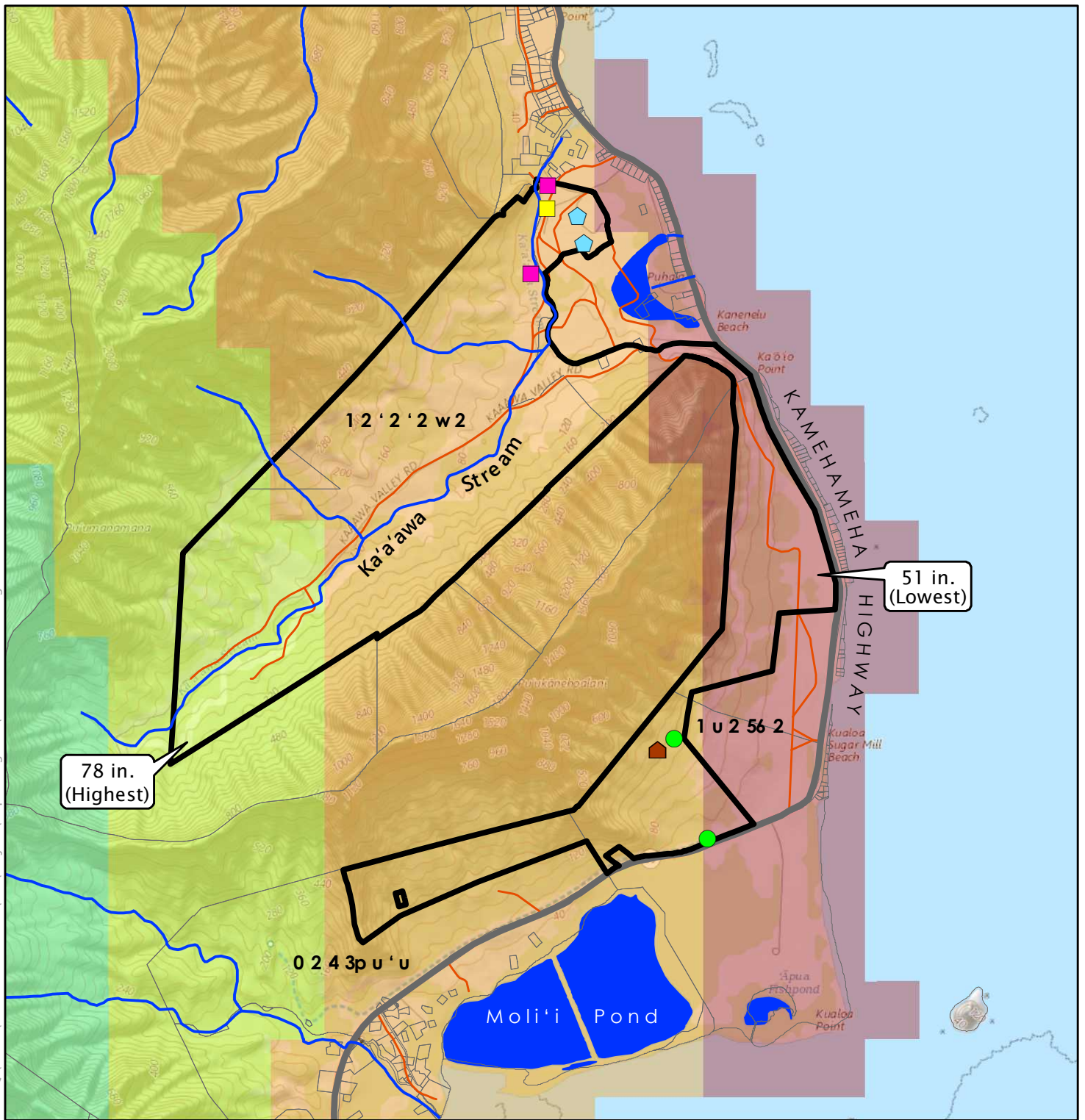
In Ka'a'awa Valley, there are two wells on the Property (see Figure 7): a drilled well currently used for existing aquaculture operations and an older alluvial well that, while not in current use, offers access to additional water resources. Kualoa Ranch also plans to drill a new well on the Property within Ka'a'awa Valley for future agricultural cultivation.

In addition to water from the BWS connections and on-site non-potable water system and wells, the Property receives a mean annual rainfall of approximately 51 to 78 inches annually, providing significant water resources (Giambelluca T. Q., 2013). Of note is that areas that receive the highest amounts of rainfall are in the portions of the Property not currently serviced by current irrigation systems.

#### **Agricultural Infrastructure**

In addition to the water resources infrastructure, the Property contains agricultural roads, and Kamehameha Highway is capable of supporting farming equipment and direct road transportation to/from markets. Figure 7 shows agricultural roads through the Property. The Property also has aquaculture ponds, a composting facility, fences, gates, berms, and windbreaks to improve agricultural productivity.





DATE: 3/20/2018

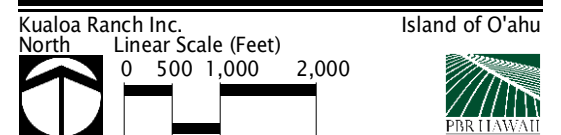
## LEGEND

- |                             |                     |
|-----------------------------|---------------------|
| Proposed IAL                | Aquaculture Pond    |
| Mean Annual Rainfall (Inch) | Well                |
| 40 - 55                     | Well (State owned)  |
| 55 - 70                     | Water Tank          |
| 70 - 85                     | Composting Facility |
| 85 - 100                    | Pond / Marsh        |
|                             | Stream / Gulch      |
|                             | Agricultural Road   |

Figure 7

Water Resources and  
Agricultural Infrastructure

## Kualoa Ranch IAL



## **Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land**

### **8. State Land Use District Boundaries**

The State Land Use Law (HRS Chapter 205) establishes the State Land Use Commission and authorizes this body to designate all lands in the State into one of four districts: Urban, Rural, Agricultural, and Conservation. Kualoa Ranch's land is located mostly within the Conservation District (61%) with approximately 39% of the total property within the State Agricultural District and State Urban District (Figure 8). HRS §205-2(d) specifies that lands within the State Agricultural district shall include (among other things): 1) activities or uses as characterized by the cultivation of crops; 2) farming activities or uses related to animal husbandry; 3) aquaculture; 4) agricultural tourism conducted on a working farm or a farming operation; and 5) open area recreational facilities. Current uses on the Property are consistent with these uses.

### **9. General Plan for the City and County of Honolulu**

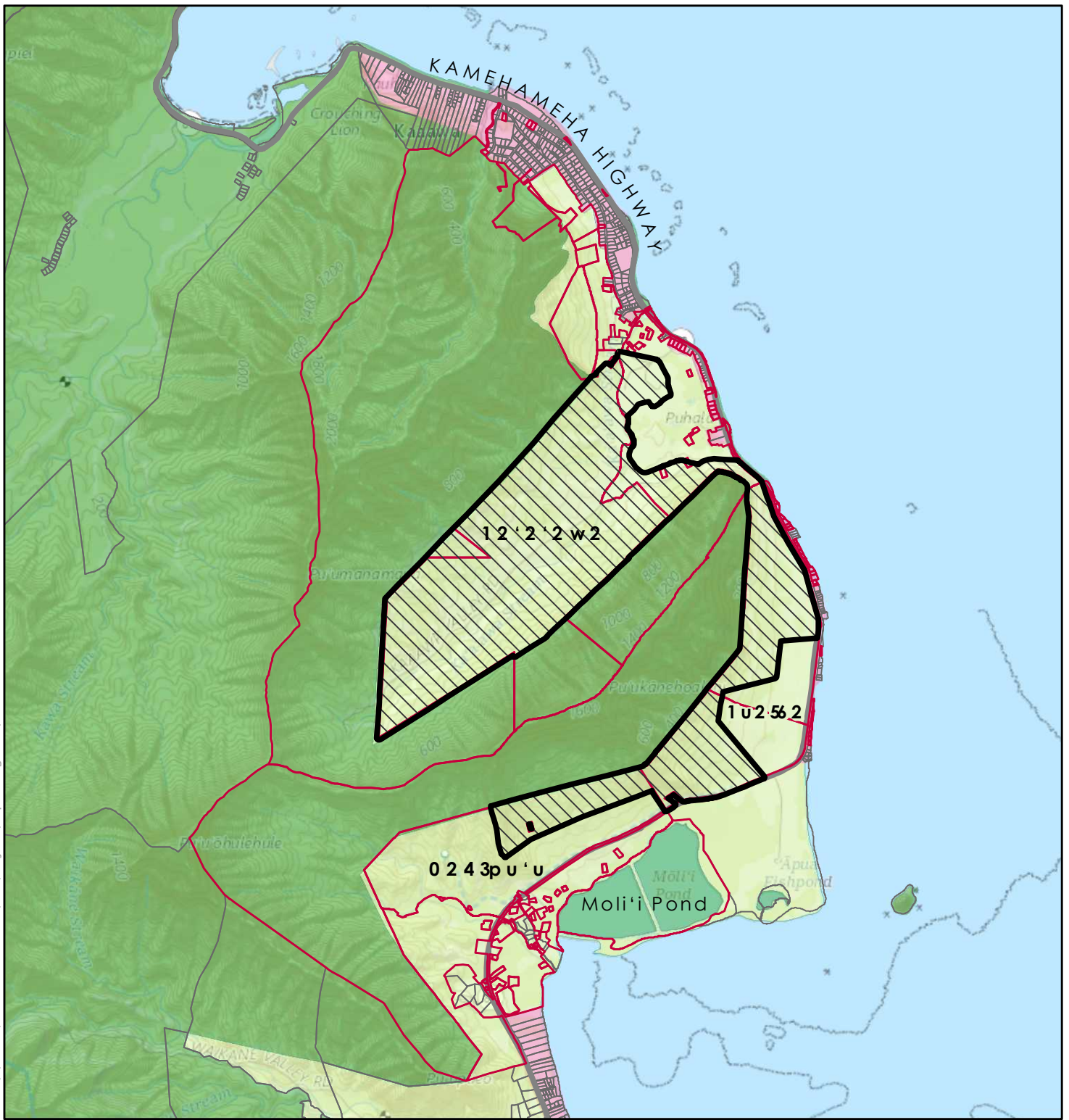
The General Plan for the City and County of Honolulu (2002) (General Plan) is a comprehensive statement of objectives and policies which sets forth the long-range aspirations of O'ahu's residents and the strategies of actions to achieve them. The General Plan includes 11 subject areas that provide the framework for the City's expression of public policy concerning the needs of the people and the functions of government.

Under the "Economic Activity" section of the General Plan is an objective and several policies to maintain the viability of agriculture on O'ahu. The designation of Property as IAL is consistent with this objective and these policies in that the designation of the land as IAL will: 1) contribute toward the continuation of agriculture as an important source of income and employment; 2) help to ensure sufficient agricultural land in Ko'olau Poko and Ko'olau Loa to encourage the continuation of agriculture in these areas; and 3) encourage more intensive use of productive agricultural land.

As of March 2018, the City is in the process of updating the General Plan. In December 2017, the City presented the updated draft of the General Plan (Proposed Revised General Plan) with anticipated transmittal to the Planning Commission and public hearing in March 2018. The Proposed Revised General Plan includes an objective and several policies to ensure the long-term viability and continued productivity of agriculture on O'ahu.

The designation of the Property as IAL is consistent with this objective and these policies in that the designation as IAL will: 1) help to ensure the continuation of agriculture as an important component of O'ahu's economy; 2) encourage active use of high quality agricultural land for agricultural purposes; 3) permanently preserve agricultural land with high productivity potential for agricultural production; 4) contribute toward lessening the urbanization of high-value agricultural land located outside the City's growth boundaries; 5) encourage investment to improve and expand agricultural infrastructure, such as irrigation systems, agricultural processing centers, and distribution networks.





DATE: 5/21/2018

## LEGEND






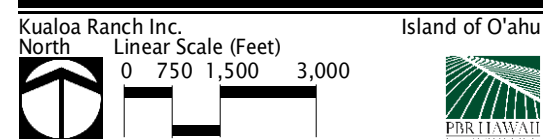
	Proposed IAL		State Land Use District
	Kualoa Ranch's Land		Agricultural
			Conservation
			Urban

Figure 8

State Land Use Districts

## Kualoa Ranch IAL



## **Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land**

### **10. City and County of Honolulu: Ko'olau Poko Sustainable Communities Plan and Ko'olau Loa Sustainable Communities Plan**

The City and County of Honolulu's Sustainable Communities Plans are policy documents that are intended to guide the City'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. The Property is split almost evenly between two regions with most land within the Ko'olau Loa Sustainable Communities Plan (Ko'olau Loa SCP) region, and a slightly smaller portion in the Ko'olau Poko Sustainable Communities Plan (Ko'olau Poko SCP) region.

The Ko'olau Poko SCP (2017) includes maps for various designations within the Ko'olau Poko SCP region. All the Ko'olau Poko SCP maps designate the Property within the Ko'olau Poko SCP region as "Agricultural Areas." Similarly, the Ko'olau Loa SCP (1999) also contains maps, and all the Ko'olau Loa SCP maps designate the Property within the Ko'olau Loa SCP region as "Agricultural." Additionally, all the Ko'olau Poko SCP and the Ko'olau Loa SCP maps show growth boundaries<sup>2</sup>. The Property is outside the growth boundaries as shown on all the Ko'olau Poko SCP and Ko'olau Loa SCP maps. Figure 9 shows the Ko'olau Poko SCP (2017) and Ko'olau Loa SCP (1999) land use maps combined to illustrate land use designation across the Property.

The City is currently in the process of updating the Ko'olau Loa SCP (Pre-Final Revised Ko'olau Loa SCP) (2012). The maps outlined in the Pre-Final Revised Ko'olau Loa SCP (2012) designate the area of the Property within the Ko'olau Loa SCP region as "Agriculture." Also, the Property is outside of growth boundaries, consistent with the previously adopted Ko'olau Loa SCP (1999). Figure 10 shows the Pre-Final Revised Ko'olau Loa SCP (2012) and Ko'olau Loa SCP (1999) land use maps combined.

In addition to maps, the Ko'olau Poko SCP (2017), the Ko'olau Loa SCP (1999), and Pre-Final Revised Ko'olau Loa SCP (2012) include objectives and policies to preserve the rural character of the regions by retaining agricultural lands identified as "prime," "unique," "arable," or "high-value for future agricultural use."

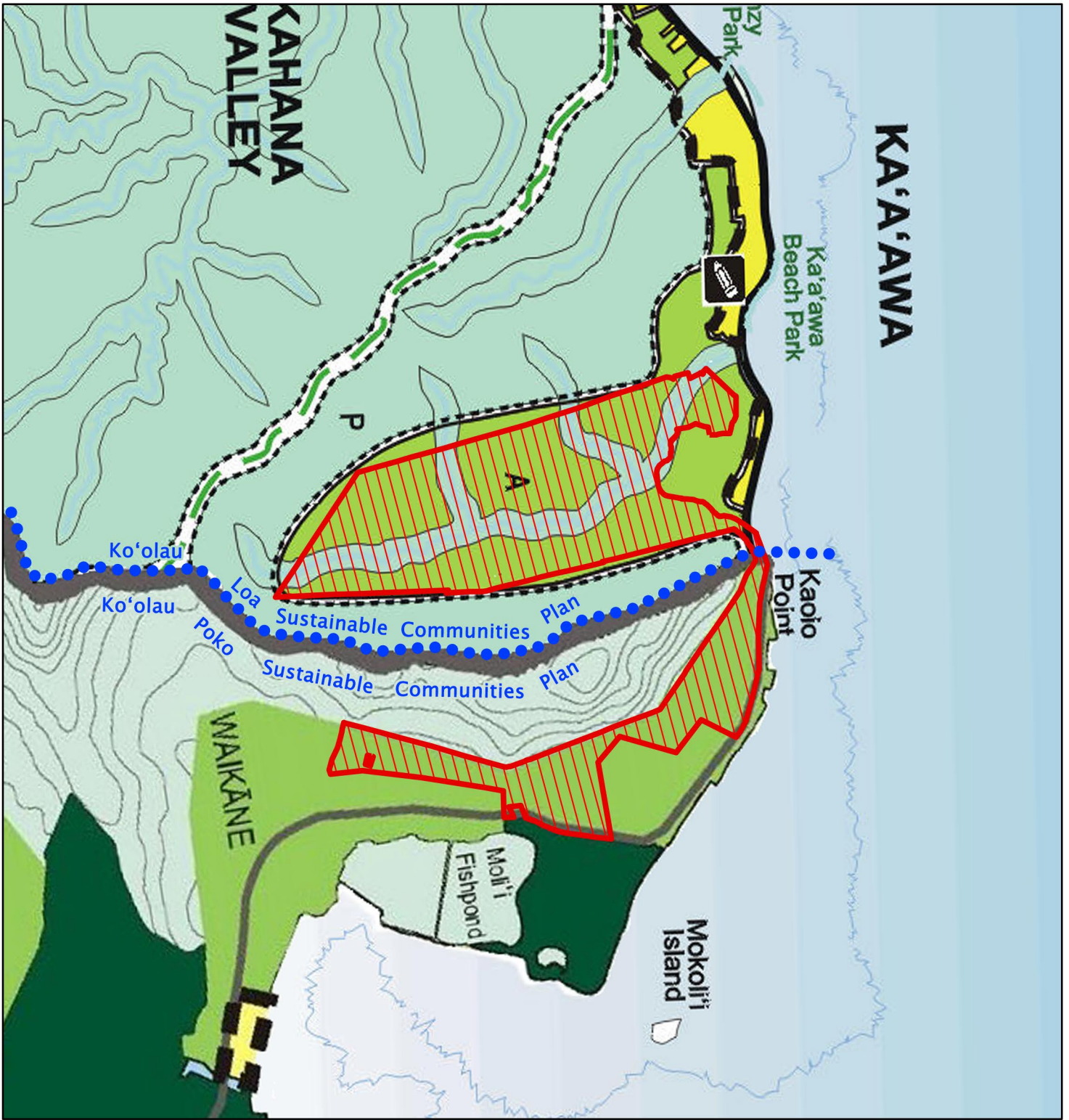
### **11. City and County of Honolulu Zoning**

The City and County of Honolulu zoning of the Property is AG-2, Restricted Agricultural District (AG-2) (Figure 11). According to the Revised Ordinances of Honolulu (ROH) §21-3.50(d), the intent of the AG-2 District is to "conserve and protect agricultural activities on smaller parcels of land." Current uses on the Property are consistent with this intent.

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<sup>2</sup> The Ko'olau Poko SCP maps refer to a "Community Growth Boundary" and the Ko'olau Loa SCP maps refer to a "Rural Community Boundary."





DATE: 3/20/2018

## LEGEND













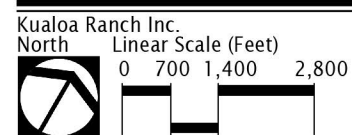
-  Proposed IAL
- Ko'olau Poko SCP (2017)**
  -  Agricultural Areas
  -  Preservation Areas
  -  Parks
  -  Low Density Residential
  -  Community Growth Boundary
- Ko'olau Loa SCP (1999)**
  -  Agricultural
  -  Preservation
  -  Rural Residential
  -  Preservation Boundary
  -  Ahupua'a Boundary
  -  Elementary School

Figure 9

Ko'olau Poko Sustainable Communities Plan (2017) and Ko'olau Loa Sustainable Communities Plan (1999)

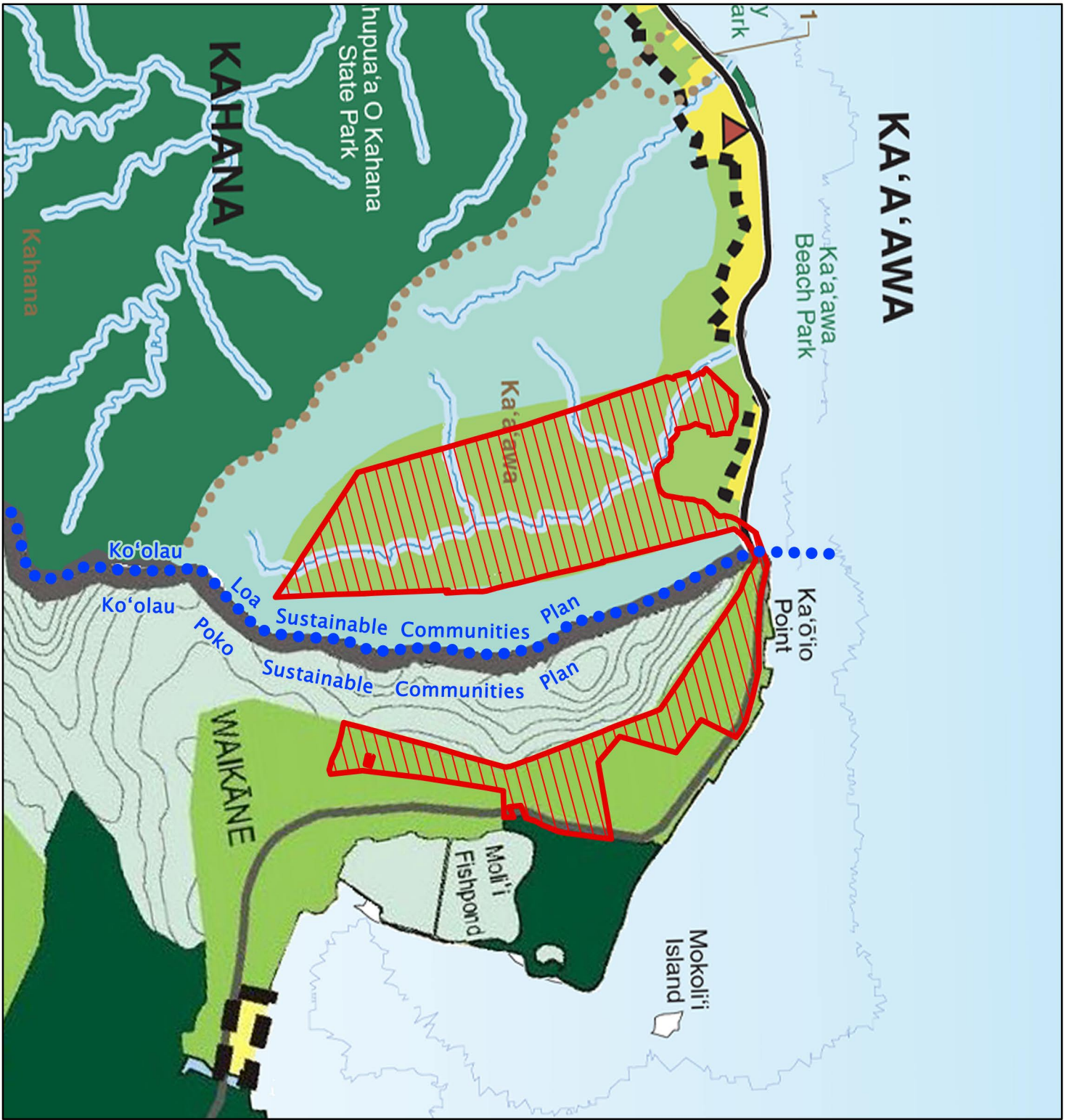
## Kualoa Ranch IAL



Island of O'ahu







DATE: 3/20/2018

## LEGEND














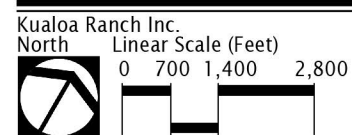
- |  |   |
|--|---|
|  Proposed IAL                               |  Ko'olau Loa SCP (2012)    |
|  Ko'olau Poko SCP (2017) Agricultural Areas |  Agriculture               |
|  Preservation Areas                         |  Preservation              |
|  Parks                                      |  Parks                     |
|  Low Density Residential                    |  Rural Residential         |
|  Community Growth Boundary                  |  Community Growth Boundary |
|  |  Ahupua'a Boundary         |

Figure 10

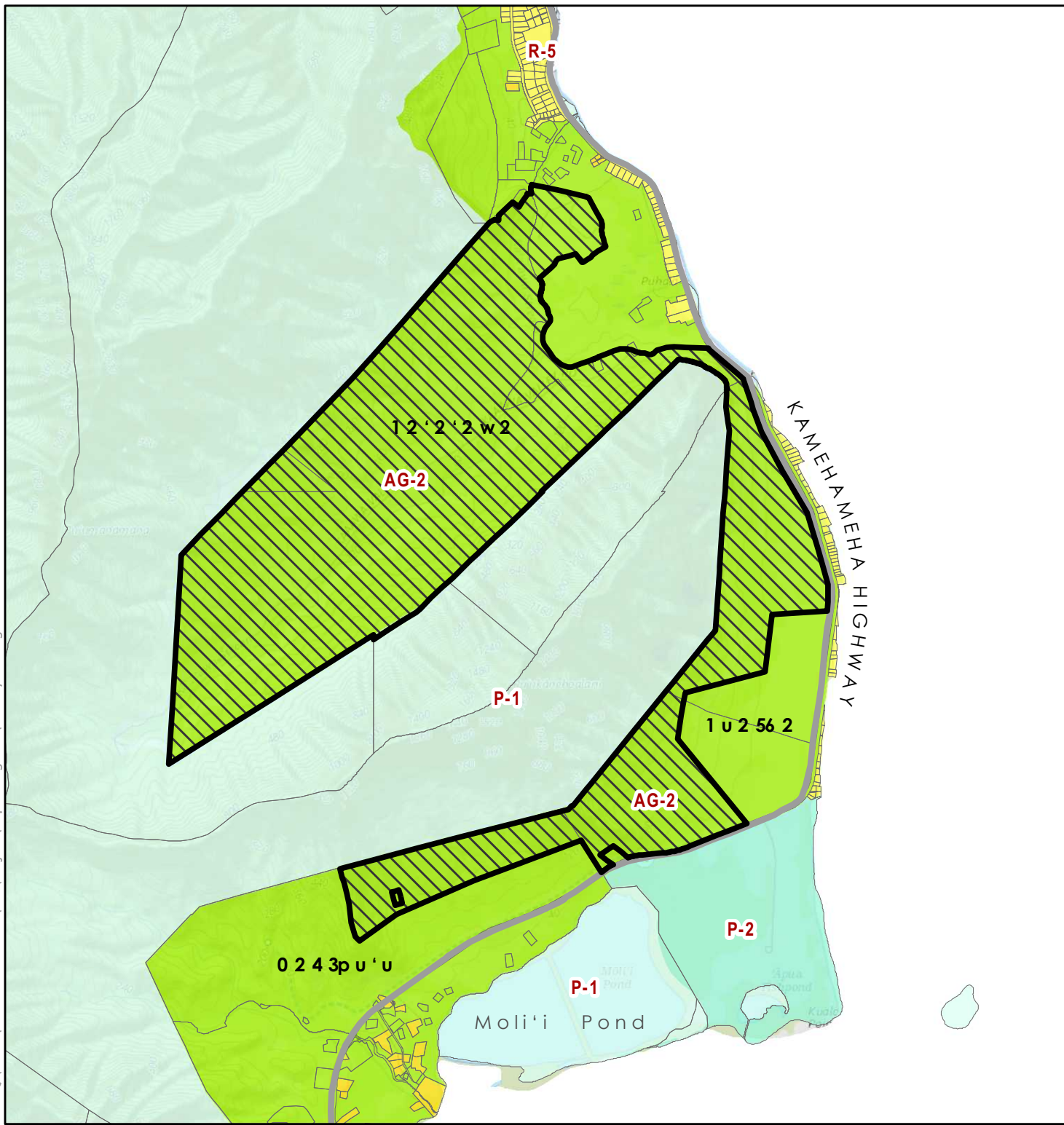
Ko'olau Poko Sustainable Communities Plan (2017) and Pre-Final Ko'olau Loa Sustainable Communities Plan (2012)

## Kualoa Ranch IAL



Island of O'ahu





DATE: 3/20/2018

## LEGEND



Proposed IAL Zoning

- P-1
- P-2
- AG-2
- COUNTRY
- R-5

Figure 11

City and County of Honolulu Zoning

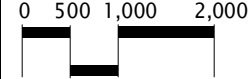
## Kualoa Ranch IAL

Kualoa Ranch Inc.

Island of O'ahu

North

Linear Scale (Feet)



## **Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land**

### **12. City and County of Honolulu Important Agricultural Lands Study**

In July 2012, the City and County of Honolulu (City) Department of Planning and Permitting (DPP) initiated the City's Important Agricultural Land Study (Study) to identify the City's candidate lands for IAL designation. The Study consists of two phases. DPP completed Phase I in April 2014. Phase I tasks included: 1) defining the IAL site selection criteria; 2) identifying available data sets to assist in mapping the defined criteria; and 3) developing methodology for weighing or ranking the criteria. Formal public review, a comment period, and notification to affected land owners was not a part of the Phase I tasks. Although the City's proposed IAL were not defined in the Phase I study, the DPP prepared a series of criteria maps and came up with two composite maps of the City's top three and four priority criteria using a geographic information system (GIS) (City and County of Honolulu Department of Planning and Permitting, 2014).

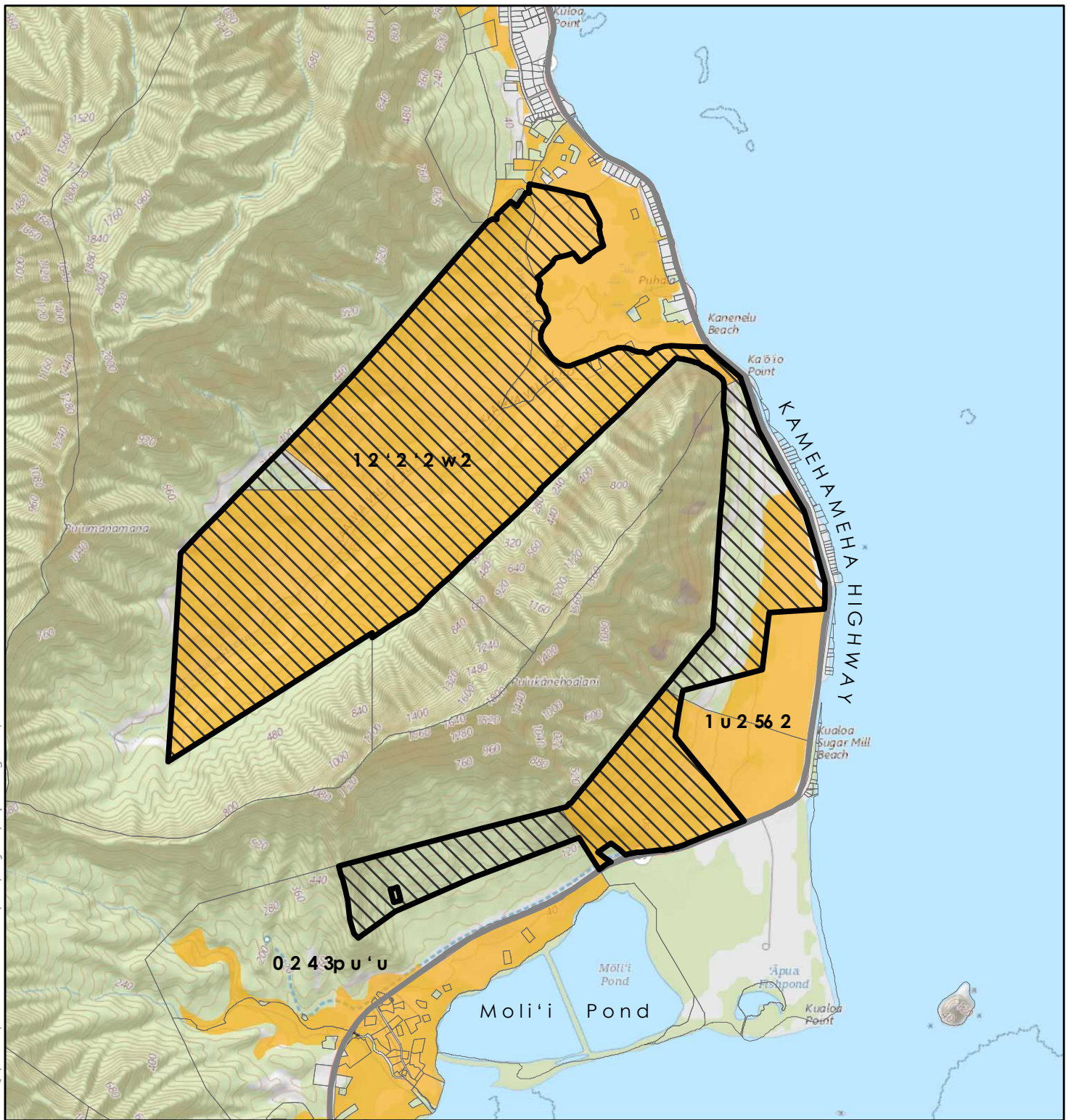
DPP began Phase II of the Study after the completion of Phase I in 2014, with public meetings held as recently as November 2017. In Phase II, the DPP is devising incentives for landowners to designate their lands as IAL and has produced draft maps of proposed IAL lands on O'ahu based on the City's top three criteria: 1) land currently used for agricultural production; 2) land with soil qualities and growing conditions suitable for agricultural production; and 3) land with sufficient quantities of water to support viable agricultural production. Figure 12 shows the Property in relation to the City's proposed IAL lands. Land possessing at least one of these three priority criteria has been included in the City's proposed designation as IAL (City and County of Honolulu Department of Planning and Permitting, 2014).

As shown on Figure 12, a large majority of the designation of the Property as IAL is consistent with the City's proposed IAL lands. The difference between the Property (i.e. the land Kualoa Ranch proposes to designate as IAL) and the City's proposed IAL designations for Kualoa Ranch's Land is: 1) toward the mouth of Ka'a'awa Valley, where the City proposes more of Kualoa Ranch's Land in this area be designated IAL; 2) in the Kualoa ahupua'a area, where the City proposes more of Kualoa Ranch's Land in this area be designated IAL; and 3) in the Hakipu'u ahupua'a area, where Kualoa Ranch proposes more land be designated a IAL than the City proposes be designated as IAL. These differences are consistent with Kualoa Ranch's current agricultural uses in the Hakipu'u ahupua'a area and future planning in Ka'a'awa Valley and the Kualoa ahupua'a area. Consistent with the intent of HRS Chapter 205 Part III, Important Agricultural Lands and the "majority incentive" in HRS Section 205-49(a)(3), Kualoa Ranch proposes to designate a majority (51.5 percent or 761.55 acres) of its Land as IAL<sup>3</sup>. The Land that Kualoa Ranch is proposing to designate as IAL (i.e. the Property) is consistent with: 1) the objective and policies for IAL set forth in HRS §205-42 and HRS §205-43; and 2) a majority of the standards and criteria for the identification of important agricultural lands set forth in HRS §205-44.

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<sup>3</sup> Section 205-49, Hawai'i Revised Statutes, provides that a majority of a landowner's landholdings excludes lands held in the State Conservation District; therefore, the calculation of the percentage of land that Kualoa Ranch is proposing to designate IAL, compared to the percentage it is not proposing to designate IAL, is based on Kualoa Ranch's total Land in the Agricultural District and Urban District. Kualoa Ranch has no land in the Rural District.





DATE: 3/20/2018

### LEGEND



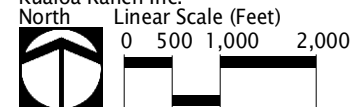
-  Proposed IAL
-  City Proposed IAL Lands

Figure 12

City and County of Honolulu  
Important Agricultural Lands Overlay

## Kualoa Ranch IAL

Kualoa Ranch Inc. Island of O'ahu





## **Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land**

Since the publication of the City's draft maps of proposed IAL lands, DPP has presented the draft maps at public meetings, received comments from the public and affected landowners, and notified affected property owners. As of June 2018, DPP is in the process of refining the proposed IAL maps and finalizing their recommendations before formally presenting them to the City and County of Honolulu Council (Council). DPP's tentative schedule is to present their IAL recommendations to the Council in 2018. The Council will review the proposed IAL recommendations and maps and make any adjustments before the City would present the recommendations and maps to the State Land Use Commission for review and adoption.

## Agricultural Land Assessment for Kualoa Ranch's Proposed Important Agricultural Land

### 13. References

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