

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%
loleau silty clay loam	2 to 6 %	loB	44.5	27%
loleau silty clay loam	6 to 12 %	loC	16.2	10%
loleau silty clay loam	12 to 20 %	loD2	10.7	07%
loleau silty clay loam	20 to 35 %	loE2	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.



Soils Map

Date: 5/31/2018

Field Office: LIHUE SERVICE CENTER
Agency: USDA-NRCS
Assisted By: GENOA STARRS

State and County: HI, Kauai County, Hawaii
Land Units: (4) 4-3-003:001
Approximate Acres: 163.13



Legend 0 800 1,200 Feet

1 inch = 600 feet

Rice Soils Map

MUSYM, MUNAME

- HnA; Hanalei silty clay, 0 to 2 percent slopes, MLRA 167
- IoB; Ioleau silty clay loam, 2 to 6 percent slopes
- IoC; Ioleau silty clay loam, 6 to 12 percent slopes
- IoD2; Ioleau silty clay loam, 12 to 20 percent slopes, eroded
- IoE2; Ioleau silty clay loam, 20 to 30 percent slopes, eroded
- LhB; Lihue silty clay, 0 to 8 percent slopes
- LhC; Lihue silty clay, 8 to 15 percent slopes
- LhD; Lihue silty clay, 15 to 25 percent slopes
- MZ; Marsh
- Mta; Mokuleia clay loam, poorly drained variant
- PkB; Pohakupu silty clay loam, 0 to 8 percent slopes
- PnB; Puhi silty clay loam, 3 to 8 percent slopes
- rRR; Rough broken land
- Rice Poly Layer



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 Keau 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 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, Drainage & 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 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.

Water Sources

Petitioner has considered two alternative proposals to furnish potable water to the Project. First, under Petitioner's Water Master Plan proposes Petitioner will dedicate its well site to the County Department of Water Supply to furnish water to the Department's storage tanks and existing water system. In return the Department will provide HoKua Place with storage for water. In the event the Department does not approve Petitioner's Water Master Plan, then Petitioner will develop a private water system, using the well to furnish water to 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.

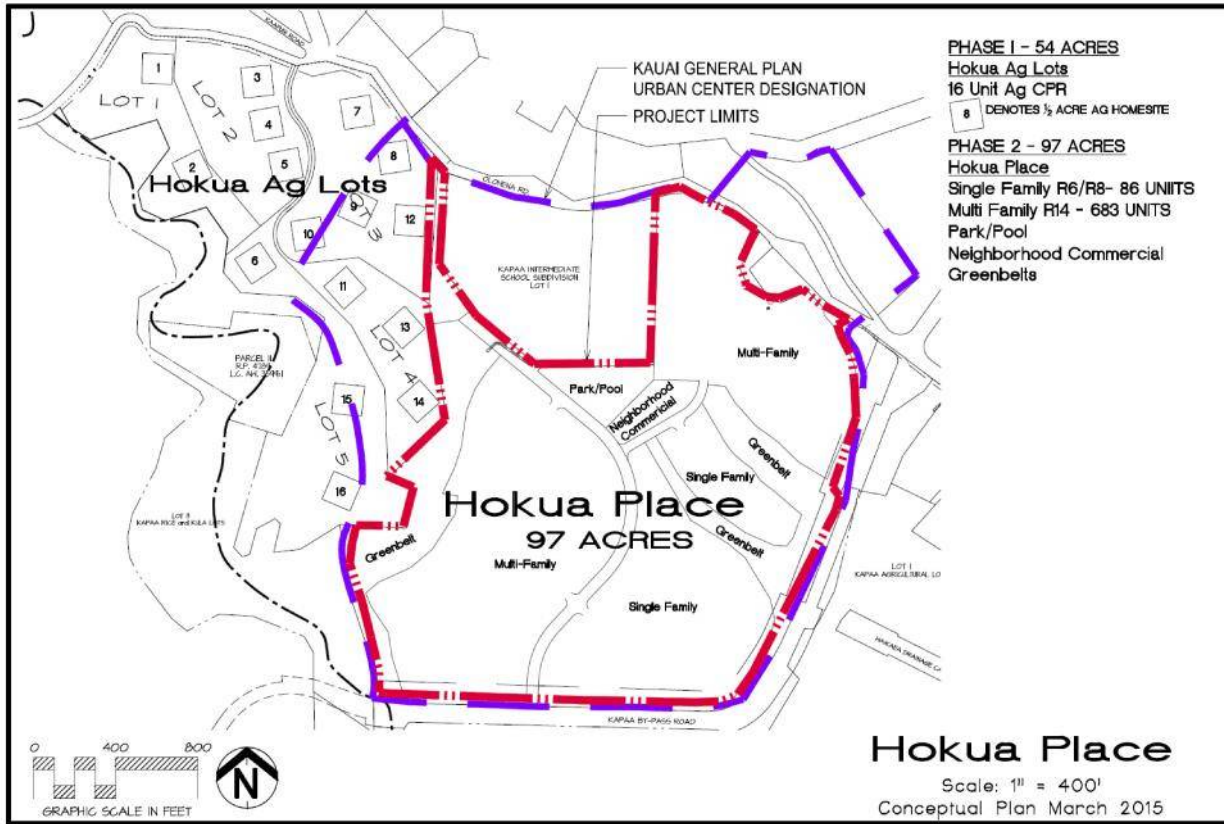
Water Master Plan

The Petitioner has submitted a Water Master Plan for HoKua Place and HoKua Farm Lots to the DOW (Exhibit D) for review and approval.

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 (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 roject 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 Kapa'a 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

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. Pump testing of the new well will be conducted for observation to obtain 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		
▪ Maximum Day Criterion	0.0521*	0.1808
▪ Fire Flowrate and Maximum Day Use Rate for Duration of the Fire, Reservoir 3/4 Full at Start	0.0229	0.3401*
214-Foot Zone		
▪ Maximum Day Criterion	0.1760*	0.4956*
▪ Fire Flowrate and Maximum Day Use Rate for Duration of the Fire, Reservoir 3/4 Full at Start	0.0298	0.3751

* Denotes required storage based on governing criterion.

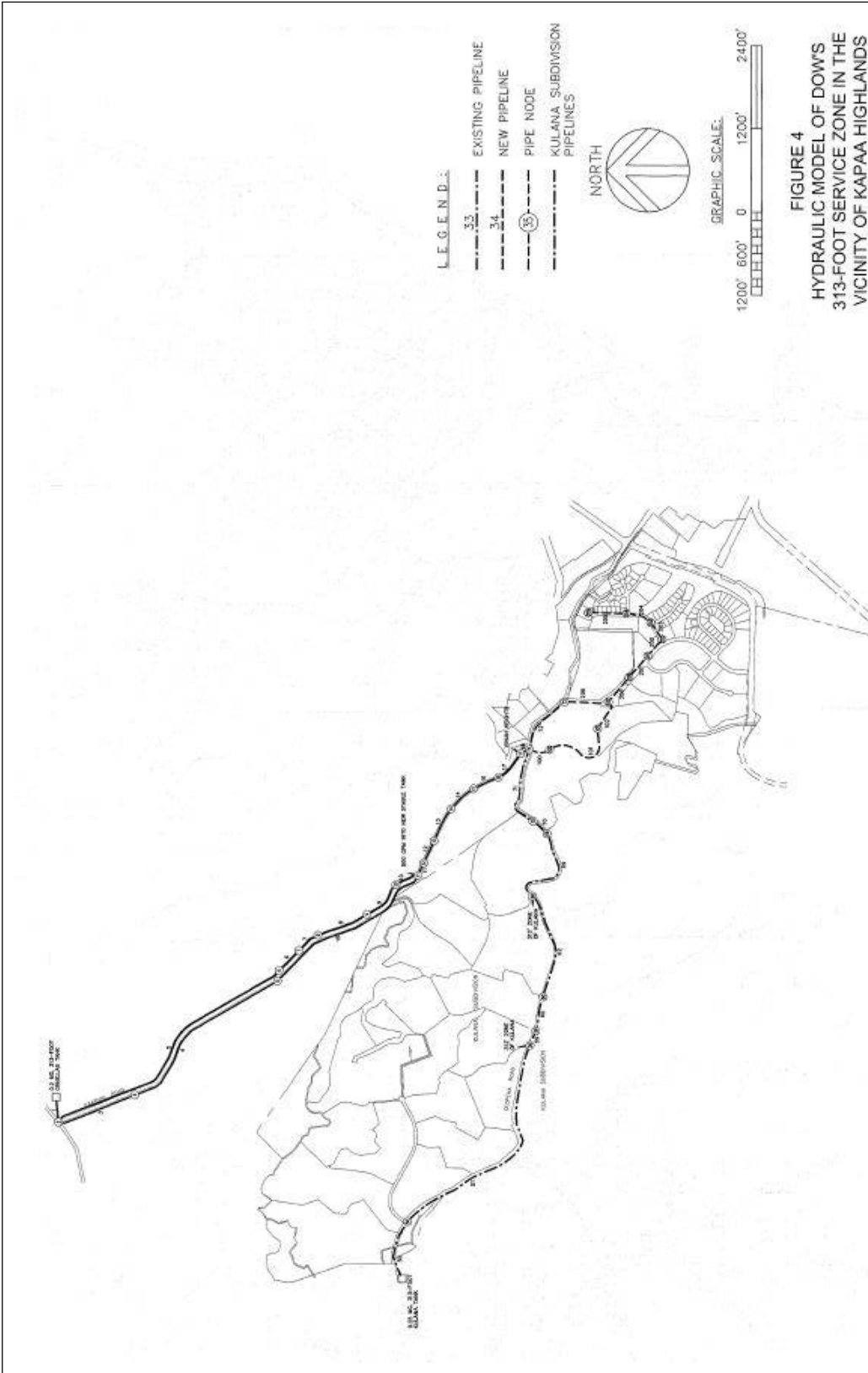
As one well pump is being provided, no credit for well inflow is taken. Fire flow-rate in both service zones of the Phase 1 area is 250-GPM for one hour. In both service zones of Phase 2, it is 2,000-GPM for two hours.

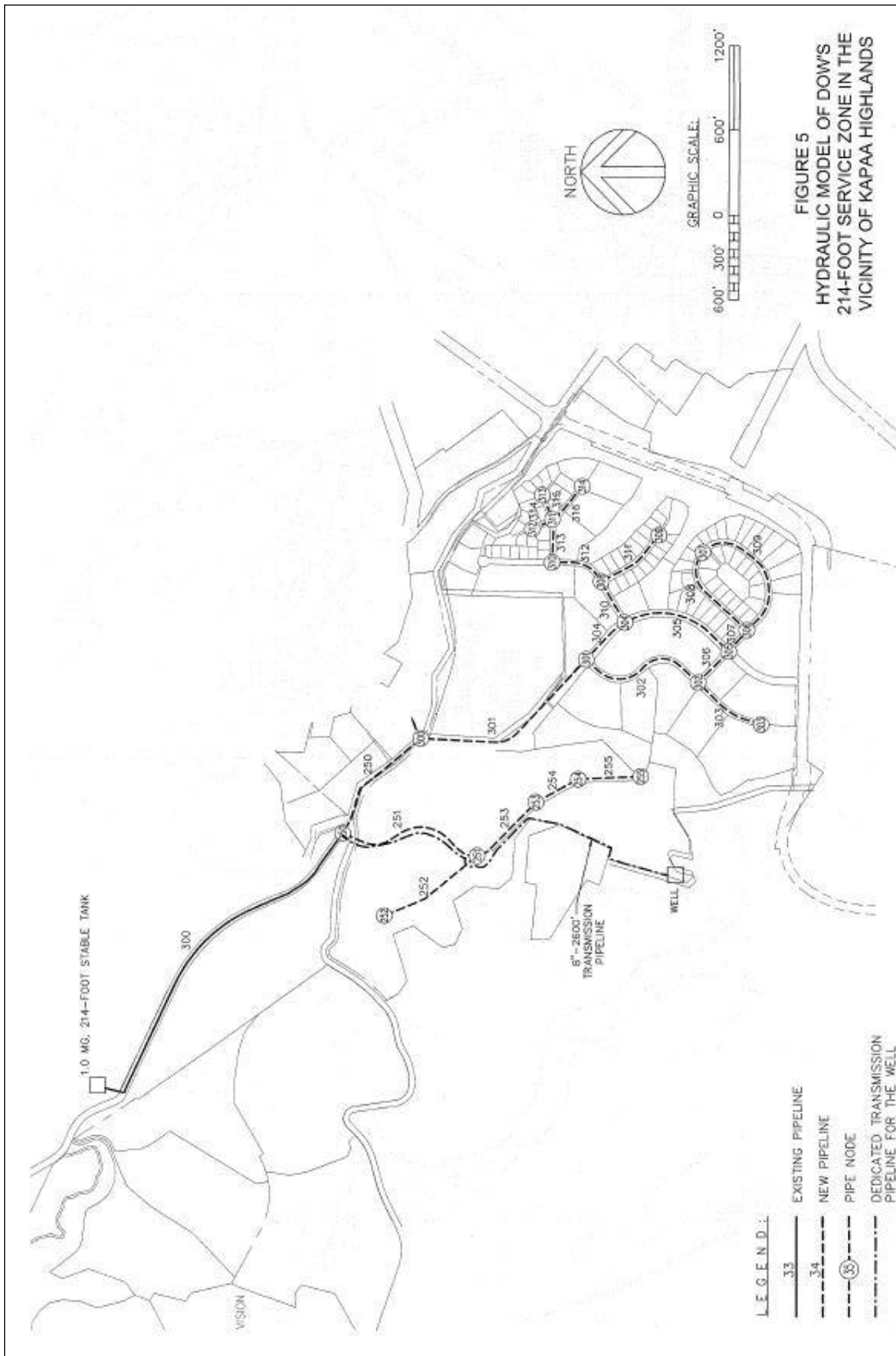
Required storage volumes are denoted by the asterisk (*) in the compilation above. DOW will allow HoKua Farm Lots (formerly known as Kapa’a Highlands I), consisting of 18 homesites (5 units in the 313-foot zone and 13-units in the 214-foot zone) to utilize storage capacity from existing DOW storage facilities.

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, former DOW Manager and Chief Engineer wrote in a letter to HoKua Place.

“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 of receiving all permits. 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.

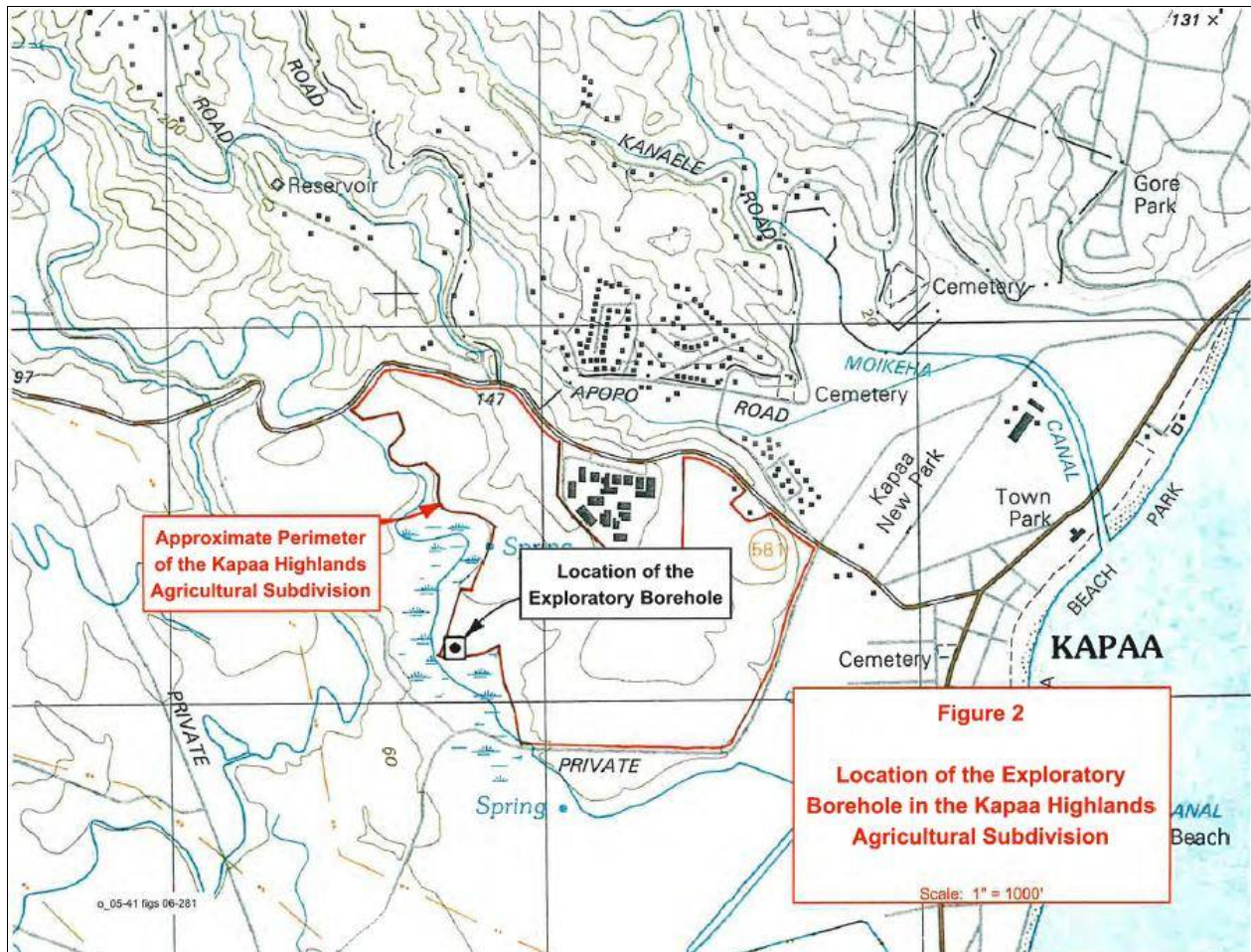
A list of the water system improvements, as they can be defined at this stage of the Project's planning and engineering is provided below. Completion is expected to take two to three years.

-) 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 Middle 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
 - o 12"-1835' (Pipe Nos. 200, 201, 202, and 206)
 - o 8"-1250' (Pipe Nos. 203, 204, and 205)
-) Ductile Iron Pipelines in the 214-Foot Service Zone
 - o 12"-2865' (Pipe Nos. 301, 304, 310, 312, and 313)
 - o 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 Petitioner's Water Master Plan for HoKua Place, then the Petitioner 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	64,600
	663 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

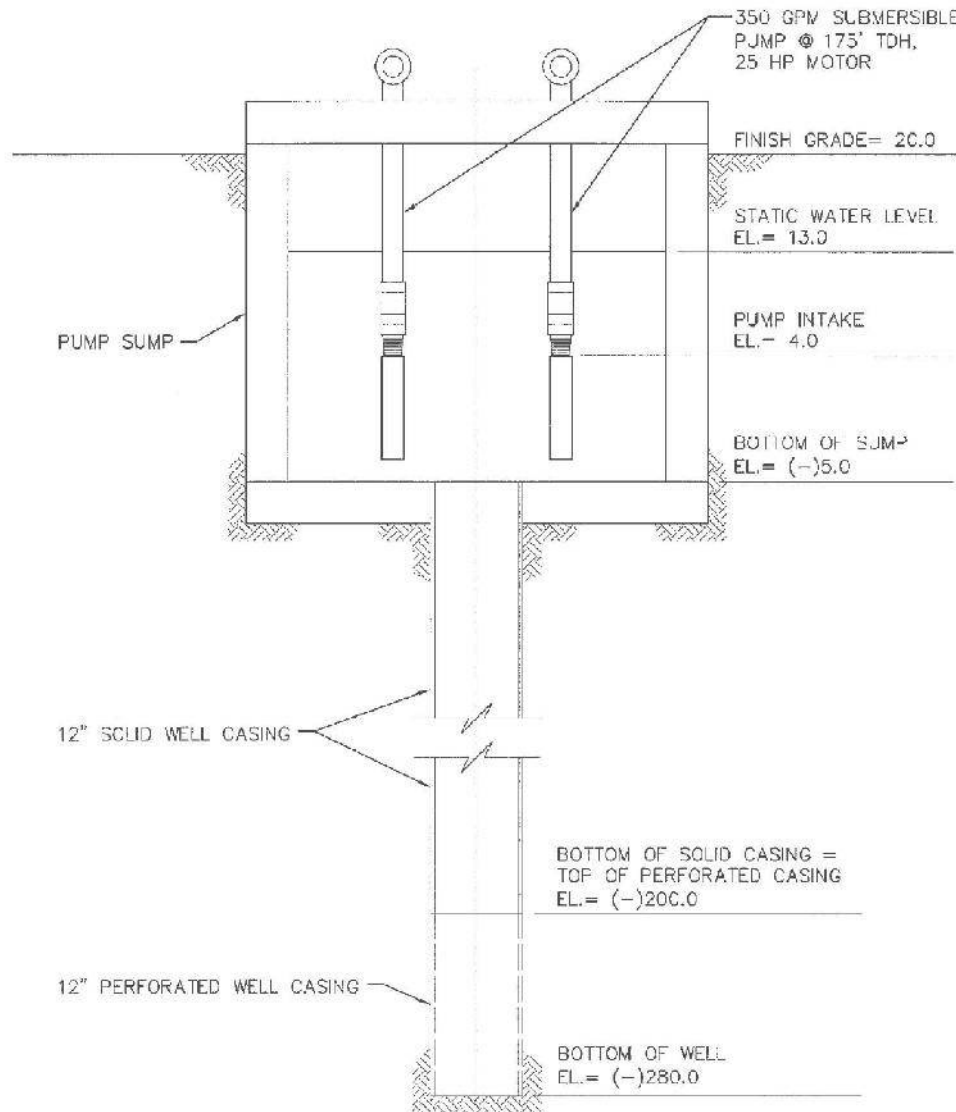
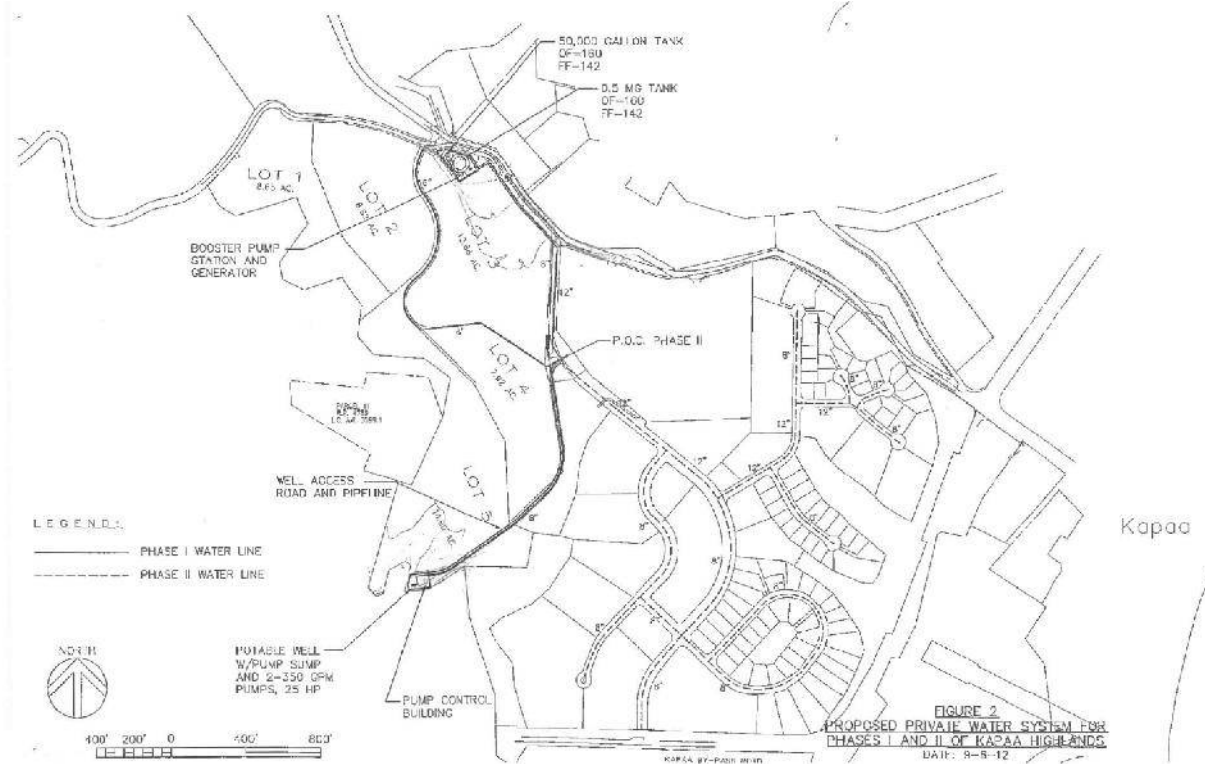


FIGURE 1
 RECOMMENDED WELL DEVELOPMENT AND PUMP INSTALLATION
 FOR THE KAPAA HIGHLANDS PROJECT
 NOT TO SCALE



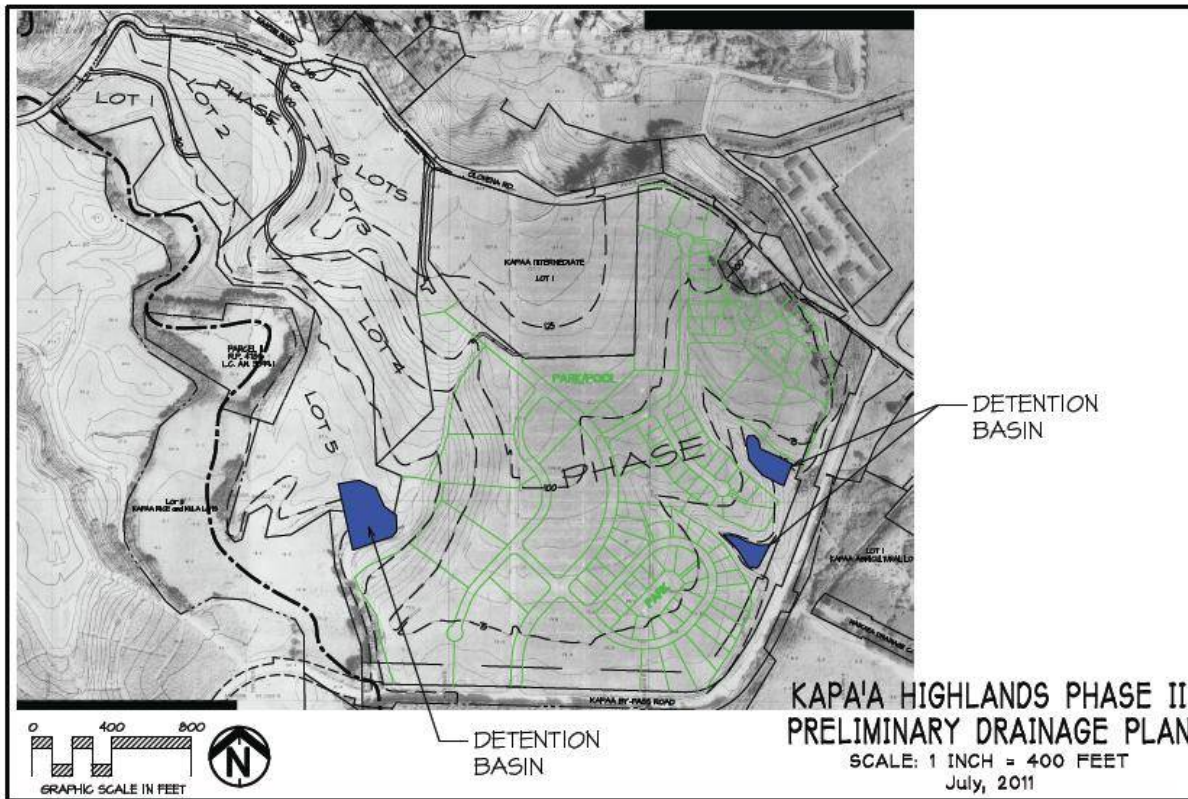
Drainage

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 Project.

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 project engineer has noted that the Kapaa Middle School drainage easement is designated on the current subdivision map as it was proposed by the DOE Kapaa Middle School construction plan. Although the outlet headwall and drain-line have been in use a number of years within the HoKua Place property, the easement (D-1) has not been formally recorded as it is not in the current title report.



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 wastewater 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, Papaloo, 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.

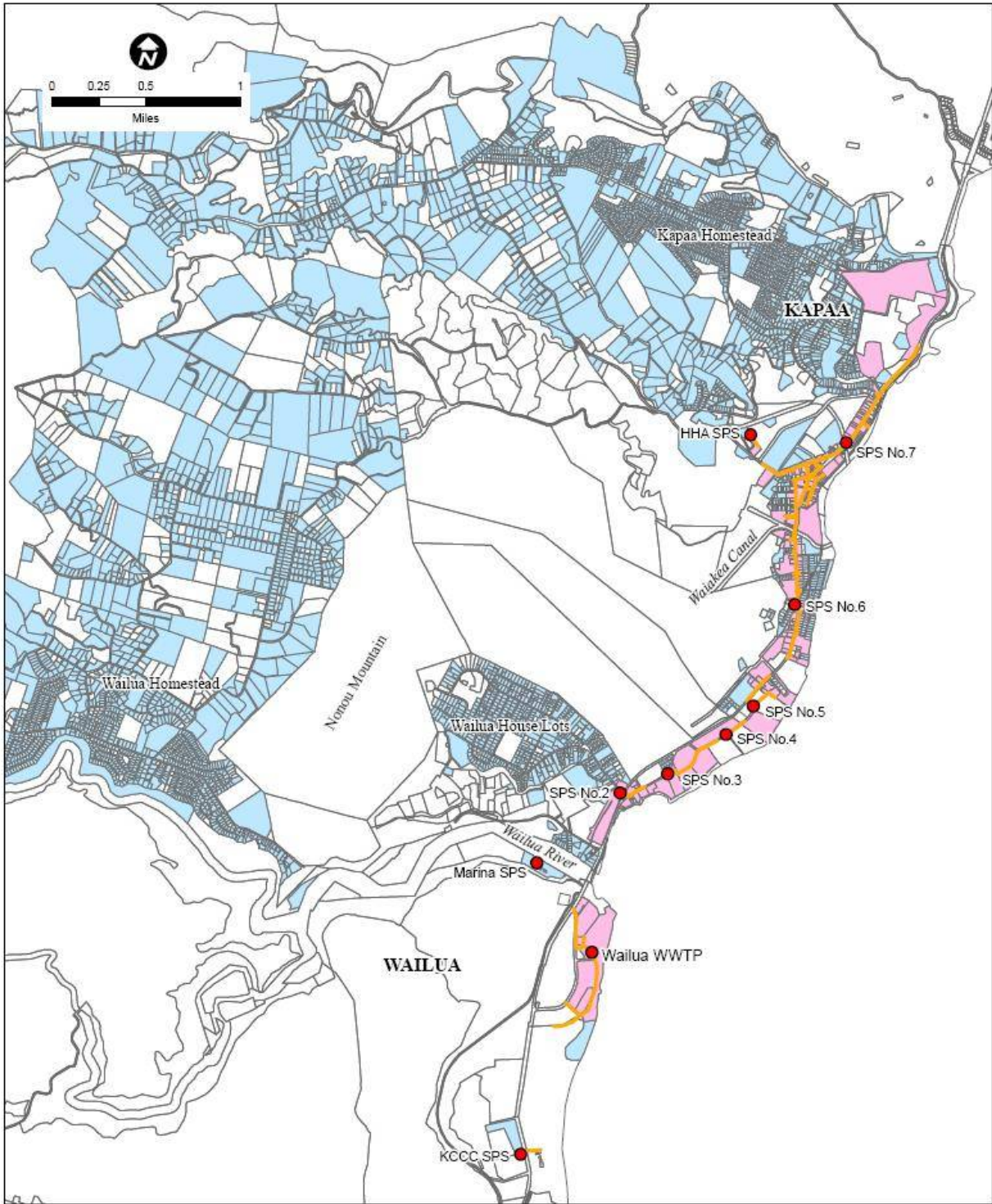
The Wailua WWTP currently uses two methods of effluent disposal, which are an ocean outfall and water reuse for irrigation at the adjacent Wailua Golf Course. Treated effluent is conveyed to the golf course by pumping out of the effluent chamber downstream of the chlorine contact basin.

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 (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 Project 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 Petitioner’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 supply the Department of Water’s storage tanks and existing water system.

The County Department of Water has conceptually approved the Petitioner’s Water Master Plan. 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 approve the applicant’s Water Master Plan, then the Petitioner 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 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 its 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

Petitioner has prepared a Preliminary Drainage Report. 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.

Per County of Kauai requirements stormwater run-off cannot exceed the pre-development conditions. The land was formally farmed in cane and has been fallow for over a decade. There is only minimal remains of the cane fields drainage and/or irrigation ditches and access roads. Almost the entire Project area is overgrown with tall grass and small trees.

Run-off from the site concentrate in several natural drainageways that lead to the Kapa'a By-Pass Road and an un-named stream along the south side of the Project. To mitigate the stormwater increases from the new neighborhood and streets, a variety of strategies utilizing practices of Low Impact Development (LID) and stormwater detention ponds will be integrated into the Project. The practices will also include measures to enhance water quality.

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.

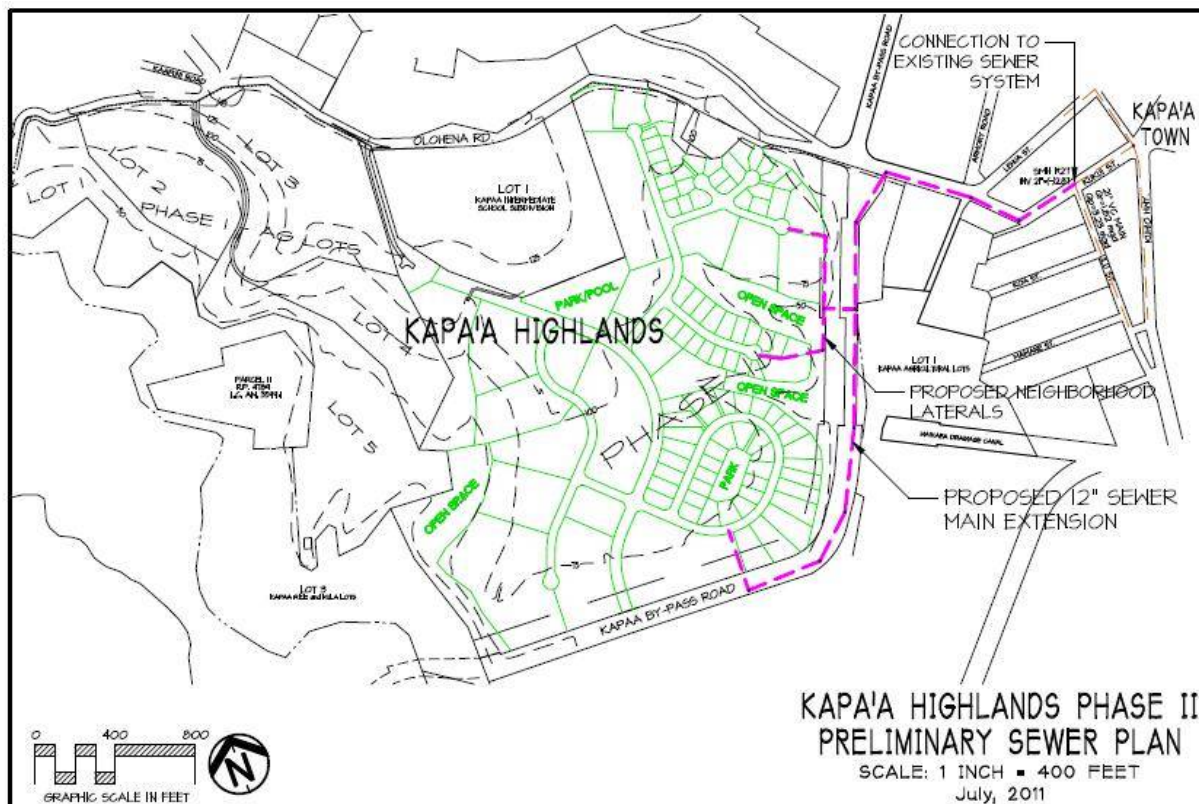
Post construction BMPs to prevent erosion and storm water runoff after construction is completed includes the installation of drain inlets and shallow drywells within the Project site, and landscaping and grassing of disturbed areas. Prior to occupancy, HoKua Place will implement and maintain storm and 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 Project. 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 Wastewater 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 (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 well will have no impact on stream flow. At this site, there are two groundwater bodies. The upper aquifer is shallow, of very limited yield, and very likely hydrologically connected to the adjacent stream.

HoKua Place will not use this upper aquifer at all and the well bore will be cemented off to make sure none of the water in this aquifer can be pumped by the well. The well will exclusively draw from the lower aquifer which is several hundred feet below ground.

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 Sustainability Plan (Exhibit B).

Presently, the site is in current fallow cane field condition with no drainage system, does experience a fair amount of erosion during rainfall events. The Kapaa By-Pass is the first property directly downstream and frequently needs to be cleared of sediment and debris after significant rainfall by the Department of Transportation. The remainder of the Property drains to an unnamed stream to the south.

It is also experiencing sedimentation from the site. The establishment of greenbelts and detention basins should alleviate this condition. Since the detention basins are sized to large rain events, smaller events would be completely captured within the basin with little or no discharge to downstream properties which would effectively reduce the average annual Total Suspended Solid (TSS) from the site.

Two detention basins are proposed for the Project and a combination of grass swales and drain lines would convey runoff to the detention basins to maintain pre-development flow rates to downstream properties.

The two detention basins proposed would normally not contain any water and are not large enough to provide any recreational opportunities. One of the basins utilizes and enlarges a basin leftover by the former cane operations adjacent to the Kapa'a Bypass Road.

The greenways follow the natural drainageways and areas outside of the detention areas could be suitable for multi-use pathways to provide pedestrian/bicycle connections between the Project clusters and to adjoining streets.

To mitigate the stormwater increases from the new neighborhood and streets, a variety of strategies utilizing practices of Low Impact Development (LID) and stormwater detention ponds will be integrated into the Project. The practices will also include measures to enhance water quality.

The key component of LID is to minimize impervious surfaces on Property. The Project seeks to do this by clustering development to make maximize use of flat areas on the property and not allowing it in the natural drainageways. Greenbelts would be established surrounding the nature drainageway and within these areas infiltration would be increased through the use of bio-swales, trees, and detention basins.

The LID strategies work best when techniques are utilized throughout the entire watershed. It would start within the Project's clusters with every available option utilized to increase infiltration and reduce run-off before it enters the neighborhood street's drainage system.

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.

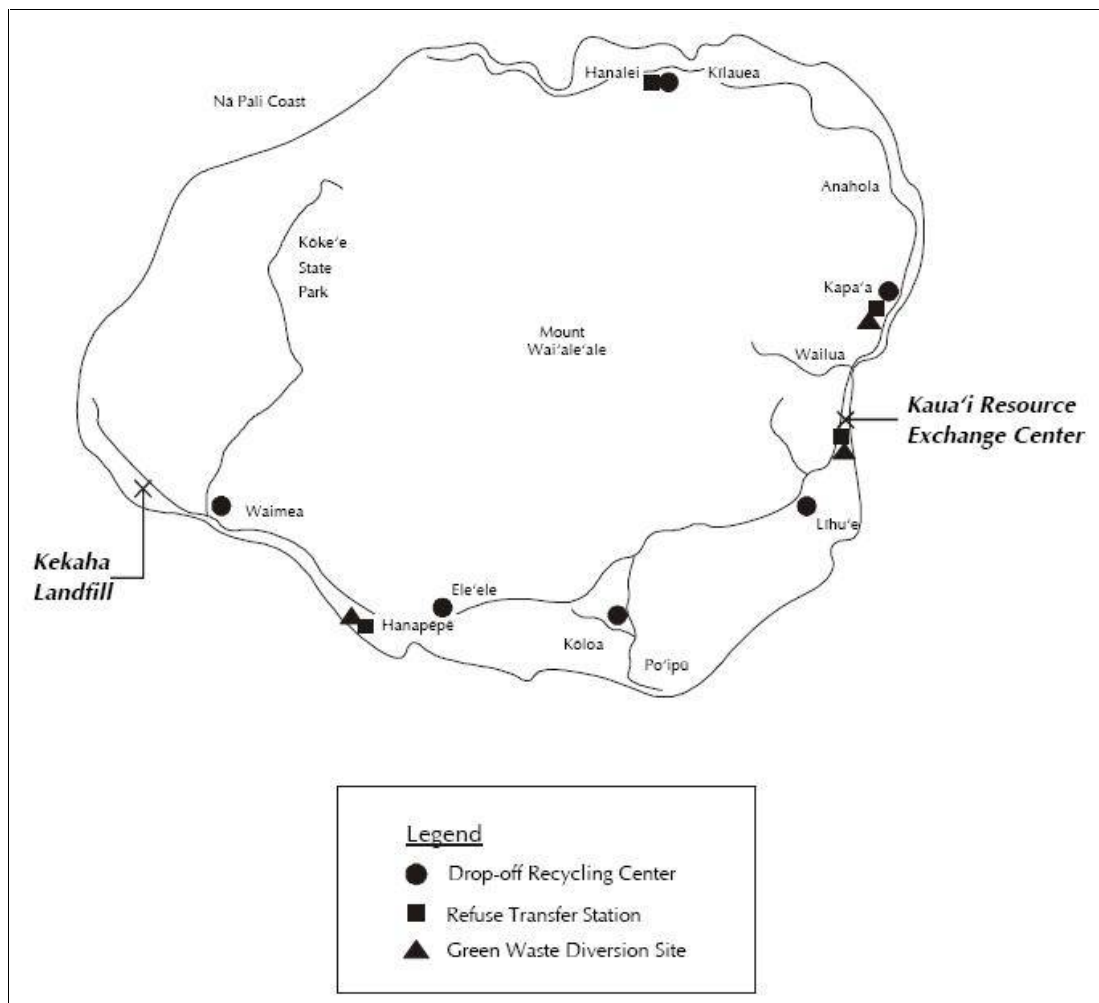
4.7 Solid Waste & Material Management

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 Project.



Kauai has several solid waste diversion programs with several other proposals in progress that will likely be implemented by the time this Project is under construction that the Project will have to adhere too to minimize solid waste generation. The Project is also situated near county recycling and green waste drop-off sites.

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 Project.

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."

Data from the Technical Study of the General Plan states that the current population for the Kawaihau-Kapa'a (East Kauai) is approximately 21,500. It is projected that the population for this area will increase to 25,110 in 2035.

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

Data from the Technical Study of the General Plan indicates that the current existing housing units is approximately 9,555 for the Kawaihau-Kapa'a (East Kauai). The projected housing units for 2035 is 10,428 units for this area.

Section 2.4.5 East Kaua'i, Kapa'a Town discusses two alternatives for development. The first is HoKua Place, where residential neighborhoods could be absorbed. This alternative includes residential neighborhoods around the Baptise Sports Complex.

The second alternative is to concentrate growth at existing developments along Kuhio Highway. This alternative however, requires much infrastructure to prepare for climate change, particularly sea level rise (SLR)

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

Based on the HoKua Place 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.

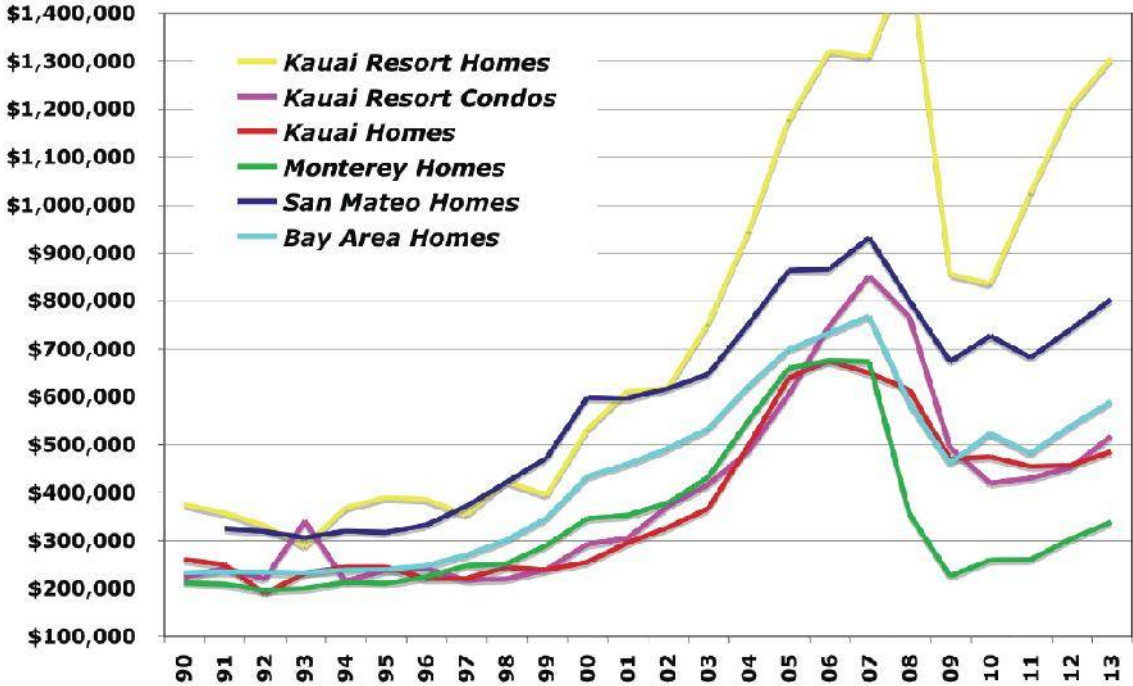
In addition, the up cycle, trough to peak, results a tripling of the number of closings. The chart below illustrates this.

The sales and Pricing for condominiums follows:

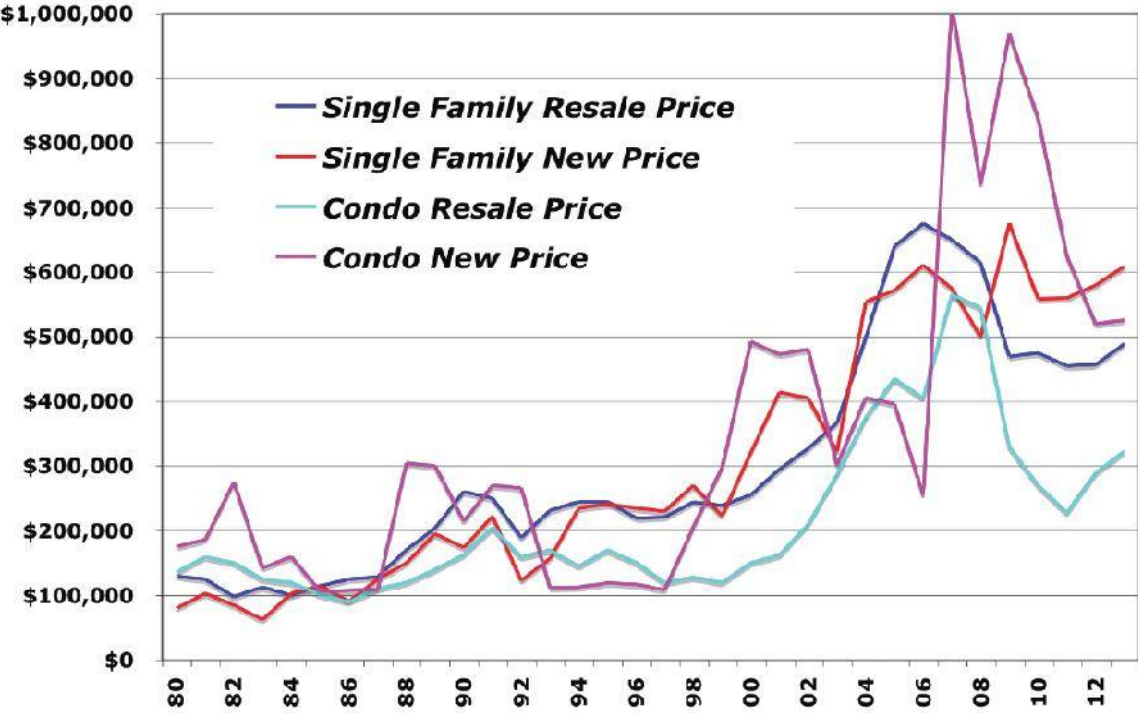


According to the state economic forecasters, Hawaii's economy continues to grow strongly at an accelerating rate. The state has very low unemployment relative to the rest of the nation, thanks to a resurgent demand in the visitor industry, which is the major engine of economic growth in the county and 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

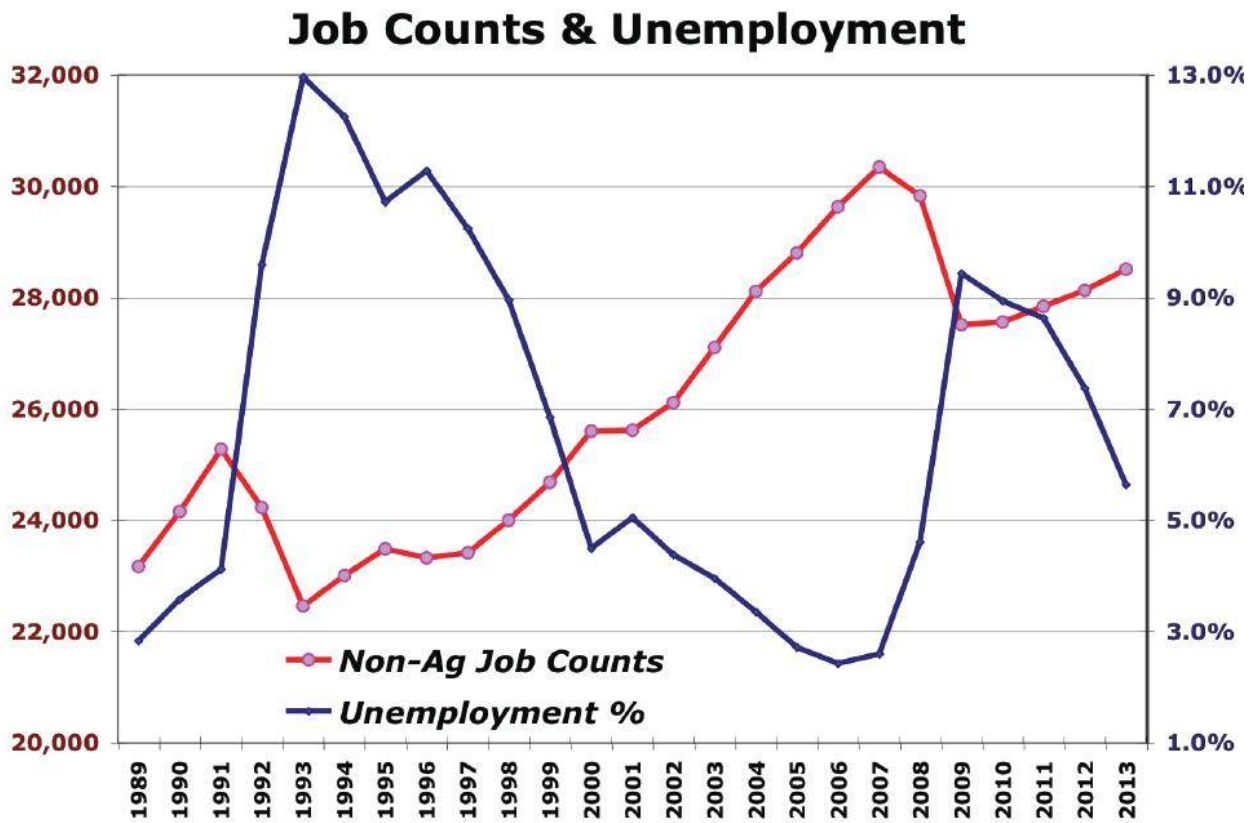
The Technical Study for the Kauai General Plan indicates that the current job count for the Kawaihau-Kapa'a (East Kauai) is approximately 5,073 with an increase in jobs to 5,724 in the year 2035. The study does not consider the three large resort projects in the Wailua area that are slated to be completed within the next 2-5 years. It is estimated that the resort projects will generate at least 500 jobs.

The state of Hawai'i has very low unemployment relative to the rest of the nation. The latest statistics show the rate near at 2%, the lowest level in more than two years.

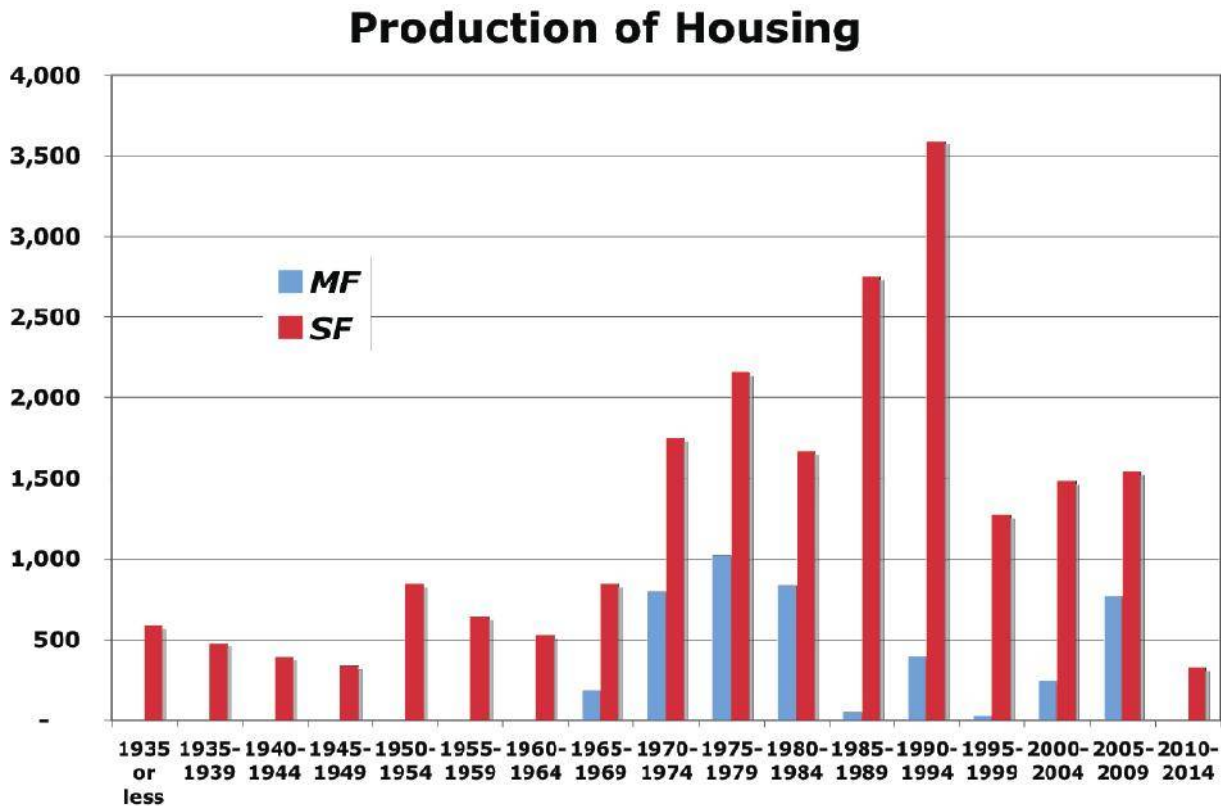
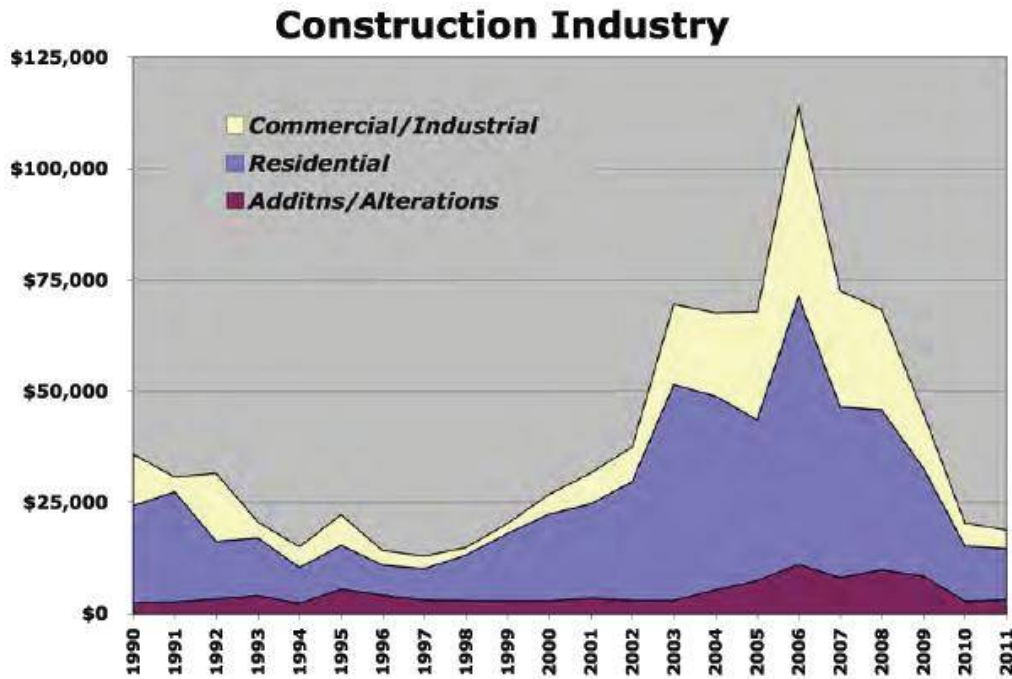
Hawai'i fared better than the nation as a whole, which experienced a 4.1 percent unemployment rate In November 2017.

On a county-by-county basis, Honolulu County's 1.6 percent jobless rate in April was the lowest in the state, as opposed to 2.1 percent in Maui County, 2.2 percent in Kaua'i County and 2.4 percent in Hawai'i County.

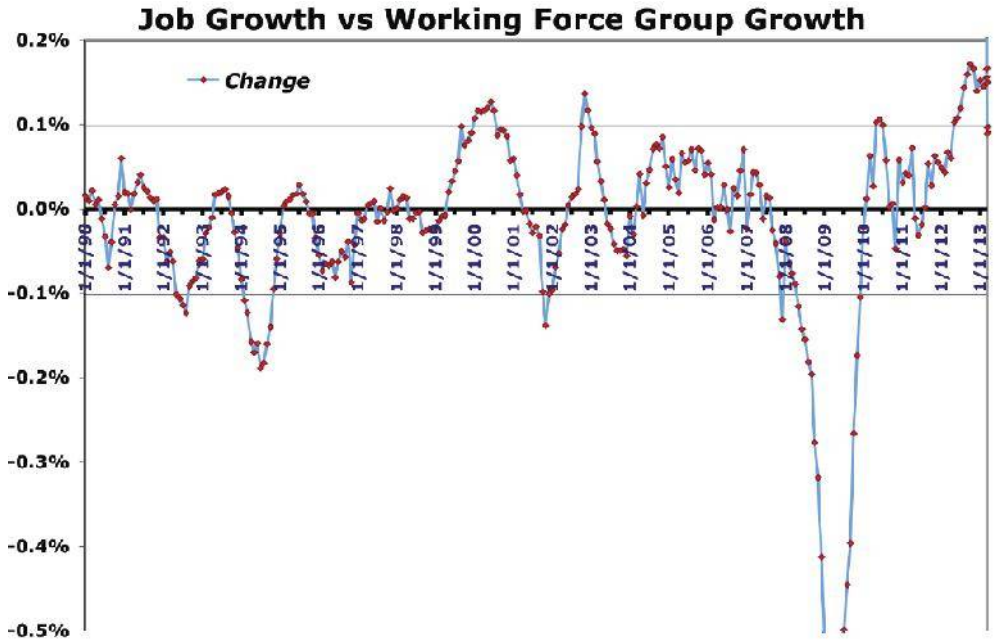
Mainland economic weakness began to affect the local economy in mid-2007, followed by a critical event that precipitated a broader downturn – the collapse of Aloha and ATA airlines early in 2008. The recession that commenced in 2009 pushed tourism over the cliff, leading to increasing unemployment, business 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. However, Kaua'i's has largely recovered since that time. As seen in the next chart, unemployment rates seem to have peaked while the job count loss has leveled out.



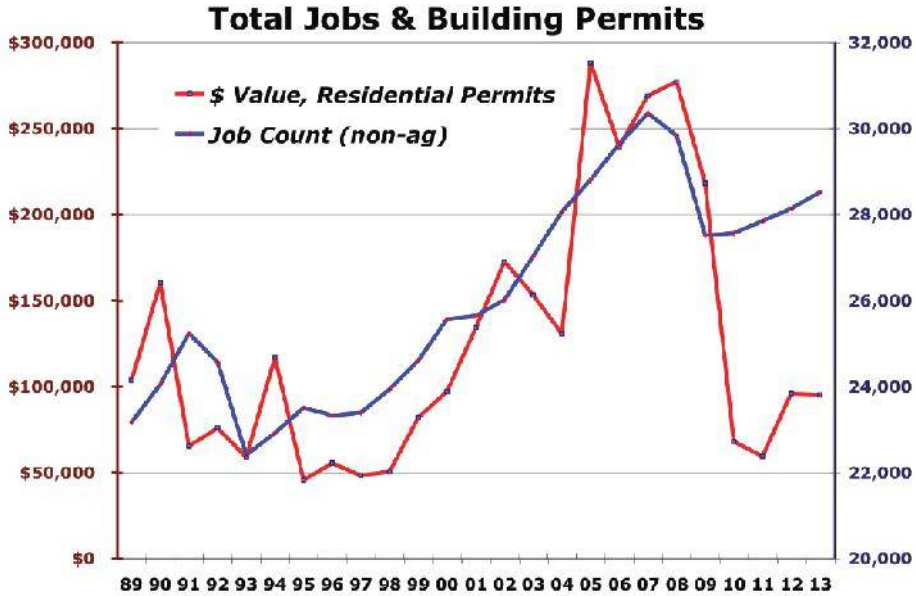
Kauai's construction industry has been lagging, with private building permits down significantly.



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

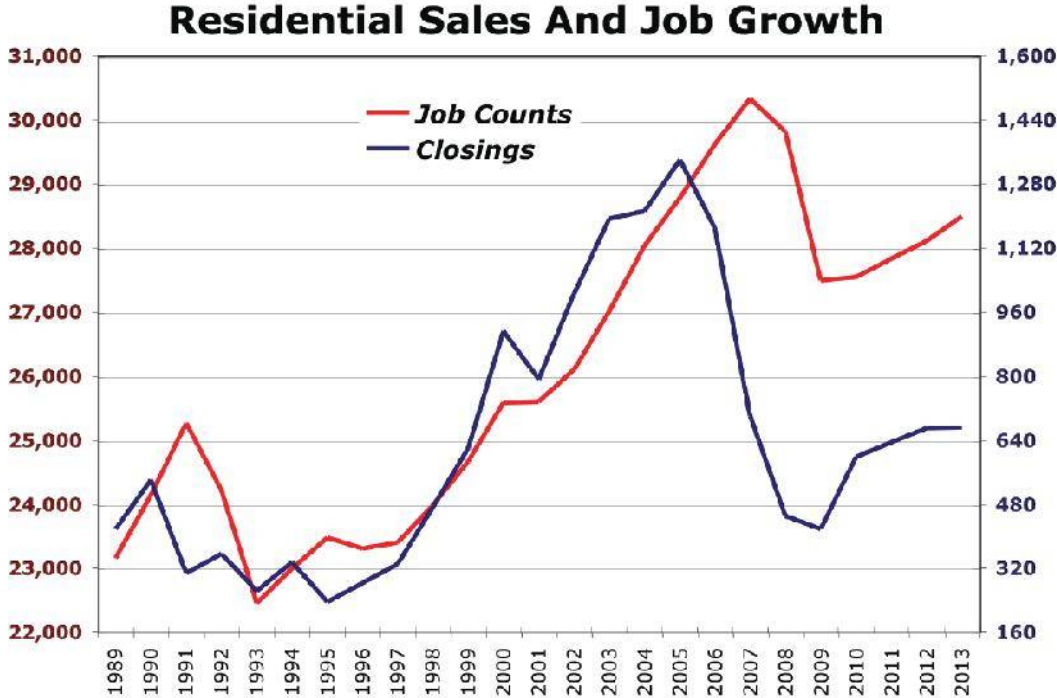
The Housing Market Study developed by The Data@Work describes and analyzes the factors and trends behind the general and specific supply and demand for housing in relation to HoKua Place. The entire study is included as Exhibit A.

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.

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 live and work 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 Līhu’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.

Fiscal Benefits

The construction and the subsequent operation and maintenance of the master planned community HoKua Place would generate significant, on-going economic and fiscal benefits for residents of Kauai, as well as for the County and State governments.

Development and construction of the Project facilities would generate employment and consequent tax revenues over several years. Thereafter, the Project supplement that with increased State and County tax revenues through increased property assessments from property owners, as well as additional general excise and increased income taxes from property owners that put their units into the long-term rental market (to say nothing of the increased employment from marketing, maintaining and operating those rental units).

In addition to this additional real estate sales activity, the Project is expected to support long-term impacts, such as additional consumer expenditures, employment opportunities, personal income and government revenue enhancement that are a result of the increase in housing stock (to say nothing of the long-term wealth effects on local owners.)

There are other significant secondary impacts as the excise tax and income (and job) generation works their way through the local economy. It is worth noting that some of these impacts will continue after completion of construction and final occupancy.

Like other major residential development, the increase in the tax base of the county in which development occurs more than offsets the cost imposed on the fire and the police department and other public agencies for their services.

The additional number of personnel to be hired by the fire and police departments is significantly lower to the number of those who will be working on the Project construction, services, et. al. before and after completion. And as the master plan is central to existing fire and police services, these costs will be much less than, say, a similar Project outside of the township areas.

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.

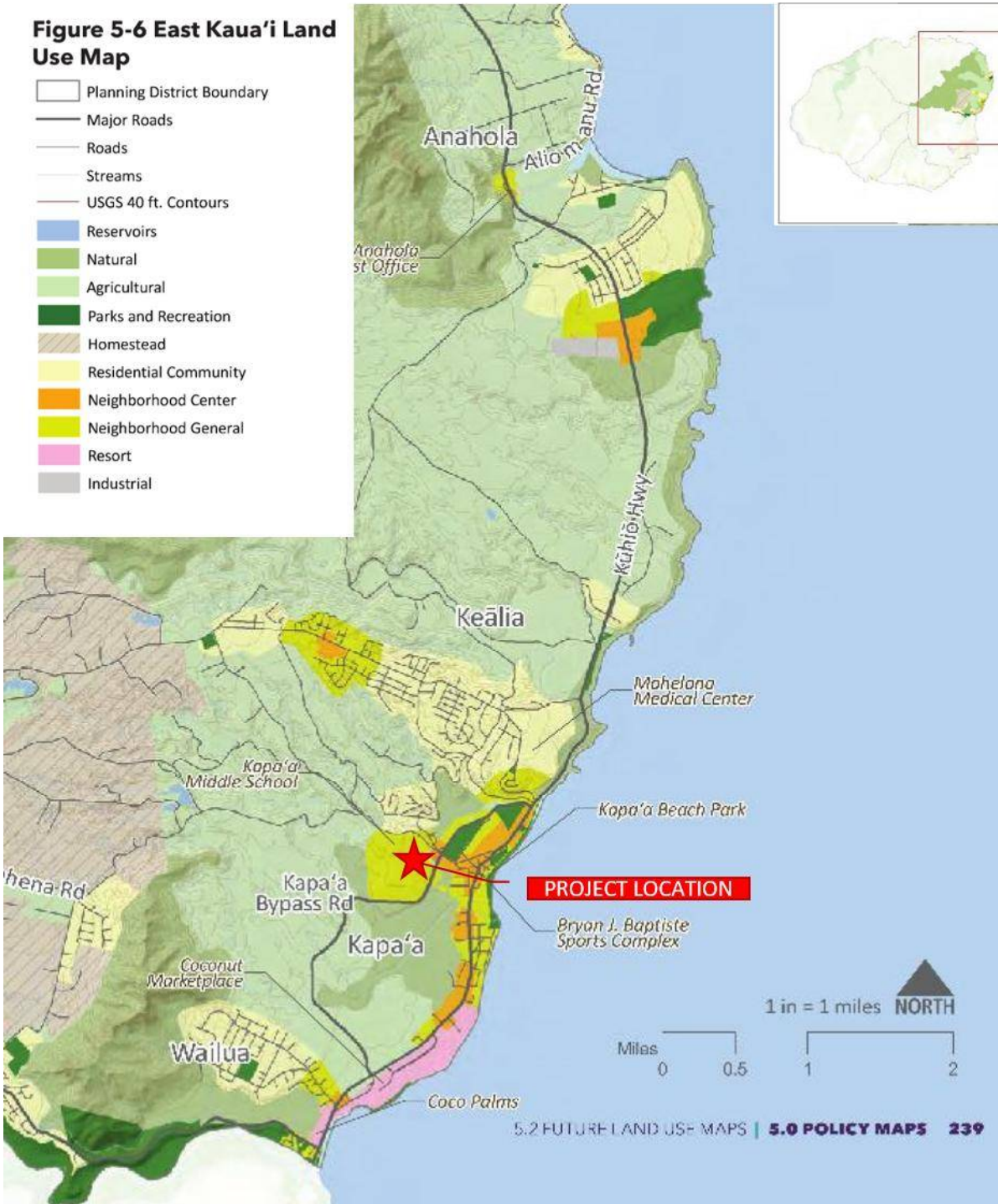
Fire protection is currently available for the Kapa'a area from a new county fire station located on the north end of Kapa'a Town, approximately 2.0-miles away from the property on Kūhiō Highway.

The applicant will work with State and Local Civil Defense on incorporating appropriate siren coverage that may include a 121 db(c) omni-directional siren within the 3.1 acres designate for the proposed park area below Kapaa Middle School.

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. The Act authorizes the Board of Education to designate school impact districts. The DOE may 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. 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 impact fees at this point in time.

DOE does not have any current plan 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.

Heidi Meeker of DOE Facilities Development Branch informed representatives of HoKua Place that the DOE will not be requesting any contribution of impact fees from HoKua Place.

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.

Project enrollment is summarized below:

School	Capacity	Enrollment	Excess Capacity
Kapa‘a Elementary	1,373	802	571
Kapa‘a Middle	1,059	635	424
Kapa‘a 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 Kapa‘a-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

DOE accepts the estimated student count and agrees with HoKua Place.

(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.)

Recreational Facilities

There are several parks within Kapa‘a 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-a-bout. 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 Kapa‘a (approximately 2-miles away from the Project) is Kaua‘i’s Eastside Critical Access Hospital, providing 24-hour emergency services. The facility is part of the Kaua‘i Region of Hawai‘i Health Systems Corporation.

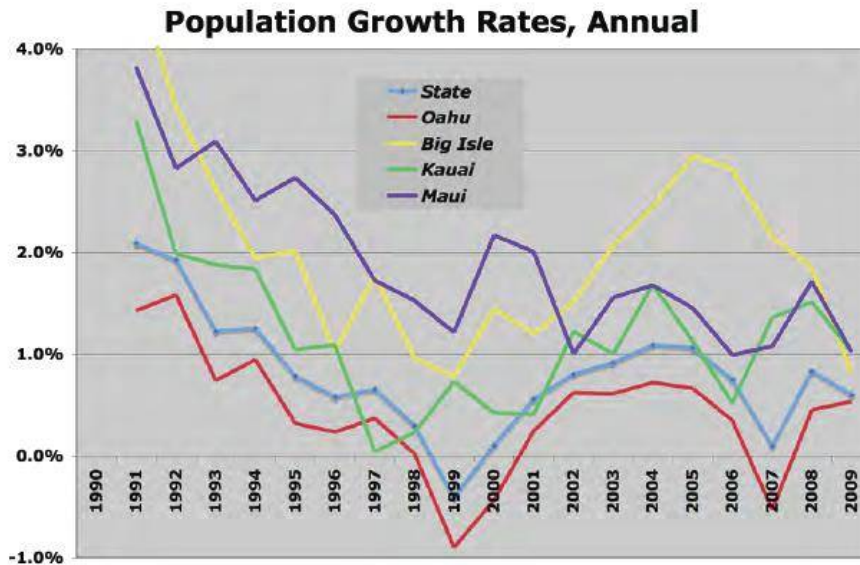
Both Kapa`a and Līhu‘e (8-miles away) provide healthcare facilities and services.

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 Neighborhood General 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

Project 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 the land owner's petition to amend 97-acres in Kapa'a to the Urban district.” “Affordable housing remains an acute need on Kaua'i, 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 Project 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 Kapa'a By-Pass 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 Kaua'i 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 Kaua'i, 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 Kapa'a By-Pass road (southwest corner of Olohena and the By-Pass 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 Kapa'a 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 Kapa'a Middle School. The park will have an area for the county's proposed relocation of the Kapa'a county swimming pool. HoKua Place also plans to develop a bike/walking path from the south of the property to the Kapa'a Middle School to facilitate biking and walking around the Project.

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 project 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 Projectt 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 Transportation

This section discusses the traffic and transportation systems 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 Middle School, generally in the southwest quadrant of the intersection of Olohena Road and Kapa'a By-Pass. 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 Middle School.

Access to and egress from Phase 2 will be provided via a new intersection along the north side of Kapa'a By-Pass 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 By-Pass 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 Middle School. Kūhiō Highway through Kapa'a Town is a two-lane, two-way State highway 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 By-Pass 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 By-Pass 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 at Kapa'a By-Pass 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 Kaehulua 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. Kaehulua Road intersects Kaapuni Road west of Olohena Road.

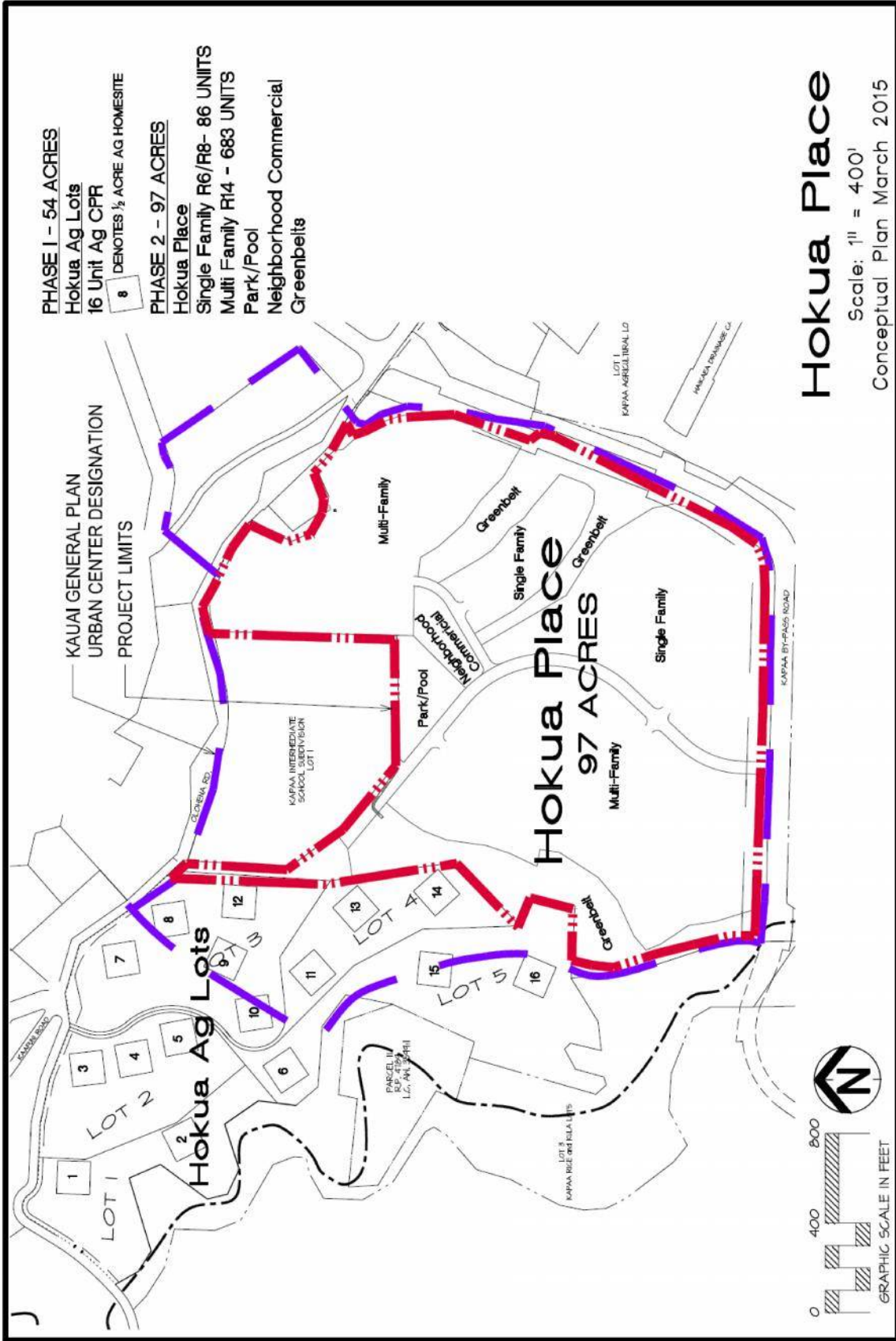
A preliminary trip generation analysis was performed to define the scope of work and study area. This analysis determined that the proposed Project will generate less than 487 trips during the morning peak hour and 560 trips during the afternoon peak hour respectively. Based on "Institute of Transportation 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 By-Pass at Olohena Road and the intersections providing access to and egress from Phase 2 of the Project (Kapa'a By-Pass 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.

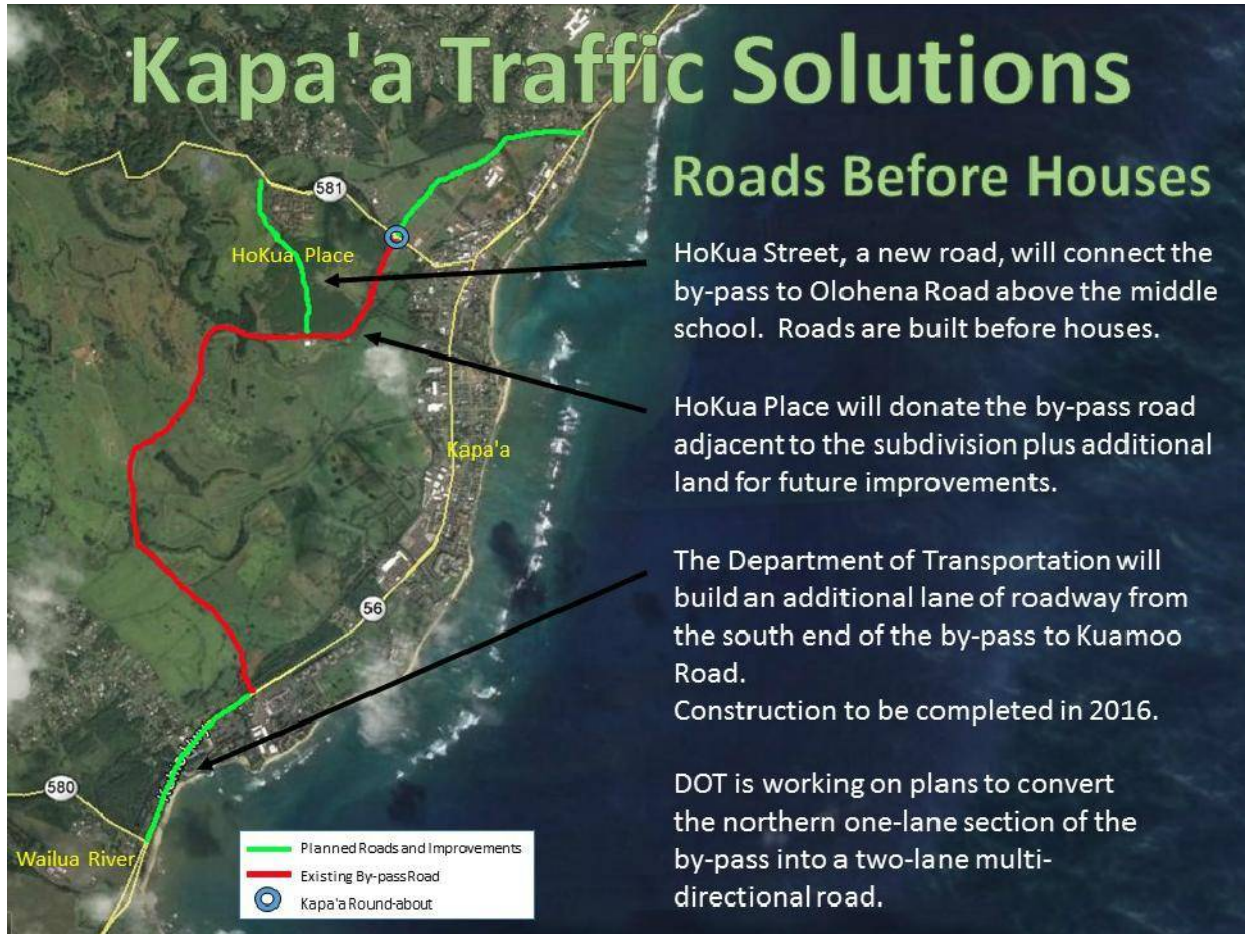
The County of Kaua'i directed that the intersection of Olohena Road at Kaapuni Road and Kaehulua Road be included in the study area.

Pursuant to the State of Hawai'i Department of Transportaton and the County of Kaua'i's comments, a new TIAR was conducted as depicted in the following next Section 4.9.2



4.9.2 Environmental Impacts & Mitigation Measures

Hokua Place completed a new Traffic Impact Assessment Report (TIAR) in May of 2017. Please refer to Exhibit "H", New TIAR. The new TIAR responded to State DOT and the County DPW comments on the DFEIS. This TIAR by Randall S. Okaneiku, P.E., supercedes the previous TIAR provided by Phillip Rowell and Associates in December of 2013.



HDOT prepared *Kapaa Transportation Solutions* in August 2015. HDOT conducted this study to prioritize near- to mid-term transportation solutions to address transportation solutions for the Kapaa area transportation system. The report identified 48 different transportation measures, then classified them as short term (that could be implemented within 5 years), mid-term (that could be implemented within 5 to 10 years) and long-term (that would take more than 10 years to implement) solutions. HDOT then identified 10 priority projects that if completed, would improve both travel time and person throughput – the number of people that can cross a specific location within an identified time frame.

Implementation of four of these measures would improve traffic circulation for the proposed HoKua Place Project. These measures are:

<u>Project No.</u>	<u>Project Location</u>	<u>Project Description</u>
<u>6</u>	<u>Temporary Kapaa By-Pass Road, north of Olohena Road</u>	<u>Add one lane in the northbound direction</u>
<u>27</u>	<u>Kuhio Highway between Temporary Kapaa By-Pass Road and Kuamoo Road</u>	<u>Add one southbound lane along Kuhio Highway</u>
<u>8</u>	<u>Kapaa New Park</u>	<u>Create direct access from Kapaa New Park to Temporary Kapaa By-Pass Road</u>
<u>24</u>	<u>Eggerking Road Extension</u>	<u>Extend Eggerking Road to connect with Temporary Kapa'a By-Pass Road</u>

Description of Traffic Impact Analysis Report

Randall Okaneku, PE prepared a new Traffic Impact Analysis Report (TIAR) to update the Traffic Impact Assessment Report Kapa`a Highlands Subdivision, dated December 9, 2013, that is attached to the Draft Environmental Impact Statement for the Proposed Hokua Place (DEIS) published in May 2015. The new TIAR was also intended to respond to comments received from the State of Hawaii Department of Transportation and the County of Kauai Department of Public Works, during their review of the DEIS traffic study.

Existing Traffic Conditions

The field investigation was conducted in March 2017, to update the existing traffic conditions from the DEIS traffic study. The study area was expanded to include Lehua Street and Ulu Street. The field investigation indicated that Lehua Street and Ulu Street were used as alternate routes between Kuhio Highway and Olohena Road/Kukui Street to avoid the delays at the intersection of Kuhio Highway and Kukui Street.

Since the preparation of the DEIS traffic study, the peak hour traffic at the round-a-bout intersection of the Kapa`a By-Pass Road and Olohena Road increased by about 12 percent and 22 percent, during the AM and PM peak hours of traffic, respectively.

Trip Generation

Hokua Place is expected to generate 487 vehicle trips per hour (vph) and 560 vph, during the AM and PM peak hours of traffic, respectively. The AM and PM peak hour trip generation characteristics for Hokua Place were increased by about 90± vph over the DEIS traffic study, primarily due to the use of the average peak hour trip rates for the multi-family dwelling units.

Traffic Impact Analysis

The construction of the connector roadway through Hokua Place, between Olohena Road and the Kapa`a By-Pass Road, is expected to mitigate the Project's traffic impacts at the roundabout intersection of the Kapa`a By-Pass Road and Olohena Road. The other intersections in the study area will require the following traffic improvements to mitigate the traffic impacts without and with the proposed Project.

Recommendations Without Project

1. Widen Kuhio Highway between the Kapa`a Bypass Road (South Junction) and Kuamoo Road to provide two through lanes in each direction.
2. Restripe the median on the north leg of Kuhio Highway at the Kapa`a By-Pass Road (South Junction) to provide a median refuge lane.
3. Restripe parking and shoulder lanes on Kuhio Highway through Kapa`a Town to provide additional through and/or left-turn lanes.
4. Modify the traffic signal operations at the intersection of Kuhio Highway and Kukui Street to reduce queuing and delays.
5. Add a right-turn by-pass lane from southbound Kapa`a Bypass Road to mauka bound Olohena Road at their roundabout intersection.
6. Realign Kaehulua Road to intersect Olohena Road and Kaapuni Road to create a four-legged, channelized intersection.
7. Extend the median refuge lane/two-way left-turn lane on the north leg of Kuhio Highway at Lehua Street.

Recommendations With Project

1. Construct Road A from Olohena Road to the Kapa`a By-Pass Road.
2. Construct a roundabout at the intersection of Road A and the Kapa`a By-Pass Road.

Conclusions

The existing traffic congestion on Kuhio Highway through Kapa`a Town can be mitigated by restricting on-street parking and restriping the shoulder lanes to provide for additional through lanes/median left-turn lanes. The existing southbound traffic demand through Kapa`a Town is reduced by the Kapa`a By-Pass Road. Dedication of the Kapa`a By-Pass Road right-of-way along the Hokua Place frontage would assure the continued usage of the existing Kapa`a By-Pass Road.

The construction of the proposed Road A will provide additional mauka-makai roadway capacity between Kapa`a Valley and the Kapa`a By-Pass Road. Road A is expected to mitigate the Hokua Place traffic impacts at the roundabout intersection of the Kapa`a By-Pass Road and Olohena Road. The Hokua Place access intersections on Olohena Road and on the Kapa`a By-Pass Road are expected to operate at satisfactory Levels of Service, during the AM and PM peak hours of traffic.

Purpose and Scope of the Study

The purpose of the new TIAR is to update the traffic impact analysis resulting from the development of the proposed Hokua Place. This report presents the findings and recommendations of the study, the scope of which includes:

1. An evaluation of existing roadways and traffic conditions.
2. The analysis of the future traffic conditions without the proposed Project.
3. The development of trip generation characteristics of the proposed Project.
3. The identification and analysis of the traffic impacts resulting from the development of the proposed Project.
5. The recommendation of roadway improvements, which would mitigate the traffic impacts identified in this study.

1. Existing Conditions

A. Roadways

Kuhio Highway is the primary arterial highway along the east coast of Kauai. Through Kapa`a Town, Kuhio Highway is a two-lane roadway with on-street parking on both sides of the roadway. Kuhio Highway is signalized at its intersection with Kukui Street. Exclusive left-turn lanes are provided on Kuhio Highway at major intersections in Kapa`a Town. The posted speed limit on Kuhio Highway in Kapa`a Town is 25 miles per hour (mph).

The Kapa`a By-Pass Road provides an alternative southbound route around Kapa`a Town. The Kapa`a Bypass Road is a one-lane, one-way, southbound roadway between its north junction at Kuhio Highway and Olohena Road, with a posted speed limit of 25 mph. The Kapa`a By-Pass Road intersects Olohena Road at a single-lane roundabout. South of Olohena Road, the Kapa`a By-Pass Road becomes a two-way, two-lane roadway, with a posted speed limit of 35 mph. A 3,700± foot section of the Kapa`a Bypass Road, south of Olohena Road, was constructed on a roadway easement, which is currently owned by the developer of Hokua Place. Hokua Place, LLC has a Memorandum of Understanding with the State of Hawaii Department of Transportation (DOT) to dedicate the roadway easement to State DOT upon the approval of the Hokua Place subdivision.

South of the proposed intersection with Road A, the posted speed limit on the Kapa`a By-Pass Road is reduced to 25 mph. At its south junction, the Kapa`a By-Pass Road intersects Kuhio Highway at an unsignalized Tee-intersection. The Kapa`a By-Pass Road provides separate left-turn and right-turn lanes at its south junction with Kuhio Highway. Exclusive left-turn and right-turn lanes are provided on Kuhio Highway at the Kapa`a By-Pass Road in the northbound and southbound directions, respectively. A median refuge lane is not delineated on the north leg of Kuhio Highway at the Kapa`a By-Pass Road. However, the striped median provide sufficient refuge space for one vehicle turning left from the Kapa`a By-Pass Road.

South of the Kapa`a By-Pass Road, the center northbound lane of Kuhio Highway is coned to provide a southbound contra-flow lane, during the AM peak period of weekday traffic, resulting in two lanes in the

southbound direction and one lane in the northbound direction. During the field investigation, the contra-flow operation occurred from 5:45 AM to 10:30 AM. The contra-flow lane provides a “free” right-turn movement from the Kapa`a Bypass Road onto southbound Kuhio Highway, during the AM peak period of weekday traffic.

Olohena Road is a two-way, two-lane collector roadway with a posted speed limit of 25 mph. The posted speed limit on Olohena Road is reduced to 15 mph as it approaches Kapa`a Middle School. Olohena Road intersects the Kapa`a Bypass Road at a single-lane roundabout. Makai of Lehua Street, Olohena Road continues as Kukui Street to Kuhio Highway.

Kaapuni Road is a two-way, two-lane, collector road which intersects Olohena Road at a stop-controlled, skewed Tee-intersection. The Kaapuni Road approach has a limited sight distance to the right, due to the vertical alignment of the mauka leg of Olohena Road. Immediately mauka of Olohena Road, the two-way, two-lane Kaehulua Road intersects Kaapuni Road at a stop-controlled, skewed Tee-intersection.

Kukui Street is a two-way, two-lane roadway between Kuhio Highway and Ulu Street with a posted speed limit of 15 mph. Kukui Street is signalized at its intersection with Kuhio Highway with a shared left-turn lane and exclusive right-turn lane. Ulu Street is a two-way, two-lane local street between Kukui Street and Ohia Street. South of Ohia Street, Ulu Street becomes a one-lane, one-way southbound roadway to Kuhio Highway. Ohia Street is a local street, which intersects Ulu Street and Kuhio Highway at stop-controlled intersections. Exclusive left- turn lanes are provided in both directions on Kuhio Highway at Ohia Street/Pono Kai Driveway. Ulu Street provides an alternate route to the south between Kuhio Highway and Kukui Street.

Lehua Street is a two-way, two-lane local street between Olohena Road and Kuhio Highway. Lehua Street intersects Olohena Road at a stop-controlled Tee-intersection. Lehua Street intersects Kuhio Highway at a stop-controlled, channelized Tee-intersection. Lehua Street provides an alternate route to the north between Kuhio Highway and Olohena Road.

Kahau Street is a two-way, two-lane cul-de-sac street. Kahau Street intersects Olohena Road at a stop-controlled Tee-intersection, immediately mauka of Lehua Street.

B. Public Transit

The Kauai County Transportation Agency operates a public bus service in the region with a stop on Olohena Road at the Kapa`a New Town Park, between the Kapa`a By-Pass Road and Kahau Street. The Kauai bus service also stops at Kapa`a Middle School. On Kuhio Highway, the Kauai Bus service stops at Lehua Street, at Ohia Street, and at the Coconut Marketplace near the Kapa`a By-Pass Road (South Junction). The Kauai Bus service is provided at hourly intervals Monday through Friday from 6 AM to 9 PM and on weekends and holidays every two hours from 8 AM to 5 PM.

C. Existing Peak Hour Traffic Volumes and Operating Conditions

1. Field Investigation and Data Collection

Turning movement traffic count surveys were conducted at the following intersections in the study area, during the week of March 13, 2017:

- a. Kapa`a By-Pass Road and Olohena Road
- b. Olohena Road and Kaapuni Road
- c. Kaapuni Road and Kaehulua Road
- d. Kuhio Highway and Kukui Street
- e. Kuhio Highway and Kapa`a By-Pass Road (South Junction)
- f. Kuhio Highway and Lehua Street
- g. Olohena Road and Lehua Street
- h. Olohena Road and Kahau Street
- i. Kukui Street and Ulu Street
- j. Ulu Street and Ohia Street
- k. Kuhio Highway and Ohia Street/Pono Kai Driveway
- l. Kuhio Highway and Ulu Street

Each intersection was surveyed during the peak periods of traffic over a two-day period. On March 14, 2017, a stalled vehicle partially blocked the circulatory roadway of the roundabout intersection of Olohena Road and the Kapa`a Bypass Road from 3:00 PM to 4:00 PM. The blockage limited traffic flows, and this data were excluded from the analysis. Otherwise, the higher peak hour volumes on the survey days at each study intersection were selected for the analysis to establish the existing conditions. The peak hours of traffic varied from intersection to intersection and from day to day.

2. Existing AM Peak Hour Traffic

The existing AM peak hour of traffic in the study area generally occurred from 7:15 AM to 8:1 AM. Table 2 summarizes the changes in the AM peak hour traffic between the DEIS traffic study and the existing AM peak hour traffic data.

Table 2. AM Peak Hour Traffic Comparison			
<u>Study Intersection</u>	<u>Intersection Volumes (vph)</u>		<u>Increase (+)</u>
	<u>2012-2013</u>	<u>2017</u>	<u>Decrease (-)</u>
<u>Olohena Road/Kapa`a By-Pass Road</u>	<u>1,447</u>	<u>1,628</u>	<u>+181</u>
<u>Kuhio Highway/Kukui Street</u>	<u>1,441</u>	<u>1,410</u>	<u>-31</u>
<u>Kuhio Hwy/Kapa`a By-Pass Road</u>	<u>1,990</u>	<u>2,111</u>	<u>+121</u>

Excerpt from updated TIAR, Exhibit "H"

In Kapa`a Town, Kuhio Highway carried about 1,400 vehicles per hour (vph), total for both directions, during the AM peak hour of traffic. South of Ulu Street, Kuhio Highway carried over 1,750 vph, total for both directions. The Kapa`a By-Pass Road carried about 800 vph, total for both directions, south of Olohena Road. Mauka of the Kapa`a Bypass Road, Olohena Road carried about 1,000 vph, total for both directions. South of the Kapa`a By-Pass Road (South Junction), Kuhio Highway carried about 2,100 vph.

The traffic signal timing cycle lengths at the intersection of Kuhio Highway and Kukui Street resulted in long delays on Kukui Street. Makai bound traffic on Olohena Road and Kukui Street were diverted to alternate routes to Kuhio Highway. About 54 percent of makai bound traffic on Olohena Road turned left onto Lehua Street to continue in the northbound direction. About 33 percent of makai bound traffic turned right onto Ulu Street to continue in the southbound direction. The remaining 13 percent of the makai bound traffic on Olohena Road continued onto Kukui Street to Kuhio Highway.

During the existing AM peak hour of traffic, the overall intersection of Kuhio Highway and Kukui Street operated at LOS "A". However, the left-turn movement on makai bound Kukui Street operated at LOS "F", with a relatively low traffic demand (32 vph). All the traffic movements in both directions on Kuhio Highway operated at LOS "A" at Kukui Street, during the existing AM peak hour of traffic.

The left-turn movement on makai bound Lehua Street operated at LOS "E" at Kuhio Highway, during the existing AM peak hour of traffic. Makai bound Ohia Street also operated at LOS "E" at Kuhio Highway at a very low volume.

Makai bound Olohena Road operated at LOS "D" at the intersection of Kapa`a By-Pass Road. Kaapuni Road operated at LOS "D" at Olohena Road. The other intersections in the study area operated at satisfactory Levels of Service, i.e., LOS "C" or better, during the existing AM peak hour of traffic. Figures 3 and 4 depict the existing AM peak hour traffic data.

3. Existing PM Peak Hour Traffic

The existing PM peak hour of traffic in the study area varied between the hours of 3:00 PM and 6:00 PM. Table 3 summarizes the changes in the PM peak hour traffic between the DEIS traffic study and the existing (2017) PM peak hour traffic data.

Table 3. PM Peak Hour Traffic Comparison			
Study Intersection	Intersection Volumes (vph)		Increase (+) Decrease (-)
	2012-2013	2017	
<u>Olohena Rd/Kapa`a By-Pass Rd</u>	<u>1,459</u>	<u>1,787</u>	<u>+328</u>
<u>Kuhio Hwy/Kukui St</u>	<u>1,370</u>	<u>1,295</u>	<u>-75</u>
<u>Kuhio Hwy/Kapa`a By-Pass Rd</u>	<u>2,176</u>	<u>2,235</u>	<u>+62</u>

Excerpt from updated TIAR, Exhibit "H"

During the existing PM peak hour of traffic, Kuhio Highway carried about 1,200 vph, total for both directions in Kapa`a Town. South of Ulu Street, Kuhio Highway carried over 1,700 vph, total for both directions. The Kapa`a By-Pass Road carried over 1,000 vph, total for both directions, south of Olohena Road. Mauka of the Kapa`a By-Pass Road, Olohena Road carried about 1,000 vph, total for both

directions. Kuhio Highway carried over 2,100 vph, total for both directions, south of the Kapa`a Bypass Road.

The northbound and southbound traffic on Kuhio Highway avoided the traffic signal delays at Kukui Street by diverting to alternate routes to Olohena Road. Less than 10 percent of the mauka bound traffic on Olohena Road at the Kapa`a Bypass Road turned from Kuhio Highway via Kukui Street. About 35 percent of the mauka bound traffic on Olohena Road turned right from Lehua Street to continue in the mauka bound direction, during the existing PM peak hour of traffic. About 55 percent of the mauka bound traffic turned left from Ulu Street onto Kukui Street to continue in the mauka bound direction on Olohena Road.

The overall intersection of Kuhio Highway and Kukui Street operated at LOS "A", during the existing PM peak hour of traffic. The left-turn movement on makai bound Kukui Street operated at LOS "E" with a relatively low traffic demand (36 vph). The other traffic movements at the intersection operated at LOS "A", during the existing PM peak hour of traffic.

The left-turn movement on makai bound Lehua Street operated at LOS "D" at Kuhio Highway, during the existing PM peak hour of traffic. Makai bound Ohia Street operated at LOS "F" at Kuhio Highway with a very low volume. The mauka bound Pono Kai Driveway operated at LOS "D", also with a very low volume.

Southbound Lehua Street operated at LOS "E" at Olohena Road, during the existing PM peak hour of traffic. Southbound Kapa`a By-Pass Road operated at LOS "D" at Olohena Road. The other intersections in the study area operated at satisfactory Levels of Service, during the existing PM peak hour of traffic. The existing PM peak hour traffic data are depicted on Figures 5 and 6.

II. Future Traffic Conditions

A. Background Growth in Traffic

The Kauai Long-Range Land Transportation Plan (KLRLTP) was prepared by the State of Hawaii Department of Transportation (DOT), in cooperation with the Kauai County Department of Public Works and Planning Department. The KLRLTP developed long-range travel forecasts for the island of Kauai. The KLRLTP anticipated that traffic in the Kapa`a area would increase by over 30 percent between the Base Year 2007 and the Horizon Year 2035. For the purpose of this analysis, an average growth factor of 1.14 was uniformly applied to the existing (Year 2017) AM and PM peak hour traffic volumes to estimate the Year 2030 peak hour traffic without the proposed Project.

B. Daily and Seasonal Adjustment Factors

The existing peak hour traffic data were adjusted for the daily and seasonal variation in traffic in the region. The adjustment factors were based upon the 2016 traffic count data, which were collected at DOT's continuous traffic count station at Mile Post 2.4 on Kuhio Highway (Route 56) in Hanamaulu, which is located about 6 miles south of Kapa`a Town. Table 4 summarizes the adjustment factors, which were applied to the existing AM and PM peak hour traffic data, to account for the daily and seasonal variation in traffic from the annual average weekday traffic (AAWDT).

Table 4. Day of the Week and Seasonal Adjustment Factors			
Date	Day	24-Hour Data	Adjustment Factors
<u>3/14/2016</u>	<u>Monday</u>	<u>15,881</u>	<u>1.03</u>
<u>3/15/2016</u>	<u>Tuesday</u>	<u>15,824</u>	<u>1.03</u>
<u>3/16/2016</u>	<u>Wednesday</u>	<u>16,611</u>	<u>0.98</u>
<u>3/17/2016</u>	<u>Thursday</u>	<u>16,467</u>	<u>0.99</u>
<u>3/18/2016</u>	<u>Friday</u>	<u>16,652</u>	<u>0.98</u>
<u>2016 AAWDT</u>		<u>16,301</u>	<u>1.00</u>

Excerpt from updated TIAR, Exhibit "H"

C. Kuhio Highway Widening

The Final Environmental Assessment Kuhio Highway Short-Term Improvements Kuamoo Road to Temporary Bypass Road (Kuhio Highway EA), was prepared for DOT, by Wilson Okamoto Corporation, dated September 2009. The Kuhio Highway EA recommended the widening of Kuhio Highway from three lanes to four lanes to provide a permanent second southbound lane between the Kapa`a By-Pass Road and Kuamoo Road. The additional lane will provide a "free" right-turn movement from the Kapa`a By-Pass Road onto southbound Kuhio Highway throughout the day.

DOT is presently planning to complete the widening of Kuhio Highway by the Year 2019. The widening of Kuhio Highway from the Kapa`a By-Pass Road to Kuamoo Road is included in this traffic impact analysis.

D. Kapa`a Transportation Solutions

The Kapa`a Transportation Solutions (KTS) was prepared for the State Department of Transportation, dated August 2015.

The KTS cited traffic congestion in the downtown/historic district of Kapa`a Town, which resulted from on-street parking in the curb lanes in both directions on Kuhio Highway. In addition, to the delays caused by vehicles maneuvering into and out of the parallel parking stalls along Kuhio Highway, the on-street parking occupies valuable highway space, which could otherwise provide additional through traffic lanes and/or median left-turn lanes. Table 5 summarizes the roadway improvements relevant to this traffic study, which were prioritized in the Kapa`a Transportation Solutions.

Table 5. Potential Traffic Solutions		
Location	Description	Priority
<u>Kapa`a By-Pass Road</u>	<u>Widen the Kapa`a By-Pass Road to provide one lane in the northbound direction from Olohena Road to Kuhio Highway.</u>	<u><5 Years</u>

<u>Kuhio Highway and Kukui Street</u>	<u>Modify traffic signal timings.</u>	<u><5 Years</u>
<u>Kuhio Hwy and Kapa`a By-Pass Road</u>	<u>Intersection improvements.</u>	<u><5 Years</u>
<u>Olohena Road at Kapa`a Middle School</u>	<u>Improve crosswalk.</u>	<u><5 Years</u>
<u>Kapa`a Bypass Road and Olohena Road Roundabout</u>	<u>Add a separate (bypass) right-turn lane at the roundabout from makai bound Olohena Road to southbound Kapa`a By-Pass Road.</u>	<u><5 Years</u>
<u>Kuhio Highway</u>	<u>Provide an additional southbound lane on Kuhio Highway from Kapa`a By-Pass Road to Kuamoo Road (scheduled for construction).</u>	<u><5 Years</u>
<u>Kuhio Highway and Kukui Street</u>	<u>Close the makai leg of Kukui Street to provide business parking. Implement vehicular and pedestrian improvements on Kukui Street (mauka leg) and Hululi Street at Kuhio Highway.</u>	<u>5-10 Years</u>
<u>Kapa`a New Town Park</u>	<u>Provide direct access from the Kapa`a New Town Park to the Kapa`a By-Pass Road.</u>	<u>5-10 Years</u>
<u>Kuhio Highway and Lehua Street</u>	<u>Improve the left-turn movement from Lehua Street onto Kuhio Highway.</u>	<u>5-10 Years</u>
<u>Kapa`a By-Pass Rd and Kuhio Highway</u>	<u>Re-align the Kapa`a By-Pass Road (South Junction) to intersect Kuhio Highway opposite Aleka Loop or Papaloa Road.</u>	<u>5-10 Years</u>

Excerpt from updated TIAR, Exhibit "H"

Table 5. Potential Traffic Solutions (Cont'd.)		
<u>Location</u>	<u>Description</u>	<u>Priority</u>
<u>Kapa`a By-Pass Road South of Olohena Road</u>	<u>Improve the horizontal alignment and shoulders of the Kapa`a By-Pass Road, south of Olohena Road, to Kuhio Highway.</u>	<u>5-10 Years</u>
<u>Kuhio Highway Between Kawaihau Road and Lehua Street</u>	<u>Provide a two-way median left-turn lane along Kuhio Highway.</u>	<u>5-10 Years</u>
<u>Olohena Rd at Kahau St and Lehua St</u>	<u>Implement intersection improvements and bicycle/pedestrian improvements to Kuhio Highway.</u>	<u>5-10 Years</u>
<u>Olohena Rd at Kaapuni Rd and Kaehulua Rd</u>	<u>Implement intersection improvements</u>	<u>5-10 Years</u>

<u>Kaapuni Road</u>	<u>Upgrade/improve Kaapuni Road to major collector standards, including bicycle lanes.</u>	<u>5-10 Years</u>
<u>Olohena Road Between Kuhio Highway and Kamalu Road</u>	<u>Improve Olohena Road to accommodate non-motorized modes.</u>	<u>5-10 Years</u>
<u>Kapa`a Bus Hub</u>	<u>Relocate the Kapa`a bus hub from its existing location near the skate park to a new location on or near the Kuhio Highway mainline, with amenities.</u>	<u>5-10 Years</u>

Excerpt from updated TIAR, Exhibit "H"

Improving the horizontal alignment and providing shoulders on the Kapa`a By-Pass Road, south of Olohena Road may impact the proposed Hokua Place frontage. Any widening and realignment should be coordinated with Hokua Place. The Kapa`a Transportation Solutions also identifies Road A as a new connector road between Olohena Road and the Kapa`a By-Pass Road, which was prioritized beyond the 10- year time frame. The construction cost of the connector road was estimated at \$25,824,000.

E. Peak Hour Traffic Analysis Without Project

1. AM Peak Hour Traffic Without Project

During the AM peak hour of traffic without the proposed Project, the overall intersection of Kuhio Highway and Kukui Street is expected to continue to operate at LOS "A". The left-turn movement on makai bound Kukui Street is expected to continue to operate at LOS "F". The traffic movements in both directions on Kuhio Highway are expected to continue to operate at LOS "A" at Kukui Street, during the AM peak hour of traffic without the proposed Project.

Makai bound Lehua Street is expected to operate at LOS "F" at Kuhio Highway, during the AM peak hour of traffic without the proposed Project. Makai bound Ohia Street is expected to operate at LOS "E" at Kuhio Highway.

During the AM peak hour of traffic without the proposed Project, makai bound Olohena Road is expected to operate at LOS "F" at the Kapa`a Bypass Road. Southbound Kapa`a By-Pass Road is expected to operate at LOS "D" at Olohena Road. Kaapuni Road is expected to operate at LOS "F" at Olohena Road. The other intersections in the study area are expected to operate at satisfactory Levels of Service, during the AM peak hour of traffic without the proposed Project.

2. PM Peak Hour Traffic Without Project

The overall intersection of Kuhio Highway and Kukui Street is expected to operate at LOS "A", during the PM peak hour of traffic without the proposed Project. The left-turn movement on makai bound Kukui Street is expected to continue to operate at LOS "E". The other traffic movements at the intersection are expected to operate at LOS "A", during the PM peak hour of traffic without the proposed Project.

The left-turn movement on makai bound Lehua Street is expected to operate at LOS "E" at Kuhio Highway, during the PM peak hour of traffic without the proposed Project. Makai bound Ohia Street

also is expected to operate at LOS “F” at Kuhio Highway. Mauka bound Pono Kai Driveway is expected to operate at LOS “E”, during the PM peak hour of traffic without the proposed Project.

Southbound Lehua Street is expected to continue to operate at LOS “F” at Olohena Road, during the PM peak hour of traffic without the proposed Project. Southbound Kapa`a By-Pass Road is expected to operate at LOS “F” at Olohena Road. The right-turn movement from the Kapa`a By-Pass Road onto Kuhio Highway is expected to operate LOS “D”. The other intersections in the study area are expected to operate at satisfactory Levels of Service, during the PM peak hour of traffic without the proposed Project.

The PM peak hour traffic demands at the intersection of Olohena Road and Kaapuni Road without the proposed Project are expected to meet the AASHTO guideline for an exclusive left-turn lane on makai bound Olohena Road.

III. Traffic Impact Analysis

A. Trip Generation Characteristics

The trip generation characteristics were based upon the ITE trip rates for single-family detached dwelling units (DU) and residential condominium/townhouse units. The weekday ITE trip rates, during the AM peak hour and the PM peak hour of adjacent street traffic, were used for this traffic impact analysis. The ITE regression equations were used to derive the trip rates for the single-family detached dwellings in this analysis.

The ITE trip generation rates for a shopping center were developed from the regression equations to estimate the trip generation from the proposed 8,000 sq. ft. retail center. The pass-by trip rate of 81.2 percent was applied to the PM peak hour trip generation. The ITE pass-by trip rate is reasonable given the size of Hokua Place and the volume of through traffic on Road A. Hokua Place is expected to generate totals of 487 vph and 560 vph, during the AM and PM peak hours of traffic, respectively. The trip generation characteristics for the proposed Project are summarized in Table 6.

Land Use (ITE Code)	Units	AM Peak Hour (vph)			PM Peak Hour (vph)		
		Enter	Exit	Total	Enter	Exit	Total
Single-Family	<u>16 DU</u>	<u>5</u>	<u>16</u>	<u>21</u>	<u>13</u>	<u>7</u>	<u>20</u>
Phase 1 (265)							
Single-Family Phase 2 (265)	<u>100 DU</u>	<u>20</u>	<u>60</u>	<u>80</u>	<u>66</u>	<u>38</u>	<u>104</u>

Condominium/ Townhouse (230)	<u>700 DU</u>	<u>52</u>	<u>256</u>	<u>308</u>	<u>244</u>	<u>120</u>	<u>364</u>
Retail Center (820)	<u>8,000 SFGFA</u>	<u>21</u>	<u>13</u>	<u>34</u>	<u>53</u>	<u>57</u>	<u>110</u>
	<u>Pass-By</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>(-)45</u>	<u>(-)45</u>	<u>(-)90</u>
Total External Trips		98	345	443	331	177	509

Excerpt from updated TIAR, Exhibit "H"

B. Site Access Improvements

A conventional channelized, Tee-intersection was considered at the intersection of Road A and the Kapa`a By-Pass, with left-turn and right-turn deceleration/storage lanes and a median refuge lane on the Kapa`a By-Pass Road. Under unsignalized traffic control, the left-turn lane from Road A onto the Kapa`a Bypass Road is expected to operate at LOS "F", during the PM peak hour of traffic. As an alternative to traffic signalization, a round-a-bout intersection is recommended at Road A and the Kapa`a Bypass Road. The following site access improvements are recommended for the proposed Project:

1. Construct a stop-controlled Tee-intersection between Road A and Olohena Road.
2. Construct a stop-controlled Tee-intersection between the Phase 1 Driveway and Olohena Road.
3. Construct a single-lane round-a-bout at the intersection of Road A and the Kapa`a By-Pass Road.

C. Traffic Assignment

The traffic assignments were based upon the existing traffic patterns along Olohena Road and Kukui Street. The traffic assignments also included through traffic demands, which are expected to be diverted from makai bound Olohena Road and from northbound Kapa`a By-Pass Road to the proposed Road A. Road A is expected to reduce the traffic demands at the roundabout intersection of the Kapa`a By-Pass Road and Olohena Road.

D. AM Peak Hour Traffic Analysis With Project

The roundabout intersection of the Kapa`a By-Pass Road and Road A is expected to operate at satisfactory Levels of Service, during the AM peak hour of traffic with the proposed Project. Road A is expected to operate at LOS "C" at Olohena Road. The Phase 1 driveway on Olohena Road is expected to operate at LOS "B".

The overall intersection of Kuhio Highway and Kukui Street is expected to continue to operate at LOS "A", during the AM peak hour of traffic with the proposed Project. The left-turn movement on makai bound Kukui Street is expected to continue to operate at LOS "F". The traffic movements in both directions on Kuhio Highway are expected to operate at LOS "A" at Kukui Street, during the AM peak hour of traffic with the proposed Project. Makai bound Lehua Street is expected to continue to operate at LOS "F" at Kuhio Highway, during the AM peak hour of traffic with the proposed Project.

Makai bound Ohia Street also is expected to operate at LOS "F" at Kuhio Highway. The Pono Kai Driveway is expected to operate at LOS "D".

During the AM peak hour of traffic with the proposed Project, the overall round-a-bout intersection of the Kapa`a By-Pass Road and Olohena Road is expected to improve from LOS "E" to LOS "D", during the AM peak hour of traffic with the proposed Project. Makai bound Olohena Road is expected to improve from LOS "F" to LOS "E", due to the diversion of makai bound traffic to Road A. Southbound Kapa`a By-Pass Road is expected to worsen from LOS "D" to LOS "E" at Olohena Road.

Kaapuni Road is expected to continue to operate at LOS "F" at Olohena Road. The left-turn movement from the Kapa`a By-Pass Road onto Kuhio Highway is expected to operate at LOS "F", during the AM peak hour of traffic with the proposed Project.

E. PM Peak Hour Traffic Analysis With Project

During the PM peak hour of traffic with the proposed Project, the round-a-bout intersection of the Kapa`a By-Pass Road and Road A is expected to operate at satisfactory Levels of Service. Road A is expected to operate at LOS "D" at Olohena Road. The Phase 1 driveway on Olohena Road is expected to operate at LOS "A".

The overall intersection of Kuhio Highway and Kukui Street is expected to continue to operate at LOS "A", during the PM peak hour of traffic with the proposed Project. The left-turn movement on makai bound Kukui Street is expected to continue to operate at LOS "F". The traffic movements in both directions on Kuhio Highway are expected to operate at LOS "A" at Kukui Street, during the PM peak hour of traffic with the proposed Project.

Makai bound Lehua Street is expected to continue to operate at LOS "F" at Kuhio Highway, during the PM peak hour of traffic with the proposed Project. Makai bound Ohia Street also is expected to operate at LOS "F" at Kuhio Highway. The Pono Kai Driveway is expected to operate at LOS "D" at Kuhio Highway.

During the PM peak hour of traffic with the proposed Project, southbound Kapa`a By-Pass Road is expected to continue to operate at LOS "F" at its roundabout intersection with Olohena Road. The left-turn and right-turn movements on the Kapa`a By-Pass Road (South Junction) at Kuhio Highway are expected to operate at LOS "E" and LOS "D", respectively. The other intersections in the study area are expected to operate at satisfactory Levels of Service, during the PM peak hour of traffic with the proposed Project.

IV. Recommendations and Conclusions

A. Recommended Traffic Improvements Without Project

The following traffic improvements expand upon the potential traffic solutions, which were cited in the Kapa`a Transportation Solutions, and are recommended to mitigate the existing and expected traffic congestion without the proposed Project:

1. Widen Kuhio Highway between the Kapa`a By-Pass Road (South Junction) and Kuamoo

Road to provide two through lanes in each direction (DOT).

2. Restripe the median on the north leg of Kuhio Highway at the Kapa`a By-Pass Road (South

Junction) to provide a median refuge lane to facilitate the left-turn movement from the Kapa`a By-Pass Road onto northbound Kuhio Highway.

3. Restrict on-street parking along Kuhio Highway within Kapa`a Town. Provide off-street business parking to replace the restricted parking along Kuhio Highway. Restripe Kuhio Highway to provide additional through and/or left-turn lanes.

4. Modify the traffic signal traffic operations at the intersection of Kuhio Highway and Kukui Street to reduce queuing and delays.

5. Add a right-turn bypass lane at the round-a-bout intersection from southbound Kapa`a By-Pass Road to mauka bound Olohena Road.

6. Realign Kaehulua Road to intersect Olohena Road and Kaapuni Road opposite the mauka leg of Olohena Road to create a four-legged intersection with stop-controls on Kaehulua Road and the mauka leg of Olohena Road. Realign/channelize the mauka leg of Olohena Road to intersect Kaapuni Road and the makai leg of Olohena Road to improve the intersection sight distance. Channelize the right-turn movements on the makai bound approaches of Kaapuni Road and Olohena Road.

7. Extend the median refuge lane/two-way left-turn lane on Kuhio Highway from Lehua Street to Kawaihau Road.

DOT is in the process of widening Kuhio Highway from the Kapa`a By-Pass Road to Kuamoo Road (Item No. 1 above). The above Item Nos. 2, 3, and 7 are expected to improve the capacity of Kuhio Highway through Kapa`a Town.

Consolidating the intersections of Olohena Road, Kaapuni Road, and Kaehulua Road (Item No. 6 above) into a single four-legged intersection is expected to improve the traffic operations and safety at the intersection. A round-a-bout intersection was considered for Olohena Road, Kaapuni Road, and Kaehulua Road. However, the existing roadway slopes would have required extensive grading to provide adequate sight distances at a roundabout intersection.

B. Recommended Traffic Improvements With Project

The following traffic improvements are recommended to mitigate traffic impacts with the proposed Project:

1. Construct Road A from Olohena Road to the Kapa`a By-Pass Road, as recommended in the Kapa`a Transportation Solutions.
2. Construct a single-lane roundabout at the intersection of Road A and the Kapa`a By-Pass Road.

C. Conclusions

An interim solution to the existing traffic congestion in Kapa`a Town is recommended in the Kapa`a Transportation Solutions. Constructing additional off-street parking areas would provide the

opportunity to restripe the existing on-street parking lanes and striped shoulders along Kuhio Highway to provide for additional through traffic lanes and/or median left-turn lanes.

The existing southbound traffic demand in Kapa`a Town is reduced by the Kapa`a By-Pass Road. Dedication of the Kapa`a By-Pass Road right-of-way along the Hokua Place frontage would assure the continued usage of the existing Kapa`a Bypass Road. Any horizontal realignment and/or widening of the Kapa`a By-Pass Road along the Project frontage should be coordinated with the development of Hokua. Widening of the north leg of the Kapa`a By-Pass Road between Olohena Road and Kuhio Highway Place (North Junction) to provide at a two-way, two-lane roadway would provide additional capacity in the northbound direction.

The construction of the proposed Road A is recommended in the Kapa`a Transportation Solutions to provide additional mauka-makai roadway capacity between Kapa`a Valley and the Kapa`a By-Pass Road. By diverting through traffic between Olohena Road and the Kapa`a By-Pass Road, Road A is expected to mitigate the Project's traffic impacts, during the AM and PM peak hour of traffic with the proposed Project at the round-a-bout intersection of the Kapa`a By-Pass Road and Olohena Road.

The round-a-bout at the intersection of the Kapa`a By-Pass Road and Road A will increase the intersection capacity, in anticipation of the increase in demand resulting from the future two-lane widening of the Kapa`a By-Pass Road between Olohena Road and Kuhio Highway (North Junction). The proposed round-a-bout intersection of the Kapa`a By-Pass Road and Olohena Road is expected to operate at satisfactory Levels of Service, during the AM and PM peak hours of traffic with the proposed Project.

4.9.3 Level of Impact after Mitigation

An interim solution to the existing traffic congestion is recommended in the Kapa`a Transportation Solutions. The recommended solutions will provide additional through traffic lanes and/or median left-turn lanes.

The existing southbound traffic demand in Kapa`a Town is reduced by the Kapa`a By-Pass Road. Dedication of the Kapa`a By-Pass Road right-of-way by the Petitioner along the HoKua Place frontage will assure the continued usage of the Kapa`a Bypass Road. Widening of the north leg of the Kapa`a Bypass Road between Olohena Road and Kuhio Highway (North Junction) would provide a two-way, two-lane roadway, thus providing additional capacity in the northbound direction.

The construction of Road A will provide additional mauka-makai roadway capacity between Kapa`a Valley and the By-Pass Road. This would mitigate the Project's traffic impacts during the AM and PM peak hour of traffic at the round-a-bout intersection of Kapa`a By-Pass Road and Olohena Road.

The round-a-bout at the intersection of Kapa`a Bypass Road and Road A will increase the intersection capacity, in anticipation of increase in demand resulting from future two-lane widening of the Kapa`a By-Pass Road.

The intersection of the Kapa'a Bypass Road and Olohena Road is expected to operate at satisfactory Levels of Service during the AM and PM peak hours of traffic as the result of the proposed Project.

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

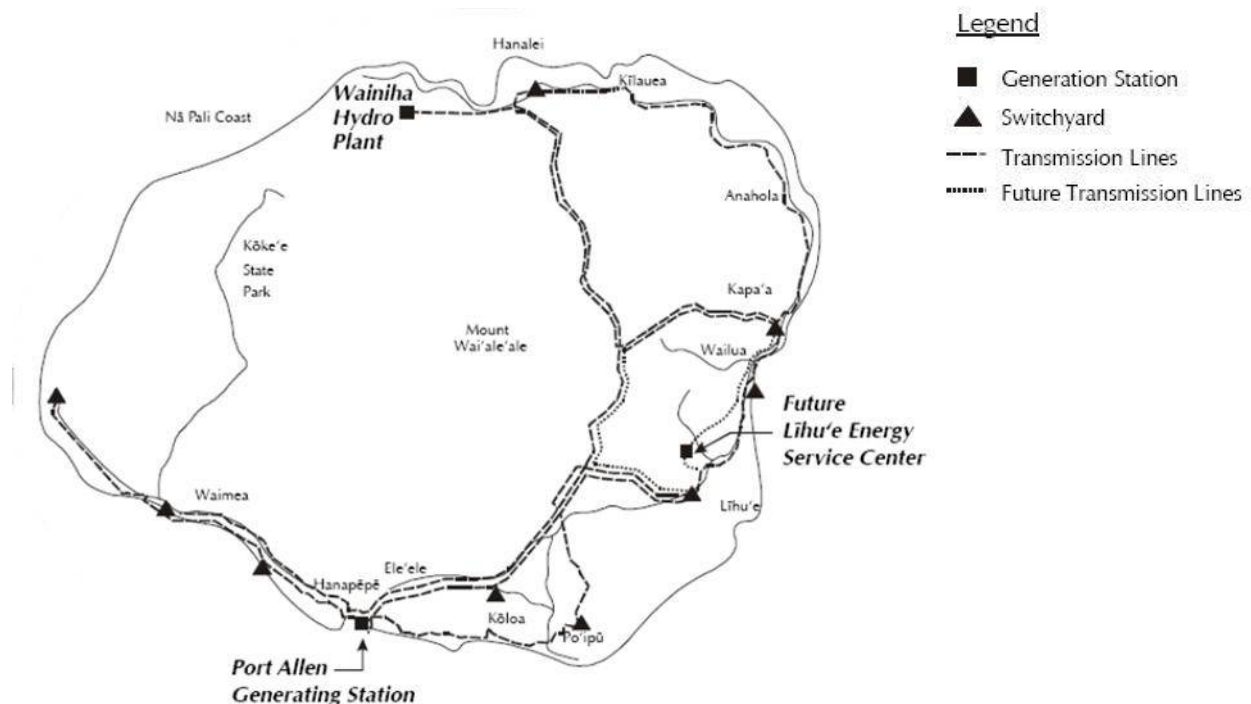
Power

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 Utilities Company. 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 placing high voltage transmission lines underground may be incorporated into the Project. This action 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 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 Middle 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 Project will incorporate exterior lighting that will not have adverse effects 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

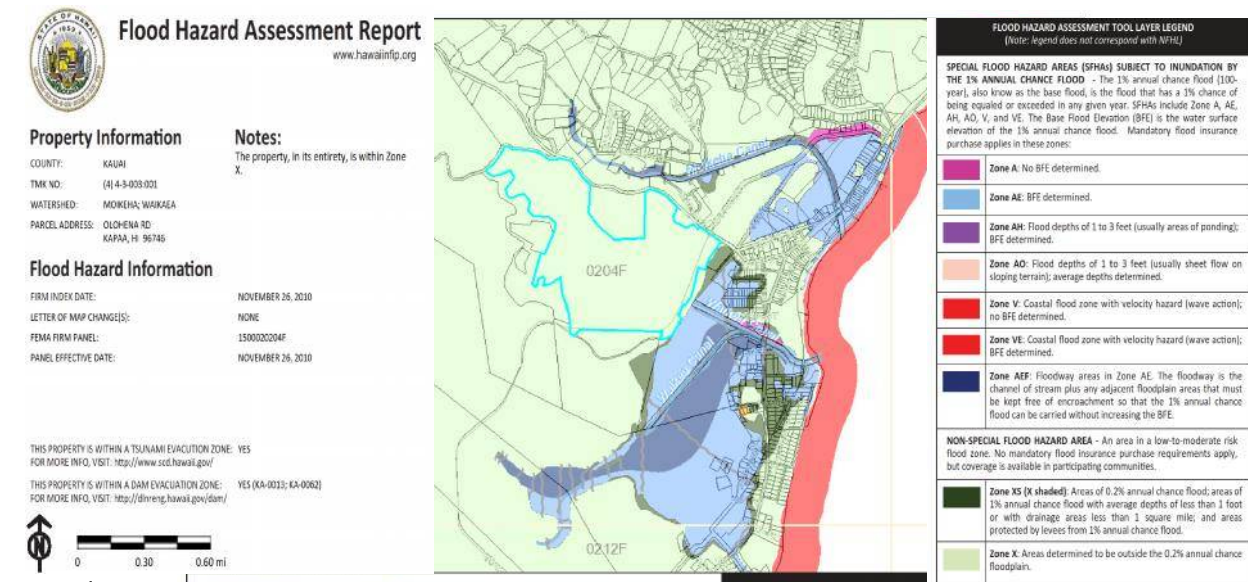
will ensure that the air quality and lighting will remain in compliance with the State laws and regulations and therefore impacts will be less than significant.

4.13 Natural Hazards

This section discusses the natural hazards which may affect the subject property including flooding, hurricanes, volcanic activity, tsunami and earthquakes.

4.13.1 Environmental Setting

Flooding



According

to the Federal Emergency Management Agency's Flood Insurance Rate Map (FIRM) Community-Panel No. 1500020135 C, almost all of the Project site is located in Zone X. Zone X is described as areas outside of the 100- and 500-year floodplains with minimal flooding.

Other Hazards

The island of Kaua'i is uniquely exposed to hurricanes due to its exposure as the western most location in the Hawaiian Islands chain.

The Project site has minimal exposure to other natural hazards, such as volcanic events and earthquakes. Additionally, the Project site is not located in a tsunami zone, so tsunami inundation parameters do not apply to the proposed Project.

4.13.2 Potential Environmental Impact & Mitigation Measures

Flooding

The Project does not involve construction within a 100-year flood plain (Zones A or V), and it does not involve a "critical action" within a 500-year flood plain.

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 Project will incorporate exterior lighting that will not have adverse effects 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.

- J 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.
- J 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.
- J 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.
- J BMPs will also be implemented for long term development and operation of activities occurring on the site as part of pollution prevention measures.
- J HoKua Place will be contributing funds to help upgrade the deferred maintenance and repair of the Kapa'a Wastewater Treatment plant. The Project will not be a detriment to the capacity of the Plant.
- J Wastewater line in Olohena and other roadways will comply with all applicable rules and regulations.
- J 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

- J 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.
- J Throughout Project construction and development, HoKua Place will seek to reduce, reuse, and recycle materials and waste to the greatest degree possible.
- J Green waste resulting from the Project's development will be chipped into mulch for on-site use or will be disposed of properly.
- J 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.
- J 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

- J 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.
- J Buildings within HoKua Place will further comply with the County of Kaua'i Energy Conservation Code (Kaua'i County Ordinance 890).
- J Solar water heaters will be utilized as made requisite under Section 196-6.5, HRS.
- J 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.
- J 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 Project 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 Project 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.

4.15.1 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	Former irrigation ditches on the property have been reduced and <u>are unrecognizable</u> or rendered inoperable and do not contribute to the historic integrity of irrigation systems on former sugarcane lands. The cumulative effect of the Project 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 <u>Neighborhood General</u> 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 Project's 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	<u>Recommendations for improving traffic is outlined in the updated TIAR (Exhibit “H”).</u> 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 & Irrecoverable 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 for 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.