

Chapter 4 - Environmental Setting, Impact & Mitigation

This chapter presents the current description of the environmental setting in the region and within the HoKua Place project area. Mitigation measures identified in this EIS have been developed to avoid, minimize, rectify or reduce the project's potential adverse environmental impacts. Mitigation measures have been considered throughout the project's planning process and incorporated into the project's design and construction plans.

The information about existing conditions, potential project impacts and potential mitigation measures presented in this Chapter has been developed through the review and use of existing information related to the project area.

4.1 Introduction

Each section in this Chapter discusses:

- (a) Environmental Setting - current conditions and/or management practices in the project area related to the specific environmental subject,
- (b) Potential Environmental Impacts and Mitigation Measures - the project's potential long-term operation phase impacts related to the specific environmental subject, and the potential mitigation measures that could be implemented by the project to avoid, minimize, rectify, or reduce potential substantial adverse environmental impacts, and
- (c) Level of Impact after Mitigation - the project's relative potential impact that will remain after the potential mitigation measures are implemented.

4.1.1 Environmental Setting

"Environmental Setting" describes the existing environmental conditions in the project area and the region as it currently exists, before the commencement of the project. This provides a baseline for comparing "before the project" and "after the project" environmental conditions.

4.1.2 Potential Environmental Impacts & Mitigation Measures

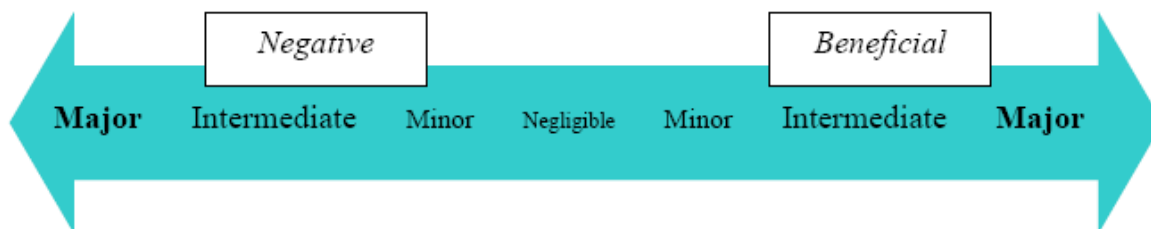
Potential environmental impacts are assessed through thresholds used to determine level of impact. "Thresholds Used to Determine Level of Impact" defines and lists specific criteria used to determine whether an impact is considered to be potentially significant.

Hawai'i Administrative Rules (HAR) Section 11-200-12 provides 13 "significance criteria" against which an action is to evaluate its potential impact. These criteria are:

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.
2. Curtails the range of beneficial uses of the environment.
3. Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders.
4. Substantially affects the economic welfare, social welfare and cultural practices of the community or State.
5. Substantially affects public health.

6. Involves substantial secondary impacts, such as population changes or effects on public facilities.
7. Involves a substantial degradation of environmental quality.
8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.
9. Substantially affects a rare, threatened or endangered species, or its habitat.
10. Detrimentially affects air or water quality or ambient noise levels.
11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water or coastal waters.
12. Substantially affects scenic vistas and view planes identified in County or State plans or studies.
13. Requires substantial energy consumption.

Effects were assessed for scope, scale and intensity of impacts to resources. Effects may be identified further as beneficial or negative, as well as short-term and long-term. Scope, scale and intensity can be defined on a range from negligible to major.



(Graphic: Pacific Southwest Research Station-Institute of Pacific Islands Forestry, 2009)

- **Negligible:** Resources will not be affected, or the effects will be at or near the lowest level of detection. Resource conditions will not change or will be so slight there will not be any measurable or perceptible consequence to a population, wildlife or plant community, public use and access opportunity, visitor experience, or cultural resource;
- **Minor:** Effects will be detectable but localized, small, and of little consequence to a population, wildlife or plant community, public use and access opportunity, visitor experience, or cultural resource. Mitigation, if needed to offset negative effects, will be easily implemented and likely to be successful;
- **Intermediate:** Effects will be readily detectable and localized with consequences to a population, wildlife or plant community, public use and access opportunity, visitor experience, or cultural resource. Mitigation measures will be needed to offset negative effects and will be extensive, moderately complicated to implement, and probably successful;
- **Major:** Effects will be obvious and will result in substantial consequences to a local area or regional population, wildlife or plant community, public use and access opportunity, visitor experience, or cultural resource. Extensive mitigating measures may be needed to offset negative effects and will be large-scale, very complicated to implement and may not have any guarantee of success. In some instances, major effects will include the irretrievable loss of the resource.

Time scales are defined as either short-term or long-term:

- **Short-term or Temporary:** An effect that generally will last less than a year or season;
- **Long-term:** A change in a resource or its condition that will last longer than a single year or season.

The thresholds established correspond to the above criteria and other environmental laws. Each section of the EIS presents a significance threshold for its specific environmental subject; should the project potentially cause an impact greater than the identified threshold then the potential impact will be considered to be significant.

“Mitigation Measures” identifies project-specific measures that may be needed that go beyond compliance with applicable existing rules, regulations and requirements, to reduce a potentially significant impact, as applicable. The compliance with existing applicable rules, regulations and requirements is considered a part of the existing regulatory environment, and is described above.

The mitigation measures identified in this EIS have been developed to avoid, minimize, rectify or reduce the project’s potential adverse environmental impacts. Mitigation measures have been considered throughout the project’s planning process and will be incorporated into the project design and construction plans. Project mitigation measures are identified and detailed in subsection 4 of sections 4.2 through 4.18.

4.1.3 Level of Impact after Mitigation

“Level of Impact after Mitigation” indicates what effect remains after application of mitigation measures, and whether the remaining effect will be considered to be significant, or not.

4.1.4 Potential Project Impacts in Context with Applicable Requirements & Mitigation Measures

The potential impacts are evaluated within the framework of the project’s compliance with all applicable rules, regulations and requirements for its action type and location. The existing rules, regulations, requirements and procedures applicable to the project are considered a part of the existing regulatory environment.

Rules, regulations and requirements which may be applicable include:

- Hawai’i Administrative Rules (HAR), including (but not limited to):
 - Title 11, Chapter 23, Underground Injection Control
 - Title 11, Chapter 45, Community Noise Control
 - Title 11, Chapter 54, Water Quality Standards
 - Title 11, Chapter 55, Water Pollution Control
 - Title 11, Chapter 60, Air Pollution Control
 - Title 11, Chapter 62, Wastewater Systems
 - Title 11, Chapter 68, Litter Control
 - Title 11, Chapter 200, Environmental Impact Statement Rules
 - Title 11, Chapter 260, Hazardous Waste Management General Provisions
 - Title 11, Chapter 262, Standards Applicable to Generators of Hazardous Waste
 - Title 13, Subtitle 5, Chapter 107, Threatened and Endangered Plants

- Title 13, Subtitle 5, Chapter 124, Indigenous Wildlife, Endangered and Threatened Wildlife and Introduced Wild Birds
- Title 13, Subtitle 13, Chapter 275-284, Historic Preservation Review Process
- Title 13, Subtitle 13, Chapter 300, Burial Sites and Human Remains
- Hawai'i Revised Statutes (HRS), including (but not limited to):
 - Chapter 6E, Historic Preservation
 - Chapter 195D, Conservation of Aquatic Life, Wildlife and Land Plants
 - Chapter 205, State Land Use Law
 - Chapter 226, Hawai'i State Planning Act
 - Chapter 342D, Water Pollution Law
 - Chapter 342J, Hawai'i Hazardous Waste Law
 - Chapter 343, Environmental Impact Statements
 - Chapter 344, Hawai'i State Environmental Policy
- County of Kaua'i ordinances, rules and requirements, including (but not limited to):
 - County of Kaua'i General Plan
 - County of Kaua'i Building and Planning Codes

4.2 Archaeological, Historic and Cultural Resources

This section discusses the cultural, archaeological and historic resources in the region and specific project area, the potential impact of the project on those resources and mitigation measures the project will employ to minimize those potential impacts.

4.2.1 Environmental Setting

Archaeological & Historic Resources

Exploration Associates Ltd. (EAL) conducted an archaeological assessment of the property (Exhibit L) “An Archaeological Assessment with Subsurface Testing for the Proposed Kapa’a Highlands Phase II Project, Kapa’a Ahupua’a, Kawaihau District, Kaua’i TMK (4) 4-3-3: 1)”. The purpose of the archaeological assessment is to address any archaeological and/or historic preservation concerns that might be raised by the proposed development.

The assessment included a surface survey and a report detailing methods and any finds. The archaeological assessment does not meet the requirements of an inventory-level survey per the rules and regulations of the State Historic Preservation Division/Department of Land and Natural Resources (SHPD/DLNR). However, the level of work is sufficient to address site types, locations, and allow for future work recommendations.

On January 3, 2012 and April 25, 2012 a field inspection of the HoKua Place/Kapa’a Highlands II project area was conducted by Exploration Associates Ltd. archaeologist Nancy McMahon, M.A. Survey transects oriented north-south were spaced apart 10 m. where it was passable as guinea grass was very thick. Field observations were recorded and photographs were taken of the project area. The work was conducted under the overall supervision of principal archaeologist Nancy McMahon, M.A.

Historical research included a review of previous archaeological studies on file at the State Historic Preservation Division of the Department of Land and Natural Resources; studies of documents at Hamilton Library of the University of Hawai’i, Kapa’a and Līhu’e Public Libraries, Kaua’i Museum, Kaua’i Historical Society and study of maps at the Survey Office of the Department of Land and Natural Resources. Nineteenth-century Land Commission Award claim records were accessed via the Internet from the Mahele Database prepared by Waihona ‘Āina Corp.

Kawaihau District

The project area lies in the traditional ahupua’a of Kapa’a, which was part of the ancient district of Puna (now the district is more commonly called “Kawaihau”), one of five ancient districts on Kaua’i (King 1935: 228). Puna was the second largest district on Kaua’i, behind Kona, and extended from the tip south of Līhu’e to Kamalomalo’o, just north of Keālia.

For taxation, educational and judicial reasons, new districts were created in the 1840s. The Puna District, with the same boundaries became the Līhu’e District, named for an important town in that district.

Early Historic Accounts of Kapa’a (1830s-1900s)

Although most of the historic record documents for Kaua’i in this period revolve around missionary activities and the missions themselves, there was indication that the Kapa’a area was being considered for new sugar cane experiments, similar to those occurring in Kōloa.

In a historic move, Ladd and Company received a 50 year lease on land in Kōloa from Kamehameha III and Kaua'i Governor Kaikio'ewa of Kaua'i. The terms of the lease allowed the new sugar company "the right of someone other than a chief to control land" and had profound effects on "traditional notions of land tenure dominated by the chiefly hierarchy" (Donohugh, 2001: 88). In 1837, a very similar lease with similar terms was granted to Wilama Ferani, a merchant and U.S. citizen based in Honolulu (Hawai'i State Archives, Interior Dept., Letters, Aug. 1837).

The lease was granted by Kauikeaouli for the lands of Kapa'a, Keālia and Waipouli for twenty years for the following purpose:

...for the cultivation of sugar cane and anything else that may grow on said land, with all of the right for some place to graze animals, and the forest land above to the top of the mountains and the people who are living on said lands, it is to them whether they stay or not, and if they stay, it shall be as follows: They may cultivate the land according to the instructions of Wilama Ferani and his heirs and those he may designate under him... (Hawai'i State Archives, Interior Dept., Letters, Aug. 1837).

Unlike Ladd & Company which eventually became the Kōloa Sugar Company, there is no further reference to Wilama Ferani and his lease for lands in Kapa'a, Keālia and Waipouli. In a brief search for information on Honolulu merchant, Wilama Ferani, nothing was found. It is thought that perhaps Wilama Ferani may be another name for William French, a well known Honolulu merchant who is documented as having experimented with grinding sugar cane in Waimea, Kaua'i at about the same time the 1837 lease for lands in Kapa'a, Keālia and Waipouli was signed (Joesting, 1984: 152).

In 1849, son of Wai'oli missionary, William P. Alexander, recorded a trip he took around Kaua'i. Although, he focuses on the larger mission settlements like Kōloa and Hanalei, he does mention Kapa'a:

A few miles from Wailua, near Kapa'a we passed the wreck of a schooner on the beach, which once belonged to Capt. Bernard. It was driven in a gale over the reef, and up on the beach, where it now lies.

A few miles further we arrived at Keālia. We had some difficulty crossing the river at this place, owing to the restiveness of our horses. The country here near the shore was rather uninviting, except the valley which always contained streams of water (Alexander, 1991: 123).

In later years, the notorious Kapa'a reef was to become the location of many shipwrecks once a landing was built there in the 1880s.

The first large scale agricultural enterprise in Kapa'a began in 1877 by the Makee Sugar Plantation and the Hui Kawaihau (Dole, 1916: 8). The Hui Kawaihau was originally a choral society begun in Honolulu whose membership consisted of many prominent names, both Hawaiian and haole. It was Kalākaua's thought that the Hui members could join forces with Makee, who had previous sugar plantation experience on Maui, to establish a successful sugar corporation on the east side of Kaua'i.

Captain Makee was given land in Kapa'a to build a mill and he agreed to grind cane grown by Hui members. Kalākaua declared the land between Wailua and Moloa'a, the Kawaihau District, a fifth district and for four years the Hui attempted to grow sugar cane at Kapahi, on the plateau lands above Kapa'a. After a fire destroyed almost one half of the Hui's second crop of cane and the untimely death of one of their principal advocates, Captain James Makee, the Hui began to disperse and property and

leasehold rights passed on to Makee's son-in-law and new Makee Plantation owner, Colonel Z. S. Spalding (Dole, 1916: 14).

As part of the infrastructure of the new plantation, a sugar mill was erected and the Makee Landing was built in Kapa'a during the early years of the Makee Sugar Plantation. Following Captain Makee's death, Colonel Spalding took control of the Plantation and in 1885 moved the mill to Keālia (Cook, 1999: 51). The deteriorating stone smokestack and landing were still there well into the 1900s (Damon, 1931:359). Conde and Best (1973:180) suggest that railroad construction for the Makee Plantation started just prior to the mid 1890s. There is one reference to a railroad line leading from the Kapa'a landing to Keālia in 1891. During Queen Lili'uokalani's visit to Kaua'i in the summer of 1891, the royal party was treated to music by a band, probably shipped in from O'ahu. "The band came by ship to Kapa'a and then by train to Keālia" (Joesting, 1984:252). This line is depicted on a 1910 USGS map which shows the line heading south from Keālia Mill and splitting near the present Coral Reef Hotel, one finger going to the old Kapa'a Landing (Makee Landing) and another line heading mauka, crossing the present Mo'ikeha Canal, traveling southwest up Lehua Street and through what is now goat pasture, along a plateau and into the mauka area behind Kapa'a swamplands. This railroad line was part of a twenty mile network of plantation railroad with some portable track and included a portion of Keālia Valley and in the mauka regions of the plateau lands north of Keālia (Conde and Best, 1973:180).

By the late 1800s, Makee Plantation was a thriving business with more than one thousand workers employed (Cook, 1999:51). Hundreds of Portuguese and Japanese immigrants found work on Makee Plantation and the new influx of immigrants required more infrastructure. In 1883, a lease for a school lot was signed between Makee Sugar Company and the Board of Education (Kapa'a School, 1983: 9). Stipulations found in the Portuguese immigrant contracts with Makee Sugar Company stated that "children shall be properly instructed in the public schools" (Garden Island, April 1, 1883). The original Kapa'a School was constructed in 1883 on a rocky point adjacent to the Makee Sugar Company railroad. Traditionally, this point was known as Kaahiahi (Kapa'a School, 1983: 10). In 1908, Kapa'a School was moved to its present site directly mauka and up the hill at Mailehune.

As in much of the rest of Hawai'i, the Chinese rice farmers began cultivating the lowlands of Kapa'a with increasing success in the latter half of the 1800s. Several Hawaiian kuleana owners leased or sold their parcels mauka of the swamp land to Chinese rice cultivators. Other Chinese rice cultivators appealed to the government for swamplands first leasing and later buying. As a result of the growing rice and sugar industries, the economic activity displaced the house lot kuleana on the makai side of the marsh for increasing commercial and residential development (Lai, 1985:148-161).

Narrow wagon roads gave way to macadamized roads in the early part of the 20th century. This new road was called the Kaua'i Belt Road and parts of it are thought to have followed the "Old Government Road" (Cook, 1999). In Kapa'a, the present day Kūhiō Highway probably follows the same route as the original Government Road and subsequent Kaua'i Belt Road. The location of the kuleana awards in Kapa'a indicates that the majority of the house lots were situated along the Government Road. LCA 3243 names a "road" as one of its boundaries.

20th Century History of Kapa'a (1900 - Present)

In the early 1900s, government lands were auctioned off as town lots in Kapa'a to help with the burgeoning plantation population. One kama'aina mentioned that in the 1930s and 1940s, the area north of Mo'ikeha Canal in Kapa'a was mostly settled by Portuguese families (Bushnell et al. 2002). The Japanese were also very prominent in the 1920s and 1930s largely replacing the Chinese merchants of

the turn of the century in the Kapa'a business sector (Bushnell et al. 2002). The Board of Health, Territory of Hawai'i ran a dispensary in Kapa'a at the makai edge of Niu Street near the Kapa'a Beach Park parking lot, adjacent to the bike path starting 1926. The lot is presently vacant. A Fire Station was once located in the area now occupied by the Coral Reef Hotel and a Courthouse and jail cell once stood at the location of the present Kapa'a Neighborhood Center. It is not known when these structures were removed or abandoned. In 1913, Hawaiian Canneries opened in Kapa'a at the site now occupied by Pono Kai Resort (Cook, 1999: 56). Through the Hawaiian Organic Act, Hawaiian Canneries Company, Limited purchased the land they were leasing, approximately 8.75-acres, in 1923 (Bureau of Land Conveyances, Grant 8248). A 1923 sketch of the cannery shows only four structures, one very large structure assumed to be the actual cannery and three small structures makai of the cannery. A 1933 historic photograph of Kapa'a Town shows an ironwood windbreak on the makai side of the cannery adjacent to the railroad. By 1956, 1.5-million cases of pineapple were being packed. By 1960, 3,400-acres were in pineapple and there were 250 full time employees and 1,000 seasonal employees for the Kapa'a Cannery (Honolulu Advertiser, March 20, 1960). In 1962, Hawaiian Canneries went out of business due to competition from third world countries.

The Ahukini Terminal & Railway Company was formed in 1920 to establish a railroad to connect Anahola, Keālia, Kapa'a to Ahukini Landing and "provide relatively cheap freight rates for the carriage of plantation sugar to a terminal outlet" (Conde and Best, 1973: 185). This company was responsible for extending the railroad line from the Makee Landing, which was no longer in use, to Ahukini Landing, and for constructing the original Waika'ea Railroad Bridge and the Mo'ikeha Makai Railroad Bridge.

In 1934, the Līhu'e Plantation Company absorbed the Ahukini Terminal & Railway Company and Makee Sugar Company (Conde and Best, 1973: 167). The railway and rolling stock formerly owned by Makee Sugar Company became the Makee Division of the Līhu'e Plantation. At this time, besides hauling sugar cane, the railroad was also used to haul plantation freight including "fertilizer, etc... canned pineapple from Hawaiian Canneries to Ahukini and Nāwiliwili, pineapple refuse from Hawaiian Canneries to a dump near Anahola and fuel oil from Ahukini to Hawaiian Canneries Co., Ltd." (Hawaiian Territorial Planning Board, 1940: 11). Former plantation workers and kama'aina growing up in Kapa'a remember when the cannery would send their waste to the pineapple dump, a concrete pier just north of Kumukumu Stream (State Site No. 50- 30-08-789) by railroad. The structure is built over the water where the rail cars would dump the pineapple waste. The current would carry the waste to Kapa'a which would attract fish and sharks (Bushnell et al. 2002).

Līhu'e Plantation was the last plantation in Hawai'i to convert from railroad transport to trucking (Conde and Best, 1973: 167). "By 1957 the company was salvaging a part of their plantation railroad, which was being supplanted by roads laid out for the most part on or close to the old rail bed" (Ibid: 167). By 1959, the plantation had completely converted over to trucking. The Cane Haul Road which begins near the intersection of Haua'ala Road and Kūhiō Highway is thought to date to the late 1950s and follows the alignment of the old railroad.

Severe floods in Kapa'a in 1940 led to the dredging and construction of the Waika'ea and Mo'ikeha Canals sometime in the 1940s (Hawaii Territorial Planning Board, 1940: 7). Although the Waika'ea Canal, bordering the Kapa'a Pineapple Cannery, had been proposed as early as 1923, nothing was constructed until after the floods (Bureau of Land Conveyances, Grant 8248). A Master Plan for Kapa'a, published in 1940, asks the Territorial Legislature for funds to be set aside for the completion of a drainage canal and for filling makai and mauka of the canal (Hawaii Territorial Planning Board, 1940:7). In 1955, reports came out on the dredging for coral proposed for the reef fronting Kapa'a Beach Park

(Garden Island Newspaper, September 21, 1955). The coral was to be used for building plantation roads. This dredging was later blamed for accelerated erosion along Kapaʻa Beach (Garden Island Newspaper, October 30, 1963).

Today, there are several sea walls along the Kapaʻa Beach Park to check erosion. Old time residents claim the sandy beach in Kapaʻa was once much more extensive than it is now (Bushnell et al. 2002). Keālia Town slowly dispersed after the incorporation of Makee Sugar Company into Līhuʻe Plantation in the 1930s. Many of the plantation workers bought property of their own and moved out of plantation camps. The plantation camps which bordered Kūhiō Highway were disbanded in the 1980s. The Līhuʻe Plantation began to phase out in the last part of the 20th century. Kapaʻa Town suffered after the closing of the Kapaʻa Cannery however the growing tourist industry helped to ease the economic effects of the Cannery's closing.



HoKua Place Site

Heiau of Kapaʻa

During their expeditions around Hawaiʻi in the 1880s, collecting stories from ka poʻe kahiko, Lahainaluna students stopped in Kapaʻa and Keālia and gathered information regarding heiau of the region. All together, fourteen heiau were named in Kapaʻa and Keālia, suggesting the two ahupuaʻa were probably more politically significant in ancient times. The following Table lists the names of the ten heiau identified in the ahupuaʻa of Kapaʻa, their location if known, their type, and associated chief and priest.

The exact locations of these heiau are unknown. The locations of two of the heiau correlate with the locations of wahi pana which are known to be in close to Kuahiahi and Kaluluomoʻikeha. Kuahiahi (also spelled Kaahiahi and Keahiahi) is the rocky headland at the north end of Kapaʻa where the first Kapaʻa School was once located. Kaluluomoʻikeha is thought to be the general area near the Moʻikeha Canal and the present day Coral Reef Hotel.

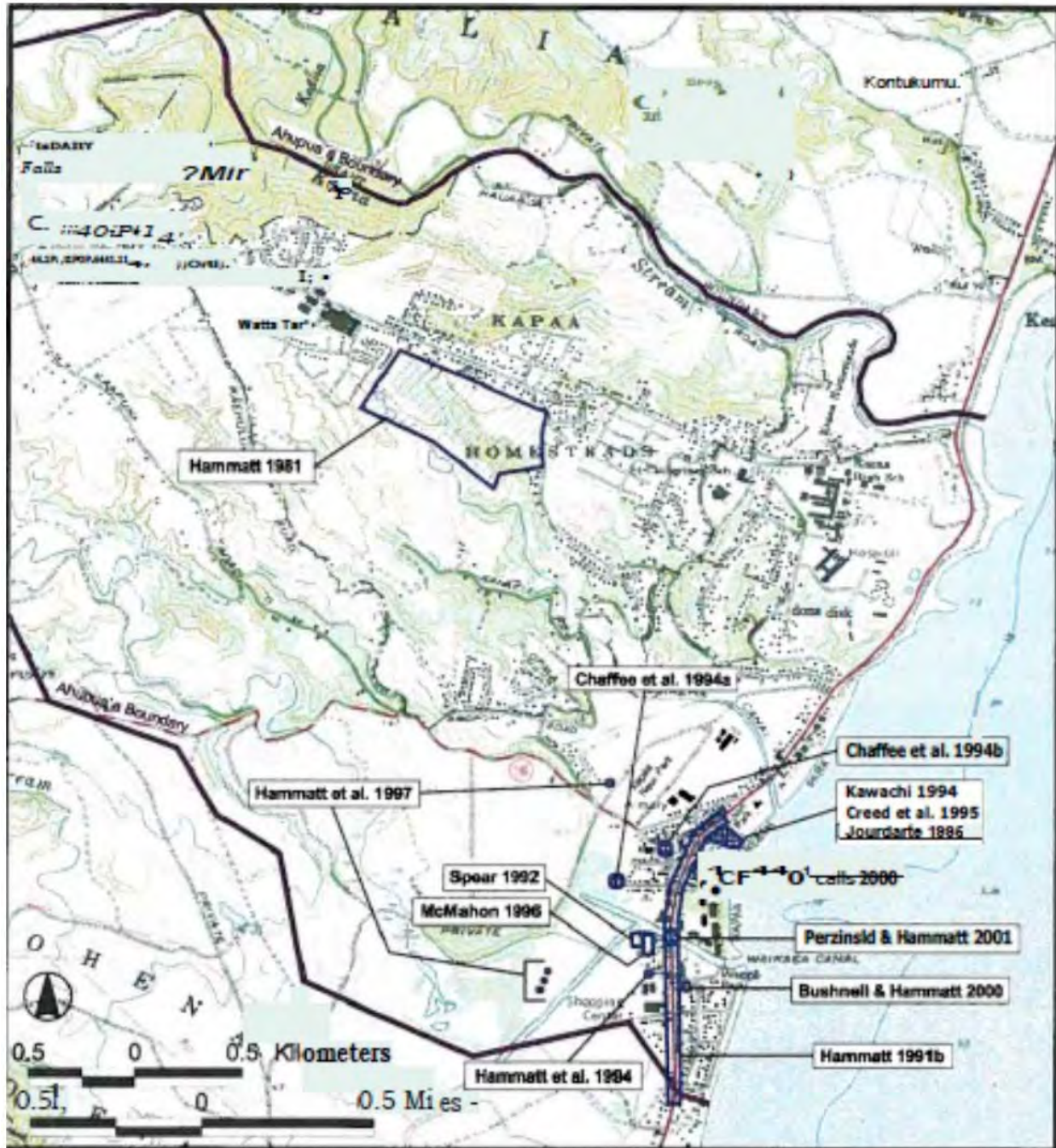
Name	Location	Type	Associated
Mailehuna	Kapa'a (Mailehuna is the area of the present day Kapa'a School)	unknown	Kiha, Kaumuali'i/ Lukahakona
Pueo	Kapa'a	unknown	Kiha, Kaumuali'i/ Lukahakona
Pahua	Kapa'a/Kealia	unknown	Kiha/ Lukahakona
Kumalae	Kapa'a/Kealia	unknown	Kiha/ Lukahakona
Waiehumalama	Kapa'a/Kealia	unknown	Kiha/ Lukahakona
Napu'upa'akai	Kapa'a/Kealia	unknown	Kiha/ Lukahakona
Noeamakali'i	Kapa'a/Kedlia	"heiau for birth of Kaua'i Chiefs, like Holoholoku"	Unknown
Pu'ukoa	Kapa'a/Kealia	"unu type heiau"	Unknown
Piouka	Kapa'a/Kealia	"unu type heiau"	Unknown
Una	Kapa'a/Kealia	Unknown	Kiha/ Lukahakona
Mano	Kapa'a/Kealia	Unknown	Kiha/ Lukahakona
Kuahiahi	Kapa'a (govn't school stands on site now)	Unknown	Kaumuali'i/ Lukahakona
Makanalimu	Upland of Kawaihau	Unknown	Kaumuali'i
Kaluluomoikeha	Kapa'a	Unknown	Mo'iikeha

Archaeological Studies and Sites in Kapa'a Ahupua'a

The following table outlines the archaeological research and historic properties identified in Kapa'a Ahupua'a. The Table provides a list of archaeological research conducted within Kapa'a Ahupua'a, including columns for source, location, nature of study, and findings.

Source	Location	Nature of Study	Findings
Bennett 1931	Island wide Identifies 2 sites: Site 110 Taro terraces and bowl and Site 111 A large simple dirt Hawaiian ditch	Archaeological Reconnaissance	Identifies 2 sites: Site 110 Taro terraces and bowl and Site 111 A large simple dirt Hawaiian ditch
Handy and Handy 1972	Archipelago-wide	Native Planter study	Discusses "highly developed irrigation system"
Ching 1976	Just south of the Waikaea Drainage Canal	Archaeological Reconnaissance	No significant findings
Hammatt 1981	Upland Kapa'a	Archaeological Reconnaissance	No significant findings
Hammatt 1986	Upper reaches of the Makaleha stream valley.	Archaeological Reconnaissance	No significant findings
Hammatt 1991	Along Kuhio Highway	Subsurface Testing	Identifies two sub-surface cultural layer sites
Kikuchi and Remoaldo 1992	Around Kapa'a Town	Cemeteries of Kauai	Identifies six cemeteries
Spear 1992	South side Waikaea Canal, mauka of Kuhio Highway. (TMK: 4-5-05:04, 09)	Monitoring Report	Designated subsurface site 50-30-08-547

Source	Location	Nature of Study	Findings
Chaffee, Burgett & Spear 1994a	A house lot near the corner of Kukui and Ulu Streets in mauka Kapa'a Town. (TMK: 4-5-09:10)	Archaeological Inventory Survey	No significant findings
Chaffee, Burgett & Spear 1994b	Mamane Street Kapa'a Town. (TMK: 4-5-09:51)	Archaeological Inventory Survey	No significant findings
Hammatt, Ida & Chiogioji 1994	Proposed bypass routes mauka of Kapa'a Town	Archaeological Assessment	No new field work, reviews literature
Hammatt, Ida & Folk 1994	South side Waikaea Canal, mauka of Kuhio Highway (TMK: 4-5-05:06)	Archaeological Inventory Survey	Weak cultural layer designated site 50-30-08-748
Kawachi 1994	Inia Street (Jasper) TMK 4-5-08:33	Burial Report	Designates Site 50-30-08-871
McMahon 1994	"behind the armory in Kapa'a near the god stones" The location is uncertain & "Buzz's near the Coconut Marketplace"	Documents second hand report of burials in two locations	Bones in 3 places reported from behind the armory, 16 bodies reported from the Buzz's restaurant. No site numbers assigned
Creed, Hammatt, Ida, Masterson & Winieski 1995	Kapa'a Sewer line project, Kuhio Highway, south and central Kapa'a Town	Archaeological Monitoring Report	Documents cultural layer of site -1848 and (an enlarged) site -1849 & recovery of thirty burials at sites —867, -868, -871, & -1894
Jourdane 1995	1382-A `Inia Street, <i>makai</i> of Kuhio Highway, central Kapa'a Town	Burial Report	Site 626
McMahon 1996	South side Waikaea Canal, mauka of Kuhio Highway (TMK: 4-5-05:08)	Archaeological Inventory Survey	No significant cultural material
Hammatt, Chiogioji, Ida & Creed 1997	Test excavations focused inland of Kapa'a Town	Archaeological Inventory Survey	Four test trenches were excavated inland of Kapa'a Town
Borthwick and Hammatt 1999	Kapa'a Seventh-Day Adventist Church at 1132 Kuhio Highway	Archaeological Monitoring and Burial Treatment Plan	Monitoring was indicated as this parcel lay within the designated Site 50-30-08-1848.



Map showing previous archaeological studies in Kapa'a

Source	Location	Nature of Study	Findings
Bushnell and Hammatt 2000	Seventh-Day Adventist Church, <i>makai</i> of Kuhio Highway, south of the Waikaea Canal	Archaeological Monitoring Report	Minimal findings (one piece of worked bone)
Callis 2000	Kapa'a Beach Park	Burial Removal and Archaeological Monitoring Report	Human Burial
Perzinski and Hammatt 2001	Kuhio Highway on the margins of the Waikaea Canal	Archaeological Monitoring Report	No significant cultural material
Elmore and Kennedy 2003	Kuhio Highway	Archaeological Monitoring Report	No significant cultural material
Dega, Michael F. and James Powell 2003	Kuhio Highway	Archaeological Monitoring Report	Human Burials •
Van Ryzin, Karl and Hallett Hammatt, 2004	Water Reservoir	Archaeological Assessment	No significant findings

The following Map and Table is a list of known historic properties within the ahupua'a and includes columns for state site numbers, site type, location and reference.



Site # 50-30-08-	Ahupua'a	Site Type/ Name (if any)	Location	Site Constraints	Reference
B001	Kapa'a	Historic Cemetery	South of bend of Kapa'a Stream, a kilometer mauka from Kuliö Hwy	Appears to be a discrete historic cemetery	Kikuchi and Remoaldo 1992
B002	Kapa'a	Historic Cemetery	Just mauka from Kuliö Highway, south of Kapa'a Stream	Appears to be a discrete historic cemetery	Kikuchi and Remoaldo 1992
B003	Kapa'a	Kapa'a Public Cemetery	South of Kanaele Road, one kilometer inland of Kuliö Highway	Appears to be a discrete historic cemetery	Kikuchi and Remoaldo 1992
B004	Kapa'a	Historic Cemetery	North of Apopo Road, one kilometer inland of Kuliö Highway	Appears to be a discrete historic cemetery	Kikuchi and Remoaldo 1992
B013	Kapa'a	Historic Cemetery	Just <i>mauka</i> from Kuliö Highway, north of the Waikaea Canal	Appears to be a discrete historic cemetery	Kikuchi and Remoaldo 1992
B014	Kapa'a	All Saints Episcopal Church Cemetery	Just <i>mauka</i> from Kuliö Highway, south of the Waikaea Canal	Appears to be a discrete historic cemetery	Kikuchi and Remoaldo 1992:62-65
547	Kapa'a	sub-surface features including a firepit and a possible house foundation	South of bend of Waikaea Canal, mauka of Kuliö Highway	Archaeological monitoring in the vicinity is recommended	Spear 1992:3
626	Kapa'a	Burial	Inia Street, <i>makai</i> of Kuliö Highway, central Kapa'a	Consultation and monitoring in vicinity indicated	Jourdane 1995
748	Kapa'a	Minimal findings, a weak cultural layer (buried A-horizon)	South of the bend of the Waikaea Canal, <i>mauka</i> of Kuliö Highway	Considered no longer significant within project area	Hammatt et al. 1994
789	Kapa'a/ Kealia	Historic Road	Coastal Cane Haul Road near Kawaihau Road turn off		Perzinski et al. 2000

Site # 50-30-08-	Ahupua'a	Site Type/ Name (if any)	Location	Site Constraints	Reference
867	Kapa'a	1 set of human remains	Kukui Street, just <i>mauka</i> of Kuhiō Highway, Kapa'a Town	Consultation and monitoring in vicinity indicated	Creed et al. 1995:50
868	Kapa'a	1 set of human remains	Lehua Street <i>mauka</i> of Kuhiō Highway, Kapa'a Town	Consultation and monitoring in vicinity indicated	Creed et al. 1995:50
871	Kapa'a	13 sets of human remains (Creed et al. 1995:50)	Inia Street, <i>makai</i> of Kuhiō Highway	Consultation and monitoring in vicinity indicated	Kawachi 1994; Creed et al. 1995:50
1848	Kapa'a	Cultural layer and sub-surface features	Along Kuhiō Highway between Wana Road and the Waikaea Drainage Canal	Archaeological monitoring in the vicinity is recommended	Hammatt 1991; Creed et al. 1995
1849	Kapa'a	Cultural layer and sub-surface features; Creed et al. 1995:53 expands boundaries to incl. burial sites, -626, -867, -868 -871, and -1894	Along Kuhiō Highway between Inia Street and Kauwila Street extending to the coast	Consultation and monitoring in vicinity indicated	Hammatt 1991; Creed et al. 1995
1894	Kapa'a	11 sets of human remains	Ulu Street, just north of Kuhiō Highway, Kapa'a Town	Consultation and monitoring in vicinity indicated	Creed et al. 1995:50
2075	Kapa'a/Ke ālia	Highway Bridge Foundation (old Kaua'i Belt Road)	Kuhiō Highway at Kapa'a/ Keālia River		Bushnell et al. 2002:55
2076	Kapa'a	Petroglyph	Rocky coast below former cane haul road (Site -789)	Preservation	Bushnell et al. 2002:55
2077	Kapa'a	Concrete steps (related to historic beach pavilion)	Near present Kapa'a Beach Park Pavilion		Bushnell et al. 2002:55

Site # 50-30-08-	Ahupua'a	Site Type/ Name (if any)	Location	Site Constraints	Reference
2078	Kapa'a	Historic Railway Alignment (2 Railroad Bridges, & RR Culvert Foundation)	Both railroad bridges span the Moikeha Canal; the RR culvert foundation is located north of the Kapa'a Swimming Pool.		Bushnell et al. 2002:55

Pattern of Archaeological Sites in Kapa'a

The pattern of archaeological studies in Kapa'a Ahupua'a is somewhat skewed with a dozen projects in urban Kapa'a Town and very little work along the coast. Major archaeological sites have been found in the Kapa'a Town area including extensive cultural layers with burials and other cultural features underlying Kūhiō Highway near All Saints Gym and near the older part of Kapa'a Town between Waika'ea Canal and Kapa'a Beach Park, makai of Kūhiō Highway (Hammatt 1991; Kawachi 1994; Creed et al. 1995; Jourdane 1995; Callis 2000). The mauka-makai extent of these cultural layers has not been clearly defined. These extensive cultural deposits associated with pre-historic and early historic habitation are known to exist in a relatively narrow sand berm that makes up the physiogeography of Kapa'a. The areas mauka of Kapa'a Town are marshy although much of it has been filled in recent decades. The five kuleana awarded during the Mahele are located adjacent to the present highway. The more mauka studies (Spear 1992, Chaffee et al. 1994a & 1994b, Hammatt et al. 1994, 1997, McMahon 1996) are thought to be located towards the mauka fringe of the sand berm, approaching more marshy conditions and have generally reported no significant or minimal findings. Less than 1.5-km to the south of Waika'ea Canal is another extensive subsurface, cultural deposit which is associated with a pre-contact fishing encampment located at the southern boundary of Waipouli adjacent to Uhalekawa'a Stream (Waipouli Stream) and the ocean (Hammatt et al. 2000).

Anticipated sites based on historic and archaeological studies in mauka Kapa'a would be evidence of cane cultivation like ditches and possible terracing for lo'i cultivation with nearby habitation sites.

Field Inspections

On January 3 and April 25, 2012 Exploration Associates Ltd. archaeologist Nancy McMahon, M.A. made field inspections on proposed HoKua Place/Kapa'a Highlands II project area. Access was made via Olohena Road (two gates).

Because of known historic cane cultivation in this area of Kapa'a, predicted sites might be historic plantation related infrastructure such as ditches, flumes, roads, temporary cane-haul railroad berms and reservoirs. None were observed during the survey. The shallow ravine the project area were surveyed and tested, however no pre-Contact or historic era terraces or habitation sites were revealed.

The parcel contains no surface archaeological sites. The access road is related to access for construction of the buildings already present on the Phase I parcel.



Entrance off Olohena Road looking makai in the distance the Solar Farm



Remnant Road with Cattle Grazing in the Distance



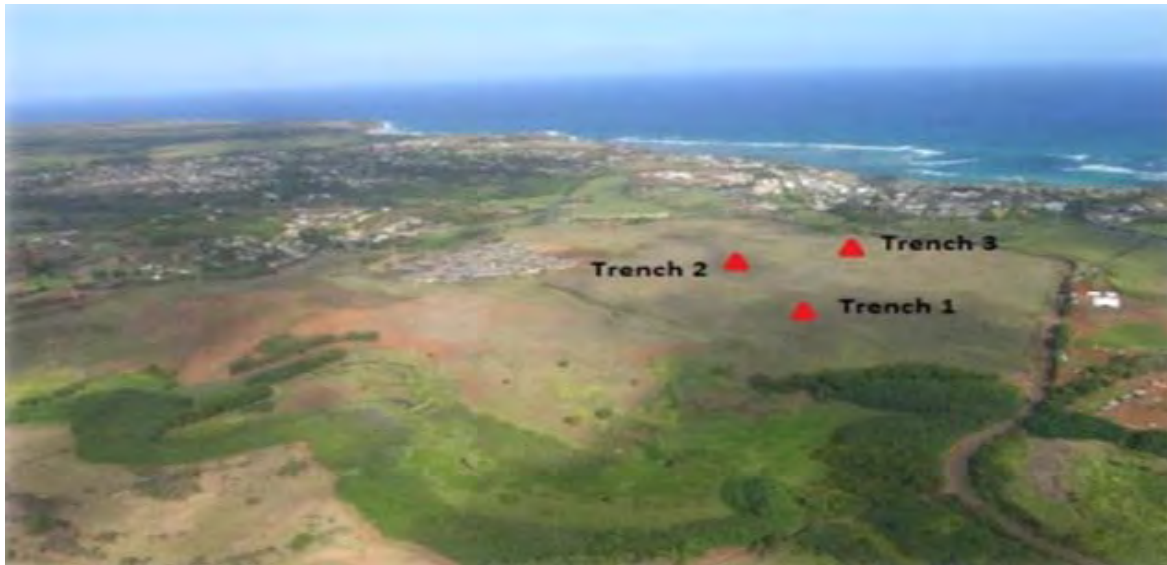
View across the Project Area, Facing Makai and Northeast



Looking at the Roof of Kapa'a Middle School

Subsurface Testing

On November 11, 2012, three trenches were excavated with a backhoe with a 24 in. width bucket. (Figure below). Trench 1 was excavated to a depth of 183 cm with a length of 10 meters. Trench 2 was excavated to a depth of 160 cm and a length of 3 m. Trench 3 was excavated to a depth of 260 cm and a length of 2.5 m. Each evinced the same soil composition. A description of the soils representing all three trenches is presented here.



Trench location, facing northeast

A representative profile description evinced the same stratigraphy consisting in all three trenches, consisting of three soil layers with only a single clear boundary delineating the topsoil from the underlying soils. Soil differences could only be determined utilizing the Munsell Color Chart. The topsoil in each trench 5 YR 4/3 reddish brown organic. The other two layers are classified as 5 YR 5/6 yellowish red [20 cmbs] and 5 YR 4/6 yellowish red [20 cmbs to base of excavation]. Characteristics are dry to very dry, crumbly, medium firm, clayey silt. It is pretty much cultivated soils. A local informant, Mr. Vasquez, who worked for the Lihue plantation most of his life Informant stated the plantation chain and ball dragged this land several times over.



Profile Test trench 2 on the left and Trench 3 on the right.

A geologic survey was undertaken on the adjacent Phase I parcel prior to the construction of a solar farm. Soils extracted and examined in test trenches revealed only agricultural soils. No buried cultural layers or plantation infrastructure was present.

Cultural Resources

A Cultural Impact Assessment (CIA) was conducted for the project; it is attached as Exhibit M. Consistent with the Office of Environmental Quality Control guidelines, the CIA methodology incorporated:

- Historic Research (conducted at the State Historic Preservation Division Library, the Hawai'i State Archives and the Bishop Museum where information on historic land use and past cultural traditions was sought.)
- Archaeological Review (using the library at the Department of Land and Natural Resources, State Historic Preservation Division to obtain information regarding previous archaeological and cultural studies in the Kapa'a area.)
- Identification of Knowledgeable Informants (Hawaiian organizations, community members and cultural and lineal descendants with lineal ties to the greater Kapa'a area, as well as others with ties to the region were contacted, including the State Historic Preservation Division (SHPD), The Office of Hawaiian Affairs (OHA), the Kaua'i/Ni'ihau Islands Burial Council, the Royal Order of Kamehameha, Kaumuali'i Chapter, Kaua'i County Council, Kaua'i County Mayor, Kaua'i Health Heritage Coastal Corridor Committee, Kaua'i Historical Society, Kaua'i Historic Preservation Commission.
- Interviews (Once the participant was identified, she/he was contacted and interviewed. Excerpts from the interview are used throughout the CIA report, wherever applicable.)
- Report (A CIA report was prepared that documents relevant information on traditions and practices from the historic record as well as from contemporary oral sources. The report includes cultural and historic documentation of Kapa'a, a summary of archaeological studies, the results of community consultation and an assessment of traditional resources/traditional practices.

The project area lies in the traditional ahupua'a of Kapa'a which belongs to the ancient district of Puna (now the district is more commonly called "Kawaihau"), one of five ancient districts on Kaua'i (King 1935: 228). Puna was the second largest district on Kaua'i, behind Kona, and extended from Kipu south of Lihu'e to Kamalomalo'o, just north of Kealia.

For taxation, educational and judicial reasons, new districts were created in the 1840s. The Puna District, with the same boundaries became the Lihu'e District, named for an important town in that district. In 1878, by the act of King Kalākaua in securing a future name for the new Hui Kawaihau, created the new district of Kawaihau.

This new district encompassed the ahupua'a ranging from Olohena on the south to Kilauea on the north. Subsequent alterations to district boundaries in the 1920s left Kawaihau with Olohena as its southernmost boundary and Moloa'a as its northernmost boundary (King 1935:222).

Historically, these ahupua'a contained two prominent landscape features, a coastal plain with sand dunes and a large marsh. An 1872 map by James Gay delineating the boundaries of Kapa'a and adjacent lands shows that much of the makai region was a "swamp" that extended from Waipouli into Kapa'a.

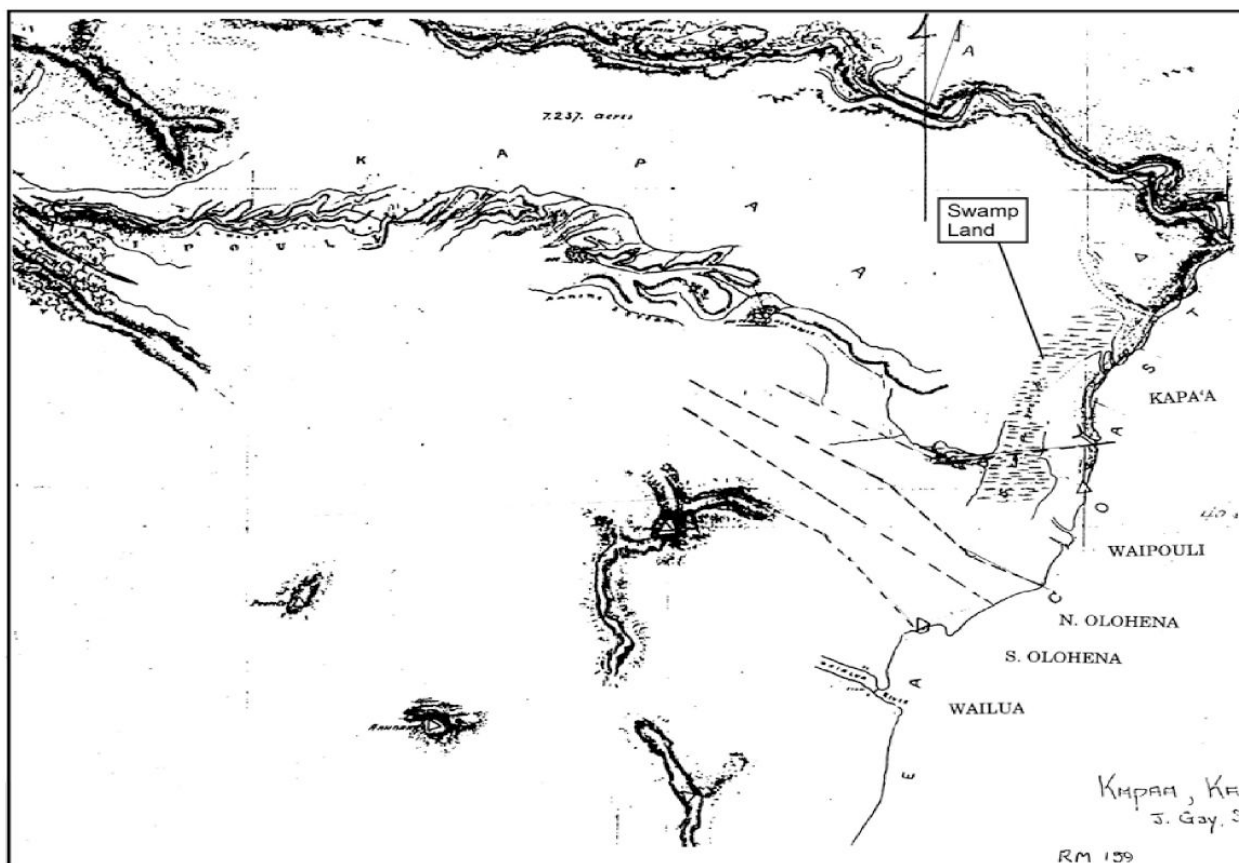
This "swamp" appears to be the most prominent natural feature of the seaward end of Waipouli and Kapa'a. The makai areas of the ahupua'a can be characterized as fairly flat. Kapa'a has an irregularly-shaped gulches and small valleys in the uplands, through which small tributary streams run, including the Kapahi, Makaleha, Moalepe and Konohiki Streams. While some of these streams combine with

other tributaries in neighboring Keālia to form Kapa'a Stream, which empties into the ocean at the northern border of the ahupua'a, others flow directly into the marsh areas of Kapa'a and Waipouli (Handy and Handy 1972:394,423; Territorial Planning Board 1940:9).

Kapa'a Town area is built on a sand berm with ocean on the makai side and marsh on the mauka side. The sand berm was probably slightly wider here than in other localities, but dry land was probably always at a premium.

Hawaiian traditions that centered on Kapa'a in pre-contact times suggest the significance of, and association with, the *ali'i*. A survey of traditional mythological literature shows that Kapa'a was prominently associated with some of the most famous legendary and historical figures including Maui, Kawelo, Mō'ikeha, Māweke, Palila, Pāka'a and Kanaka Nunui Moe.

What few specific references there are suggest that high status habitation was focused near the coast with less intensive utilization of the uplands which were regarded as wild places. The most notable feature of the traditional accounts are the references to grasses and sedges (Kalukalu grass and Ahuawa rushes) which undoubtedly reflects in part the natural marsh lands near the coast but may also reflect transformation of the landscape through a denudation of trees by the activities of a relatively dense population harvesting slow growing trees for firewood and construction materials over many centuries.



Portion of 1872 Survey Map by James Gay, Showing Swamp Land in Puna.

The Organic Acts of 1845 and 1846 initiated the process of the Mahele, which introduced private property into Hawaiian society. In 1848 the crown and the ali'i received their lands. The common people received their kuleana in 1850. It is through information garnered from records for Land Commission Awards (LCAs) generated during the Mahele that specific documentation of traditional life in Kapa'a come to light.

Documents relating to Land Commission Awards (kuleana) during this period show, surprisingly, that only six individuals were awarded kuleana parcels in the relatively large ahupua'a of Kapa'a. Five of the six received multiple parcels and show characteristic similarities. They are Keo (LCA #3554, 3599), Kiau (#8843), Kamapaa (#8837), Ioane Honolii (#3971) and Hululii (#3638). All five had lo'i on the mauka side of the lowland swamp area, sometimes extending a short distance up into small, shallow gulches and valleys. Each also had a separate house lot located on the makai side of the swamp, adjacent to the beach.

Interestingly, the residential "village" of Kapa'a did not exist as a single entity, but was a series of small settlements or compounds that stretched along the shoreline of the ahupua'a and included (south to north) Kupanihi (Makahaikupanihi), Kalolo (Kaulolo), Puhi, and Ulukiu. The sixth individual, Ehu (#8247), was the only person to be awarded a single parcel in the upland area of Kapa'a at Moalepe valley, approximately five miles from the shore.

A check of the Foreign Testimony (F.T.) for Kuleana Claims to Quiet Land Titles in the Hawaiian Islands (1848-50) reveals the names of three 'auwai in Kapa'a. Cross referencing this information with various maps gives a general indication of their location: Makahaikupanihi, along the southern border near the shore and the settlement in Waipouli; Makea, near the current Kapa'a Public Library on the mauka side of Kūhiō Highway; and Kapa'a, probably along the current Kanaele Road.

There were no kuleana claims found within the project area.

Burials

The coastline in Kapa'a once contained extensive sand dunes that were documented in travels throughout the nineteenth century (Knudsen 1991; Alexander 1991). Most of the sand dunes were modified or destroyed at the onset of the twentieth century. This was due to the extensive use of the coastal areas for ranching, settlement, and new transportation routes like trains and roads.

Archaeological studies in the Kapa'a area demonstrate the widespread prehistoric use of sand as a medium for burials. Burials have been identified along the coast and extending well mauka of the coastline into present day Kapa'a Town. Cultural deposits found associated with burials in the Kapa'a area shed light on the Hawaiian tradition of burying members of the 'ohana in the kulaiwi, or birth land.

For Hawaiians, "man's immortality was manifest in his bones...Even the bones of the living became symbols of the link between man's progenitors and his own eventual immortality" (Pukui et al. 1972:106). Thus, the discovery of iwi (bones) is a very sensitive issue for the Hawaiian community requiring much mediation and protocol.

No burials are believed to be present within the project area and none are known in the vicinity.



There are no sites within the property as noted on the Kawaihau Planning District Heritage Resources map above.

Interviews

A substantial effort was made to locate knowledgeable informants for the area of Kapa'a. An attempt was made to contact as many individuals as possible. These led to the five knowledgeable parties that were interviewed for this project.

Through the consultation process, five individuals were identified as potential informants. Three had written letters of their knowledge of the area. Two others informants gave verbal interviews.

One of these spoke about the use of the lands for pasture when the Plantation ceased using the land for cane. The other informant was from the East Kaua'i Soil and Water District and had no knowledge any plantation ditches that were still intact within the project area. The old maps he had, showed the ditch system around Twin Reservoir which is located directly across Olohena Road from this property but the maps stop before this project area. This indicates that there were no permanent plantation ditch lines on this parcel.

No Native Hawaiian informants came forward to discuss any traditional gathering associated with this project area. The Office of Hawaiian Affairs gave a list of possible individuals with extensive knowledge of traditional cultural practices and resources but none knew of any for this project area.

Gathering for Plant Resources

Hawaiians utilized upland resources for a multitude of purposes. Forest resources were gathered, for not only the basic needs of food and clothing, but for tools, weapons, canoe building, house construction, dyes, adornments, hula, medicinal and religious purposes

The present project area is dominated by alien vegetation (albezia, ginger, California grass) although some traditional cultigens (banana, bamboo, kid and historically introduced food plants (papaya)) are present as well. Within the project area itself no specific documentation was found regarding gathering of plants during traditional Hawaiian times.

During the assessment there were no ongoing practices related to traditional gathering of plant resources identified in the present project area. None of the individuals contacted for this assessment identified any native plant gathering practices within the project area.

Historic Properties

No historic properties were identified within the project area or in the vicinity. The density of identified historic properties is far greater near the coast of Kapa'a Ahupua'a.

Trails

Based on nineteenth and twentieth century maps the primary transportation routes mauka/makai correlated closely to the existing major roadways. During the assessment there were no trail systems identified in the proposed project area.

Plantation Ditch System or 'Auwai

Based on the archaeological assessment (McMahon, 2012 & 2013), field checks, documentation from land records, plantations records and maps, and informants information, no remnants of these historic properties exist. Several pieces presumed to be remnant of the metal flumes (transportable irrigation) were found. It is also thought that the existing roads on the property might be filled.

Past Analysis

In researching archeological/cultural issues related to the HoKua Place/Kapa'a Highlands II site, past environmental review documents were studied.

The Final Environmental Impact Statement and Site Selection Study for the New Kapa‘a Intermediate School by The Keith Companies in 1993 analyzed an area bordering the HoKua Place property. The study noted,

“None of the potential school sites fall within an area identified as culturally sensitive on the County Cultural Sensitivity Maps and the sites have been historically disturbed through sugar cane cultivation and grazing activities. No archaeological, historical or cultural resources are known or expected to be present at any of the sites, however an archaeological inventory survey of the selected site will be conducted to insure that no archeological, historical or cultural resources of significance are impacted by the proposed development. Should such resources be found at the selected site, mitigation and/or preservation plans will be prepared in consultation with the State Department of Land and Natural Resources, State Historic Preservation Division, the County Planning Department, and the Kaua‘i Historic Preservation Review Commission.”

It is not known if an archeological inventory study was done for the site. The FEIS also notes a letter from the State Historic Preservation Division which states,

“A review of our records show that there are no known historic sites at these four proposed project locations.”

The Final Environmental Assessment for Kūhiō Highway Improvements, Extension of Temporary Bypass Road, Kūhiō Highway to Olohena Road by the State Department of Transportation in August 2004, analyzed the property surrounding the HoKua Place project site. It states,

“The project has been in agricultural use for over 100 years. During the course of this use, the site has been extensively disturbed and the likelihood of any archaeological or cultural artifacts remaining on site are extremely unlikely.”

“The project site has a long established history in sugar cane agricultural use. This use has removed the site from any cultural practices for over 100 years. The site has been fallowed in recent years and the road has been closed to the public with a gate off of Kūhiō Highway and concrete barrier walls in the vicinity of the ball field. During a site inspection several individuals were observed fishing for Samoan crab along the bridge. This practice can be conducted at any point along the canal however the bridge provided a convenient improved surface for this fishing activity. The proposed bypass road improvement will not preclude this fishing activity however the bridge location will not be suitable for fishing as the bridge will not include pedestrian easements.”

“Water resources are often identified as potential habitation sites however the Mo‘ikeha Canal is a man made and improved drainage feature therefore no habitation sites are likely to be found in the vicinity of the bridge.”

“The State Historic Preservation Division has not issued a determination regarding the impact of the proposed project and no statement of ‘no effect’ has been presented in the Draft EA. The Draft EA does state that the likelihood of finding any archaeological material is minimal as the project will not require any significant subsurface grading.”

The Final Environmental Assessment Wailua Facility Plan prepared for County of Kaua‘i, Department of Public Works, Division of Wastewater Management by Fukunaga & Associates Inc. in April 2008 analyzes the Wailua area as a whole. It states,

“Wailua is known for a culturally significant area in Kaua‘i, especially in the vicinity of the Wailua River. According to the Malae Heiau: Vegetation Removal and Landscaping Plan, “The lands along the Wailua River comprised a political, religious and social center for Kaua‘i’s paramount chiefs who resided at Wailua most of the year.”

“The Wailua Complex of Heiau is identified and registered on the National and State Register of Historic Places (NRHP). Landscape elements, such as historic plantation town architecture in Kapa‘a, are also known and preserved as a significant historic cultural value of Kaua‘i. The State Department of Land and Natural Resources (DLNR), Historic Preservation Division recognizes historically significant structures in Kapa‘a.

- Puuopae Bridge (Site #: 30089398, TMK: 4-4-02)
- Opaekaa Road Bridge (Site #: 30089377, TMK: 4-2-02:22)
- Seto Building (Site #: 30089379, TMK: 4-5-11:31)
- Kapa‘a School (Site #: 30089391, TMK: 4-6-14:31)
- Kawamura Residence and Utility Shed (Site #: 30089393, TMK: 4-5-08:16)
- Wailua Complex of Heiaus (Site #: 3008502, TMK: 3-9-06:01, 4-1-02:03, 4-2-13:17)
- Kukui Heiau (Site #: 3008108, TMK: 4-3-02:01)”

“According to the DLNR, Historic Preservation Division, the Wailua WWTP service areas are within historically sensitive areas requiring careful planning and monitoring to ensure proper preservation. The proposed project is in a culturally and historically significant area. However, since the project will be in areas that have been previously disturbed, no adverse effect on significant historic sites or human burials is anticipated. Construction and the required mitigation plans will be coordinated with the State Historic Preservation Division, the Kaua‘i Burial Council and the Office of Hawaiian Affairs in accordance with the Hawai‘i Revised Statutes (HRS) and the Hawai‘i Administrative Rules to minimize any long term negative impacts on historic sites.”

4.2.2 Potential Environmental Impacts & Mitigation Measures

Archaeological, Historic and Cultural Resources

An Archaeological Assessment and A Cultural Impact Assessment was conducted for the proposed HoKua Place (formerly known as Kapa‘a Highlands II). Historic research of the project area was carried out to identify any cultural resources or traditional cultural practices associated with the area encompassing the proposed HoKua Place. In addition, community consultation was conducted. An attempt was made to contact parties regarding cultural knowledge, land use history, cultural sites and traditional Hawaiian or other cultural practices in the vicinity of the project area. Five individuals came forward as knowledgeable informants. In addition to the informants, other community members shared valuable information regarding traditional land use, attitudes and practices associated with the project area.

The marshlands of Kapa‘a were once a significant resource prior to Western contact. The fringes of the marsh were utilized for lo‘i kalo, and other resources including the gathering of kalukalu, a type of grass utilized for kapa. Places in the marshes also served as fishponds. Vestiges of the cultural significance of the marshlands are retained in the mo‘olelo and ‘olelo no‘eau particular to this area. With the establishment of the sugar plantations in the late nineteenth century, the marshlands were significantly altered. Marsh areas were drained and filled to create more dryland for commercial agriculture and pasture land.

Several individuals consulted and interviewed grew up fishing for 'ōpae and 'o'opu in the irrigation ditches which once drained the swamps. They expressed sadness at the changing of the landscape and the passing of their childhood traditions with the final draining and filling of the swamps. No further concerns regarding the marshlands were expressed other than the presumed low potential of possibly encountering habitation deposits and burials related to former LCA parcels.

The CIA report documents the use of the 'auwai or plantation ditches for irrigation and water use by the residents up until the 1960s. The 'auwai were also utilized for a variety of activities beyond their primary irrigation purpose. The bulk of the 'auwai have been lost through modern pasturage, disuse and adjacent road improvements.

In general the community emphasized the importance of communicating with the 'ohana of Kapa'a regarding changes to the land. This includes asking permission of the 'ohana, including 'uhane (immortal spirits) for opening up the land to proposed new uses. It was stressed that this and other protocols are necessary to "open the path" for change, thus avoiding accidents and potential obstacles of a cultural nature.

4.2.3 Level of Impact after Mitigation

As noted in Exploration Associates Limited's field checks, archaeological assessment (Exhibit L) and cultural impact assessment (Exhibit M) of the property, as well as prior archeological and cultural evaluations for neighboring properties, no archaeological sites or historic preservation concerns are evident on or in the vicinity of the property.

There are no known traditional resources or cultural practices associated with the HoKua Place Project Area.

If in the unlikely event that any human remains or other significant subsurface deposits are encountered during the course of development activities, all work in the immediate area will stop and the State Historic Preservation Division will be promptly notified.

4.3 Biological Resources

This section discusses the biological resources (flora and fauna) in the region and in project area, the potential impacts of the project on those resources and mitigation measures the project will take to mitigate those potential impacts.

4.3.1 Environmental Setting

The project site has been extensively used for sugar cane cultivation for many years. The project site is currently fallow and was last cultivated over 15-years ago.

Botanical Survey

During April and May of 2012 a botanical survey was conducted on a 97 acre parcel in Kapa`a, Kaua`i, referred to as HoKua Place (formerly known as Kapa`a Highlands II) (TMK (4)3-8-003:001). This research documented 44 vascular plant species within the survey area. Forty taxa were non-native plant species, three taxa were very common indigenous native species, and one taxon was a Polynesian introduction. (The Report is found in Exhibit J.)

That investigation concluded, "No federally listed as threatened or endangered plant species were observed within or near the survey area." (Text case was changed to sentence case - the report had this sentence in All Caps.)

Botanical Survey Methods

On April 19, 2012 and May 7, 2012, K. R. Wood (Endangered Species Specialist) and assistant Megan D. Kirkpatrick (M.S. Environmental Science) conducted a biological inventory on an undeveloped parcel of property in Kapa`a, Kaua`i (TMK [4]3-8-003:001). The survey area is approximately 97-acres of undeveloped land. The primary objectives of this field survey were to:

- a. search for threatened and endangered plant species as well as species of concern;
- b. provide a complete vascular plant checklist of both native and non-native plant taxa observed on property; and
- c. provide a summary concerning the conservation status of all native taxa observed;

A walk-through survey method was used. Transects included walking/driving around boundaries of property (TMK (4)3-8-003:001) and several transects through the interior portions of property. Plant identifications were made in the field and were recorded. Plant names and authors of dicots and monocots follow Wagner et al. (1990) and pteridophytes follow Palmer (2003). Plants of particular interest were collected by the second author (MK) as herbarium specimen vouchers and deposited at the National Tropical Botanical Garden (NTBG) herbarium. Specimens were placed in newspaper sheets and pressed in-between cardboard herbarium presses and dried at the NTBG.

Botanical Survey Results

The study area represents a lowland non-native mesic plant community dominated by secondary vegetation of trees, shrubs, and grasses, many of which are considered invasive. The land is vacant and currently undeveloped and has a past history of grazing and sugarcane cultivation.

The non-native grass *Panicum maximum* (Poaceae – Guinea grass) and non-native shrub or small tree *Leucaena leucocephala* (Fabaceae – koa haole) are by far the dominant species found at the site.

Additional common non-native trees and shrubs include: *Lantana camara* (Verbenaceae – lākana), *Indigofera suffruticosa* (Fabaceae – indigo), *Syzygium cumini* (Myrtaceae – Java plum), *Psidium guajava* (Myrtaceae – guava), *Spathodea campanulata* (Bignoniaceae – African tulip), and *Senna surattensis* (Fabaceae – kolomona).

Several less common non-native trees and shrubs include: *Clidemia hirta* (Melastomataceae – Koster's curse), *Cinnamomum camphora* (Lauraceae – camphor tree), *Falcata moluccana* (Fabaceae – albezia), *Ficus microcarpa* (Moraceae – Chinese banyan), and *Schefflera actinophylla* (Araliaceae – octopus tree).

No Hawaiian endemic species (i.e., restricted to only Hawai'i) were observed. One Polynesian introduction was observed, namely *Aleurites moluccana* (Euphorbiaceae – kukui tree) which is common throughout the Hawaiian Islands. The three indigenous species found at the site are quite common and include: *Hibiscus tiliaceus* (Malvaceae – hau) which is also often an invasive tree species, the fern species *Psilotum nudum* (Psilotaceae – moa), and *Waltheria indica* (Sterculiaceae – `uhaloa). For complete checklist of species see Table 1 which also includes the common names and status (i.e., indigenous/naturalized) category of each taxon.



In addition to the survey, a review of other reports was conducted as part of the assessment. According to the Hawai'i Natural Diversity Database, there have been no recordings of rare species or eco-systems on the subject property. Considering that the 97-acres have no natural water resources, the near proximity of residential and commercial neighborhoods and the adjacent public school, threatened or endangered birds are not expected to frequent the site.

Botanical Resources

The dominate vegetation zone along the eastern coast of Kaua'i is made up of open guava forest with shrubs. Characteristic vegetation within this zone includes guava, Koa Haole, Lantana, Spanish clover and Bermuda grass.

Surrounding residential and commercial areas are planted with Coconut trees, common landscaping trees, bushes and ornamental plants. The areas along the Moikeha Canal banks are heavily vegetated with invasive mangrove.

Avian and Mammalian Survey

An avian and mammalian survey was conducted on an approximately 97-acre parcel of land identified as Tax Map Key (4) 3-8-003:001 located in Kapa'a, Island of Kaua'i.

The associated report is identified as Exhibit K in this assessment. The report describes the methods used and the results of the avian and terrestrial mammalian surveys conducted on the project site. Both surveys were conducted as part of the environmental disclosure process associated with the proposed project.



Hau bushes along southwestern bounday

The primary purpose of the surveys was to determine if there are any avian and terrestrial mammalian species currently listed, or proposed for listing under either federal or State of Hawai'i endangered species statutes within or adjacent to the study area. The federal and State of Hawai'i listed species status follows species identified in the following referenced documents, (Department of Land and Natural Resources (DLNR) 1998; U. S. Fish & Wildlife Service (USFWS) 2005, 2012). The avian and mammalian surveys were conducted May 21, 2012.

Avian Survey Methods

A total of six avian point count stations were sited roughly equidistant from each other within the project site. Six-minute point counts were made at each of the count stations. Each station was counted once.

Field observations were made with the aid of Leica 8 X 42 binoculars and by listening for vocalizations. Point counts were concentrated during the early morning hours, the peak of daily bird activity. Time not spent counting was used to search the remainder of the project site for species and habitats that were not detected during count sessions.

Mammalian Survey Methods

With the exception of the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), or 'ōpe'ape'a as it is known locally, all terrestrial mammals currently found on the Island of Kaua'i are alien species, and most are ubiquitous. The survey for terrestrial mammalian species was limited to visual and auditory detection, coupled with visual observation of scat, tracks, and other animal sign.

No trapping program or heterodyne bat detection survey methods were used during the course of this survey. A running tally was kept of all terrestrial vertebrate mammalian species detected within the project area during time spent within the project site.

Avian Survey Results

A total of 193 individual birds of 17 species, representing 13 separate families, were recorded during station counts. All 17 species recorded are alien to the Hawaiian Islands. Avian diversity and densities were in keeping with the location of the property and the habitat presently on the site.

Four species, House Finch (*Carpodacus mexicanus*), Nutmeg Mannikin (*Lonchura punctulata*), Japanese White-eye (*Zosterops japonicus*) and Zebra Dove (*Geopelia striata*) accounted for slightly more than 45 percent of all birds recorded during station counts.

The most commonly recorded species was House Finch, which accounted for 14 percent of the total number of individual birds recorded. An average of 32 individual birds was recorded per station count; a number that is about average for point counts in this area on the Island of Kaua'i.

No avian species currently proposed or listed under either the State of Hawai'i or federal endangered species statutes was detected during the course of the survey, nor would they be expected given the habitat currently present on the site.

Mammalian Survey Results

Four terrestrial mammalian species were detected while on the site. Numerous dogs (*Canis f. familiaris*) were heard barking from areas adjacent to the site. Tracks and scat of pig (*Sus s. scrofa*) were encountered within the site. Tracks, and scat of both horse (*Equus c. caballus*) and cow (*Bos taurus*), were also encountered within the site.

Avian Resources

The findings of the avian survey are consistent with the location of the property, and the habitat present on the site. As previously stated all of the avian species detected during the course of this survey are alien to the Hawaiian Islands.

Although not detected during this survey, the endangered Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened endemic sub-species of the Newell's Shearwater (*Puffinus auricularis newelli*) have been recorded over-flying the project site between April and the end of November each year (David, 1995; Morgan et al., 2003, 2004; David and Planning Solutions 2008).



Typical Guinea grass/koa haole shrub vegetation looking northwest

Additionally, the Save Our Shearwaters Program has recovered both species from the general project area on an annual basis over the past three decades (Morgan et al., 2003, 2004; David and Planning Solutions, 2008; Save our Shearwater Program, 2012).

The petrel is listed as endangered, and the shearwater as threatened under both Federal and State of Hawai'i endangered species statutes. The primary cause of mortality in both Hawaiian Petrels and Newell's Shearwaters is thought to be predation by alien mammalian species at the nesting colonies (USFWS 1983, Simons and Hodges 1998, Ainley et al., 2001).

Collision with man-made structures is considered to be the second most significant cause of mortality of these seabird species in Hawai'i.

Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. When disoriented, seabirds can collide with manmade structures, and if they are not killed outright, the dazed or injured birds are easy targets of opportunity for feral mammals (Hadley 1961; Telfer 1979; Sincock 1981; Reed et al., 1985; Telfer et al., 1987; Cooper and Day, 1998; Podolsky et al. 1998; Ainley et al., 2001; Hue et al., 2001; Day et al 2003).

There are no nesting colonies nor appropriate nesting habitat for either of these listed seabird species within the current study site.

Following build out it is probable that cleared areas, especially those that are landscaped as lawns, and or parking lots will provide loafing habitat for Pacific Golden-Plover (*Pluvialis fulva*).

The plover is an indigenous migratory shorebird species which nests in the high Arctic during the late spring and summer months, returning to Hawai'i and the Tropical Pacific to spend the fall and winter months each year. They usually leave Hawai'i for their trip back to the Arctic in late April or the very early part of May each year. This species is a common site around the state during the late fall and winter months.

Mammalian Resources

The findings of the mammalian survey are consistent with the location of the property and the habitat currently present on the site.

No Hawaiian hoary bats were seen overflying the site. Hawaiian hoary bats are widely distributed in the lowland areas on the Island of Kaua'i, and have been documented in and around almost all areas that still have some dense vegetation (Tomich, 1986; USFWS 1998, David, 2012).

Although no rodents were detected during the course of this survey, it is virtually certain one or more of the four established alien muridae found on Kaua'i, roof rat (*Rattus r. rattus*), Norway rat (*Rattus norvegicus*), European house mouse (*Mus musculus domesticus*) and possibly Polynesian rats (*Rattus exulans hawaiiensis*) use various resources found within the general project area.

All of these introduced rodents are deleterious to native ecosystems and the native faunal species dependant on them.

Past Analysis

In addition the surveys conducted, past environmental review documents were reviewed - statements from reports and analysis on neighboring properties follows.

The Final Environmental Impact Statement and Site Selection Study for the New Kapaa Intermediate School by The Keith Companies in 1993 analyzed an area bordering the HoKua Place property. The study noted,

“Typical vegetation observed throughout the service area include several types of palms, ironwood, Norfolk pine, papaya, guava, banana, mango, avocado, lantana, koa haole, hau, sugarcane, taro, java plum, and numerous grass species.”

“Domestic pets, feral animals, livestock and rodents make up the majority of the nonhuman mammals inhabiting the service area. The Hawaiian hoary bat, the only native land mammal can be found in the service area, while the endangered marine mammal, the monk seal, occasionally visits the area's shoreline.”

The present Kapa‘a Intermediate School was described as Site #1 in the FEIS. The analysis of that site states,

“Sites #1, #2, and #4 are or were until recently utilized for sugar cane cultivation and sugar cane is the primary botanical species present at these sites. No endangered plant or animal species are known or expected to be affected by establishment of a school at these locations.”

“The native Hawaiian seabird, Newell's Shearwater, listed as "threatened" under the Federal Endangered Species Act, is known to nest in the interior mountains above the Wailua area. Shearwaters leaving their nests at night can become disoriented and confused by urban lights and may become exhausted or fly into unseen objects such as utility wires, trees, buildings and automobiles. School facilities lighting can be designed and located to minimize the attraction and confusion impacts on Newell's Shearwater. Avoidance of situations where light glare projects upward or laterally, particularly during the critical fallout period of October and November, will minimize adverse impacts on this unique species.”

The Final Environmental Assessment for Kūhiō Highway Improvements, Extension of Temporary Bypass Road, Kūhiō Highway to Olohena Road by the State Department of Transportation in August 2004, analyzed the property surrounding the HoKua Place project site. It states,

“The majority of the project alignment is covered with koa haole, giant sensitive plant, and various noxious weedy species. These plants are typical of fallowed agricultural fields. The area along the Moikeha Canal banks is heavily vegetated with mangrove, which is also considered a pest. No rare, threatened or endangered species of flora were observed along the project alignment.”

“The site does not serve as an endangered wildlife habitat although avifauna, feral cats, dogs and rodents may be found on-site. A few egrets were observed onsite in the grassy areas outside of the project alignment. No rare or endangered species of avifauna were identified.

Fauna within the canal include mosquito fish, tilapia, crayfish and Samoan crabs. It is also likely that some ocean fish, such as barracuda, may enter the lower portions of the canal."

The Final Environmental Assessment Wailua Facility Plan prepared for County of Kauai, Department of Public Works, Division of Wastewater Management by Fukunaga & Associates Inc. in April 2008 analyzes the Wailua area as a whole. It states,

"According to the data compiled by the Hawaii Biodiversity and Mapping Program and the Hawaii Gap Analysis Program, the project area has multiple classifications of low intensity development, cultivated land, grassland, scrub shrub and wetland habitats. The predominant vegetation zone along the eastern coast of Kauai is made up of open guava forest with shrubs. Characteristic vegetation within this zone includes Guava, Koa Haole, Lantana, Spanish clover and Bermuda grass. Surrounding residential and commercial areas are planted with Coconut trees, vegetable gardens, common landscaping trees, bushes and ornamental plants. The project areas are highly disturbed, and it is unlikely that any endangered species of flora are in the areas."

"Mammals in the vicinity of the project include feral cat, roof rat, cattle, dog, pig, and the Hawaiian hoary bat. Birds that are associated with the prevalent vegetation type along the eastern coast of Kauai include cardinal, spotted dove, barred dove, mockingbird, mynah, ricebird, white eye, house sparrow, elepaio, pueo, and golden plover. 'Elepaio and pueo are native Hawaiian birds, and the golden plover is an indigenous Hawaiian bird."

"The U.S. Department of the Interior, Fish and Wildlife Service confirmed that there is no federally designated critical habitat in the proposed project area. However, the following species are observed in the project vicinity and listed as federally threatened and endangered species.

Federally threatened species: Newell's shearwater (*Puffinus auricularis newelli*)

Federally endangered species: Hawaiian petrel (*Pterodroma phaeopygia sandwichensis*); Hawaiian hoary bat (*Lasurus cinereus semotus*); Hawaiian duck (*Anas wyvilliana*); Hawaiian stilt (*Himantopus mexicanus knudseni*); Hawaiian goose (*Branta sandvicensis*); Hawaiian moorhen (*Gallinula chloropus sandvicensis*); Hawaiian coot (*Fulica alai*); Hawaiian monk seal (*Monachus schauinslandi*).

The project areas are already highly disturbed, and it is unlikely that any of the endangered or critical fauna species listed above inhabit the areas."

"Construction timing should avoid disturbance to possible nesting wetland birds in area adjacent to wetlands. Hawaiian petrel and Newell's shearwater are known to transit this area and are prone to collisions with objects in artificially-lighted areas. Artificial lighting and structures higher than the current existing vegetation will attract seabirds circling the light source, and they might collide with structures or fall to the ground. Lights should be designed to prevent the attraction of these nocturnal seabirds (i.e. no emit light upward or no light at night). Contractors need to consult with U.S. Fish and Wildlife Service if necessary."

"There are no indications of rare or endangered flora in the project area. Although the U.S. Department of Interior, Fish and Wildlife Service has confirmed that threatened and endangered

species are observed in Wailua-Kapaa area, the project sites are already highly disturbed and developed. Therefore, no negative impacts to existing plants and mammals are anticipated.”

4.3.2 Potential Environmental Impacts & Mitigation Measures

Botanical

As all of the plant species recorded are either naturalized species or common indigenous species it is not expected that the development and operation of the proposed subdivision will result in deleterious impacts to any botanical species currently listed or proposed for listing under either federal or State of Hawai'i endangered species statutes.

The Conclusion of the Botanical Survey concluded: No threatened or endangered plant species were observed within or anywhere near the survey area during research and therefore there are no concerns about possible impacts to rare plant species at the HoKua Place (formerly known as Kapa'a Highlands II) project. The current conditions of this study site indicate that the area has been dominated by non-native weedy species for a very long time. The senior author certified his expertise with more than 25 years conducting biological inventories within the Hawaiian Islands and has specialized in the conservation of Hawai'i's Federally Listed as Endangered plant species, including those considered Candidates for listing, Species of Concern, or Federally Listed as Threatened (USFWS 1999a, 1999b, 2004, 2010).

Seabirds

The principal potential impact that construction and operation of the HoKua Place (formerly known as Kapa'a Highlands II) project poses to protected seabirds is the increased threat that birds will be downed after becoming disoriented by lights associated with the project during the nesting season. The two main ways that outdoor lighting could pose a threat to these nocturnally flying seabirds is if, 1) during construction it is deemed expedient, or necessary to conduct nighttime construction activities, and 2) following build-out, the potential operation of streetlights and exterior safety and security lighting.

Hawaiian hoary bat

The principal potential impact that the development of the HoKua Place (formerly known as Kapa'a Highlands II) project poses to bats is during the clearing and grubbing phases of construction as vegetation is removed. The removal of vegetation within the project site may temporarily displace individual bats, which may use the vegetation as a roosting location.

As bats use multiple roosts within their home territories, the potential disturbance resulting from the removal of the vegetation is likely to be minimal. During the pupping season, females carrying their pups may be less able to rapidly vacate a roost site as the vegetation is cleared.

Additionally, adult female bats sometimes leave their pups in the roost tree while they forage. Very small pups may be unable to flee a tree that is being felled. Potential adverse effects from such disturbance can be avoided or minimized by not clearing woody vegetation taller than 4.6 meters (15-feet), between June 15 and September 15, the period in which bats are potentially at risk from vegetation clearing.

Critical Habitat

There is no federally delineated Critical Habitat for any species present on or adjacent to the project area. Thus the development and operation of the proposed project will not result in impacts to federally designated Critical Habitat. There is no equivalent statute under State law.

Invertebrates

No voids or lava tube entrances etc were noted on the site. Likewise, there is no evidence of standing water or streams on the site. These are two conditions that could indicate habitat for listed invertebrates.

The two listed subterranean invertebrates on the Island of Kaua'i have only been found in the Po'ipū/Kukui'ula area.

Based on this, there is no evidence of listed invertebrates on the project site.

Recommended Mitigation Measures

- All exterior lights installed in conjunction with the proposed project should be shielded to reduce the potential for interactions of nocturnally flying seabirds with external lights and man-made structures (Reed *et al.*, 1985; Telfer *et al.*, 1987). Any lighting fixtures that meet the "Dark Skies" guidelines are appropriate.
- It is recommended that woody vegetation taller than 4.6 meters (15-feet), not be cleared between June 1 and September 15, the period in which bats are potentially at risk from vegetation clearing. As an alternative to this, the areas with vegetation exceeding 15-feet that are scheduled for removal will first be reviewed by a qualified land manager, biologist, forester, etc prior to the vegetation removal. The DLNR and the USFWS will be notified if the 'ōpe'ape'a is found to be in trees scheduled for removal.
- It is recommended that, where appropriate and practicable, native plant species be used in landscaping efforts. Not only is this ecologically prudent, but also if the appropriate plants are used, it will also likely save maintenance and water costs over the long term.

4.3.3 Level of Impact after Mitigation

As noted in the botanical survey by Wood & Kirkpatrick (Exhibit J) and the biological surveys (avian and mammalian) (Exhibit K) by Rana Biological Consulting Inc. of the property, as well as prior botanical and biological surveys for neighboring properties, no species currently proposed or listed as threatened or endangered under either the federal or state of Hawaii endangered species statutes were documented on the subject property.

There is no federally delineated Critical Habitat for any species present on or adjacent to the project area. Thus, the development and operation of the proposed project will not result in impacts to federally designated Critical Habitat. There is no equivalent statute under State law.

The project will follow all applicable rules and regulation and adhere to the mitigation measure described above. The project will not have a significant impact on any botanical or biological resources.

4.4 Visual & Aesthetic Resources

This section describes the existing visual, vista and viewplane conditions on within the project area, discusses the visual impacts the project may have, and identifies how the project mitigates its potential visual impacts.

4.4.1 Environmental Setting

HoKua Place entails approximately 97-acres north of Kapa'a town. The Kapa'a By-Pass Road separates the town and the Property.

The Property is on the north-west corner of the Kapa'a By-Pass Road and Olohena Road. Olohena Road runs along and adjacent to the east and north boundaries of the Property. The Kapa'a Middle School is located on the northern end of the Property fronted by Olohena Road.



Aerial view of the subject property

The southern border of the Property, along the by-pass road, is elevated approximately 55 feet above msl. The Property rises in elevation to the northern border approximately 130 feet above msl or an average upslope of less than 5%. There are particular areas of the property with 20% slopes.



Aerial view of the subject property

The Property is located on an elevated plateau and the topography of the Property affords many ocean view lots. Olohena Road bordering the northern property boundary is elevated adequately so ocean views will continue from that road.

The Property is currently fallow and is vegetated with Guinea Grass (*Panicum maximum*), Koa Haole (*Leucaena leucocephala*), and Java Plum (*Syzygium cumini*). Sugar cane cultivation was the last previous use of the property over fifteen years ago.

4.4.2 Potential Environmental Impact & Mitigation Measures

The project site is not part of a scenic corridor and the project will not affect scenic vistas and view planes. The proposed project will not involve significant alteration of the existing topographic character of the site and will not affect public views to and along the shoreline

Olohena Road, along the northern property of HoKua Place is well above the project site. The property slopes down approximately 5% from Olohena Road to the by-pass road to the south.

Re-vegetation with native plants will occur in areas disturbed by construction activities and overtime the vegetation near construction areas will grow and mature.

The architecture of the project will ensure that the project is compatible with its visual environment. The project will create structures which are both visually appealing and blend in with the scenery around them.

Additionally, there currently are high voltage electrical lines around part of the project's perimeter. The electrical utility (KIUC) and HoKua Place would like to run the lines underground thru the project, dependent upon funding. This would be a preventative measure to protect shearwater birds, and to beautify the historic Kapa'a town core area.

4.4.3 Level of Impact after Mitigation

The mitigation for the impacts to visual and aesthetic resources is incorporated into the project's design. Therefore, the level of the visual impact after mitigation will be less than significant.

4.5 Geology, Soils & Slope Stability

This section discusses the geology, soils and slope stability in the region and site area, the potential impact of the project on those characteristics, and mitigation measures project will employ to mitigate those potential impacts.

4.5.1 Environmental Setting

The southern border of the Property, along the by-pass road, is elevated approximately 55-feet above mean sea level (msl). The Property rises in elevation to the northern border approximately 130-feet above msl or an average upslope of 5%. There are areas of the Property with 20% slopes. The topography of the Property affords many ocean views lots.

Soils

A soil inventory report was included in the Kapa'a Highlands Agricultural Master Plan by Agricon Hawaii LLC. The soil within the HoKua Place (formerly known as Kapa'a Highlands II) project area primarily consists of Līhu'e-Puhi association, deep, nearly level to steep, well drained soils with fine texture and moderately fine texture subsoil. Permeability is moderately rapid, run-off is slow and erosion hazard is slight.

The following table describes the soil types on the entire 163-acre parcel of TMK (4) 4-003-003:001, which includes the HoKua Farm Lots and HoKua Place (formerly known as Kapa'a Highlands I and II).

Soil Type	Percent Slope	Map Unit Symbol	Acres	Percent
Hanalei silty clay	0 to 2 %	HnA	01.4	01%
Ioleau silty clay loam	2 to 6 %	IoB	44.5	27%
Ioleau silty clay loam	6 to 12 %	IoC	16.2	10%
Ioleau silty clay loam	12 to 20 %	IoD2	10.7	07%
Ioleau silty clay loam	20 to 35 %	IoE2	24.7	15%
Līhu'e silty clay	0 to 8 %	LhB	08.4	05%
Līhu'e silty clay	8 to 15 %	LhC	00.8	00%
Līhu'e silty clay	15 to 25 %	LhD	04.0	02%
Mokuleia clay loam, poorly drained variant	NA	Mta	03.2	02%
Marsh	NA	MZ	00.3	00%
Pohakupu silty clay loam	0 to 8 %	PkB	00.9	01%
Puhi silty clay loam	3 to 8 %	PnB	31.9	20%
Rough Broken Land	NA	rRR	15.0	09%
		TOTAL	162.0	100%

Hanalei Series

This series consists of somewhat poorly drained to poorly drained soils on bottom lands on the Islands of Kaua'i and O'ahu. These soils developed in alluvium derived from basic igneous rock. They are level to gently sloping. Elevations range from nearly sea level to 300-feet. The annual rainfall amounts to 20 to 120-inches. The mean annual soil temperature is 74 F. Hanalei soils are geographically associated with Haleiwa, Hihimanu, Mokuleia and Pearl Harbor soils. These soils are used for taro, pasture, sugarcane and vegetables. The natural vegetation consists of para-grass, sensitive-plant, honohono, Java plum and guava.

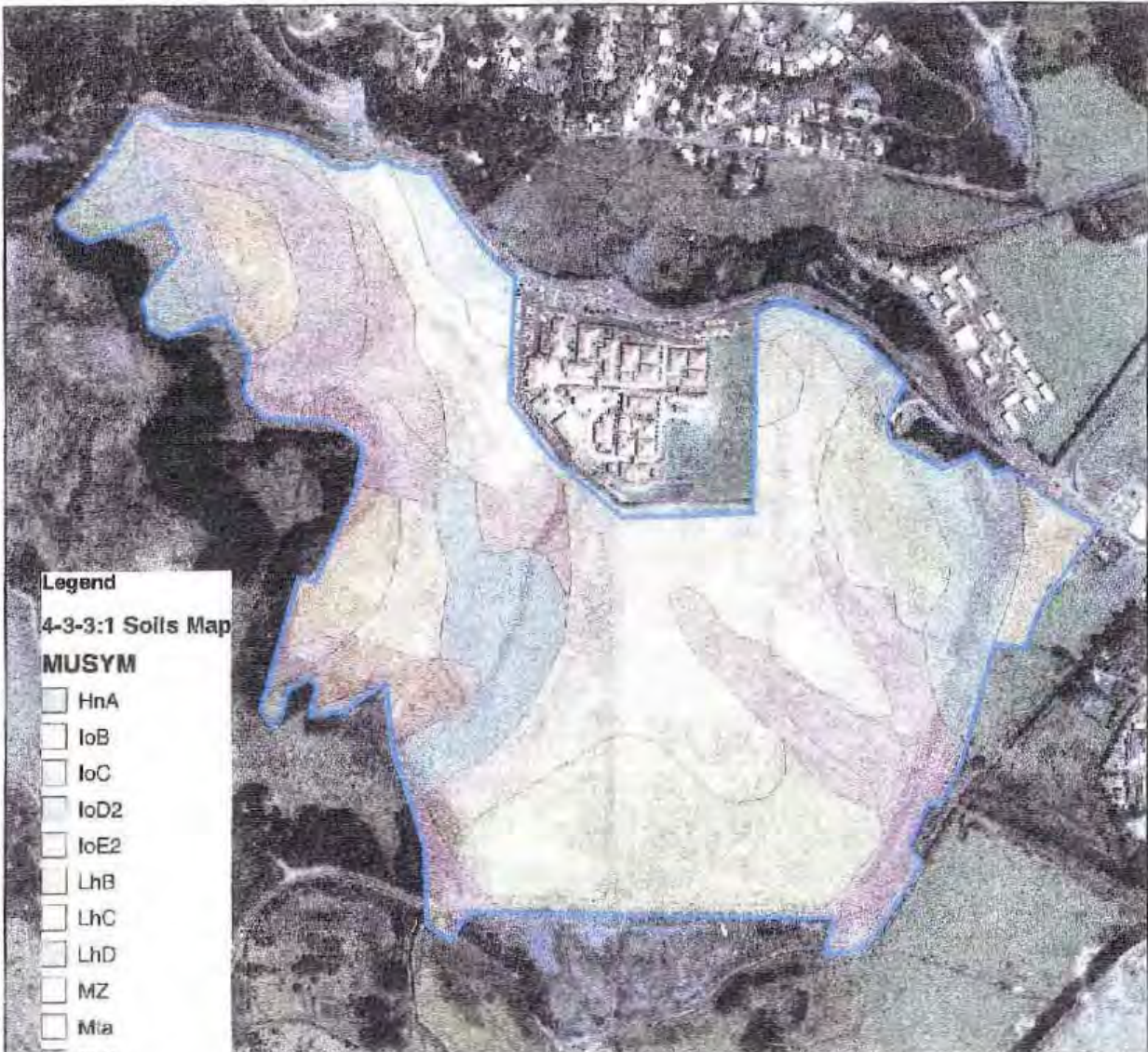
TMK 4-3-3:1 Soils Map

Date: 2/28/2007

District: EAST KAUAI SOIL AND WATER CONSERVATION DISTRICT

Field Office: LIHUE SERVICE CENTER
Agency: NRCS

State and County: HI, KAUAI



tmk_a_hi007



Image: highest-1-s_hi007.tif

325 0 325 650 975 1300 Feet



Ioleau Series

This series consists of well-drained soils on uplands on the island of Kaua'i. These soils developed in material weathered from basic igneous rock, probably mixed with volcanic ash. They are gently sloping to steep. Elevations range from 100 to 750-feet. The annual rainfall amounts to 40 to 70-inches. The mean annual soil temperature is 72 F. Ioleau soils are geographically associated with Līhu'e and Puhi soils.

These soils are used for irrigated sugarcane, pasture, pineapple, irrigated orchards, irrigated truck crops, wildlife habitat and woodland. The natural vegetation consists of lantana, koa haole, guava and associated shrubs and grasses.

Līhu'e Series

This series consists of well-drained soils on uplands on the island of Kaua'i. These soils developed in material weathered from basic igneous rock. They are gently sloping to steep. Elevations range from nearly sea level to 800 feet. The annual rainfall amounts to 40 to 60 inches. The mean annual soil temperature is 73 F. Līhu'e soils are geographically associated with Ioleau and Puhi soils.

These soils are used for irrigated sugarcane, pineapple, pasture, truck crops, orchards, wildlife habitat, woodland and homesites. The natural vegetation consists of lantana, guava, koa haole, joe, kikuyu-grass, molasses-grass, guinea-grass, Bermuda-grass and Java plum.

Mokuleia Series

This series consists of well-drained soils along the coastal plains on the islands of O'ahu and Kaua'i. These soils formed in recent alluvium deposited over coral sand. They are shallow and nearly level. Elevations range from nearly sea level to 100 feet. The annual rainfall amounts to 15 to 40 inches on O'ahu and 50 to 100 inches on Kaua'i. The mean annual soil temperature is 74 F. Mokuleia soils are geographically associated with Hanalei, Jaucas and Keaau soils.

In this survey area a poorly drained variant of the Mokuleia series was mapped. This soil, Mokuleia clay loam, poorly drained variant, is described in alphabetical order, along with other mapping units of this series.

These soils are used for sugarcane, truck crops and pasture. The natural vegetation consists of kiawe, klu, koa haole and Bermuda-grass in the drier areas and napier-grass, guava and joe in the wetter areas.

Marsh

Marsh consists of wet, periodically flooded areas covered dominantly with grasses and bulrushes or other herbaceous plants. Approximately 0.30-acres of the property (representing a statistically insignificant portion of the overall property) are identified as having "Marsh" soils classification. Characteristics of this soil type include "wet, periodically flooded areas" and "water stands on the surface." However, upon inspection of the site, there are no wet areas or any standing water.

The area identified with this soil type is situated entirely within the HoKua Farm Lots (formerly known as Kapa'a Highlands I) and is in the "Open Space" of the HoKua Farm Lots project. No construction is proposed in the project "Open Space."

Since no construction will occur in this area, there will be no harm, changes or loss of this area.

Pohakupu Series

This series consists of well-drained soils on terraces and alluvial fans on the islands of O‘ahu and Kaua‘i. These soils formed in old alluvium derived from basic igneous material. They are nearly level to moderately sloping. Elevations range from 50 to 250-feet. The annual rainfall amounts to 40 to 50-inches. The mean annual soil temperature is 73 F. Pohakupu soils are geographically associated with Alaeloa, Papaa and Līhu‘e soils.

These soils are used for sugarcane, pineapple, truck crops, pasture and homesites. The natural vegetation consists of guava, Christmas berry, Japanese tea, koa haole and kikuyu-grass.

Puhi Series

This series consists of well-drained soils on uplands on the island of Kaua‘i. These soils developed in material derived from basic igneous rock. They are nearly level to steep. Elevations range from 175 to 500-feet. The annual rainfall amounts to 60 to 80-inches. The mean annual soil temperature is 73 F. Puhi soils are geographically associated with Līhu‘e and Kapa‘a soils.

These soils are used for sugarcane, pineapple, truck crops, orchards, pasture, woodland, wildlife habitat water supply and homesites. The natural vegetation consists of guava, Java plum, pangola-grass, kikuyu-grass, elephantopus, joe, yellow fogtail and rhodomyrtus.

Rough Broken Land

Rough broken land consists of very steep land broken by numerous intermittent drainage channels. In most places it is not stony. It occurs in gulches and on mountainsides on all the islands except O‘ahu. The slope is 40 to 70 percent. Elevations range from nearly sea level to about 8,000-feet. The local relief is generally between 25 and 500-feet. Runoff is rapid, and geologic erosion is active. The annual rainfall amounts to 25 to more than 200-inches.

These soils are variable. They are 20 to more than 60-inches deep over soft, weathered rock. In most places some weathered rock fragments are mixed with the soil material. Small areas of rock outcrop, stones and soil slips are common. Included in mapping were areas of colluvium and alluvium along gulch bottoms.

This land type is used primarily for watershed and wildlife habitat. In places it is used also for pasture and woodland. The dominant natural vegetation in the drier areas consists of guava, lantana, Natal redtop, Bermuda-grass, koa haole and molasses-grass. ‘Ōhi‘a, kukui, koa and ferns are dominant in the wetter areas. Puakeawe, a‘ali‘i and sweet vernal-grass are common at the higher elevations.

4.5.2 Potential Environmental Impacts & Mitigation Measures

Applicable law will be followed to minimize soil movement, erosion and compaction during all project actions.

Both short-term construction and long-term maintenance BMPs will be included in any permit conditions. Implementation of Best Management Practices (BMPs) will ensure that the alterations to the terrain minimize erosion, water quality degradation and other environmental impacts.

4.5.3 Level of Impact after Mitigation

As noted in the Kapa'a Highlands Agricultural Master Plan by Agricon Hawaii LLC., which includes a soil inventory report (Exhibit C), the soils at HoKua Place (formerly known as Kapa'a Highlands II) are generally well drained and the soils can be expected to be low in organic matter. Further, the soil is not ideal for the growing of most commercially viable crops due to poor soil. No impacts on geological resources were noted in the Agricultural Master Plan or accompanying soil inventory report.

The mitigation measures proposed will further reduce the level of impact to geologic resources, which is considered less than significant without any mitigation.

4.6 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.

4.6.1 Environmental Setting

A stream exists within the HoKua Farm Lots (formerly known as Kapa'a Highlands I), flowing from north to south along the western border of HoKua Place. The stream flows along the boundary, passes under a bridge on the By-Pass Road at the southwest corner of the property, and empties into the Waiākea drainage canal about 800' downstream from the property.

HoKua Place is committed to keeping the flow of the stream consistent to prevent any potential health and mosquito problems associated with streams when not flowing naturally.

The irrigation facility for this former sugar land is no longer available. There are numerous abandoned irrigation ditches on the property have been reduced or rendered inoperable as the property is developed.

Water Sources

With respect to water resources to be used within the project, two alternatives are considered. First, if the County Department of Water Supply makes a final decision to approve the applicant's Water Master Plan where DOW will provide HoKua Place (formerly known as Kapa'a Highlands II) with storage for water in exchange for HoKua Place dedicating its well site to the DOW to feed the Department of Water's storage tanks and existing water system. In the event the DOW does not make final approval of the applicant's Water Master Plan, then the applicant will develop a private water system, using the well for its use within the project.

Implementation of a final alternative is based on the decision of the County Department of Water Supply; each is an acceptable alternative to the applicant.

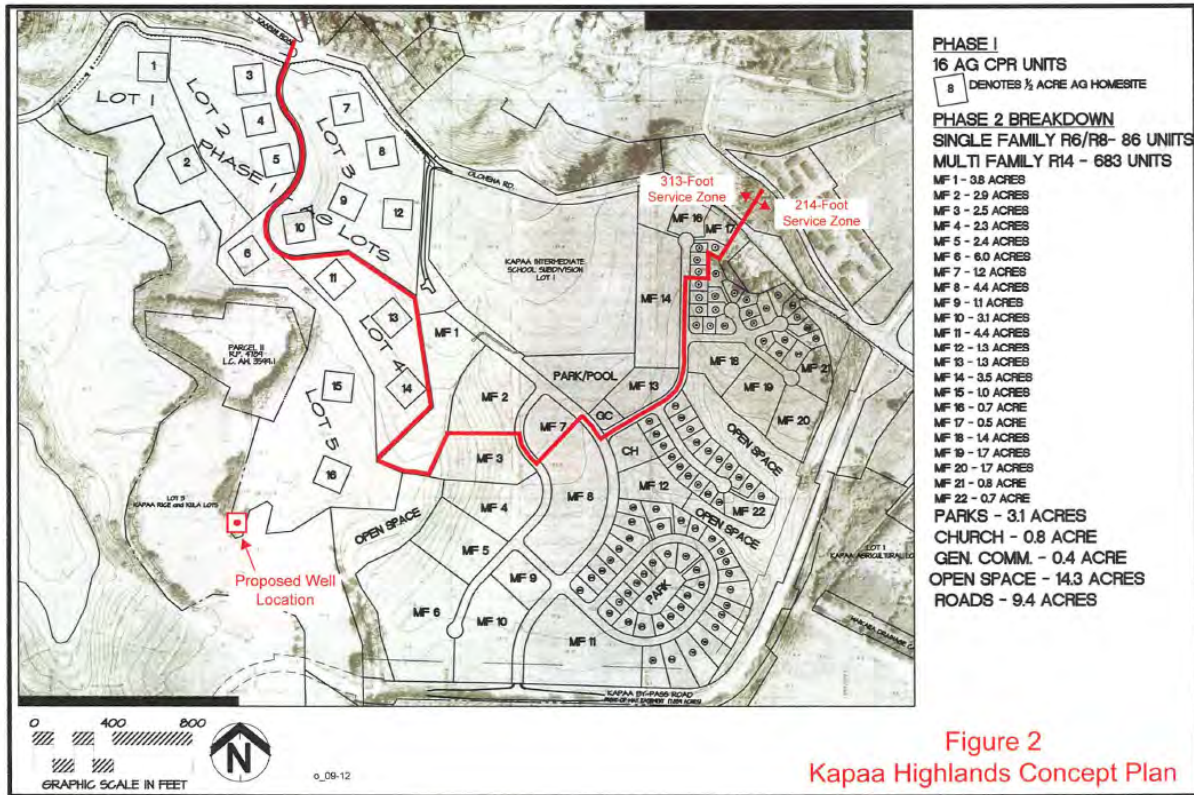
Water Master Plan

A Water Master Plan for HoKua Place and HoKua Farm Lots (formerly known as Kapa'a Highlands) has been approved, in concept, by the County Department of Water (DOW) (Exhibit D).

HoKua Place has a proven well site that will be dedicated to the DOW to feed the Department of Water's storage tanks and existing water system or operated privately. HoKua Place is committed to working with the DOW on pertinent water issues during the design and development phase.

Tom Nance Water Resource Engineering (TNWRE) prepared a water master plan for the development of an agricultural subdivision on site (Exhibit E - Part 1) and estimated the required water system infrastructure and the basis of its sizing.

All infrastructure improvements will be designed, constructed and conveyed in accordance with Kaua'i Department of Water (DOW) rules, regulations, standards and policies.



As presented in the earlier 2002 Kapa'a Highlands Water Master Plan, the entire project was to be served from DOW's 313-foot service zone. In the updated Water Master Plan, service to the project will be from the 313-foot and 214-foot service zones. The red line on the figure above delineates the two service zones in the project site.

The table below is a compilation of the projected average demand in each service zone based on the unit use rates in DOW's standards. Presented below is a summary of average, maximum day, and peak flow rate requirements by development phase and service zone.

**Summary of Average, Maximum Day, and Peak Demands
for the Kapaa Highlands Project**

Service Zone	Development Phase	Average Demand (GPD)	Maximum Day (GPD)	Peak (GPD)
313-Foot	1	34,725	52,088	104,175
	2	85,830	128,745	257,490
	Totals	120,555	180,832	361,665
214-Foot	1	117,350	176,025	352,050
	2	213,020	319,530	639,060
	Totals	330,370	495,555	991,110
Totals for Both Zones		450,925	676,388	1,352,775

Well Supply

Providing the maximum day demand in a 24-hour pumping day defines the required well pumping capacity. The required capacities for both service zones combined are 158 GPM for Phase 1 and 470 GPM on completion of Phase 2.

As a part of Phase 1 water system improvements, a new well of 500 GPM capacity would be completed at the site in Lot 5 of Phase 1.

A test well that was drilled in this location was pump tested for 12 hours at 550 GPM. The test well produced water of consistently low salinity (specific conductance of 430 uS/cm and chlorides of 53 MG/L at the end of the test).

Based on these results, a sustainable capacity of 500 GPM is expectable for a properly developed well. During pump testing of the new well, the test well will be used for observation to get more complete data on aquifer response. Following this, the test well will be sealed in conformance with CWRM requirements.

The new well will have 12-inch casing, be approximately 300-feet deep and draw water exclusively from the lower (second) aquifer at depths between 220 and 300-feet. It will be outfitted with a 500 GPM, 4-pole submersible pump set at a depth of about 50-feet. Chlorination would occur at the well.

The route of the 8-inch or 12-inch, 2,600-foot long dedicated transmission pipeline in a paved roadway from the well to connect to DOW's system is shown on the map below. Based on DOW's stated preference, the connection would be to the 214-foot service zone.

As demonstrated in the calculations following, the transit time in the 2,600-foot long dedicated transmission pipeline would provide adequate chlorine contact time:

- The required CT for water with a pH of 6 to 9 and temperature of 76.2° F. is 2 (MG/L)(MIN) from the table on page 5-33 of the Hawai'i SWTR Manual.
- Volume in the 8-inch or 12-inch, 2,600-foot long pipeline is 907.6 ft³ or 6,788 gallons. The pumping rate will be 500 GPM. Therefore, the residence time in the pipeline will be 13.58 minutes.
- Free chlorine residual at the well head will be 0.5 MG/L.
- Baffle factor for the pipeline is 1.0 based on plug flow.
- Therefore: $CT = (0.5 \text{ MG/L}) (13.58 \text{ Min.}) (1.0 \text{ BF}) = 6.79 \gg \text{Required Value of 2}$

The well will be at a relatively low elevation and it, as well as the entire project area, is makai of the Underground Injection Control (UIC) line. Both of these aspects suggest that contamination of the groundwater pumped by the well may be an issue.

Fortuitously, the underlying strata provide excellent natural protection against such an occurrence.

The well will be constructed to draw water exclusively from a lower aquifer which is hydrologically separated from a poorly yielding upper aquifer by an impermeable aquiclude that is more than 100 feet thick. This means that if contaminants are released into the subsurface they will accumulate in the upper aquifer and never reach the lower aquifer tapped by the well.

Average Demand for Phase 2 of Kapaa Highlands

Service Zone	Development Parcel	No. of Units	Unit Use Rate (GPD / Unit)	Average Demand (GPD)
313-Foot	SF Residences	4	500	2,000
	MF-1	53	350	18,550
	MF-2	41	350	14,350
	MF-7	17	350	5,950
	MF-13	18	350	6,300
	MF-14	49	350	17,150
	MF-15	14	350	4,900
	MF-16	10	350	3,500
	MF-17	7	350	2,450
	Park	2.37 Acres	4,000	9,480
	General Commercial	0.4 Acres	3,000	1,200
Total for 312-Foot Zone				85,830
214-Foot	SF Residences	82	500	41,000
	MF-3	35	350	12,250
	MF-4	32	350	11,200
	MF-5	34	350	11,900
	MF-6	84	350	29,400
	MF-8	62	350	21,700
	MF-9	15	350	5,250
	MF-10	43	350	15,050
	MF-11	62	350	21,700
	MF-12	18	350	6,300
	MF-18	20	350	7,000
	MF-19	24	350	8,400
	MF-20	24	350	8,400
	MF-21	11	350	3,850
	MF-22	10	350	3,500
	Church	0.8 Acres	4,000	3,200
	Park	0.73 Acres	4,000	2,920
Total for 214-Foot Zone				213,020
Total for Phase 2 in Both Service Zones				298,850

With regard to developing a drinking water well makai of the UIC line, DOH has recently (May 2009) instituted a process which includes public notification and the resulting prohibition of installing any new disposal wells within 1/4-mile of the drinking water well.

The 18 homesites in the HoKua Farm Lots (formerly known as Kapa'a Highlands I) will have individual wastewater disposal systems consisting of septic tanks and leach fields. DOH will require the five homesites that will be within 1,000-feet of the well (homesites 14, 15, and 16 and the two homesites on Parcel 11) to have DOH-approved enhanced septic systems.

As an extra precaution, all 18 of the homesites in the HoKua Farm Lots will be required to install enhanced septic systems. All of HoKua Place will be connected to the County's centralized sewer system to eliminate the wastewater treatment and disposal issue for this more densely developed area.

Reservoir Storage

Summarized below are the required reservoir storage volumes by development phase and service zone. Two criteria are applied: (1) provide the maximum day volume; and (2) provide the fire flow-rate and coincident maximum day demand for the duration of the fire with the reservoir 3/4 full at the start.

Computations of Required Reservoir Storage

Service Zone	Required Reservoir Storage	
	Phase 1 (MG)	Phase 2 (MG)
313-Foot Zone <ul style="list-style-type: none"> Maximum Day Criterion Fire Flowrate and Maximum Day Use Rate for Duration of the Fire, Reservoir 3/4 Full at Start 	0.0521* 0.0229	0.1808 0.3401*
214-Foot Zone <ul style="list-style-type: none"> Maximum Day Criterion Fire Flowrate and Maximum Day Use Rate for Duration of the Fire, Reservoir 3/4 Full at Start 	0.1760* 0.0298	0.4956* 0.3751

* Denotes required storage based on governing criterion.

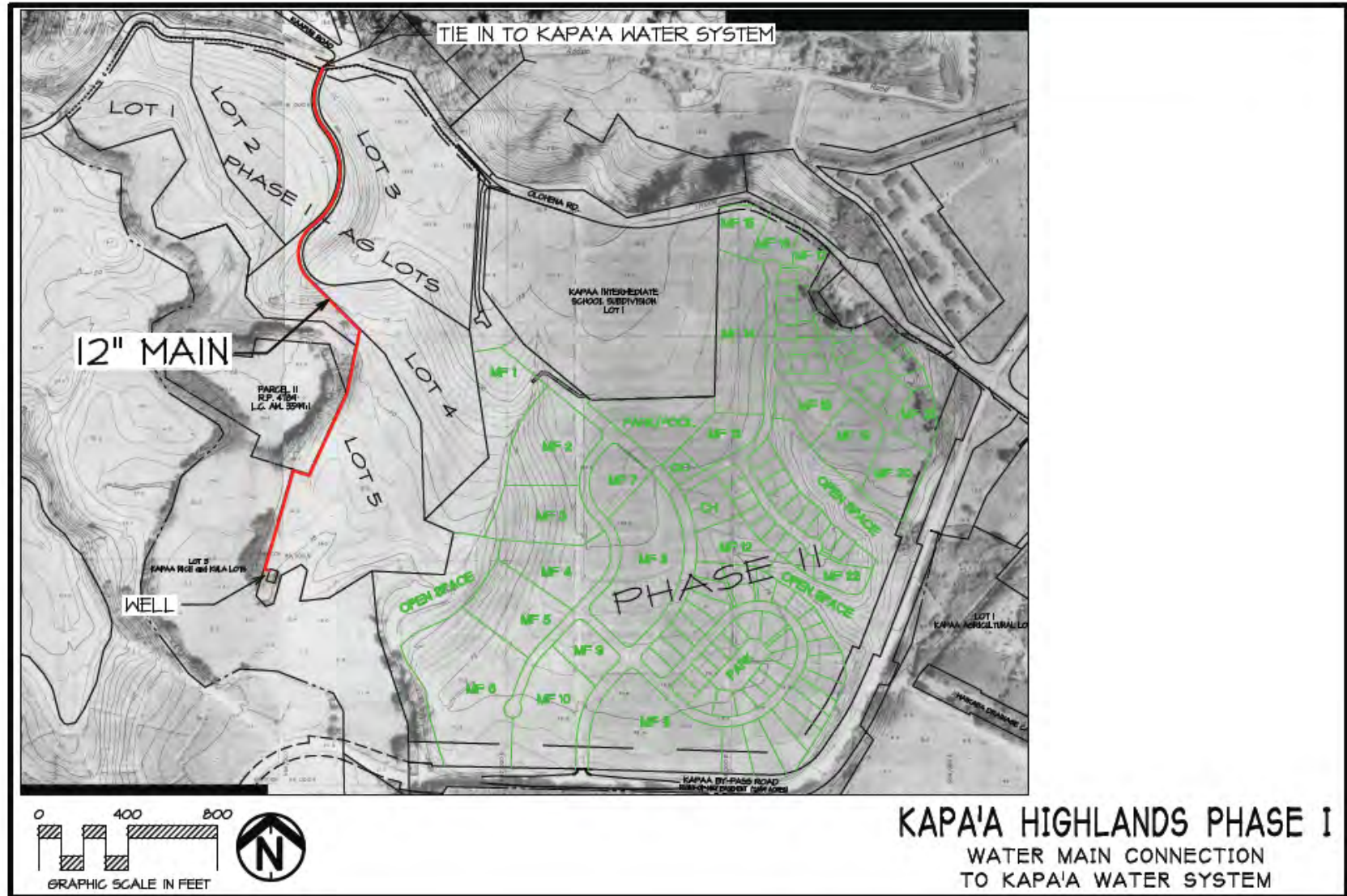
As one well pump is being provided, no credit for well inflow is taken. Fire flow-rate in both service zones of the Phase 1 area is 250-GPM for one hour. In both service zones of Phase 2, it is 2,000-GPM for two hours.

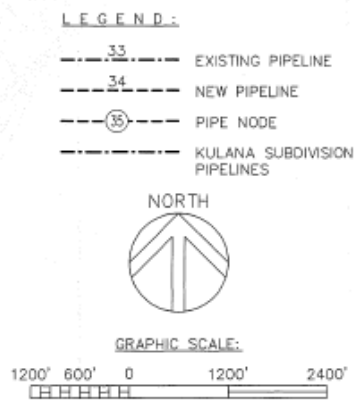
Required storage volumes are denoted by the asterisk (*) in the compilation above. DOW will allow HoKua Farm Lots (formerly known as Kapa'a Highlands I), consisting of 18 homesites (5 units in the 313-foot zone and 13-units in the 214-foot zone) to utilize storage capacity from existing DOW storage facilities.

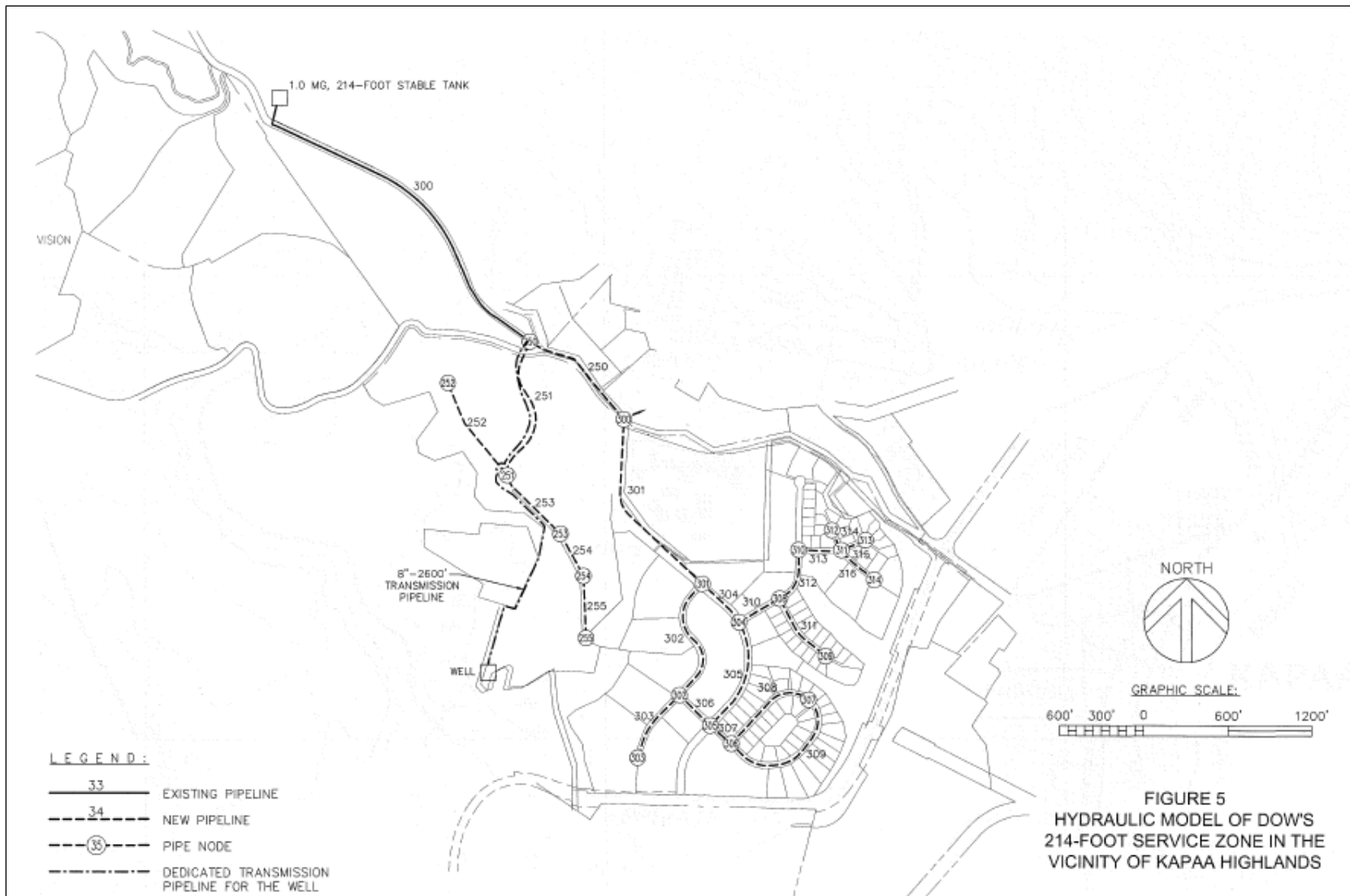
Additionally, DOW will provide HoKua Place with storage for water in exchange for HoKua Place dedicating its well site to the DOW to feed the Department of Water's storage tanks and existing water system. David Craddick, DOW Manager and Chief Engineer wrote in a letter to HoKua Place (formerly known as Kapa'a Highlands II):

"At the Department of Water, Water Board July 28th 2011 meeting, via Managers Report 12-10, in response to your letters of April 22, 2011 and May 11,2011, accepted the proposed exchange of source for storage on a dollar for dollar basis."

Prior to water meter service and/or building permit approval, the developer will complete the required water system facilities and other conditions required by DOW for the project.







Pipeline Sizing for Peak and Fire Flow-rate Requirements

All pipelines will be ductile iron. Pipe sizing is based on two criteria: (1) to provide a minimum 40 psi residual pressure during peak flow-rate conditions, with peak flow-rate defined as the three times the average demand; and (2) to provide the required fire flow-rate with coincident maximum day demand [1.5 times average] and a minimum 20 psi residual pressure at the hydrant. For the agricultural CPR lots of Phase 1, the required fire flow-rate is 250 GPM. For the urban development in Phase 2, required flow-rates have been selected as follows:

Land Use	G P M
Single Family R6 / R8	1250
Multi-Family R 14	1500
General Commercial	2000
Church	2000

Overview of the Hydraulic Impact on DOW's Kapa'a Systems

HoKua Place will draw water from DOW's 313-foot and 214-foot systems, but the source of supply will only deliver water into the lower, 214-foot service zone. Due to the configuration and use of DOW's system, this will not adversely impact DOW's higher service zones in Kapa'a.

- At present, a substantial amount of water is conveyed from wells in the Kapa'a Homesteads 530-foot zone through the 313-foot zone and past the 248-foot PRV zone for consumption in the 214-foot zone. This ongoing transmission from the 530-foot zone to the 214-foot zone substantially exceeds the requirements of HoKua Place in the 313-foot zone.
- When the HoKua Place project comes on line, every gallon of water used in its 313-foot zone would be replaced by a similar volume of water pumped by its well into the 214-foot zone. This means that there will be no increase in the amount of water conveyed from the 530-foot zone to the 313-foot zone and therefore no impact on customers in the 530-foot zone.
- Due to this gallon-for-gallon replacement of water, it also means that it is not necessary to install a booster pump in the 214-foot zone to pump water back up into the 313-foot zone.

Summary of the Project's Infrastructure Requirements and Tentative Implementation Schedule

Phase 1 - Following approval of the water master plan by DOW, work to construct the well and the roads for Phase 1 would commence within six months. The cost of installing the necessary improvements will be covered by a Subdivision Bond prior to Phase 1 subdivision approval. Payment of facilities charges for storage and occupancy of the Phase 1 homesites would be made by the developer.

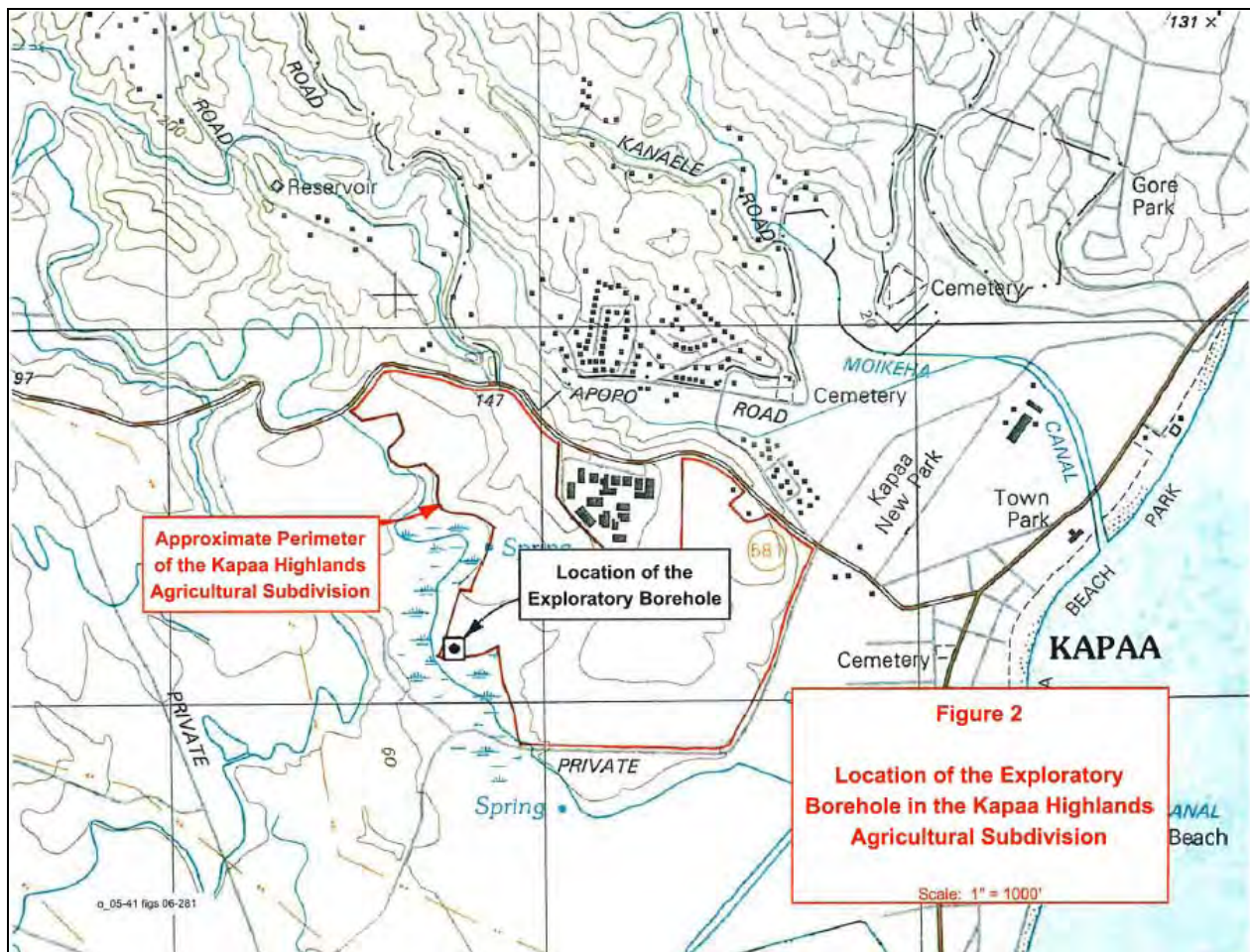
A list of the water system improvements, as they can be defined at this stage of the project's planning and engineering is provided below. Completion is expected to take two to three years.

- Drill, Case and Pump Test the Supply Well (19-inch borehole to 300-foot depth, 220-feet of solid 12-inch casing, and 80-feet of 12-inch louvered casing).
- Outfit Supply Well (500 GPM, 50 horsepower motor set at 50-foot depth; control building; chlorination; related site work).
- Well Transmission Pipeline (8-inch or 12-inch, 2,600-foot DI pipeline).
- Distribution Pipelines in the 313-Foot Service Zone (6-inch, 1820 feet of ductile iron pipeline and five service meter connections with backflow preventer assemblies. Pipe Nos. 100, 101 and 102.
- Distribution Pipelines in the 214-Foot Service Zone (6-inch, 3020 feet of ductile iron pipeline and 13 service meters with backflow preventer assemblies. Pipe Nos. 251 through 255.

- If not completed by others: 12-inch, 925-foot long pipeline from Olohena/Kaapuni intersection to Kapa'a Intermediate School (Pipe No. 72)

Phase 2 - Water system infrastructure required for Phase 2 would not be started until all land use permits and approvals are obtained, a process that may take two to three years. A tentative list of the pipelines required to be installed, all within the project area, is given below.

- Ductile Iron Pipelines in the 313-Foot Service Zone
 - 12"-1835' (Pipe Nos. 200, 201, 202, and 206)
 - 8"-1250' (Pipe Nos. 203, 204, and 205)
- Ductile Iron Pipelines in the 214-Foot Service Zone
 - 12"-2865' (Pipe Nos. 301, 304, 310, 312, and 313)
 - 8"-5780' (Pipe Nos. 302, 303, 305 to 309, 311 and 314 to 316)



Private Water System

In the event the County Department of Water does not give final approval to the applicant's Water Master Plan for HoKua Place (formerly known as Kapa'a Highlands II), then the applicant will supply water to the project through a private water system, in part described above, as well as supplemental summary here and further described in (Exhibit E - Part 2).

Reservoir Storage

With regard to the reservoir storage volume, DOW's two design criteria are appropriate for the private water system: (1) provide the maximum day demand with no credit for well inflow; and (2) provide the fire flowrate with coincident maximum day demand for the duration of the fire with the largest well pump out of service and the reservoir 3/4 full at the start of the fire. For the Phase 1 fire flowrate, DOW's standards require only 250 GPM for one hour. A stricter criterion of 500 GPM for two hours is used herein. Application of the two sizing criteria results in the required storage volumes tabulated below. In all cases, the maximum day sizing criterion governs.

Summary of Computed Required Reservoir Storage Volumes*

Design Criteria	Phase 1 Ag Subd.	Phase 2 Residential	Phased 2 Ag Subd.
(1) Maximum Day Demand (Gallons)	48,000	496,275	150,000
(2) Fire Flowrate			
▪ Fire Flowrate (GPM)	500	2000	500
▪ Fire Duration (Hours)	2	2	2
▪ Coincident Max. Demand (GPM)	33	345	104
▪ Well Inflow Credit (GPM)	350	350	350
▪ Required Storage Volume (Gallons)	29,280	319,200	40,640

*Phase 2 storage volumes include the Phase 1 requirement.

Based on the foregoing calculations, the recommended reservoir storage is as follows:

- For Phase 1, a 50,000-gallon storage tank would be installed.
- For the Phase 2 residential project, a second tank of 500,000-gallon capacity would be installed.
- In the event that Phase 2 consists of the 34 SF residential units in an agricultural subdivision, the second tank would be 100,000 gallons.
- All storage tanks would be lined and bolted steel with a concrete floor and passive cathodic protection.
- The tanks would be located at the project's highest elevation which is adjacent to residential Lot 7 in Phase 1. The Phase 1 and Phase 2 tanks would have identical floor and spillway elevations of 142 and 160 feet, respectively.
- Except at the project's lowest elevations, pumped delivery from the storage tanks will be necessary to provide adequate delivery pressures and fire flowrates. These pumping requirements are described in the section following.

Pumped Delivery for the Distribution System

DOW's design criteria for required delivery pressures are appropriate for this private water system. These are: (1) to provide a minimum of 40 psi residual pressure during the peak flowrate condition, with peak flowrate defined as three times the average demand; and (2) to provide a minimum 20 psi residual pressure at the critical hydrant during fire flowrate at that hydrant and coincident maximum day demand throughout the system.

The onsite storage reservoir elevations will not provide adequate gravity pressure to meet either of these criteria. In each development phase, this will require parallel domestic and fire flowrate pumping systems with a generator to provide backup power. For Phase 1, the pump systems would provide up to 70 GPM for peak domestic use and a 500 GPM fire pump. For the Phase 2 residential development, the domestic pumping capacity would be increased to 700 GPM and the fire pump to 2000 GPM. All pumping systems would be sized to produce a total dynamic head of 110 feet, in effect creating a single, 270-foot service pressure zone across the entire project site.

Water System Layout

Phase 2 would consist of the 769-unit residential development. By development phase, these would consist of:

Phase 1

- 12-inch, 300-foot deep well, pump sump, and two 350 GPM pumps in the pump sump located at the makai end of the Phase 1 development area.
- A dedicated 8-inch transmission pipeline from the well pumps to the storage reservoir.
- A 50,000-gallon storage tank.
- Parallel domestic and fire flowrate pump systems at the storage tank with backup generator power.
- A distribution pipeline loop consisting of 12-inch for the section that will also serve Phase 2 and 6-inch for the remainder of the loop.

Phase 2

- No change or additions to the well, well pumps, or transmission pipeline.
- Second storage tank of 500,000-gallon capacity.
- Substantial capacity increases for the parallel domestic and fire pumping systems and generator backup power.
- Distribution pipelines of 12-, 8- and 6-inch size.

Average and Maximum Day Demands for the
Phase 1 Agricultural Subdivision and Phase 2 Residential Development

Development Phase	Land Use	Design Criterion (GPD / Unit)	Average Demand (GPD)	Maximum Demand (GPD)
1	16 SF Residential	2,000	32,000	48,000
2	86 SF Residential	500	43,000	64,500
	683 MF Residential	350	239,050	358,575
	3.1 Ac. Parks	4,000	12,400	18,600
	0.8 Ac. Church	4,000	3,200	4,800
	0.4 Ac. Commercial	3,000	1,200	1,800
	Total for Phase 2		298,850	448,275
Total for Both Phases			330,850	496,275

Average and Maximum Day Demands for Development of
Phases 1 and 2 as Agricultural Subdivisions

Development Phase	Land Use	Design Criterion (GPD / Unit)	Average Demand (GPD)	Maximum Demand (GPD)
1	16 SF Residential	2,000	32,000	48,000
2	34 SF Residential	2,000	68,000	102,000
Total for Both Phases			100,000	150,000

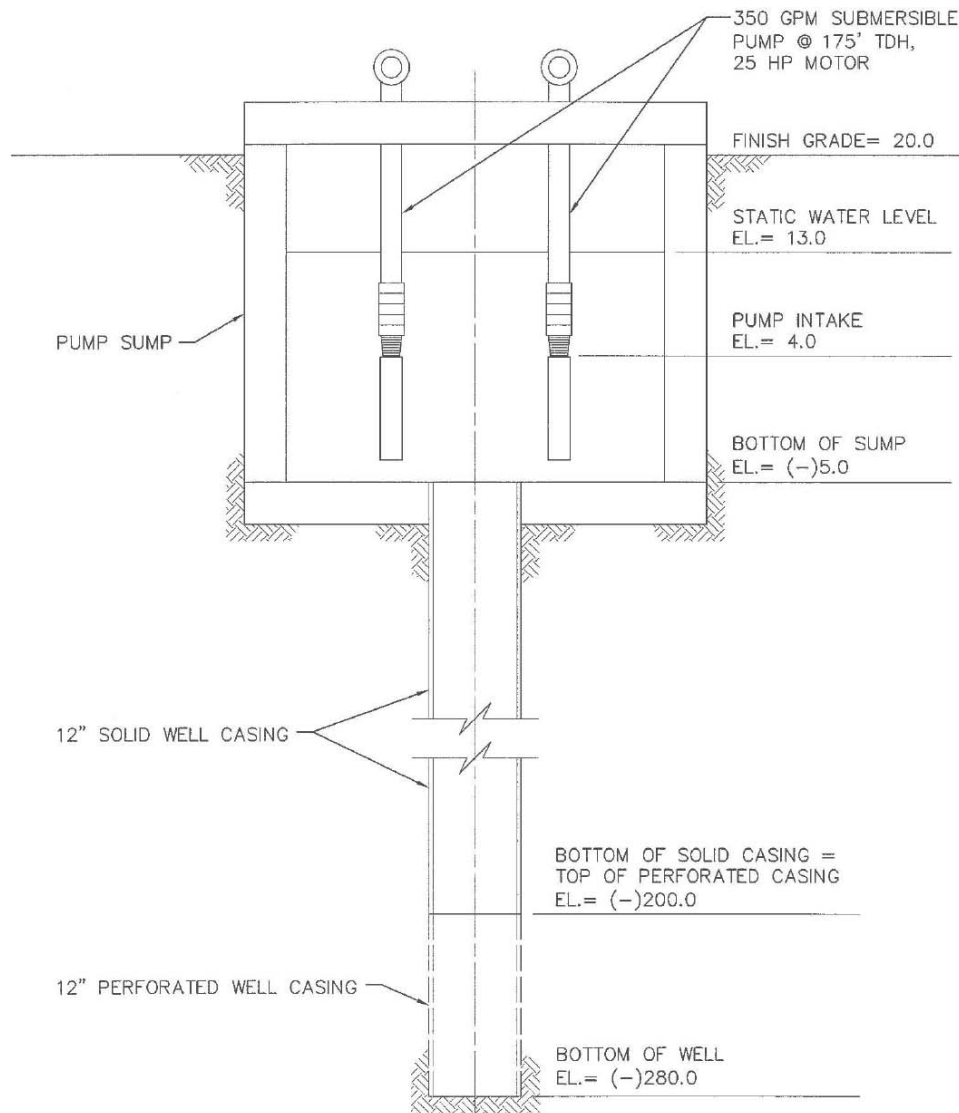
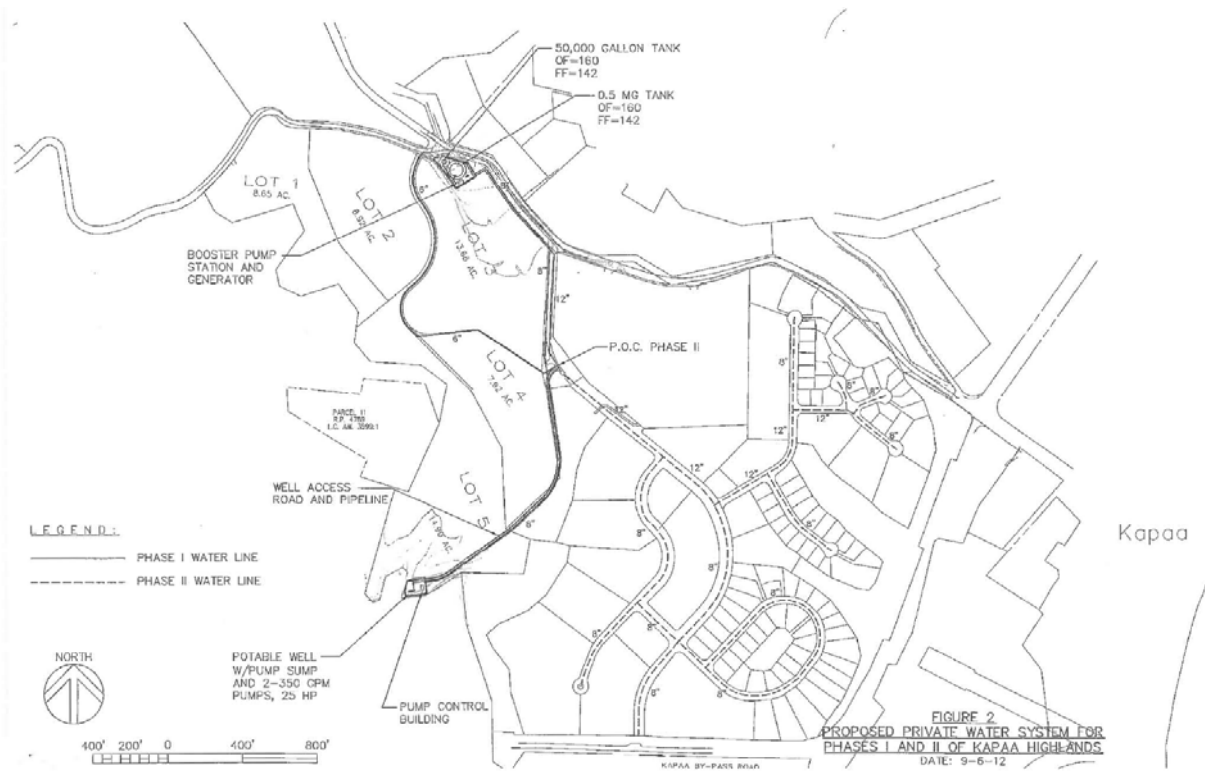


FIGURE 1
RECOMMENDED WELL DEVELOPMENT AND PUMP INSTALLATION
FOR THE KAPAA HIGHLANDS PROJECT
NOT TO SCALE

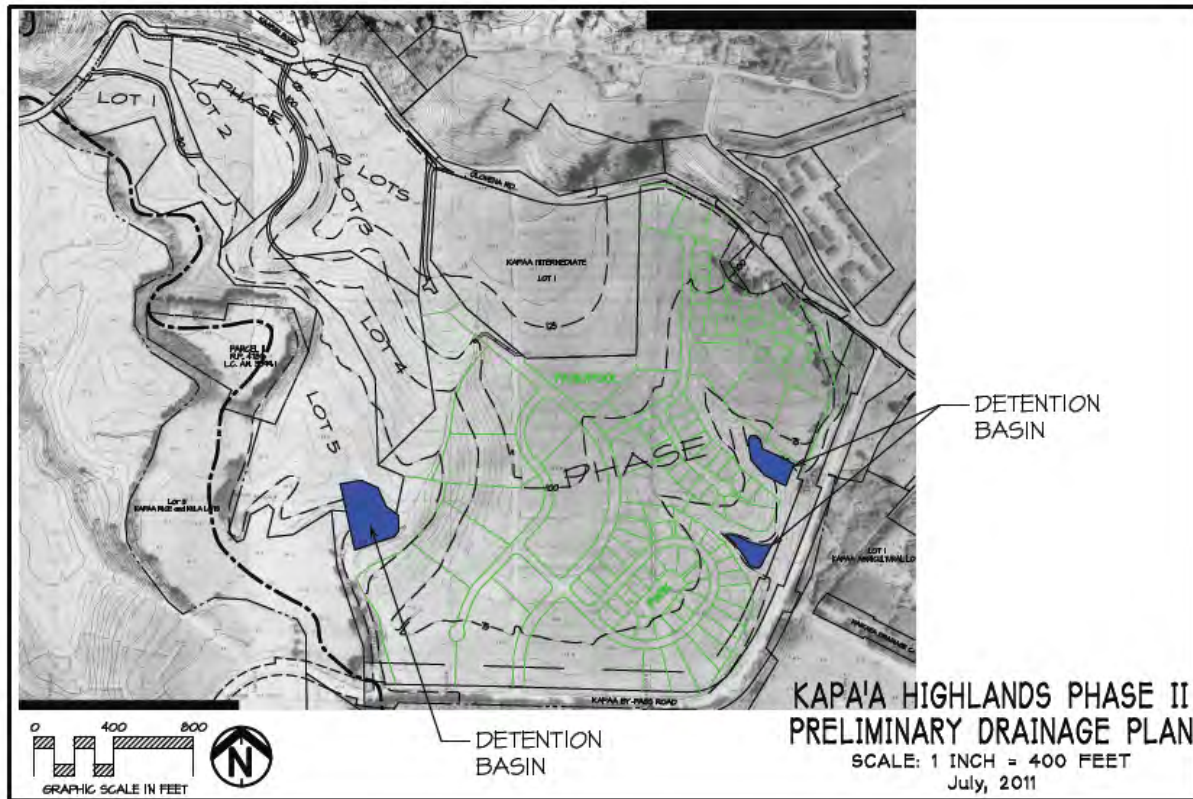


Drainage

Per the County of Kaua'i's "Storm Water Runoff System Manual" 2001, all developments of this scope are required to maintain the existing storm water flows and patterns as feasibly possible so that downstream properties are not subject to any additional storm water flows that are created by the increases in impervious surfaces of the watershed by the proposed development.

A report examining the existing drainage conditions of the property and the proposed measures to control the storm water from the proposed Phase II development is included as Exhibit F.

According to the Natural Resource Conservation Service (NRCS) soil survey the soils on the property are Ioleau and Puhi silt clay loams. The NRCS hydrologic classification for these soils is Group C for the Ioleau soils and Group B for the Puhi soils. Group B soils have a moderately low runoff potential, while the Group C soils have a moderately high runoff potential. Both soils are in Group I erosion resistance classification, which is the least erodible of the NRCS classifications.



The topography of the site varies from gently sloping, bluff top property, to steep areas that drop off into drainage gullies that lead to an unnamed stream and to the Bypass Road.

Storm water generated from each of the Phase II lots will be directed to the nearest downstream street or natural drainage way. A drainage system along the streets will collect the storm water and convey it to the detention basins shown on the map above. The detentions basins moderate the storm flows and allow infiltration back into the soil. They are sized so that the outlet peaks flows match or lower the existing storm water flows prior to the development for both small rainfall events and the 100 year storm event.

Wastewater

The County sewer treatment plant, Wailua WWTP, is located on approximately 2.1-acres of County owned land next to Lydgate Park.

The treatment plant is designated as an R-2 facility, which means the plant provides secondary treatment and disinfection. This meets the minimum requirements for wastewater treatment per Hawai'i Administrative Rules (HAR) Title 11, Chapter 62.

It has a capacity of 1.5 million-gallons a day. It is currently operating at 500,000-gallons a day. HoKua Place will be contributing to the deferred maintenance and to the cost of repairs to the sewer treatment plant. A preliminary wastewater report has been completed and is included as Exhibit G.

The Wailua WWTP was originally constructed in 1964 and receives wastewater from the Kapa'a, Papaloa, Waipouli and Wailua areas. The plant was originally designed to treat an average flow of 0.5-million gallons per day (mgd).

The plant has gone through four phases of construction, the most recent in 1992 to expand to the current design average daily flow of 1.5-mgd and a design peak flow capacity of 5.03-mgd. The existing collection system consists of gravity lines, pump stations and force mains. The collection system is centered in the coastal area along the Kūhiō Highway.

In the Wailua-Kapa'a area, wastewater treatment is accomplished with Individual Wastewater Systems (IWS), such as cesspools or septic tanks, or at the County owned and operated Wailua WWTP. IWSs are assumed to be used in the parcels that have water service but no sewer service. Based on that assumption, there are approximately 4,300 residential cesspools in the Wailua-Kapa'a area.

The discharge of raw waste water directly into the ground is not beneficial to the environment; therefore, Department of Health (DOH) now limits the construction of any new cesspools. Approximately 12% of the cesspools in the Wailua-Kapa'a area have reported failures.

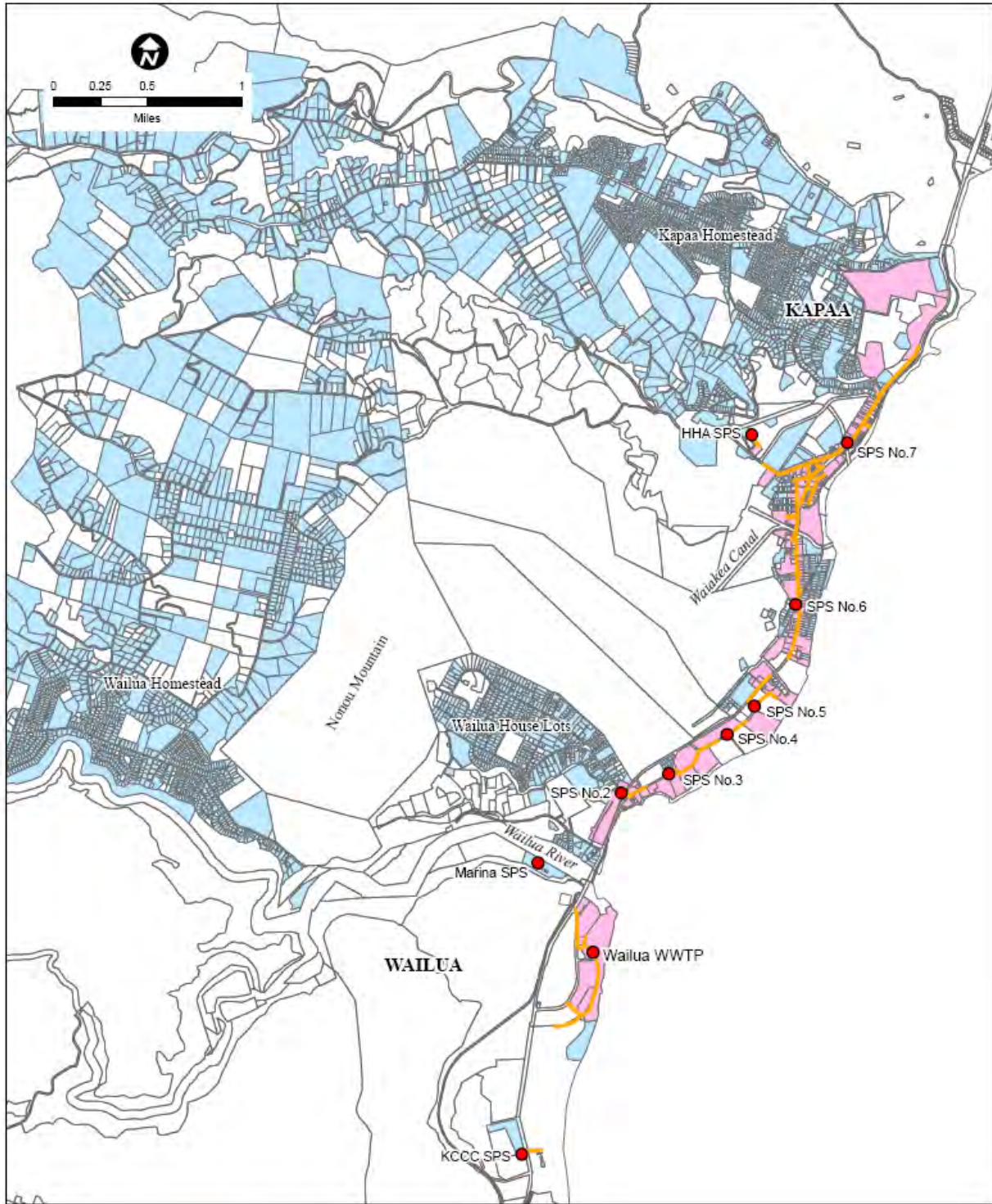
The Wailua WWTP currently uses two methods of effluent disposal, which are an ocean outfall and water reuse for irrigation at the adjacent Wailua Golf Course. Treated effluent is conveyed to the golf course by pumping out of the effluent chamber downstream of the chlorine contact basin.

Effluent sent to the ocean outfall flows by gravity to the ocean through an overflow pipe. When effluent is sent to the golf course, it is stored in a reservoir located at the golf course and is pumped out as required for irrigation.

The Sewer Design Standards, 1973 by the County of Kaua'i, Department of Public Works, together with the Wailua Facility Plan, September 2008 by Fukunaga and Associates were the primary references for the preliminary wastewater report for HoKua Place (formerly known as Kapa'a Highlands II) (Exhibit G) and will be abbreviated as SDS and WFP, respectively, when quoted in the following summary.

The WFP is a detailed study of the entire Wailua to Kapa'a wastewater system completed in 2008 to guide the County with the necessary expansion and management of the system through the year 2025. It broke down projected flows to the Wailua Treatment Plant in three phases, the current and near term flows up to the year 2010, middle term flows for the 2010-2015 period, and far term flows for the years 2015 to 2025.

Wailua-Kapa'a Average Daily Wastewater Flows ¹	
Planning Interval	Average Wastewater Flow (mgd)
Current	0.70
Near Term (2010)	0.98
Middle Term (2015)	1.39
Far Term at Wailua WWTP(2025)	1.72
Kapaa Start-Up (2025)	0.40



LEGEND:

- Sewerline
- Sewer & Water Service Parcels
- Water Service Parcels (Assumed IWS)

WAILUA FACILITY PLAN

Water & Sewer Service Area

The need for the WFP was partially based upon the rapid development that was occurring in the Wailua-Kapa'a area during 2004-2007 period. Development has slowed considerably since this time and several of the developments anticipated in the WFP calculations have been put on hold or are no longer proposed. Of the proposed developments, the Coco Palms Hotel will be removed from the near term anticipate flows and be considered part of the middle term flows. The Coconut Beach Resort and Coconut Plantation Village will be removed from the middle term flows and be considered for the far term flows.

The proposed HoKua Place development is not expected to be at total capacity by 2015, but for the purposes of this analysis, it will be considered to be completed in the middle term planning period of the WFP. The table below is the adjusted Average Daily Flows (ADF) based upon the current flow to the Wailua Treatment Plant and adjustments due to slower development than anticipated by WFP.

Adjusted Wailua-Kapa'a Average Daily Wastewater Flows	
Planning Interval	Average Wastewater Flow (mgd)
Current	0.70
Near Term (2010)	0.98
Middle Term (2015)	1.39
Far Term at Wailua WWTP(2025)	1.72

Kapa'a Highlands Phase II Wastewater Flow Estimates	
Item	Projected Wastewater Flow (gpd)
Single Family Homes	34,400
Multi-Family Homes	170,750
Neighborhood Commercial	4,800
Total	209,950

Note: Single Family Homes assumed to have 4 occupants/unit and Multi-Family Homes have 2.5 occupants/unit.

¹ Table ES-1, WFP, September 2008

4.6.2 Potential Environmental Impact & Mitigation Measures

Water Sources

With respect to water resources to be used within the project, two alternatives are considered. First, if the County Department of Water Supply makes a final decision to approve the applicant's Water Master Plan where DOW will provide HoKua Place with storage for water in exchange for HoKua Place dedicating its well site to the DOW to feed the Department of Water's storage tanks and existing water system.

A Water Master Plan has been previously approved, in concept, by the County Department of Water (DOW). HoKua Place has a proven well site that will be dedicated to the DOW to feed the Department of Water's storage tanks. HoKua Place is committed to working with the DOW on pertinent water issues during the design and development phase.

In the event the DOW does not make final approval of the applicant's Water Master Plan, then the applicant will develop a private water system, using the well for its use within the project.

Implementation of a final alternative is based on the decision of the County Department of Water Supply; each is an acceptable alternative to the applicant.

The proposed water system will be subject to regulation as a public water system and will meet conditions of the State Department of Health, including HAR Chapter 11-20, 11-21 and 11-25.

Water Management and Conservation

The project will result in additional consumption of fresh (potable) water; however the installation of water efficient fixtures and the implementation of a water saving practices will reduce the demand for freshwater resources as noted in the HoKua Place (formerly known as Kapa'a Highlands II) Sustainability Plan (Exhibit B).

As an overarching philosophy in all source alternatives, HoKua Place is committed to water conservation strategies to reduce consumption, conserve resources and minimize water use. The goal is to reduce the total water use through a combination of water saving equipment and strategies.

A number of measures may be implemented to facilitate conservation, including water restrictions during drier periods, public education and more efficient landscaping practices. Consumption could be significantly reduced through end-user conservation. Efficient fixtures and appliances will reduce indoor water use.

The water distribution system will be maintained to prevent water loss and homeowners and businesses will be encouraged to maintain fixtures to prevent leaks. Landscaping will emphasize climate-adapted native and other appropriate plants suitable for coastal locations. Best management practices will be designed and implemented to minimize infiltration and runoff from daily operations.

High efficiency toilets: (HETs) reduce flush volumes by no less than 20% compared to conventional ultra-low flow (ULFT) toilets. Dual-flush HETs allow users to choose one of two flushes: liquids or solids. In actual operation, dual-flush HETs average about 1.2 to 1.4 gpf. Pressure-assist HETs use a pressurized tank that creates for a more forceful flush with less water.

Faucets: Water flow is reduced by **Flow limiters** which are built into the faucet or are installed as after-market fittings. Aerators or laminar flow devices are types of flow limiters.

- Aeration injects air into the stream of water, displacing much of the water content.
- Laminar flow uses multiple small diameter parallel streams of water that are not aerated.

Flow control valves can limit water flow down to 1.5 to 0.5 gpm per side (hot and cold).

Showerheads: Federal law since 1994 mandates that all showerheads sold in the United States use 2.5 gpm or less. Despite this, some showerheads actually use much more than 2.5 gpm, and shower towers that include multiple showerheads or jets can total 12.5 gpm or more. A better option is a good quality low-flow showerhead designed to use 2.0 gpm or less while providing a satisfying shower.

Water conserving and Low impact landscaping: Landscaping shall be of native trees, shrubs and flowering plants as encouraged by the Kaua'i Department of Water as part of their recommendations for water conservation. Selection and distribution of plants must be carefully planned when designing a functional landscape. Aesthetics are a primary concern, but it is also important to consider long-term maintenance goals to reduce inputs of labor, water and chemicals. Properly preparing soils and

selecting species adapted to the microclimates of a site greatly increases the success of plant establishment and growth, thereby stabilizing soils and allowing for biological uptake of pollutants.

Drainage

A Preliminary Drainage Report has been prepared. A detailed Drainage and Erosion Mitigation Plan will be prepared and submitted to the County Engineer for approval during the design and development stages. The Applicant will be providing major drainage improvements in connection with development of the property. Multiple detention ponds are proposed for the property. Additionally, a series of catch basins, drainage, pipes and culverts will be utilized to direct run off to major drainage areas on the property.

The project's proposed drainage system will be designed to minimize impacts to near shore coastal waters. Water quality treatment and detention basins will be built to prevent runoff and sedimentation from impacting groundwater resources. Prior to the occupancy of any residential or commercial unit within the project, HoKua Place shall implement and maintain storm and surface-water runoff BMPs, subject to any applicable review and approval of the State DOH, designed to prevent violations of State water quality standards as a result of storm-water discharges originating from the project. These BMPs will be documented in a declaration of covenants, conditions and restrictions that will be recorded against the property and will run with the land.

Potential water quality impacts during construction of the project will be mitigated by adherence to State and County water quality regulations governing grading, excavation and stockpiling. Construction BMPs will be utilized pertaining to grading, grubbing, stockpiling, soil erosion and sedimentation during construction. BMPs will also be implemented for long term development and operation of activities occurring on the site as part of pollution prevention measures.

BMPs include storm water runoff and non-storm water sources control measures and practices that will be implemented to minimize the discharge of erosion and other pollutants from entering into the receiving State waters.

Post construction BMPs to prevent erosion and storm water runoff after construction is completed includes the installation of drain inlets and shallow drywells within the project site, and landscaping and grassing of disturbed areas. Prior to occupancy, HoKua Place will implement and maintain storm and surface-water runoff BMPs, subject to any applicable review and approval of the DOH. Those BMPs will be designed to prevent violations of State water quality standards as a result of storm-water discharges originating from the Project.

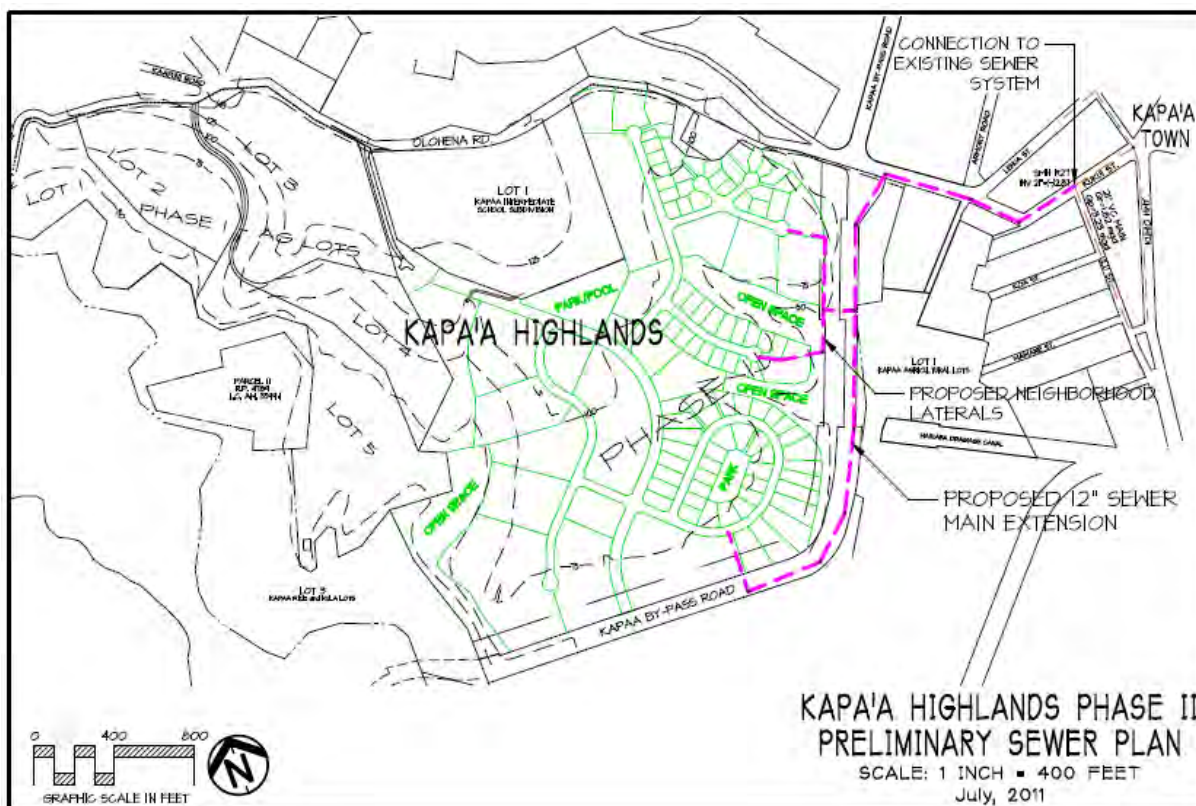
Wastewater

Based upon the projected flow of 209,950-gpd (0.21 mgd), with a max load factor of 4.1, a 12" sewer main would be required to serve the development. It would begin along the Kapa'a By-pass Road and terminate at an existing manhole near the intersection of Ulu and Kukui Streets, shown on the map below.

The length of the main within the existing public Right-of-Ways would be about 3,400 linear feet. The wastewater line will comply with all applicable rules and regulations.

The main will connect with the County's existing sewer system. At the existing manhole connection the existing main downstream of the connection is a 21" main with a capacity of 3.2 mgd. The 21" main

currently has a peak flow of about 0.6 mgd, therefore the proposed flow is well within the capacity of the existing sewer system, including allowances for the future increases anticipated in the “Final Wailua Facility Plan”, September 2008.



HoKua Place will be contributing funds to help upgrade the deferred maintenance and repair of the Kapa’a Waste Water Treatment plant. The project will not be a detriment to the capacity of the Plant.

The project’s design features and policies to comply with applicable rules and regulations will include conformance to applicable provisions of the Department of Health’s Administrative Rules, Chapter 11-62, “Wastewater Systems.”

4.6.3 Level of Impact after Mitigation

A Water Master Plan for HoKua Place (formerly known as Kapa’a Highlands II) (Exhibit D) and the agreement for the exchange of source for storage has been approved, in concept, by the County Department of Water (DOW). HoKua Place has a proven well site that will be dedicated to the DOW to feed the Department of Water’s storage tanks and existing water system. Or, a private water system will be constructed as described.

The 97-acres do not have natural water resources; therefore there are no impacts on our natural water resources for this particular project.

Mandatory compliance with requirements of the Department of Water Supply will ensure that the project has a less than significant impact on water resources or water quality.

Implementation of a water saving practices will reduce the demand for freshwater resources as noted in the HoKua Place (formerly known as Kapa'a Highlands II) Sustainability Plan (Exhibit B).

In addition, the project will adhere to recommendations in the Preliminary Engineering Report Wastewater Improvements (Exhibit G) and Preliminary Engineering Report Drainage Improvements (Exhibit F) to ensure water, drainage ways and wastewater improvements will have a less than significant impact.

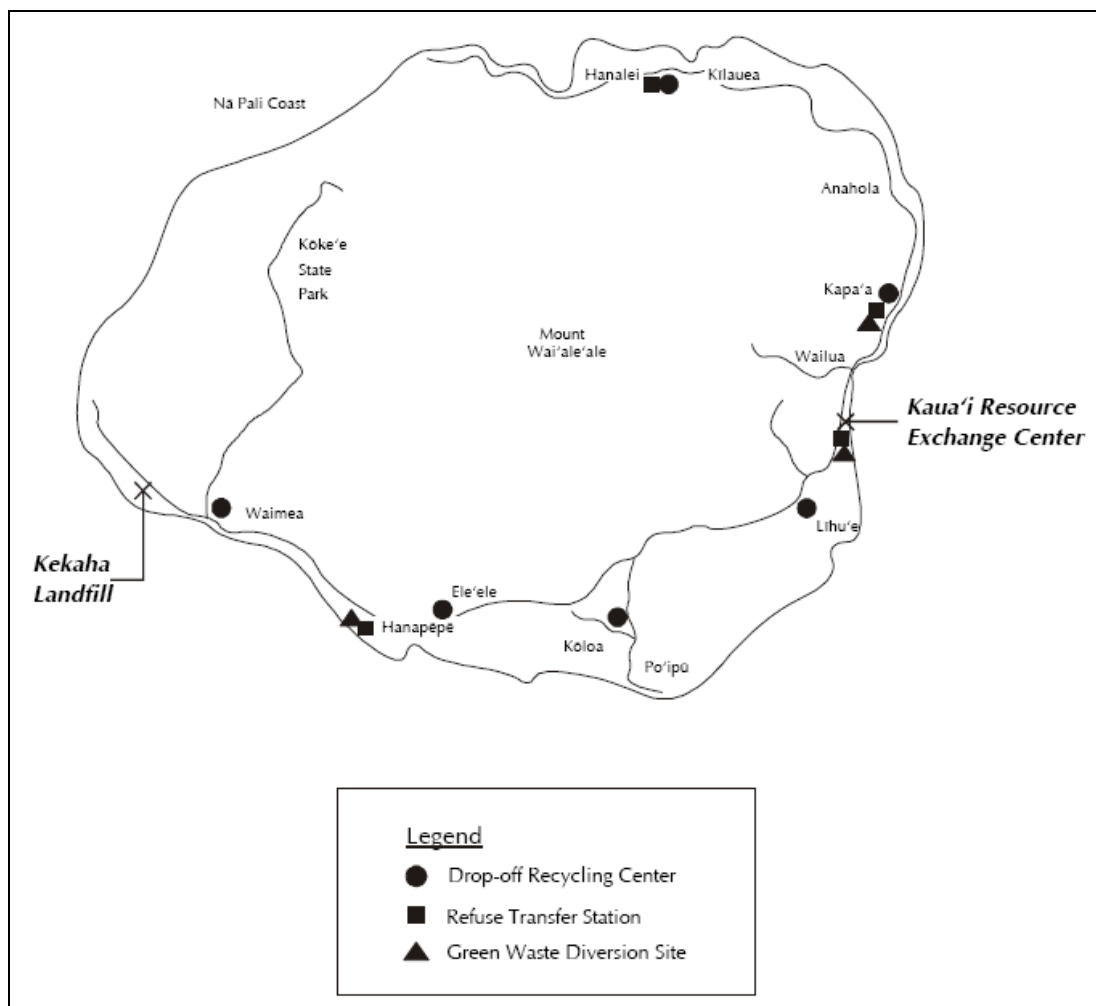
4.7 Solid Waste & Material Management

This section discusses the solid waste and materials management practices within the project area and potential impacts of the project on those practices. Measures that will be implemented by HoKua Place to reduce the possible impacts of solid waste on the environment are also presented.

4.7.1 Environmental Setting

Solid waste, as defined under Section 1004(27) of the Resource Conservation and Recovery Act (RCRA), refers to any discarded solid, semisolid, liquid, or contained gaseous materials. Currently because of the very limited use of the area, no significant amount of solid waste is produced.

The County of Kaua'i currently provides single-family residences with solid waste disposal service on a once-per-week basis. A refuse transfer station is located in Kapa'a town. The County of Kaua'i has one landfill to service the entire island, the Central Kaua'i Landfill, which is located in Kekaha. Because there are only six years of capacity left in the current landfill, the County is currently pursuing a new landfill in a more central location (in the vicinity of Lihu'e.) There is necessary capacity to accommodate the proposed development.



4.7.2 Potential Environmental Impact & Mitigation Measures

Waste generated through site development will consist predominantly of vegetation and debris. Soil and debris displaced from grading and clearing will be utilized as fill throughout the site as required, minimizing disposal and transit/relocation of the materials.

Throughout project construction and development, HoKua Place will seek to reduce, reuse, and recycle materials and waste to the greatest degree possible.

Construction materials that are rendered un-recyclable will be disposed of in the Central Kaua'i Landfill. Green waste resulting from the project's development will be chipped into mulch for on-site use or will be disposed of properly.

Measures and provisions to implement recycling, such as collection systems and storage for recyclables, will be incorporated to the HoKua Place project. A community management system will be in place for the residences of this project.

The management policies will encourage residences to participate in the moral ethics of respecting the surrounding environment, reduce waste and excessive consumption, and fulfill the responsibility as trustees of the environment for the present and the future generations. Residences will be invited to participate in policy and decision making.

Solid waste disposal service for the Single-family residences will be provided by the County of Kaua'i. Private solid waste disposal will be available for the multi-family projects.

4.7.3 Level of Impact after Mitigation

Mandatory compliance with existing regulations and requirements and the implementation of the mitigation measures proposed above, will ensure that the project will have a less than significant impact in regards to solid waste management.

4.8 Socioeconomic Conditions & Public Service Facilities

This section discusses the socioeconomic conditions and public services and facilities in the region and in the project area, and the potential long-term socio-economic impacts of the HoKua Place development.

4.8.1 Environmental Setting

Population

Kaua'i County is the fourth largest county in the state, as ranked by population and economic activity, behind the City & County of Honolulu (O'ahu), Maui County and the Big Island of Hawai'i.

The Kapa'a-Wailua basin is home to a large portion of Kaua'i's population. An urban corridor extends along Kūhiō Highway from Haleilio Road in Wailua to Kawaihau Road, at the northern edge of Kapa'a Town. The Kapa'a-Wailua urban corridor is vibrant and active, a "working town."

Kapa'a town is located 0.3-miles south of the property. Kapa'a is the eastside of Kaua'i's center of trade and employment, with numerous professional and business services. Although Līhu'e, approximately 8-miles south of the property, is the center of county, state, and federal government services, its population is slightly less than Kapa'a's which has the largest resident population on the island.

Housing

The Kapa'a-Wailua Basin community plan outlines the regional issues and opportunities that will be subjects for future community planning. A "Build-Out Analysis" of the Kapa'a-Wailua Basin was prepared in the General Plan Update. As of 1998, this area had an estimated 4,700 dwelling units, making it the largest residential community on Kaua'i.

Based on the General Plan Land Use Map designations, the analysis found that an additional 4,000-units could be developed if the General Plan-designated lands were fully zoned, subdivided and built out.

About 2,400 more units could be built in Urban Residential areas, about 500 more in Rural Residential areas and approximately 1,100 more units in the Agricultural areas. This would increase the housing units and population of the area by 85%.

The "Build-Out Analysis" specifically included the subject property as an "expansion area." The new General Plan Land Use Map designates the subject property as Urban Center.

The Kawaihau Planning District has substantial capacity for additional residential development, as described in Section 6.2.3.1 (Build-Out Analysis) of the Kaua'i General Plan:

"Lands previously designated for urban use but as yet mostly undeveloped include an area located near Kapa'a, south of Oloheua Road. This area was previously designated for Urban Mixed Use and is shown as Urban Center on the new General Plan Land Use Map. Owned partly by the State and partly by Amfac/JMB (or its successor), this 'expansion area' for Kapa'a has already accommodated the Kapa'a Middle School."

Market studies have shown that the population growth and correlating need and demand for housing is high on Kaua'i. The proposed development will allow residents to purchase from a variety of housing options.

Based on the HoKua Place (formerly known as Kapa‘a Highlands II) Housing Market Study, much like the state, Kaua‘i’s residential real estate supply is inflexible and constrained, but to a greater degree, the political climate is viewed as unfriendly towards any and all attempts to expand the supply of residentially zoned land, particularly at the high end and/or in areas that are highly visible (literally and figuratively).

At the same time, demand for residential real estate is both flexible and strong, particularly in good economic times and over the long run. It can be, and is currently, constrained to an uncharacteristic degree, thanks to havoc in the financial markets the last few years and the drastic fall off in economic activity globally and nationally.

Currently, Kaua‘i’s residential market shows recovery. The question is, going forward, how will they behave? The rule of thumb for the residential market is that the upswing in the cycle, the up cycle, generally lasts about 6.5 years, and is about twice as long as the down cycles.

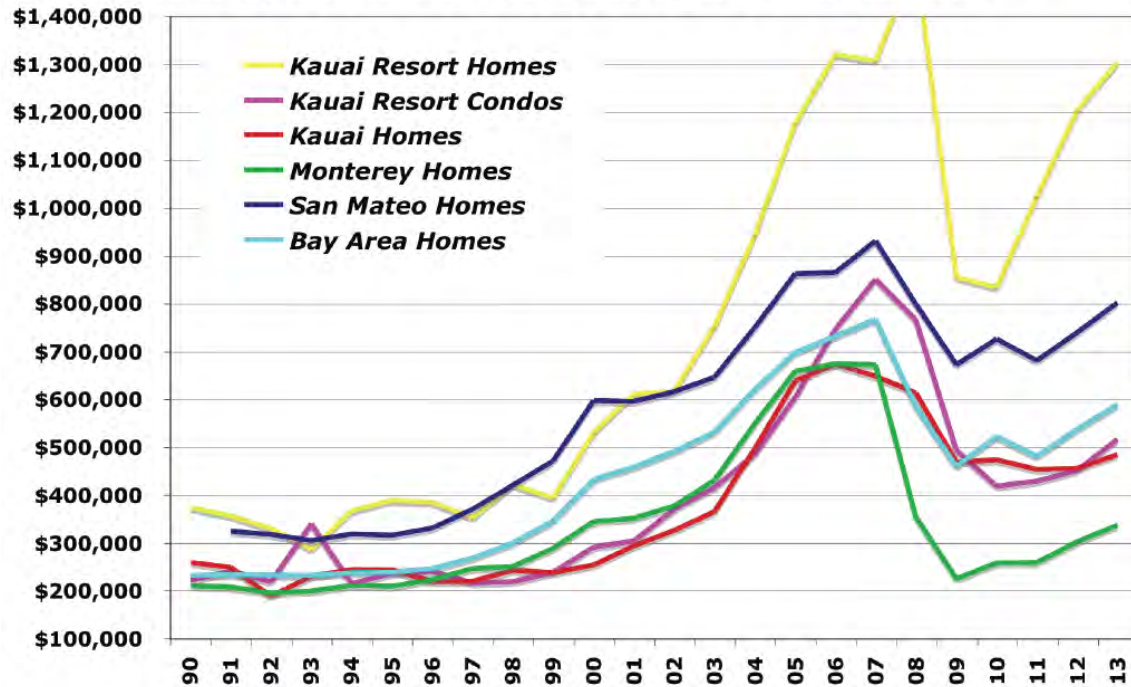
In addition, the up cycle, trough to peak, results a tripling of the number of closings. The chart below illustrates this.

The sales and Pricing for condominiums follows:

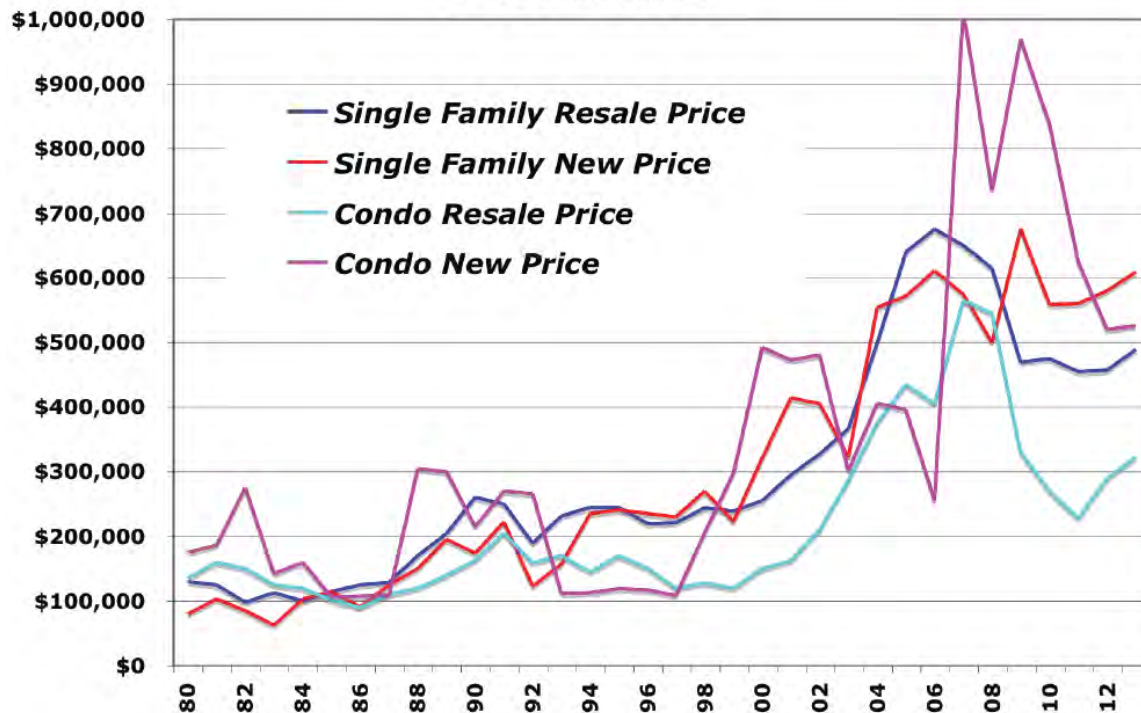


According to the state economic forecasters, Hawaii's economy continues to grow strongly at an accelerating rate. The state has very low unemployment relative to the rest of the nation, thanks to a resurgent demand in the visitor industry, which is the major engine of economic growth in the county and the state. This, in turn has resulted in recovering and increasing real estate price trends, as noted below:

Average Price Trends, Kauai vs California



Price Trends



Employment & Income

The state of Hawai'i has very low unemployment relative to the rest of the nation. The latest statistics show the rate near 6-percent, the lowest level in more than two years.

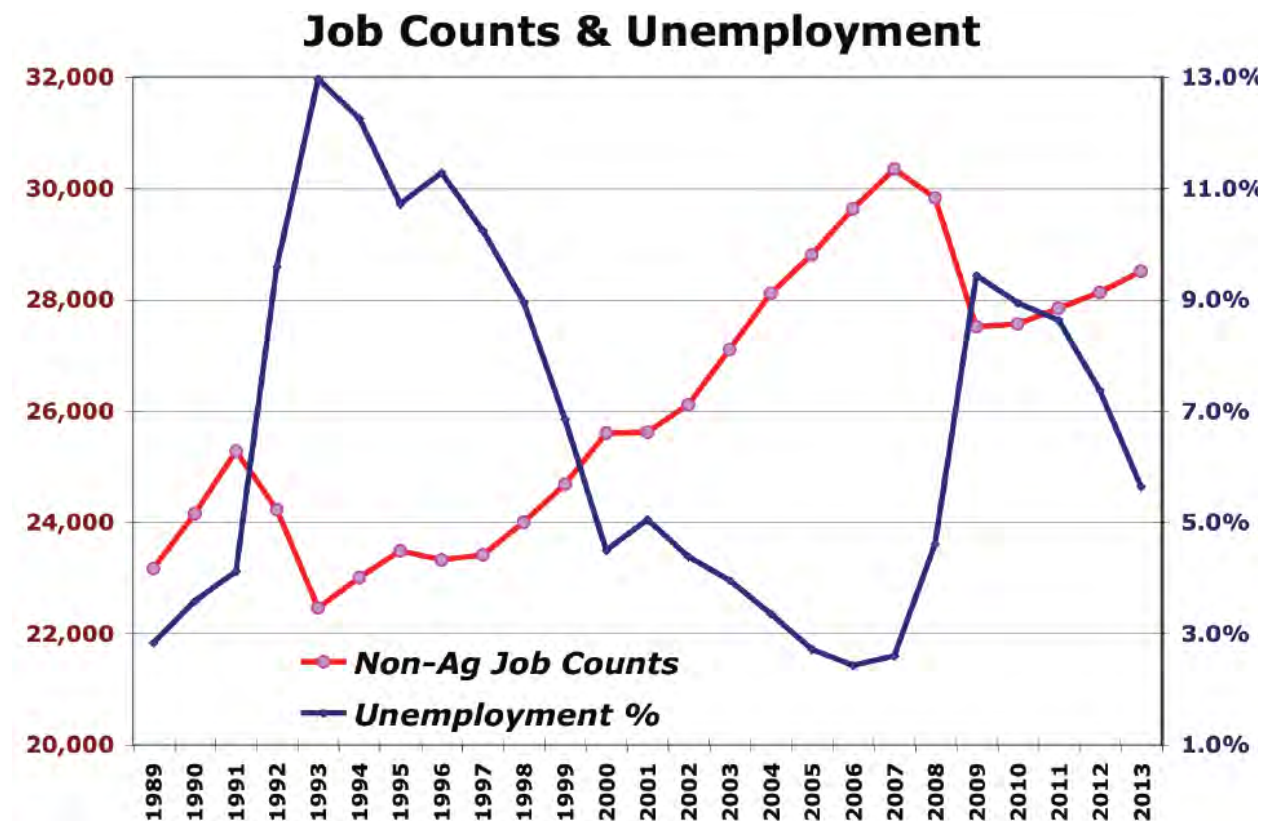
Hawai'i fared better than the nation as a whole, which experienced an increase in the average unemployment rate to 9 percent in April 2011 from 8.8 percent in March 2011.

On a county-by-county basis, Honolulu County's 4.6 percent jobless rate in April was the lowest in the state, as opposed to 7.1 percent in Maui County, 7.7 percent in Kaua'i County and 8.9 percent in Hawai'i County.

Mainland economic weakness began to affect the local economy in mid-2007, followed by a critical event that precipitated a broader downturn – the collapse of Aloha and ATA airlines early in 2008.

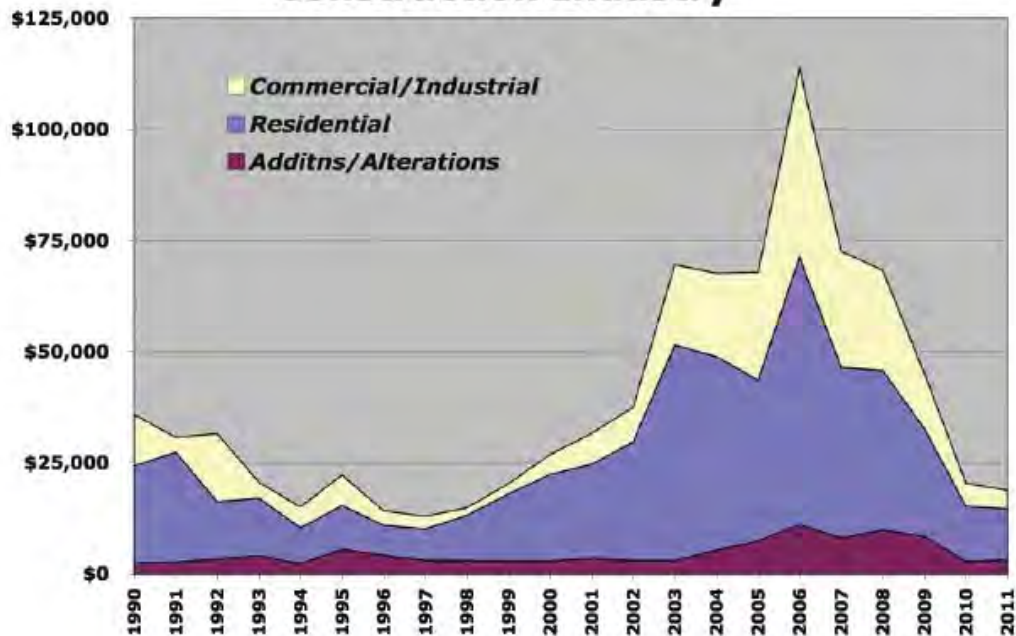
This pushed tourism over the cliff, leading to increasing unemployment, business failures, slackening of demand, and undercut spending levels island wide.

As a result, the unemployment rate on Kaua'i, traditionally among the lowest in the nation, more than doubled. As seen in the next chart, unemployment rates seem to have peaked while the job count loss has leveled out.

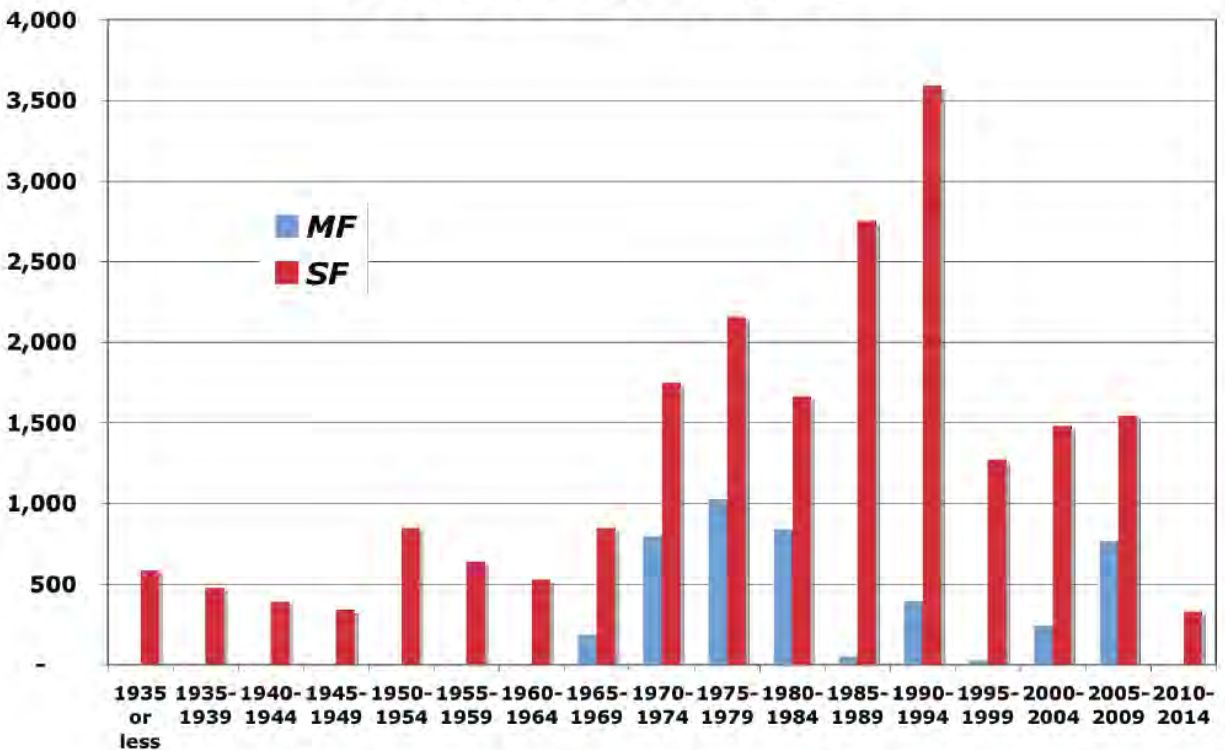


Kaua'i's construction industry has been lagging, with private building permits down significantly.

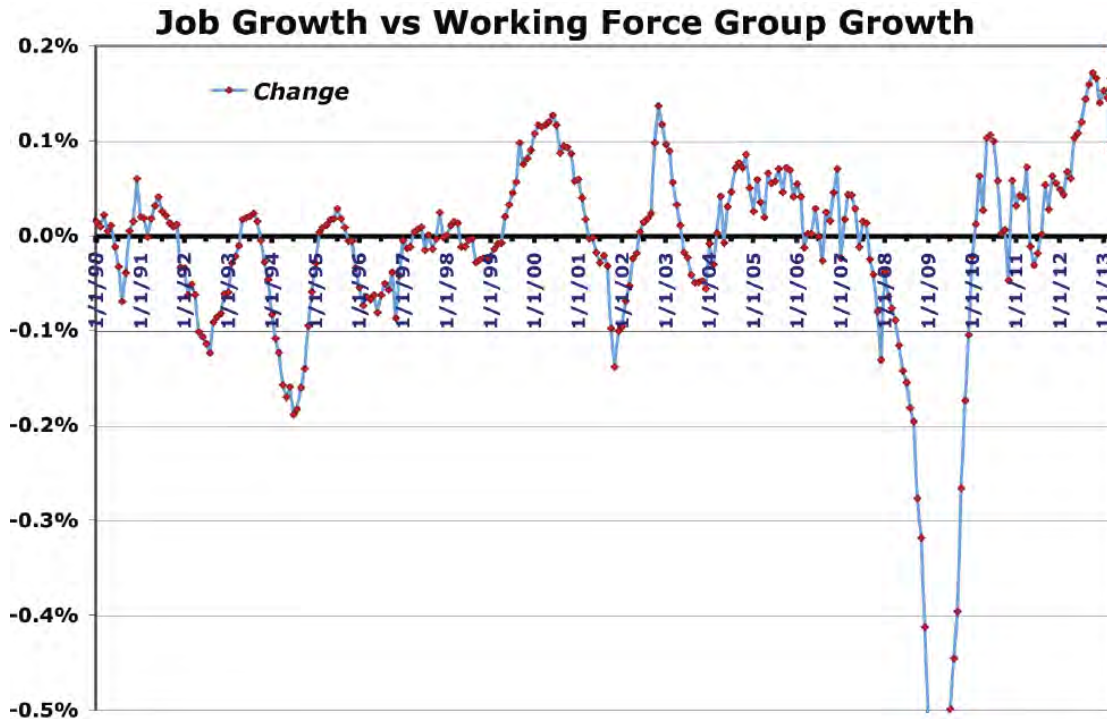
Construction Industry



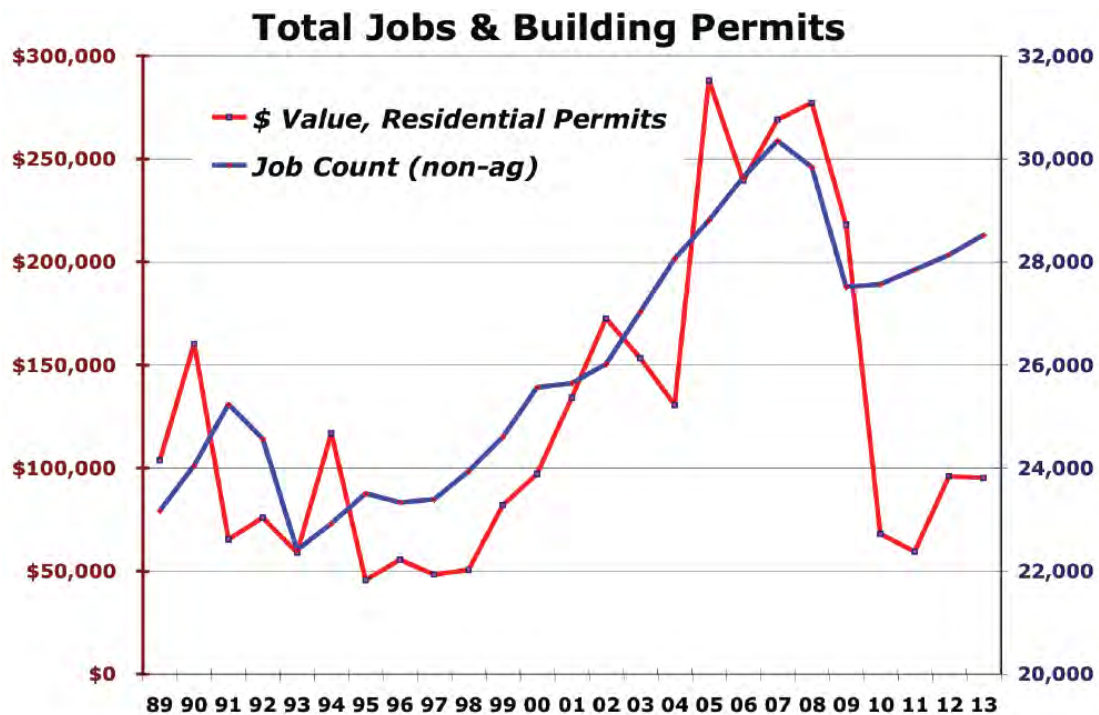
Production of Housing



Lastly, the balance between job growth and working force (new entrants into the job market, i.e., those needing jobs) has rebounded strongly, thanks to a slight slowing growth of the population, in combination with a rebound in health care and business services, plus a strong tourism sector and federal (defense) spending.



Notwithstanding the recent turmoil, mid to long-term indicators and foundational economic attributes have begun to look up for Kaua'i and especially the Kapa'a study area.



Economy

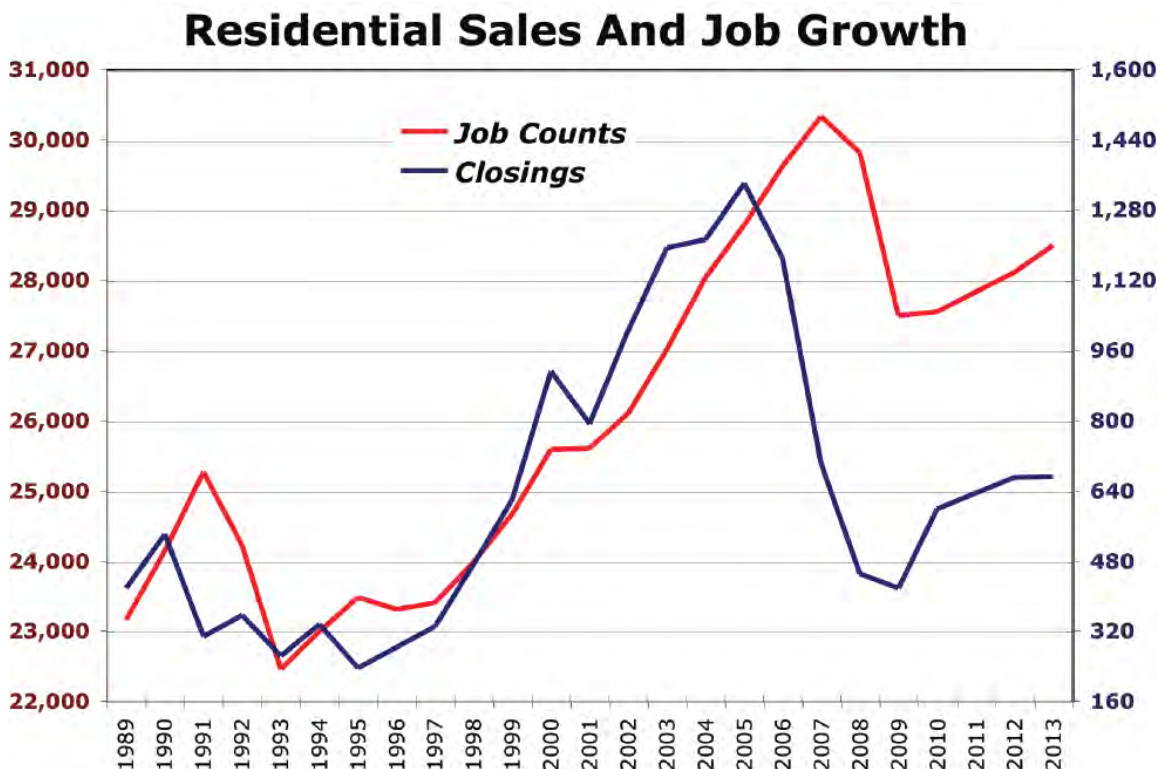
The Housing Market Study developed by The Data@Work describes and analyzes the factors and trends behind the general and specific supply and demand for housing in relation to HoKua Place (formerly known as Kapa'a Highlands II). The entire study is included as Exhibit A.

The Data@Work is a market research firm that specializes in analyzing residential real estate markets for developers and lenders. They were retained to perform a study analyzing the market for the proposed master planned community on the island of Kaua'i, called HoKua Place (formerly known as Kapa'a Highlands II).

The study focused on the historical and projected market conditions and trends in accessing the ability of the project to be successful in selling its residential properties at a price and at a velocity. The study entailed collecting, comparing and analyzing information that has a bearing on the numerous aspects of market demand for the proposed project, including but not limited to publicly available real property, economic and commercial data.

The majority of the island's roughly 52,000 residents lives and works in the coastal areas leaving the interior of Kaua'i natural and pristine. It has one of the strongest brands in the global visitor industry, as well as arguably the most diversified visitor industry of any of the islands, combining large resort master planned communities, cruise ship visitations, time share developments and small-scale bed and breakfasts.

The breadth and depth of this economic base, like the rest of the state, rests on the county's economy's unique comparative advantage relative to the other visitor destinations world-wide: it has a very high quality of life, a function of a naturally beautiful setting, with a benign environment and near perfect climate.



The majority of the primary housing development is located within the Kapa'a and Lihu'e urban zones, with secondary sources located areas in and around Po'ipū, Kīlauea/Hanalei, and Hanapēpē and Waimea.

Second home development is located within and around the three major resort communities, as well as in locations that are close to the coastline and/or in westward facing locales.

By way of context, housing construction hit a peak on Kaua'i when major resorts were developed in the 1970s; recent high-volume years reach only half that level. Thereafter, many of the condominium projects that were developed targeted the offshore buyer market. Sales records show that upwards of 30% of the condo sales went to out of state buyers.

Census records have shown that a quarter of the County's housing stock did not house residents. Thus, while the Census categorizes these units as "vacant," they may be actually rented to vacationers, reserved by owners as a second home, or both.

Demand in the housing market hence comes from residents, investors and non-residents.

Public Services & Facilities

Police protection for the Kapa'a, area is provided by the Kaua'i County Police Department, with its main headquarters located in Lihu'e. A substation is located in Kapa'a Town approximately 0.5-mile away from the Property.

Fire protection is currently available for the Kapa'a area by a new county fire station located on the north end of Kapa'a town, approximately 2.0-miles away on Kūhiō Highway.

Education

In recent decades the requirement to provide land and money for schools was imposed by state and county agencies as a condition of urbanizing land. The Department of Education (DOE) collected payments of school land and cash from some developers when their projects were required to make "fair-share contributions" by the State Land Use Commission or the counties to gain project approval.

The DOE was only granted its own authority to collect impact fees by Act 245, Session Laws of Hawaii 2007.

Prior to Act 245, the State Legislature in 2005 established a School Impact Fee Working Group (hereinafter "Working Group"). The Working Group submitted its findings and recommendations in a report, Hawaii School Impact Fee Working Group Report in March 2007.

The report analyzed salient issues, including "Fair Share" practices; conducted two case studies for specific areas in Central Oahu; and offered impact fee legislative language.

The 2007 report also provided a framework, or procedure, for determining fee schedules for those areas of the state experiencing enough new residential development to create the need for new or expanded school facilities.

Act 245 incorporated many of the findings and recommendations in the 2007 Report. It allows DOE to charge impact fees within school impact districts where new public schools must be constructed or expanded to accommodate the children from new homes.

The Legislature determined that new residential developments within identified school impact districts create additional demand for public school facilities.

Therefore, developers of new housing are required to pay a portion of the cost of providing new or enlarged public schools to serve the additional students who will be living in the new housing.

The land or fees charged are based on each new development's proportionate share of the additional demand on public school facilities.

At this time, neither Kapa'a nor any other district on Kaua'i is designated as a School Impact Fee District. According to Heidi Meeker, Planning Section, DOE Facilities Development Branch, the DOE will not be asking the HoKua Place project for any contributions or fees at this point in time.

DOE does not have any current plans to propose an impact district in Kapa'a. However, it is possible that a future impact district may cover Kapa'a. In that event, HoKua Place may be required to pay impact fees, based on the fee schedule established for the district.

Representatives of HoKua Place had conversations and received information from the DOE concerning possible impacts the proposed project may have on school facilities and programs.

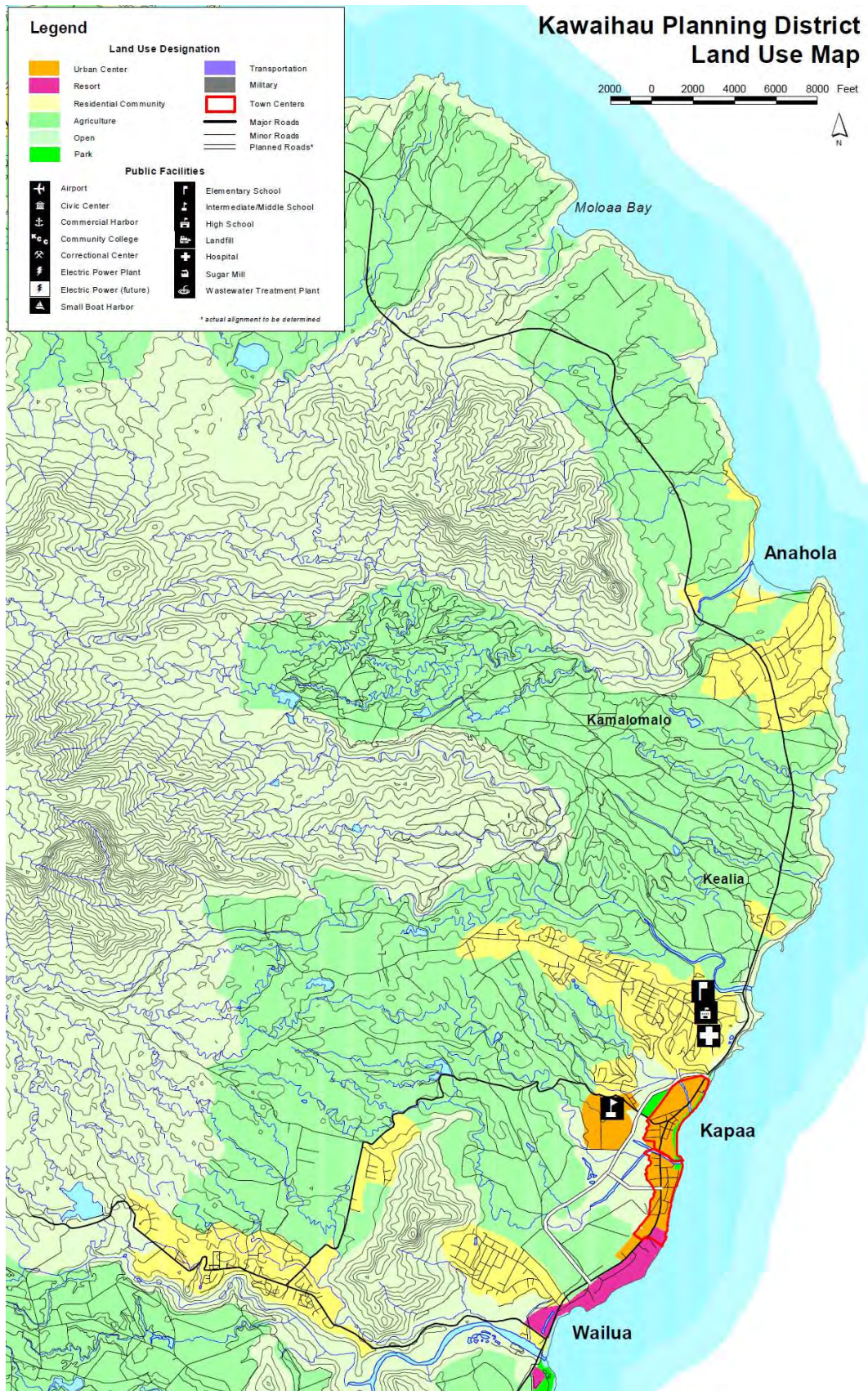
The following is a summary of information concerning existing school facilities serving HoKua Place, estimated student generation due to the project and other information concerning impacts to school facilities. This information is based on information in DOE's Classroom Utilization Report 2007-2008 (CUR 07-08.)

The Kapa'a Middle School is adjacent and to the north of the HoKua Place project. Kapa'a High School and Elementary School, share a campus, which is located within 2-miles of the Property.

Kapa'a Elementary School serves grades K-5 and has capacity for 1,373 students (DOE). The 2010/2011 school year fall enrollment was 802 students (Kapa'a Elementary School Status and Improvement Report, School Year 2010-2011).

Kapa'a Middle School, with facilities' capacity for 1,059 students (DOE), was opened in 1997 and had a fall enrollment for the 2010/2011 school year of 635 students (Kapa'a Middle School Status and Improvement Report, School Year 2010-2011).

Kapa'a High School has capacity for 1,445 students (DOE) and had a 2010/2011 fall enrollment of 1,053 students (Kapa'a High School Status and Improvement Report, School Year 2010-2011.)



Note that all area schools have student enrollment significantly less than the capacity of each school.

This is summarized below:

School	Capacity	Enrollment	Excess Capacity
Kapaʻa Elementary	1,373	802	571
Kapaʻa Middle	1,059	635	424
Kapaʻa High	1,445	1,053	392

In discussions between HoKua Place and the DOE (Heidi Meeker), a preliminary spread sheet that calculated student generation estimates, as well as computed impact fee was provided to HoKua Place.

Below is the indicated student generation for the HoKua Place project, based on 86-single-family units and 683-multi-family units (estimated Kapaʻa-area-only SGR:)

Student Generation (Rate)	S.F.	M.F.	Student Generation (Students)
Elementary	0.13	0.10	Elementary 82
Middle	0.06	0.05	Middle 42
High	0.10	0.03	High 32

(Per the DOE representative (Heidi Meeker), DOE does not have a problem with the estimated student count.)

(Per the DOE representative (Heidi Meeker), DOE does not have a have a problem with the general assessment that there is sufficient capacity in the Kapaʻa schools at this point in time to accommodate the students who will reside in the project.)

Recreational Facilities

There are several parks within Kapaʻa town, including a beach park, which are within walking distance of the project area. A County owned 1.9-acre park is located within walking distance from the subject property, just south east of the corner of Olohena Road and the by-pass road round-about. The park consists of a baseball field, football field, basketball courts, restroom facilities, picnic tables and a barbecue area.

Healthcare Services

Mahelona Medical Center located in Kapaʻa (approximately 2-miles away from the project) is Kauaʻi's Eastside Critical Access Hospital, providing 24-hour emergency services. The facility is part of the Kauaʻi Region of Hawaiʻi Health Systems Corporation.

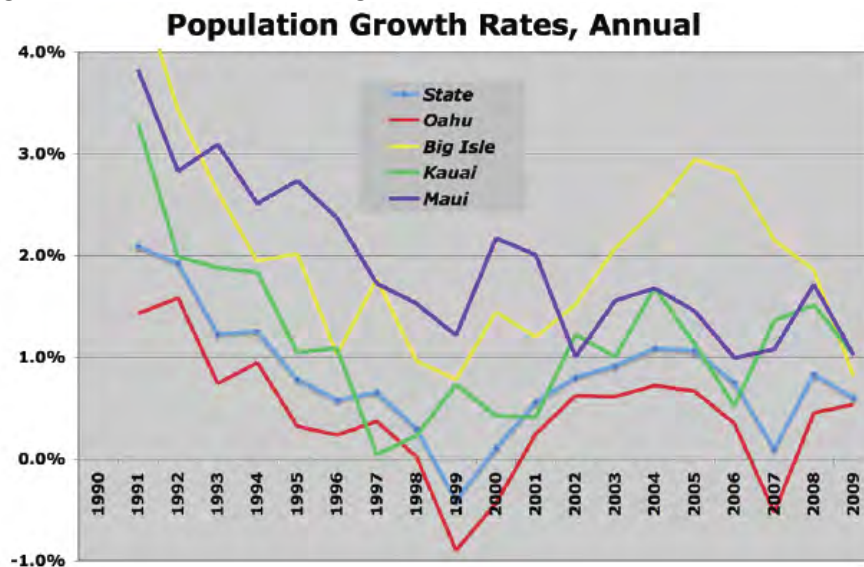
Both Kapaʻa and Līhuʻe (8-miles away) provide healthcare facilities and services.

4.8.2 Potential Environmental Impact & Mitigation Measures

Population

An increasing population base via natural growth and inevitable in-migration, coupled with the intrinsic worldwide demand for Hawaiian tourism and its limited land resources, will help in a revival of the economy, along the well-established, highly-cyclical historic trend lines.

The population growth is seen in the following chart.



It is likely that the population growth for the county in the coming years will return to the long-term historical rate of slightly over 1% growth, p.a.

Housing

This project will have a positive impact on housing and population aspects of the East Kaua'i Region. The Kaua'i General Plan specifically points out the need for more housing in the area and specifically designates the subject property as Urban Center for that purpose.

HoKua Place is a well located master planned project on the Island of Kaua'i targeting primary housing demand from local and in-migrant families, as well as offshore second home demand for view estate ownership. Located in the middle of the island, the project is close to the centers of employment and resort activity, plus the airport, beaches, shopping, recreation, etc.

Development of the Property will address a portion of the significant demand for affordable housing in the County of Kaua'i, without significantly affecting reserve areas for foreseeable urban growth.

HoKua Place will respond to varying spectrums of demand for housing within Kaua'i by providing a wide range of housing opportunities inclusive of affordable housing alternatives. HoKua Place will seek to create and sustain a mixed-income community allowing for unparalleled social diversity.

Affordable housing demands exhibited a significant upward trend over the last several years. Recent market studies have indicated a current shortage of single-family housing in the East Kaua'i area. The forecast is that demand for housing will continue to increase, especially in the area of affordable housing. The proposed development will assist in alleviating some of the current supply-and-demand pressures on Kaua'i's current housing market by providing a variety of additional housing products and opportunities for long-term local residents.

In a 2010 letter to the applicant, the Planning Director wrote,

"We are writing in general support of Three Stooges LLC's petition to amend 97-acres in Kapa'a to the Urban district. The proposed amendment is in conformance with the

County of Kauaʻi's General Plan and will provide 231-units of affordable housing. Affordable housing remains an acute need on Kauaʻi, even with a falling real estate market and as such the County is generally supportive of any petition that proposes additional affordable housing, particularly when contiguous to developed urban areas, infrastructure and consistent with our General Plan."

Employment & Income

Development of HoKua Place would generate employment and consequent income and taxes. On a short-term basis, the proposed development will have a direct beneficial impact on the local economy during construction through construction and construction-related employment.

HoKua Place proposes two areas for commercial uses that, ultimately, will serve to promote and provide a variety of job opportunities. A 1.4-acre parcel is proposed for commercial uses such as a country store and small personal service type uses are anticipated. A 1-acre site on the makai side of the Kapaʻa Bypass Road is also proposed for commercial development or for use as sub-stations for the police and/or fire department.

Economy

By providing the opportunity for new residences on the Island of Kauaʻi and generating additional real estate sales activity, the project is expected to support long-term impacts, including additional consumer expenditures, personal income and government revenue enhancement.

HoKua Place provides significant, on-going economic and fiscal benefits for residents of Kauaʻi, as well as for the County and State governments. Over the long term, the residential homeowners will require various services related to home maintenance and improvement that will further support the local economy.

Public Services & Facilities

HoKua Place will have lands available for county police and fire substations on the Property. One acre on the Makai side of the Kapaʻa Bypass road (southwest corner of Olohena and the bypass road) is proposed for future commercial use or for sub-stations for the police and fire departments.

Education

The proposed project will generate increased demand on student enrollment within the region. However, this demand falls well within the existing capacity of all schools serving the district, elementary, middle and high. Per the DOE representative, DOE does not have a problem with the estimated student count. Per the DOE representative, DOE does not have a have a problem with the general assessment that there is sufficient capacity in the Kapaʻa schools at this point in time to accommodate the students who will reside in the project.

HoKua Place will coordinate with the DOE to ensure that the DOE's facility assessment policy and school impact fee provisions are appropriately addressed. Additionally, a 3.1-acre park is proposed adjacent to the existing Kapaʻa Middle School. The park will have an area for the county's proposed relocation of the Kapaʻa county swimming pool. HoKua Place also plans to develop a bike/walking path from the south of the property to the Kapaʻa Middle School to facilitate biking and walking around the development.

HoKua Place will work with DOE to address any impacts to school facilities due to the project.

Recreational Facilities

HoKua Place holds respect for the environment by interlinking natural features and open space as core components of the community.

Open space and open greenway areas encompassing 14.3-acres will be developed within the project. A 3.1-acre park is proposed within the project for outdoor recreation. Land for the proposed relocation of the Kapa'a county swimming pool will be available within the 3.1-acre park. The provision of a 3.1-acre park with a county swimming pool within the proposed development will provide residents with an opportunity for leisurely recreational activities.

Healthcare Services

Through the layout and design of HoKua Place, there is an overall opportunity for a positive effect on the health of its residents. Communities that make it easy and safe to walk and ride bikes are opening the door to a wide range of health benefits for their residents by reducing barriers to being physically active and helping individuals integrate physical activity into their daily lives.

Active living is a way of life that integrates physical activity into daily routines. For individuals, the goal is to get a total of at least 30-minutes of activity each day by, for example, walking, bicycling, playing in the park, working in the yard, taking the stairs or using recreation facilities.

For communities, the goal is to provide opportunities for people of all ages and abilities to engage in routine physical activity and to create places and policies that encourage better physical health. Such places within HoKua Place include, open space and open greenway areas encompassing 14.3-acres, a 3.1-acre park for outdoor recreation and land for the proposed relocation of the Kapa'a county swimming pool which will provide residents with an opportunity for leisurely recreational and physical fitness activities.

4.8.3 Level of Impact after Mitigation

As noted in the Kapa'a Housing Market Study developed by The Data@Work (Exhibit A) the project will help satisfy current and future housing demand.

Per the DOE representative Heidi Meeker, DOE does not have a have a problem with the general assessment that there is sufficient capacity in the Kapa'a schools at this point in time to accommodate the students who will reside in the project.

The proposed development will not necessitate unreasonable public investment in infrastructure facilities or public services.

The mitigation measures proposed will increase the project's benefit to the island community and the State. Beyond these important collateral employment and economic impacts, the project will provide the area with housing opportunities, a park and relocation of the County's swimming pool for area residents. No significant impacts are anticipated.

4.9 Traffic

This section discusses the traffic in the region and the specific project area, the potential impacts of the project on traffic, and the mitigation measures HoKua Place will employ to mitigate potential impacts.

4.9.1 Environmental Setting

The proposed project is located west of Kapa'a Town and adjacent to Kapa'a Intermediate School, generally in the southwest quadrant of the intersection of Olohena Road and Kapa'a Bypass. The project is a residential subdivision with single-family and multi-family residences and neighborhood supporting retail. The project has two phases. The former Kapaa Highlands development plan is summarized as follows:

Adjoining Ag - 16 Single-Family Units

HoKua Place - 86 Single-Family Lots & Units
683 Multi-Family Units
8,000 SF Neighborhood Retail

Access to and egress from Phase 1 will be via driveways along the south side of Olohena Road west of Kapa'a Intermediate School.

Access to and egress from Phase 2 will be provided via a new intersection along the north side of Kapa'a Bypass and a new intersection along the south side of Olohena Road. These two intersections will be connected by a new curvilinear roadway running through the project. For purposes of discussion in the report, this roadway is referred to as Road 'A.'

Kapa'a Bypass is a two-lane, two-way roadway along the southern and eastern boundaries of the project. This section of Kapa'a Bypass is owned by the HoKua Place developer, who has entered a memorandum of understanding with State of Hawai'i Department of Transportation to dedicate the roadway to the State upon approval of the HoKua Place subdivision.

According to State of Hawai'i Department of Transportation traffic count data from 2010, Kapa'a Bypass has a weekday traffic volume of 7,400 vehicles per day.

Olohena Road is a two-lane, two-way roadway along the northern boundary of the project. Olohena Road also provides service to Kapa'a Intermediate School.

Kūhiō Highway though Kapa'a Town is a two-lane, two-way State highway along the east of the study area.

The intersection of Kūhiō Highway at Kukui Street is a four-legged, signalized intersection located approximately 1,600 feet east of the project. The northbound and southbound approaches are Kūhiō Highway and the eastbound and westbound approaches are Kukui Street. The northbound and southbound left turns are protected-permissive.

The intersection of Kūhiō Highway at Kapa'a Bypass is a three-legged, un-signalized intersection approximately two miles south of Kukui Street. The northbound and southbound approaches are Kūhiō

Highway. The eastbound approach is the Kapa'a Bypass and is the controlled approach. The northbound approach is coned during the morning peak hours to provide on left turn and one through lane. The coning also allows the eastbound to southbound left turn to operate as a free right turn. During the afternoon peak hours and off peak hours, there is one left turn lane and two through lanes. The southbound approach has one through lane and one right turn lane. The eastbound approach has one left turn lane and one right turn lane.

The intersection Kapa'a Bypass and Olohena Road is a four-legged roundabout. All approaches are one lane only. The north leg of the intersection is one-way southbound into the intersection. The remaining three legs are two-way.

The intersection of Olohena Road at Kaapuni Road and Kaehula Road is actually two intersections. Olohena Road is the eastbound and westbound approaches and Kaapuni Road is the STOP sign controlled approach at Olohena Road. Kaehula Road intersects Kaapuni Road west of Olohena Road.

A preliminary trip generation analysis was performed to define the scope of work and study area. This analysis determined that the proposed project will generate less than 500 trips during either the morning or afternoon peak hour. Based on "Institute of Transportation Engineers" standards, the traffic study should be a "small development: traffic impact assessment."

Accordingly, the study area was defined to include the intersection of Kapa'a Bypass at Olohena Road and the intersections providing access to and egress from Phase 2 of the project (Kapa'a Bypass at Road 'A' and Olohena Road at Road 'A'). Phase 1 lots are serviced by individual driveways which will have negligible traffic volumes.

State of Hawai'i Department of Transportation reviewed the first draft of the report and directed that the study area be expanded to include the intersections of Kūhiō Highway at Kukui Street and Kūhiō Highway at Kapa'a Bypass.

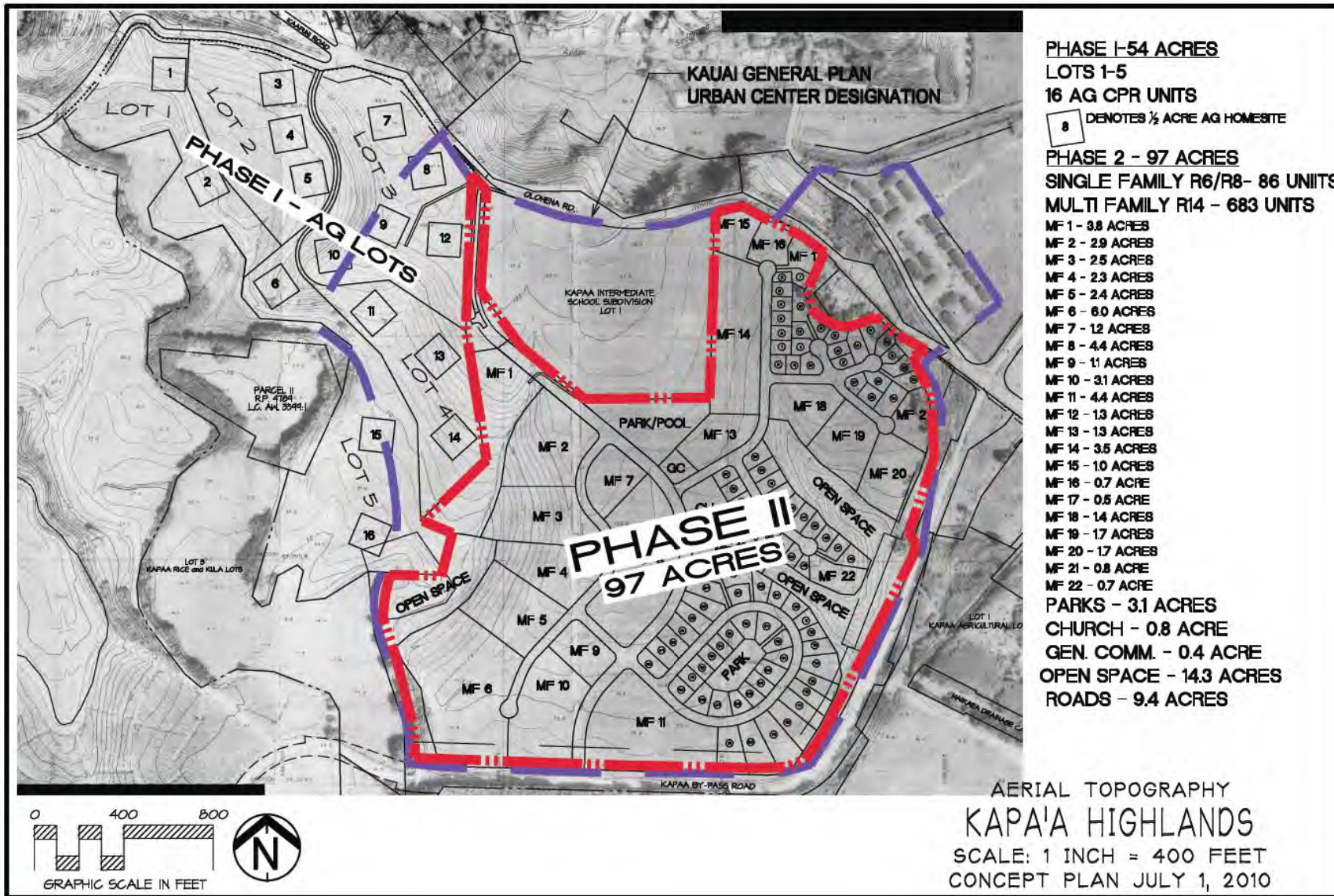
The County of Kaua'i directed that the intersection of Olohena Road at Kaapuni Road and Kaehula Road be included in the study area.

A field reconnaissance was performed to identify existing roadway cross-sections, intersection lane configurations, traffic control devices, and surrounding land uses. Current weekday peak hour traffic volumes were obtained from manual traffic counts at the study intersections.

Existing intersection levels-of-service were determined using the methodology described in the "2000 Highway Capacity Manual". Existing deficiencies were identified based on the results of the level-of-service analysis and field observations.

Peak hour traffic that the proposed project will generate was estimated using trip generation analysis procedures recommended by the Institute of Transportation Engineers. Project generated traffic was distributed and assigned to the adjacent roadway network.

A level-of-service analysis for future traffic conditions with traffic generated by the study project was performed. The impacts of traffic generated by the proposed project were quantified and summarized. A report documenting the conclusions of the analyses performed and recommendations was prepared.



4.9.2 Environmental Impacts & Mitigation Measures

Phillip Rowell and Associates completed the Traffic Impact Assessment Report (TIAR) for HoKua Place (formerly known as Kapa'a Highlands II) and the report is attached as Exhibit H of this assessment. The major finding and conclusion of the report notes:

1. The HoKua Place subdivision is located west of Kapa'a Town and adjacent to Kapa'a Intermediate High School. The project is a residential subdivision with single-family and multi-family residences and neighborhood supporting retail.
2. The project has two phases. Phase 1 will be 16 single-family agricultural lots. Access to and egress from these lot will via driveways along Olohena Road west of Kapa'a Intermediate School.
3. The second phase will consists of 683-multi-family units, 86-single family lots and homes and 8,000 square feet of neighborhood supporting retail. Access to and egress from Phase 2 will be provided via a new intersection along the north side of Kapa'a Bypass and a new intersection along the south side of Olohena Road.
4. The conclusion of the trip generation analysis is that Phases 1 and 2 will generate a total of 394 trips during the morning peak hour and 487 trips during the afternoon peak hour.
5. The level-of-service analysis of the intersection of Kūhiō Highway at Kukui Street determined that the overall intersection and all controlled movements will operate at Level-of-Service B without and with project generated traffic. There are no changes in the level-of-service of the intersections or controlled lane groups as a result of project related traffic.
6. A level-of-service analysis of the intersection of Kapa'a Bypass at Olohena Road concluded that the eastbound approach to the roundabout is currently over-capacity (Level-of-Service E) during the morning peak hour without the project but will operate at Level-of-Service D with the project. This improvement is because eastbound to southbound traffic will be diverted from the intersection to Road A.
7. The intersection of Kūhiō Highway at Kapa'a Bypass will operate at Level-of-Service F without and with the project during the morning and afternoon peak hours. The delay of the eastbound to northbound left turn increases even though the project adds no traffic to this movement. The delay of this movement is so long that it affects the level-of-service of the overall intersections. The proposed project adds no traffic to this movement. The proposed project adds traffic to the northbound to westbound left turn, which increases the delay to the eastbound to northbound left turn, but is not considered significant. The morning and afternoon peak hour projections for this lane group are 5 and 12 vehicles per hour, respectively.
8. Based on the results of the level-of-service analysis, no roadway improvements are recommended to accommodate project related traffic. The project actually has a positive impact as a result of constructing Road 'A', which will divert traffic away from the intersection of Olohena Road and Kapa'a Bypass. The eastbound to southbound movement will be over-capacity without Road 'A'. Traffic impacts due to the project are not considered significant.

Existing Peak Hour Traffic Volumes

Current weekday peak hour traffic volumes at the intersection of Kapa'a Bypass at Olohena Road were obtained from manual traffic counts. The counts at the intersection of Olohena Road at Kapa'a Bypass were performed Tuesday, May 15, 2012. The counts at the intersection of Kūhiō Highway were performed Thursday, August 8, 2013, and the counts at the intersection of Kūhiō Highway at Kapa'a Bypass were performed on Tuesday, October 29, 2013.

The traffic counts include mopeds, motorcycles, buses, trucks and other large vehicles.

During the surveys, the following was observed at the intersection of Olohena Road at Kapa'a Bypass:

1. The number of pedestrians crossing the approaches to the intersection are minimal, even with the bus stop and transfer site at the park along the north side of Olohena Road east of the intersection.
2. Long queues of 15 vehicles or more along the westbound approach of Olohena Road were noted during the morning peak hour.

The Kaua'i Bus operates along Olohena Road and Kapa'a Bypass. A major bus stop and transfer point is located along Olohena Road east of Kapa'a Bypass in the parking lot adjacent to the park.

Level-of-Service Concept

"Level-of-Service" is a term which denotes any of an infinite number of combinations of traffic operating conditions that may occur on a given lane or roadway when it is subjected to various traffic volumes. Level-of-service (LOS) is a qualitative measure of the effect of a number of factors which include space, speed, travel time, traffic interruptions, freedom to maneuver, safety, driving comfort and convenience.

There are six levels-of-service, A through F, which relate to the driving conditions from best to worst, respectively. In general, LOS A represents free-flow conditions with no congestion. LOS F, on the other hand, represents severe congestion with stop-and-go conditions. Level-of-service D is typically considered acceptable for peak hour conditions in urban areas.

Corresponding to each level-of-service shown in the table is a volume/capacity ratio. This is the ratio of either existing or projected traffic volumes to the capacity of the intersection. Capacity is defined as the maximum number of vehicles that can be accommodated by the roadway during a specified period of time.

The capacity of a particular roadway is dependent upon its physical characteristics such as the number of lanes, the operational characteristics of the roadway (one-way, two-way, turn prohibitions, bus stops, etc.), the type of traffic using the roadway (trucks, buses, etc.) and turning movements.

Like signalized intersections, the operating conditions of intersections controlled by stop signs can be classified by a level-of-service from A to F. However, the method for determining level-of-service for unsignalized intersections is based on the use of gaps in traffic on the major street by vehicles crossing or turning through that stream. Specifically, the capacity of the controlled legs of an intersection is based on two factors:

- 1) the distribution of gaps in the major street traffic stream, and
- 2) driver judgment in selecting gaps through which to execute a desired maneuver. The criteria for level-of-service at an un-signalized intersection is therefore based on delay of each turning movement.

Existing Levels-of-Service

The results of the level-of-service analysis of the intersection of Kūhiō Highway at Kukui Street is summarized in the table “Existing Levels-of-Service - Signalized Intersections”, below. Since this intersection is signalized, the volume-to-capacity ratio, delay and level-of-service is shown for the overall intersection and each controlled movement. The traffic signal timing was estimated by manually timing the traffic signals during the peak hours.

Existing Levels-of-Service - Signalized Intersections ⁽¹⁾

Intersection and Movement	AM Peak Hour			PM Peak Hour		
	V/C ⁽²⁾	Delay ⁽³⁾	LOS ⁽⁴⁾	V/C	Delay	LOS
Cycle Length = 60 Seconds ⁽⁵⁾						
Kuhio Highway at Kuhio Street	0.51	11.5	B	0.49	11.1	B
Eastbound Left & Thru	0.10	17.0	B	0.09	16.9	B
Eastbound Right	0.03	16.4	B	0.01	16.3	B
Westbound Right	0.00	16.2	B	0.01	16.2	B
Northbound Left	0.03	5.0	A	0.02	5.0	A
Northbound Thru & Right	0.68	11.5	B	0.61	10.1	B
Southbound Left & Thru	0.65	10.9	B	0.67	11.5	B
Southbound Right	0.00	4.8	A	0.00	4.8	A

NOTES:

- (1) See [Attachments F and G](#) for Level-of-Service Worksheets.
- (2) Volume-to-Capacity ratio.
- (3) Delay is in seconds per vehicle.
- (4) Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.
- (5) Traffic signal cycle length determined by timing the traffic signal during peak hours.

The overall intersection operates at Level-of-Service B during both peak periods. All controlled lane groups operate at Level-of-Service A or B. This indicates good operating conditions.

The results of the level-of-service analysis of the intersection of Kapa’a Bypass and Olohena Road are summarized in the table “Existing Levels-of-Service - Kapa’a Bypass at Olohena Road”, below.

Existing Levels-of-Service - Kapa’a Bypass at Olohena Road

Approach	AM Peak Hour		PM Peak Hour	
	Without Project		Without Project	
	V/C ⁽¹⁾	LOS ⁽²⁾	V/C	LOS
Overall Intersection	0.92	E	0.50	A
Eastbound Approach	0.92	E	0.49	A
Westbound Approach	0.18	A	0.42	A
Northbound Approach	0.09	A	0.38	A
Southbound Approach	0.63	B	0.62	B

NOTES:

- (1) V/C. denotes volume-to-capacity ratio.
- (2) LOS denotes Level-of-Service.
- (3) See [Attachments F and G](#) for Level-of-Service Worksheets.

For roundabout intersections, the HCS methodology calculates volume-to-capacity ratios for the intersection approaches, which is then related to the volume-to-capacity ratio definitions for levels-of-service discussed previously. The levels-of-service calculations indicate that the eastbound approach is near capacity during the morning peak hour with a volume-to-capacity ratio of 0.92. All the remaining movements operate at Level-of-Service A or B.

The results of the level-of-service analysis of the remaining unsignalized intersections are summarized in the table “Existing Levels-of-Service of Un-signalized Intersections”, below. The HCM methodology calculates only delays for controlled lane groups only. Volume-to-capacity ratios are not calculated. The 95th percentile queue lengths as reported by Synchro are also shown.

Existing Levels-of-Service of Unsignalized Intersections						
Intersection, Approach and Movement	AM Peak Hour			PM Peak Hour		
	Delay ⁽¹⁾	LOS ⁽²⁾	95 th Queue ⁽³⁾	Delay	LOS	95 th Queue
<i>Kuhio Highway at Kapaa Bypass</i>	95.3	F	NC	12.3	B	NC
Eastbound Left	273.5	F	999	57.9	F	227
Eastbound Right	Uncontrolled Lane Group			Uncontrolled Lane Group		
Northbound Left	9.2	A	8	13.2	B	82
Northbound Thru	Uncontrolled Lane Group			Uncontrolled Lane Group		
Southbound Thru	Uncontrolled Lane Group			Uncontrolled Lane Group		
Southbound Right	Uncontrolled Lane Group			Uncontrolled Lane Group		
<i>Oloheua Road at Kaapuni Road</i>	9.8	A	NC	3.1	A	NC
Eastbound Left & Thru	0.9	A	2	1.7	A	2
Westbound Thru & Right	Uncontrolled Lane Group			Uncontrolled Lane Group		
Southbound Left & Right	22.5	C	112	13.5	B	26
<i>Kaapuni Road at Kaehula Road</i>	0.7	A	NC	0.3	A	NC
Westbound Left & Right	11.5	B	4	11.4	B	1
Northbound Thru & Right	Uncontrolled Lane Group			Uncontrolled Lane Group		
Southbound Left & Thru	0.0	A	0	0.1	A	0
NOTES:						
(1) Delay is in seconds per vehicle.						
(2) LOS denotes Level-of-Service.						
(3) 95th percentile queue in feet as reported by Synchro.						
(4) NC = Not calculated						
(5) See Attachments F and G for Level-of-Service Worksheets.						

The intersection of Kūhiō Highway at Kapa‘a Bypass operates at Level-of-Service F during the morning peak hour and Level-of-Service B during the afternoon peak hour. It is the eastbound left turn lane with a delay so long that it impacts the overall intersection, resulting in the poor level-of-service.

The intersection of Oloheua Road at Kaapuni Road and Kaehula Road is actually two intersections. Oloheua Road is the eastbound and westbound approaches and Kaapuni Road is the STOP sign controlled approach at Oloheua Road. Kaehula Road intersects Kaapuni Road west of Oloheua Road. Therefore, the level-of-service results are shown for two intersections. The intersections of Oloheua Road at Kaapuni Road and Oloheua Road at Kaehula Road both operate at Level-of-Service A during both peak periods.

Existing Deficiencies

The eastbound approach at the intersection of Oloheua Road at Kapa‘a Bypass is at or near capacity during the morning peak hour with a volume-to-capacity ratio of 0.92 and a Level-of-Service of E. The

deficient movement is mitigated when the project is constructed as traffic will be redistributed as a result of constructing Road A through the project.

The eastbound to northbound left turns at the intersection of Kūhiō Highway at Kapa'a Bypass operate at Level-of-Service F during both peak hours. However, the morning and afternoon volumes are only 5 and 12 vehicles, respectively. Since the volumes are so low, mitigation has been deferred. It should also be noted that the proposed development project adds no traffic to these movements.

Background Traffic Projections

Based on data in the Kaua'i Long-Range Land Transportation Plan, population growth in the Kawaihau District, which includes Kapa'a, will be less than one percent per year until 2020. In addition, we are not aware of any approved projects in the vicinity that will impact traffic conditions along Kapa'a Bypass or Olohena Road before the design year of this project.

Therefore, for this particular study, it was assumed that there will be no significant increase in peak hour traffic at the study intersections as a result of regional background growth or traffic generated by approved new projects in the vicinity of the project.

Future 2020 background (without project) traffic volumes were estimated to be comparable to existing peak hour traffic volumes at the study intersections.

Project Trip Generation

Future traffic volumes generated by HoKua Place and HoKua Farm Lots (Phases 1 and 2) were estimated using the methodology described in the "Trip Generation Handbook" and data provided in "Trip Generation". This method uses trip generation equations or rates to estimate the number of trips that the project will generate during the peak hours of the project and along the adjacent street.

The equations used for the trip generation analysis are summarized in table "Trip Generation Equations", below. The trip generation equations for the residential uses are based on the number of planned residential units. The equations for the retail portion of the project are based on the gross leasable square footage of the retail area. The equations shown estimate the number of peak hour trips during the peak hours of the generator, which may or may not coincide with the peak hour of the adjacent street. "Trip Generation" does not note the peak hours of the generators.

A portion of the trips to and from the retail area will be from the adjacent traffic stream. These trips are referred to as "pass by trips" and are deducted from the total number of trip to estimate the number of new trips generated by the project. However, these trips are added to the driveway volumes at the retail areas. The equation for estimating the percent pass by trips is also provided. This equation is based on the gross leasable square footage of the retail area. Pass by equations are provided of the PM peak hour only.

It should be noted that the percentage of pass by trip estimated from the equation provided in the Trip Generation Handbook is 81%. State of Hawai'i Department of Transportation felt that this percentage was too high. It was agreed with State of Hawai'i Department of Transportation that 34% would be used for the trip generation calculations.

Trip Generation Equations⁽¹⁾

		Single Family Units (Land Use Code 210)	Multi-Family Units (Land Use Code 230)	Neighborhood Commercial (Land Use Code 820)	Pass By Trips
Period & Direction		Equation or Percent ⁽¹⁾	Equation or Percent ⁽¹⁾	Equation or Percent ⁽¹⁾	Equation or Percent ⁽²⁾
Weekday Total		$\text{Ln}(T) = 0.92 \text{ Ln}(X) + 2.71$	$\text{Ln}(T) = 0.85 \text{ Ln}(X) + 2.55$	$\text{Ln}(T) = 0.65 \text{ Ln}(x) + 5.83$	No Equation Provided
AM Peak Hour	Total	$T = 0.70(X) + 12.05$	$\text{Ln}(T) = 0.82 \text{ Ln}(X) + 0.171$	$\text{Ln}(T) = 0.60 \text{ Ln}(A) + 2.29$	No Equation Provided
	Inbound	25%	18%	61%	
	Outbound	75%	82%	39%	
PM Peak Hour	Total	$\text{Ln}(T) = 0.89 \text{ Ln}(X) + 9.61$	$T = 0.34(X) + 38.31$	$\text{Ln}(T) = 0.66 \text{ Ln}(A) + 3.40$	$\text{Ln}(T) = -0.29 \text{ Ln}(A) + 5.00$
	Inbound	63%	64%	48%	50%
	Outbound	37%	36%	52%	50%

Notes:

(1) Source: Institute of Transportation Engineers, *Trip Generation, 7th Edition*, Washington, D.C., 2003

(2) Source: Institute of Transportation Engineers, *Trip Generation Handbook*, Washington, D.C., 2004, p 47

(3) T = Trips, X = Number of Units, A = Gross Leasable Square Feet

The results of the trip generation analysis are summarized in table “Trip Generation Calculations”, below. The conclusion of the trip generation analysis is that Phases 1 and 2 will generate a total of 394 trips during the morning peak hour and 487 trips during the afternoon peak hour. As noted earlier, the numbers of peak hour trips shown are the trips generated during the peak hour of the generator, which may or may not coincide with the peak hours of the adjacent streets.

Trip Generation Calculations

		Trip Generation Calculations											
		Phase 1	Phase 2							Total Project Trips			
		Single Family	Single Family	Multi-Family	Neighborhood Commercial		Phase 2 Total Trip						
		16 Units	100 Units	700 Units	8,000 TLSF					(Phases 1 and 2)			
Period & Direction		Trips	Trips	Trips	Trips	Pass By Trips ⁽¹⁾	New Trips	Trips	Pass By Trips	New Trips	Total Trips	Pass By Trips	New Trips
AM Peak Hour	Total	23	82	255	34	0	34	371	0	371	394	0	394
	Inbound	6	21	46	21	0	21	88	0	88	94	0	94
	Outbound	17	61	209	13	0	13	283	0	283	300	0	300
PM Peak Hour	Total	22	111	276	118	40	78	505	96	409	527	40	487
	Inbound	14	71	177	57	20	37	305	48	257	319	20	299
	Outbound	8	40	99	61	20	41	200	48	152	208	20	188

Notes:

(1) The percentage of pass by trips is 34% of the afternoon peak hour trips.

Project trips were distributed and assigned based on existing traffic approach and departure patterns of traffic into and out of the study area as estimated from the traffic counts. Given the location of the retail, which is the center of Phase 2, it was assumed that all the pass by trips would be diverted from the internal road system of Phase 2.

Background Plus Project Projections

Background plus project traffic projections were estimated by superimposing the peak hourly traffic generated by the proposed project on the background (without project) peak hour traffic projections. This assumes that the peak hourly trips generated by the project coincide with the peak hour of the adjacent street. This represents a worse-case condition as it assumes that the peak hours of the intersection approaches and the peak hour of the study project coincide.

As noted earlier, construction of Road 'A' will divert traffic from the eastbound to southbound right turns and northbound to westbound left turns from the intersection of Olohena Road at Kapa'a Bypass.

Traffic Impact Assessment

The traffic impact of the proposed project was assessed by analyzing changes in traffic volumes at the study intersections and changes on the level-of-service.

An analysis of the project's share of 2020 background plus project intersection approach volumes at the study intersections is summarized in table "Analysis of Project's Share of Total Intersection Approach Volumes", below. The table summarizes the project's share of total 2020 peak hour approach volumes at each intersection.

Also shown are the percentages of 2020 background plus project traffic that is the result of background growth and traffic generated by related projects. The negative percentages reflect the redistribution of traffic as a result of Road 'A'.

**Analysis of Project's Share of Total
Intersection Approach Volumes ⁽¹⁾**

Intersection	Period	Existing	2020 Background Plus Project	Project Traffic	
Kukui Highway at Kukui Street	AM	1441	1453	12	0.8%
	PM	1370	1385	15	1.1%
Olohena Road at Kapaa Bypass	AM	1447	1372	-75	-5.5%
	PM	1459	1407	-52	-3.7%
Kuhio Highway at Kapaa Bypass	AM	1990	2266	276	12.2%
	PM	2176	2518	342	13.6%

Notes:

- (1) Volumes shown are total intersection approach volumes or projections.
- (2) Percentage of total 2015 background plus project traffic.
- (3) Data to be provided in final draft report.

The percentage of project traffic at the intersection of Kūhiō Highway at Kukui Street is 0.8% during the morning peak hour and 1.1% during the afternoon peak hour. The analysis indicates that the peak hour traffic volumes at the intersection of Olohena Road at Kapa'a Bypass will be less than existing because of the redistribution of traffic to Road 'A.'

The analysis indicates that peak hour traffic at the intersection of Kūhiō Highway at Kapa'a Bypass will increase 12.2 % during the morning peak hour and 13.6% during the afternoon peak hour. These increases are higher than desirable but the intersection is over two miles from the project. Typically, the study area for a project that generates the amount of traffic that this project generates should be limited to one-half mile, or less.

A level-of-service analysis was performed for "without project" and "with project" conditions to confirm that the intersections will operate at an acceptable level-of-service and that there are no traffic operational deficiencies.

The results of the 2020 level-of-service analysis of the intersection of Kūhiō Highway at Kukui Street are summarized in the table “2020 Levels-of-Service – Kūhiō Highway at Kukui Street”, below. The overall intersection and all controlled movements will operate at Level-of-Service B without and with project generated traffic. There are no changes in the level-of-service of the intersections or controlled lane groups as a result of project related traffic.

2020 Levels-of-Service - Kūhiō Highway at Kukui Street ⁽¹⁾

Intersection and Movement	AM Peak Hour						PM Peak Hour					
	Without Project			With Project			Without Project			With Project		
	V/C ⁽²⁾	Delay ⁽³⁾	LOS ⁽⁴⁾	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Overall Intersection	Cycle Length = 60 Seconds ⁽⁵⁾						Cycle Length = 60 Seconds					
	0.51	11.5	B	0.51	11.6	B	0.49	11.1	B	0.50	11.1	B
Eastbound Left & Thru	0.10	17.0	B	0.11	17.1	B	0.09	16.9	B	0.10	17.0	B
Eastbound Right	0.03	16.4	B	0.04	16.5	B	0.01	16.3	B	0.02	16.3	B
Westbound Right	0.00	16.2	B	0.00	16.2	B	0.01	16.2	B	0.01	16.2	B
Northbound Left	0.03	5.0	A	0.03	5.1	A	0.02	5.0	A	0.04	5.2	A
Northbound Thru & Right	0.68	11.5	B	0.68	11.5	B	0.61	10.1	B	0.61	10.1	B
Southbound Left & Thru	0.65	10.9	B	0.65	10.9	B	0.67	11.5	B	0.67	11.5	B
Southbound Right	0.00	4.8	A	0.00	4.8	A	0.00	4.8	A	0.00	4.8	A

NOTES:

(1) See [Attachment Q and R](#) for Level-of-Service Worksheets.

(2) Volume-to-Capacity ratio.

(3) Delay is in seconds per vehicle.

(4) Level-of-Service calculated using the operations method described in *Highway Capacity Manual*. Level-of-Service is based on delay.

(5) Traffic signal cycle length determined by timing the traffic signal during peak hours.

The results of the level-of-service analysis for the intersection of the Kapa’a Bypass at Olohena Road, the only existing study intersection, are summarized in table “Future (2020) Levels-of-Service - Kapa’a Bypass at Olohena Road”, below. The Highway Capacity Manual methodology for analysis of roundabouts calculates only the volume-to-capacity ratio of each intersection approach. The volume-to-capacity ratio is then referenced to the level-of-service definitions for signalized intersection to determine the level-of-service of each approach.

Future (2020) Levels-of-Service - Kapa’a Bypass at Olohena Road

Approach	AM Peak Hour				PM Peak Hour			
	Without Project		With Project		Without Project		With Project	
	V/C ⁽¹⁾	LOS ⁽²⁾	V/C	LOS	V/C	LOS	V/C	LOS
Overall Intersection	0.92	E	0.83	D	0.50	A	0.64	B
Eastbound Approach	0.92	E	0.83	D	0.49	A	0.43	A
Westbound Approach	0.18	A	0.19	A	0.42	A	0.42	A
Northbound Approach	0.09	A	0.05	A	0.38	A	0.30	A
Southbound Approach	0.63	B	0.63	B	0.62	B	0.64	B

NOTES:

(1) V/C. denotes volume-to-capacity ratio.

(2) LOS denotes Level-of-Service.

(3) See [Attachment Q and R](#) for Level-of-Service Worksheets.

The analysis concluded that the eastbound approach is over-capacity (Level-of-Service E) during the morning peak hour without the project but will operate at Level-of-Service D with the project. This improvement is because eastbound to southbound traffic will be diverted to Road A.

The results of the level-of-service analysis for the remaining un-signalized intersections are summarized in table “202 Levels-of-Service of Un-signalized Intersections”, below. Shown are the delays, levels-of-service and 95th percentile queues.

2020 Levels-of-Service of Unsignalized Intersections

Intersection, Approach and Movement	AM Peak Hour						PM Peak Hour					
	Without Project			With Project			Without Project			With Project		
	Delay ⁽¹⁾	LOS ⁽²⁾	Queue ⁽³⁾	Delay	LOS	Queue	Delay	LOS	Queue	Delay	LOS	Queue
Kuhio Highway at Kapaa Bypass	95.3	F	NC	191.4	F	NC	12.3	B	NC	42.4	F	NC
Eastbound Left	273.5	F	999	479.7	F	1676	57.9	F	227	190.1	F	1116
Eastbound Right	Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group		
Northbound Left	9.2	A	8	9.6	A	15	13.2	B	82	21.0	C	203
Northbound Thru	Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group		
Southbound Thru	Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group		
Southbound Right	Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group		
Olohehena Road at Kaapuni Road	9.8	A	NC	10.1	B	NC	3.1	A	NC	3.3	A	NC
Eastbound Left & Thru	0.9	A	2	0.9	A	2	1.7	A	2	1.5	A	2
Westbound Thru & Right	Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group		
Southbound Left & Right	22.5	C	112	24.0	C	121	13.5	B	26	14.4	B	32
Kaapuni Road at Kaehula Road	0.7	A	NC	0.6	A	NC	0.3	A	NC	0.3	A	NC
Westbound Left & Right	11.5	B	4	11.7	B	4	11.4	B	1	11.6	B	1
Northbound Thru & Right	Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group			Uncontrolled Lane Group		
Southbound Left & Thru	0.0	A	0	0.0	A	0	0.1	A	0	0.1	A	0

NOTES:
 (1) Delay is in seconds per vehicle.
 (2) LOS denotes Level-of-Service.
 (3) 95th percentile queue in feet as reported by Synchro.
 (4) NC = Not calculated
 (5) See [Attachments Q and R](#) for Level-of-Service Worksheets.

The intersection of Kūhiō Highway at Kapa‘a Bypass will operate at Level-of-Service F without and with the project during the morning and afternoon peak hours. The delay of the eastbound to northbound left turn increases even though the project adds no traffic to this movement. The delay of this movement is so long that it affects the level-of-service of the overall intersections. The remaining unsignalized intersections will operate at Level-of-Service A without and with project traffic.

The configurations of the intersections of Kapa‘a Bypass and Road ‘A’ and Olohehena Road at Road “A” were determined before the level-of-service analysis was performed for these intersections. An assessment of the need for a separate left turn lane at both intersections was performed using FHWA’s standard. If the intersection of the approaching volume and the opposing volume is left of the calculated or estimated percent of left turns, a left turn lane is not warranted. As shown, the assessment determined that a separate left turn lane is warranted at the intersection of Kapa‘a Bypass at Road ‘A’ based both AM and PM peak hour projections and at the intersection of Olohehena Road at Road ‘A’ based on PM peak hour projections.

Based on the results of the assessment for a separate left turn lane at the new intersections, the level-of-service analysis was performed using the following assumptions:

1. There will be a separate left turn lane for left turns from eastbound Kapa‘a Bypass to northbound Road ‘A.’
2. There will be a separate left turn lane for left turns westbound Olohehena Road to southbound Road ‘A.’
3. Road ‘A’ approaches to both Kapa‘a Bypass and Olohehena Road will be one lane each for the level-of-service analysis. However, each approach may be widened to provide separate left and right turns lanes to minimize delays to right turns.

The results of the level-of-service analysis of the STOP sign controlled intersections are summarized in table “2020 Levels-of-Service – New Intersections”, below. As shown, all lane groups will operate at Level-of-Service C, ore better.

2020 Levels-of-Service - New Intersections

Intersection and Movement	AM Peak Hour			PM Peak Hour		
	Delay ¹	LOS ²	Queue ³ (Feet)	Delay	LOS	Queue (Feet)
<i>Kapa’a Bypass at Road ‘A’</i>	10.5	B	NC	4.3	A	NC
Eastbound Left	9.2	A	9	8.8	A	24
Southbound Left & Right	30.5	D	155	12.0	B	33
<i>Olohena Road at Road ‘A’</i>	2.5	A	NC	3.4	A	NC
Westbound Left	9.0	A	2	7.9	A	4
Northbound Left & Right	16.7	C	31	16.8	C	35

NOTES:

- (1) Delay is in seconds per vehicle.
- (2) LOS denotes Level-of-Service. Level-of-Service is based on delay.
- (3) 95th Percentile in feet as reported by Synchro.
- (4) See [Attachments Q and R](#) for Level-of-Service Analysis Worksheets.
- (5) NC = Not calculated.

Project Road System

For signalized intersections, Level-of-Service D is the minimum acceptable Level-of-Service and that this standard is applicable to the overall intersection rather than each controlled lane group. Minor movements, such as left turns, and minor side street approaches may operate at Level-of-Service E or F for short periods of time during the peak hours so that the overall intersection and major movements along the major highway will operate at Level-of-Service D, or better. All volume-to-capacity ratios must be 1.00 or less.

A standard has not be established for un-signalized intersections. Therefore, Level-of-Service D is an acceptable level-of-service for any major controlled lane groups, such as left turns from a major street to a minor street. Side street approaches may operate at Level-of-Service E or F for short periods of time. This is determined from the delays of the individual lane groups. If the delay of any of the side street approaches appears to be so long that it will affect the overall level-of-service of the intersection, then mitigation measures should be accessed.

Using this standard, the Traffic Analysis concluded that no mitigation is recommended.

The eastbound to northbound left turns at the intersection of Kūhiō Highway at Kapa’a Bypass will operate at Level-of-Service F, without and with project traffic. The proposed project adds no traffic to this movement. The proposed project adds traffic to the northbound to westbound left turn, which increases the delay to the eastbound to northbound left turn.

The level-of-service of the eastbound approach of Olohena Road to Kapa’a Bypass improves from Level-of-Service E to Level-of-Service D with project as a result of construction of Road ‘A’ between Kapa’a Bypass and Olohena Road, providing an alternate route and diverting traffic from the intersection. Thus, Road ‘A’ running through the project connecting these two intersections, distributes traffic and reduces the overcapacity condition at this intersection during the AM peak hour.

Other Traffic Related Issues

Impacts of Kapa'a Closure Bypass - Based on the traffic counts performed for this study, the Kapa'a Bypass accommodates between 600 and 700 vehicles per hour during the peak hours. A closure of the bypass would force this traffic to use Kūhiō Highway. During the field reconnaissance for this project, it was noted that traffic flow along Kūhiō Highway is congested, especially during the afternoons, with very slow speeds and long delays indicating low levels-of-service. It would be difficult for the intersections along Kūhiō Highway in Kapa'a Town to accommodate this additional traffic at acceptable levels-of-service. The addition of traffic that now uses Kapa'a Bypass to current traffic along Kūhiō Highway would result in longer delays and therefore lower levels-of-service. The conclusion is that Kapa'a Bypass serves as a major mitigation to potential traffic congestion and low levels-of-service along Kūhiō Highway.

Pedestrian and Traffic - It is reasonable that there will be a small amount of pedestrian and bicycle activity along Olohena Road in the vicinity of Kapa'a Intermediate School. Some of this pedestrian activity may be generated from HoKua Place. Accordingly, the intersections into and out of the subdivisions should provide pedestrian crosswalks to accommodate this activity.

Speed Control Along Road 'A' - As noted earlier in this report, Road 'A' will provide an alternate route to Kapa'a Intermediate School since it will be a more direct route for northbound traffic. Since Road 'A' will be through a residential area, traffic calming measure should be provided to control vehicle speeds and enhance the safety of pedestrians. Measures that should be considered include four-way stops, speed humps or tables.

4.9.3 Level of Impact after Mitigation

As noted in the response letter from the Department of Transportation related to the Traffic Impact Analysis Report, as found in Exhibit H of this report, DOT concurs with the findings of that analysis. A summary of their response is noted below:

- Your justification that a traffic signal warrant and queue analysis would not be appropriate is acceptable.
- Our concern over "traffic calming" measures along Road A through the subdivision remain, since it would potentially reduce the utility that Road A would divert significant traffic; however your justification is acceptable.
- A left-turn storage lane from the Kapaa Bypass into Road A of the subdivision may be deferred for the immediate future but the subdivision is still required to provide one should traffic conditions warrant it at no cost to the Department of Transportation (DOT).
- With reference to the executed Memorandum of Agreement dated May 30, 2002, the appropriate.
- Right-of-way of the Kapaa Bypass with "No Access Permitted" except at existing access (i.e. Road A) along the project frontage, shall be dedicated to the DOT as a condition of the Land Use Commission.

4.10 Power & Communication

This section discusses the electrical power and communications facilities in the region, the potential impact of the project on those facilities, and mitigation measures HoKua Place will employ to mitigate potential impacts.

4.10.1 Environmental Setting

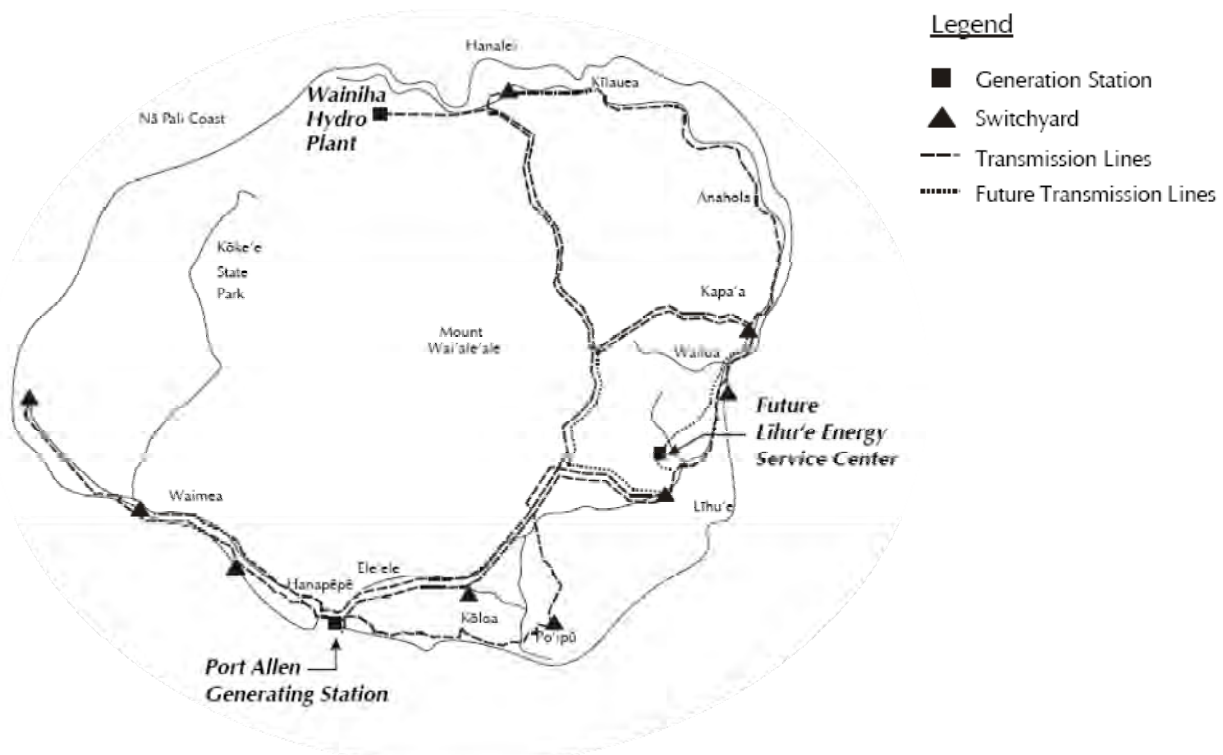
Power

Residents of the State of Hawai'i pay the highest electricity rates in the US. The average American paid 10.5 cents/kWh in 2010. In the state of Hawai'i, O'ahu currently has the lowest residential electricity rates, while Lāna'i has the highest. Residential rates on Kaua'i average between 40-45 cents/kWh.

Hawai'i relies on imported oil for approximately 76% of its total electricity production. The price variation across the state is largely a result of difference in power plant efficiencies, power purchasing agreement and other infrastructure.

	Kaua'i	Oahu	State
Medium Income (2009)	\$55,723	\$67,019	\$63,741
Electricity Price (May 2011)	44.27 cents/kWh	30.1 cents/kWh	-

The Kaua'i Island Utility Cooperative ("KIUC") is the sole electric utility on Kaua'i. KIUC began serving the people of Kaua'i on November 1, 2002, when it purchased Kaua'i Electric from Connecticut-based Citizens Communications. KIUC is America's newest electric cooperative, but it's by no means the only one. It is one of approximately 900 electric cooperatives serving electric consumers in 47 states.



Like all cooperatives, KIUC operates as a not-for-profit organization that is owned and controlled by the people it serves. KIUC serves over 23,300 customers with 92% of KIUC's electricity coming from the burning of imported fossil fuels.

According to the Kaua'i General Plan, the Kawaihau region is served via a tap off the mauka transmission line that connects the Wainiha Hydroelectric Plant with Port Allen. This tap provides power via the Kapa'a Switchyard at Kapa'a Town and other developed coastal areas, as well as to residential communities in Kapa'a and Wailua Homestead areas. Kapa'a Switchyard is also linked to the Lydgate Substation and the Līhu'e Switchyard.

A photovoltaic system that can generate up to 1.18 MW of electricity is situated in HoKua Farm Lots (formerly known as Kapa'a Highlands I). Its operator entered into an agreement to sell to Kaua'i Island Utility Cooperative electricity generated from the solar farm for 20 years. "Creating more renewable energy alternatives is one of the most critical challenges we face," Kaua'i Mayor Bernard Carvalho said at a dedication ceremony for the solar farm.

The photovoltaic system project spreads over five acres and has 5,376-solar panels mounted on posts and piers. The panels average about 12-feet off the ground.



Communications

The project site is served by Hawaiian Telcom telephone lines. Numerous cell towers across the island provide cellular phone service to the area.

4.10.2 Environmental Impacts & Mitigation Measures

Power

The project will not have a significant impact on KIUC's electrical grid. The solar facility located at HoKua Farm Lots (formerly known as Kapa'a Highlands I) will be transmitting electricity to nearby KIUC transmission lines.

In a September 6, 2007 email to HoKua Place (formerly known as Kapa'a Highlands II), Curt K. Tadani, Eastside Distribution Planner for KIUC wrote,

"I got your message and the plans that you brought in were already approved and signed off by us on June 27, 2005 so as far as we're concerned, it should be okay".

Pursuant to Chapter 344 (State Environmental Policy) and Chapter 226 (Hawai'i State Planning Act), HRS, all HoKua Place activities, buildings and grounds will be designed with a significant emphasis on energy conservation and efficiency.

Efficient design practices and technologies will be the cornerstone of HoKua Place's design phase. Buildings within HoKua Place will further comply with the County of Kaua'i Energy Conservation Code (Kaua'i County Ordinance 890).

Furthermore, solar water heaters will be utilized as made requisite under Section 196-6.5, HRS. HoKua Place will confer with KIUC in regards to suggestions and proposals for customized demand-oriented management programs offering rebates for the installation of alternative energy efficient technologies and measures.

HoKua Place is committed to renewable energy and energy efficiently as ways to reduce environmental harm and self sufficiency. HoKua Place will continue to improve programs and create new programs as the development is initiated.

In 2009, the State Legislature codified the need for energy efficiency by enacting the statewide energy efficiency portfolio standard with a target of reducing energy consumption by 30% of forecasted energy consumption by 2030 (4,300 GWh) and beginning the process for separating efficiency from the existing renewable portfolio standard.

Hawai'i Revised Statutes section 46-19.6 requires all county agencies to place a "priority on processing of permit applications for construction projects incorporating energy and environmental design building standards."

To reduce net energy consumption and demand, HoKua Place will consider the implementation of elements of the United States Environmental Protection Agency (EPA) Energy Star Program; including efficient insulation, high performance windows, compact construction, efficient ventilation systems, and energy efficient lighting elements and appliances.

HoKua Place will furthermore seek to harness energy conservations and technologies to facilitate the possibility of net energy metering in building design to empower residents and tenants to reduce their electricity costs and provide energy back to the grid.

Energy conservation and efficiency measures will be implemented and emphasized where applicable in the design of HoKua Place. Energy-efficiency technologies to be considered include:

- Solar energy for water heating
- Photovoltaic systems, fuel cells, biofuels and other renewable energy sources
- Optimal utilization of daytime sunlight
- High efficiency light fixtures
- Roof and wall insulation, radiant barriers and energy efficient windows

- Optimized air-flow
- Installation of heat resistant roofing
- Intelligent Landscaping to provide for shading, dust control, and heat-mitigation
- Portable solar lighting (i.e. parking lots)

Additionally, there currently are high voltage electrical lines around part of the project's perimeter. The electrical utility and HoKua Place would like to run the lines underground thru the project, dependent upon funding and may be incorporated into the project. This would be a both a preventative measure to protect shearwater birds, and to beautify the historic Kapa'a town core area.

Communications

The project will not have a significant impact on communication resources or services.

4.10.3 Level of Impact after Mitigation

The use of alternative/renewable energy, as well as, the implementation of energy conservation and efficiency measures, as noted in the HoKua Place (formerly known as Kapa'a Highlands II) Sustainability Plan (Exhibit B), will serve to reduce the impact of the project on energy grids and resources. The projects energy consumption and communication needs will have a less than significant impact.

The project will not have a significant impact on KIUC's electrical grid. The solar facility located at HoKua Farm Lots (formerly known as Kapa'a Highlands I), will be transmitting electricity to nearby KIUC transmission lines.

4.11 Noise

This section discusses the noise conditions in the region and in the project area, the potential impacts of the project on those conditions, and the mitigation measures HoKua Place will employ to mitigate those potential impacts.

4.11.1 Environmental Setting

Sound levels are fluctuating air pressure waves expressed on a logarithmic scale in decibels (abbreviated as dB). A change of 10 units on a decibel scale reflects a 10-fold increase in sound energy. A 10-fold increase in sound energy roughly translates to a doubling of perceived loudness. In general, humans can barely hear a change of 1 decibel, can usually hear a change of 3 decibels and can easily hear a change of 5 decibels. In evaluating human response to noise, acousticians compensate for people's varying abilities to discern frequency or pitch components of sound.

While a healthy young ear may be able to hear sounds over the frequency range of 20 hertz (Hz) to 20,000 Hz, the human ear is most sensitive to sounds in the middle frequency range used for human speech, and less sensitive to lower- and higher-pitched sounds. The "A" weighting scale is used to account for this varying sensitivity. Thus, most community noise standards are expressed in decibels on the A-weighted scale, abbreviated dBA.

Zero on the decibel scale corresponds to the threshold of human hearing, while sound levels of 120 dBA and higher can be painful and cause hearing damage. For reference, human speech at 10-feet is about 60-70 dBA. Noise-sensitive uses include residences, hospitals, schools, parks and similar uses. Noise could also be a sensitive issue for cultural practices and nature-watching activities.

4.11.2 Environmental Impacts & Mitigation Measures

A temporary increase in noise during construction is anticipated; however, this impact will be a minor, short term inconvenience and will be minimized by the limitations on the hours of construction activity and plans to reduce impacts of construction traffic.

Activities and use of the proposed 3.1-acre park will increase noise especially during the weekends and after school. However, the noise level will be comparable to the noise generated by the adjacent intermediate school. Additionally, the noise environment will be affected to a degree by the addition of traffic.

The development of housing on a vacant site will increase noise in the area. Buildings will be designed, oriented and located to minimize conflicts with the surrounding community activities and in a manner that avoids or minimizes the impacts on the development from noise.

Walls, fences and landscaping can be incorporated into project plans to help screen and buffer the project from the impacts of vehicular traffic as well as avoid or minimize the impacts of noise from the project on nearby residences.

In addition, best management practices that include performing construction-related activities in strict compliance with all applicable noise regulations will mitigate any temporary impacts.

HoKua Place operations are not expected to cause a significant noise impact, and no mitigation measures beyond compliance with applicable regulations, requirements, and standards, are required. However, if noise levels exceed the Department of Health's (DOH) "maximum permissible" property-line noise levels, contractors will be required to consult with DOH per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction.

4.11.3 Level of Impact after Mitigation

The implementation of the mitigation measures identified will serve to further reduce the noise associated with the project. It is expected that HoKua Place will result in a negligible increase in noise and a minor increase in vehicular traffic noise, neither of which will result in a significant impact.

4.12 Climate, Air Quality & Lighting

This section discusses the air quality, climatic, and lighting conditions in the region and specific subject area, the potential impact of the project on those resources, and mitigation measures HoKua Place will employ to mitigate potential impacts.

4.12.1 Environmental Setting

Climate

While Hawai'i is generally characterized as being temperate, the geography of the East Shore District is notable for its breezy temperate climate. Rainfall along the east side of Kaua'i is slightly higher than other western and inland areas on the island. Prevailing trade winds flow along the coast in the northeasterly direction.

The climate of the Kapa'a area is mild, with average monthly temperatures ranging from 72 degrees Fahrenheit in the winter to 80 degrees Fahrenheit in the summer. The winds are from the northeast and the mean annual rainfall for the area is 60 to 80-inches.

Air Quality

In the State of Hawai'i, both federal and state environmental health standards pertaining to outdoor air quality are generally met due to prevalent trade winds and the absence of major stationary sources of pollutant emissions.

There are no non-attainment areas for air quality in the State of Hawai'i, and air quality monitoring data is thus, very limited. The ambient air quality of the project site is typically clean but heavy with particulate matter from the prevailing on shore winds.

There are no major sources of air pollution in the immediate vicinity such as agricultural burning, manufacturing plants and incinerators. Auto emissions from vehicular traffic on Kūhiō Highway and local streets are not a factor, as the project site is located north of Kūhiō Highway.

In its former use, the site would experience periods of degraded air quality when cane haul trucks were actively hauling sugar cane. Since the cessation of sugar cane cultivation in the project area, the site has reverted to an overgrown natural state and air quality has remained good.

Lighting

The absence of large, brightly-lit cities on the Island of Kaua'i, mean that there are very few light sources or lighting impacts within the subject property.

4.12.2 Environmental Impacts & Mitigation Measures

Climate

HoKua Place will have no effect on climatic conditions and no mitigative measures are necessary.

Air Quality

While air quality will be impacted to a certain extent during the course of development, such as exhaust emissions from on-site construction equipment and construction vehicle traffic, the impact will be short-term.

In addition, best management practices that include performing construction-related activities in strict compliance with all applicable air regulations will mitigate any temporary impacts. Contractors will be required to comply with Hawai'i Administrative Rules, Chapter 11-60.1, "Air Pollution Control."

Increasingly stringent pollution control measures for new vehicles will also result in a decrease in vehicular emissions over time. Exhaust emission should not have any significant effect on the area because prevailing winds should disperse any exhaust gas concentration.

On-Site grading and infrastructure improvements and residential construction will result in an increase in dust. However, dust resulting from construction is anticipated to be minimal. The prevailing trade wind pattern is from the north-east directions.

Potential airborne matters will generally be carried in the south-west direction, away from the school and existing residential areas. However, on occasions, the easterly winds may carry the potential airborne matters towards the school and existing residential neighborhoods.

Construction activities shall comply with the provisions of Hawai'i Administrative Rules 5-11-60.11.33 on Fugitive Dust. Dust preventive measures will include:

- Planning of construction phases to minimize the amount of dust generating materials and activities, centralizing on-site vehicular traffic routes and locating of potential dust-generating equipment in areas of the least impact.
- Providing adequate water source at the site prior to start of construction.
- Landscaping and providing rapid covering of bare areas developed during construction.
- Minimizing dust from shoulders and access roads.
- Providing dust control measures during weekends, after hours, and prior to daily construction.
- Controlling dust from debris being hauled away from the site.

The implementation of dust control measures noted above is warranted during development and construction; however, potential fugitive dust emissions would be temporary and, over the long term, air quality would not be impacted by the proposed well.

Lighting

All construction activities will integrate lighting mitigation measures to reduce lighting impacts. The Newell's Shearwater birds are known to nest in the interior mountain of Wailua and Kapa'a. The flights of these birds may be over the subject property.

The proposed development will incorporate exterior lighting that will not have adverse affects on the Newell's Shearwater birds. Additionally, any streetlights that may be installed as part of the project will be shielded to reduce the potential for interactions of nocturnally flying native birds with external lights and man-made structures.

4.12.3 Level of Impact after Mitigation

The project will not have a significant adverse impact on air quality or climate, even without mitigation. Compliance with existing requirements and the implementation of mitigation measures described above will ensure that the air quality and lighting will remain in compliance with the State laws and regulations and therefore impacts will be less than significant.

Site Preparation and construction of the proposed project is not anticipated to result in flooding of the project site or lower elevation properties and the project will be consistent with applicable regulations and guidance relating to floodplain management.

The project will comply with requirements of the Federal Flood Insurance Program.

Other Hazards

The Uniform Building Code (UBC) prepared by the International Conference of Building Officials, details “Prescriptive Details for Hurricane-Resistant Construction” (1991 UBC Appendix Chapter 25).

These prescriptive details help buildings withstand wind acceleration and gusts from hurricanes. Buildings within the HoKua Place will be built with these prescriptive details, where applicable.

In the long-term, the proposed project will not exacerbate any natural hazard conditions. Planning and design for the proposed project will be based on County construction-related standards.

Additionally, Impacts from natural hazards can be mitigated by adherence to appropriate civil defense evacuation procedures.

4.13.3 Level of Impact after Mitigation

The project will not have a significant impact on natural hazards. Compliance with existing requirements and the implementation of mitigation measures described above will ensure that no significant impacts are expected.

4.14 Site Preparation & Construction

This section discusses the potential site preparation and construction impacts related to the natural and built environment and the potential mitigation measures that could be employed. Site preparation and construction effects will be temporary.

No unusual site preparation or construction techniques or materials are anticipated. During site preparation and construction related activities, HoKua Place will comply with all applicable rules and regulations.

4.14.1 Potential Environmental Impacts

The project will require site preparation in order to implement the action. In some cases, this is limited vegetation removal, while others will require grading and leveling of portions of the site.

Heavy equipment including bulldozers, rippers, excavators, loaders, jack hammers, backhoes, dump trucks, pick-up trucks, boom-mounted flatbed trucks, asphaltic concrete hauling trucks, pavers and rollers will be employed.

Activities will occur in phases and involve short-term, temporary impacts from site preparation, cutting, filling, trenching, backfilling and clean-up operations. Activities and facilities may require minimal leveling of ground but will not require significant soil excavation; therefore, site preparation will have a negligible effect on the environment.

Environmental impacts associated with the site preparation and construction phase of a project are generally localized and temporary in nature. Anticipated impacts include noise from heavy construction equipment, fugitive dust from earthmoving activities, air pollutant emissions from internal combustion engines, and soil erosion and sedimentation.

Construction activities will include site preparation, foundation construction, drainage structure construction or installation, preparation of roads, and clean up. Construction will also generate solid waste in the form of packaging from building materials, detergents, paint, metals and solvents.

Because of the expected levels and timing of construction, with implementation of mitigation measures, construction-related impacts are not expected to be significant. Necessary construction-phase permits will be obtained and complied with including:

- National Pollutant Discharge Elimination System (NPDES) and component Best Management Practice (BMP) plan
- Noise permit
- Noise variance
- Oversize and Overweight Vehicles Permit (OOVP)

4.14.2 Mitigation Measures

Mitigation measures for all phases and types of project site preparation and construction includes conformance to all laws, codes, rules and regulations.

The potential construction impacts are evaluated within the framework of compliance with all applicable rules, regulations and requirements for the project type and location. Applicable rules, regulations and requirements will include OSHA, and necessary permits.

The following mitigation measures have been identified to minimize potential impacts:

Cultural, Archaeological and Historic Resources

- If in the unlikely event that any human remains or other significant subsurface deposits are encountered during the course of development activities, all work in the immediate area will stop and DLNR's State Historic Preservation Division will be promptly notified.

Biological Resources

- Landscaping within the HoKua Place project seeks to include native trees, shrubs and flowering plants, as encouraged by the Kaua'i Department of Water, as part of their recommendations for water conservation.
- The proposed development will incorporate exterior lighting that will not have adverse affects on the Newell's Shearwater birds.

Visual and Aesthetic Resources

- Re-vegetation will occur in areas disturbed by construction activities and overtime the vegetation near construction areas will grow and mature.
- The architecture of the project will ensure that the project is compatible with its visual environment. The project will create structures which are both visually appealing and blend in with the scenery around them.
- High voltage electrical lines around part of the project's perimeter may be run underground, funding permitting.

Geology, Soils and Slope Stability

- Applicable law will be followed to minimize soil movement, erosion and compaction during all project actions.
- Implementation actions will include Best Management Practices (BMPs) to ensure that the alterations to the terrain minimize erosion, water quality degradation and other environmental impacts.
- Both short-term construction and long-term maintenance BMPs will be included in any permit conditions.

Water Resources and Wastewater

- HoKua Place will work with the DOW on pertinent water issues during the design and development phase.
- The proposed water system will meet conditions of the State Department of Health, including HAR Chapter 11-20, 11-21 and 11-25.
- Installation of water efficient fixtures and the implementation of a water saving practices to reduce the demand for freshwater resources.
- The water distribution system will be maintained to prevent water loss and homeowners and businesses will be encouraged to maintain fixtures to prevent leaks.
- Landscaping will emphasize climate-adapted native and other appropriate plants suitable for coastal locations.

- Best management practices will be designed and implemented to minimize infiltration and runoff from daily operations.
- The project's proposed drainage system will be designed to minimize impacts to near shore coastal waters. Water quality treatment and detention basins will be built to prevent runoff and sedimentation from impacting groundwater resources.
- Prior to the occupancy of any residential or commercial unit within the project, HoKua Place shall implement and maintain storm and surface-water runoff BMPs, subject to any applicable review and approval of the State DOH, designed to prevent violations of State water quality standards as a result of storm-water discharges originating from the project.
- Potential water quality impacts during construction of the project will be mitigated by adherence to State and County water quality regulations governing grading, excavation and stockpiling.
- BMPs will also be implemented for long term development and operation of activities occurring on the site as part of pollution prevention measures.
- HoKua Place will be contributing funds to help upgrade the deferred maintenance and repair of the Kapa'a Waste Water Treatment plant. The project will not be a detriment to the capacity of the Plant.
- Wastewater line in Olohena and other roadways will comply with all applicable rules and regulations.
- The project's design features and policies to comply with applicable rules and regulations will include conformance to applicable provisions of the Department of Health's Administrative Rules, Chapter 11-62, "Wastewater Systems."

Solid Waste and Material Management

- Soil and debris displaced from grading and clearing will be utilized as fill throughout the site as required, minimizing disposal and transit/relocation of the materials.
- Throughout project construction and development, HoKua Place will seek to reduce, reuse, and recycle materials and waste to the greatest degree possible.
- Green waste resulting from the project's development will be chipped into mulch for on-site use or will be disposed of properly.
- Measures and provisions to implement recycling, such as collection systems and storage for recyclables, will be incorporated to the HoKua Place project. A community management system will be in place for the residences of this project.
- The management policies will encourage residences to participate in the moral ethics of respecting the surrounding environment, reduce waste and excessive consumption, and fulfill the responsibility as trustees of the environment for the present and the future generations. Residences will be invited to participate in policy and decision making.

Power and Communications

- Pursuant to Chapter 344 (State Environmental Policy) and Chapter 226 (Hawai'i State Planning Act), HRS, all HoKua Place activities, buildings and grounds will be designed with a significant emphasis on energy conservation and efficiency.
- Buildings within HoKua Place will further comply with the County of Kaua'i Energy Conservation Code (Kaua'i County Ordinance 890).
- Solar water heaters will be utilized as made requisite under Section 196-6.5, HRS.

- HoKua Place will confer with KIUC in regards to suggestions and proposals for customized demand-oriented management programs offering rebates for the installation of alternative energy efficient technologies and measures.
- HoKua Place is committed to renewable energy and energy efficiently as ways to reduce environmental harm and self sufficiency. HoKua Place will continue to improve programs and create new programs as the development is initiated.
- To reduce net energy consumption and demand, HoKua Place will consider the implementation of elements of the United States Environmental Protection Agency (EPA) Energy Star Program; including efficient insulation, high performance windows, compact construction, efficient ventilation systems, and energy efficient lighting elements and appliances.
- HoKua Place will furthermore seek to harness energy conservations and technologies to facilitate the possibility of net energy metering in building design to empower residents and tenants to reduce their electricity costs and provide energy back to the grid.
- Energy conservation and efficiency measures will be implemented and emphasized where applicable in the design of HoKua Place.

Noise

- Limitations on the hours of construction activity and plans to reduce impacts of construction traffic.
- Buildings will be designed, oriented and located to minimize conflicts with the surrounding community activities and in a manner that avoids or minimizes the impacts on the development from noise.
- Walls, fences and landscaping can be incorporated into project plans to help screen and buffer the project from the impacts of vehicular traffic as well as avoid or minimize the impacts of noise from the project on nearby residences.
- Best management practices that include performing construction-related activities in strict compliance with all applicable noise regulations will mitigate any temporary impacts.
- If noise levels exceed the Department of Health's (DOH) "maximum permissible" property-line noise levels, contractors will be required to consult with DOH per Title 11, Chapter 46, HAR (Community Noise Control) prior to construction.

Climate, Air Quality and Lighting

- Best management practices that include performing construction-related activities in strict compliance with all applicable air regulations will mitigate any temporary impacts.
- The Contractor will be required to comply with Hawai'i Administrative Rules, Chapter 11-60.1, "Air Pollution Control."
- Construction activities shall comply with the provisions of Hawai'i Administrative Rules 5-11-60.11.33 on Fugitive Dust.
- Planning of construction phases to minimize the amount of dust generating materials and activities, centralizing on-site vehicular traffic routes and locating of potential dust-generating equipment in areas of the least impact.
- Providing adequate water source at the site prior to start of construction.
- Landscaping and providing rapid covering of bare areas developed during construction.
- Minimizing dust from shoulders and access roads.
- Providing dust control measures during weekends, after hours, and prior to daily construction.
- Controlling dust from debris being hauled away from the site.
- All construction activities will integrate lighting mitigation measures to reduce lighting impacts.

- The proposed development will incorporate exterior lighting that will not have adverse effects on the Newell's Shearwater birds.
- Any streetlights that may be installed as part of the project will be shielded to reduce the potential for interactions of nocturnally flying native birds with external lights and man-made structures.

Natural Hazards

- The project will be consistent with applicable regulations and guidance relating to floodplain management.
- The project will comply with requirements of the Federal Flood Insurance Program.
- The Uniform Building Code (UBC) prepared by the International Conference of Building Officials, details "Prescriptive Details for Hurricane-Resistant Construction" (1991 UBC Appendix Chapter 25). These prescriptive details help buildings withstand wind acceleration and gusts from hurricanes. Buildings within the HoKua Place will be built with these prescriptive details, where applicable.
- Impacts from natural hazards can be mitigated by adherence to appropriate civil defense evacuation procedures.

4.14.3 Level of Impact after Mitigation

Prior to the implementation of the mitigation measures described above, the potential impact was found to be less than significant. The implementation of the mitigation measures, including best management practices and conformance with existing laws, codes and ordinances, will serve to further reduce the potential impacts related to HoKua Place construction. Site preparation and construction effects will be temporary.

4.15 Secondary & Cumulative Impacts

The proposed project does not appear to have the potential to involve any significant secondary impacts. While there are anticipated changes in several environmental and social categories, as noted above, these are anticipated and the result of implementation of the County's General Plan. These changes are less than significant.

A cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions.

Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

Hence, a cumulative impact will occur when the incremental environmental effects of the Project added to other past, present, and reasonably foreseeable future actions result in substantial significant impacts.

There are direct effects from implementing the alternatives for this project and this section discusses the overall, or cumulative, effects.

HoKua Farm Lots (formerly known as Kapa'a Highlands I) is an agricultural subdivision that is adjoining and mauka of HoKua Place. Within the HoKua Farm Lots is the previously referenced photovoltaic solar facility. Makai of the property is the Kūhiō Bypass Road and below the road is the urban center of Kapa'a Town. Adjoining and surrounded by the property is the Kapa'a Middle School below that is a State affordable Housing project. Mauka and south of the subject parcel are in agricultural uses and are not identified for urbanization in the County's General Plan. It is not anticipated that urbanization requests will be made on these surrounding properties; in the event they are, an amendment to the General Plan must be made.

14.15.1 Summary of Potential Contribution of the Preferred Alternative to Cumulative Effects

The following chart identifies possible resources that could be impacted individually or cumulatively by the proposed project. The analysis evaluates potential impacts in the context of the existing environment, anticipated uses, compliance with applicable rules, regulations and requirements, and mitigation measures previously identified.

Table 14.15.1 - Summary of Potential Contribution of the Preferred Alternative to Cumulative Effects

Resource Area	Effect	Cumulative Effect
Cultural, Archaeological & Historic	Less than Significant	While irrigation ditches are on the property, they have been reduced or rendered inoperable and do not contribute to the historic integrity of irrigation systems on former sugarcane lands, so the cumulative effect will be less than significant.
Biological	Less than Significant	There is no habitat or endangered plants or animals, so the cumulative effect will be less than significant.

Resource Area	Effect	Cumulative Effect
Visual & Aesthetic	Less than Significant	Developing on undeveloped land will alter the visual nature of the area; re-vegetation with native plants in areas disturbed by construction activities and appropriate architecture will ensure that the project in the context of the surrounding area is compatible with its visual environment, so the cumulative effect will be less than significant
Geology, Soils & Slope Stability	Less than Significant	There is limited identified surrounding disturbances to land; soil movement, erosion and compaction on the site will occur during construction; by implementing BMPs and following applicable laws, so the cumulative effect will be less than significant.
Water Resources & Wastewater	Less than Significant	HoKua Place will result in additional consumption of fresh (drinking) water and the creation of additional wastewater; through the installation of water efficient fixtures and water saving practices, dedication of proved well site to DOW will produce additional water into the County system, meeting applicable conditions of DOH and contributing funds to help upgrade the deferred maintenance and repair of the Kapa'a Waste Water Treatment plant, so the cumulative effect will be less than significant.
Solid Waste & Material Management	Less than Significant	Additional solid waste will be generated; by utilizing soil and debris displaced from grading and clearing as fill throughout the site, recycling and reuse of construction wastes and implementing collection systems and storage for recyclables, the cumulative effect will be less than significant
Socioeconomic Conditions & Public Service Facilities	Less than Significant & Beneficial	HoKua Place will result in an increased population of the area; however the Kaua'i General Plan specifically points out the need for more housing in the area and specifically designates the subject property as Urban Center for that purpose. Development of the Property will address a portion of the demand for affordable housing in the County of Kaua'i, without significantly affecting reserve areas for foreseeable urban growth. HoKua Place will have lands available for county police and fire substations on the Property. So, the cumulative effect will be less than significant.
Power & Communications	Less than Significant	The projects energy consumption and communication needs will have a less than significant cumulative impact. The use of alternative/renewable energy, as well as, the implementation of energy conservation and efficiency measures will serve to reduce the impact of the project on energy grids and resources, so the cumulative effect will be less than significant.
Climate, Air Quality & Lighting	Less than Significant	Impacts on air quality and climate will be short term due to construction. Mitigative lighting techniques will ensure the cumulative effect will be less than significant.

Resource Area	Effect	Cumulative Effect
Traffic	Less than Significant	Based on the results of the level-of-service analysis, no roadway improvements or mitigation measures are recommended to accommodate project related traffic. The project actually has a positive impact as a result of constructing Road 'A', which will divert traffic away from the intersection of Olohena Road and Kapa'a Bypass. The eastbound to southbound movement will be over-capacity without Road 'A'. Traffic impacts due to the project are not considered significant.
Noise	Less than Significant	It is expected that HoKua Place will result in a negligible increase in noise and a minor increase in vehicular traffic noise, however the implementation of the mitigation measures will serve to reduce the noise associated with the project, so the cumulative effect will be less than significant.
Natural Hazards	None	None
Site Preparation & Construction	Less than Significant	Site preparation and construction impacts will be short term during the construction phase of the project and mitigation measures will ensure the cumulative effect will be less than significant.

In general, the project will add a limited increment to the current level of cumulative impact. As noted previously in this chapter, impacts to the resources are estimated to be less than significant; in addition the project would not tip the balance from a less than significant to a significant level on a cumulative basis.

14.15.2 Irreversible & Irretrievable Commitments of Resources

HoKua Place will require minor commitments of both renewable and nonrenewable energy and material resources. Nonrenewable resources that will be used during the project include fuel, water and other resources necessary to develop and operate HoKua Place.

Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., non-renewable resources) also are irretrievable.

Alteration of substrates by construction activities, visual impacts and road development will be irreversible. Construction could result in irreversible commitment of fuel for construction vehicles and equipment and irretrievable commitment of land. Additionally, construction could result in irreversible commitment and expenditure of human labor that could not then be expected in the service of other projects. These commitments of resources are neither unusual nor unexpected, given the nature of the action.

14.15.3 Conclusion

Implementation of the proposed action will not result in significant impacts that will not be able to be mitigated, to any environmental resource area. Therefore, the proposed action, in conjunction with other actions on and in the vicinity of HoKua Place, will not result in significant cumulative impacts.