

4.0 HUMAN ENVIRONMENT

4.1 Surrounding Land Use

4.1.1 EXISTING CONDITIONS

4.1.1.1 PETITION AREA

The Petition Area and its surrounding lands were once part of the Līhu‘e Plantation, and are currently owned by the Petitioner, Keālia Properties LLC. The 53.4 acre Keālia Mauka site is part of an approximately 1,072-acre tax map parcel [TMK (4)4-7-004:001] that extends from Kūhiō Highway to the mauka lands where Keālia Road intersects with Hauaala Road near the Spalding Monument. This parcel is referred to by the Petitioner as the “Kumukumu parcel.” Mauka of the Petition Area near the Spalding Monument, Keālia Road veers northward and forms the mauka boundary of the Kumukumu parcel. The adjacent TMK parcel to the south is also owned by Keālia Properties and is referred to as the “Makee parcel.” The Makee parcel extends from Kūhiō Highway to Hauaala Road and is about 929 acres in size. The location of both parcels is shown in Chapter 1, Figure 1-3. The Kumukumu parcel is currently outleased for grazing; the Makee parcel is largely fallow, with some diversified agriculture and equestrian activity.

The Keālia Mauka Petition Area is located at the southern corner of the Kumukumu parcel, adjacent to the existing 38-lot Ka‘ao Road subdivision, also known as “Keālia Town Tract.” This former plantation neighborhood includes house lots ranging in size from about 7,500 square feet (SF) to about 20,000 SF. The neighborhood is characterized by low rise, plantation-style homes on both sides of Ka‘ao Road. Three house lots are accessed off Hopoe Road. All of the lands surrounding the Petition Area to the north and west are former plantation lands and are currently used for cattle grazing.

The Petition Area’s eastern (makai) boundary is the two-lane Kūhiō Highway, State Route 56. This highway is the primary thoroughfare along the east Kaua‘i shoreline. It connects Līhu‘e and Kapa‘a to Keālia, Anahola and Kīlauea, and to the north shore communities of Princeville and Hanalei.

At the base of Keālia Road near Kūhiō Highway, there remain a number of plantation-era structures. Several of these structures are still in use, including an open shed used by Keālia Farms for staging and a farmers market, the Keālia Post Office, and a rodeo ring. An old school building on the north side of Keālia Road is vacant.

Directly across Kūhiō Highway from the Petition Area is the luxury Keālia Kai subdivision, also known as “Keālia Makai.” This exclusive oceanfront development encompasses 300 acres, and includes 35 homesites and 29 lots ranging in size from five to 38 acres. The development fronts Keālia Beach, one of the most popular recreational beaches on the east side.

The nearest large concentration of population is Kapa‘a, located about two miles to the south of the Petition Area. In addition to being a population center, Kapa‘a is a major commercial, industrial and visitor center. To the north of Keālia, Anahola is the next community to the north.

4.1.1.2 OFF-SITE

Off-site infrastructure improvements include improvements to Keālia Road, and installation of utility infrastructure, including a proposed sewer main that will extend approximately 7,000 feet down Keālia Road and south along Kūhiō Highway to a sewer manhole just past the Kaiakea Fire Station. The sewer main will be installed on the west (mauka) side of the highway, within the right-of-way. It will be mounted to the proposed Kapa'a Stream Bridge at the Kapa'a Stream crossing (see Appendix L).

Kūhiō Highway is a two-lane road that parallels Kaua'i's eastern coast in the one mile stretch between Keālia Road and the Kaiakea Fire Station. Lands on the west (makai) side of the highway are former sugar cane lands that are mostly undeveloped, although uses include the Kapa'a High School athletic field complex, Saint Catherine Cemetery, and several private properties being used as residences (Hawai'i Department of Transportation, 2017). Land uses on the makai side of the highway are primarily ocean recreation-related, and include Keālia Beach Park, unpaved parking areas, picnic shelters, and Ke Ala Hele Makalae, the pedestrian and bicycle shared use path which parallels the coast.

4.1.2 POTENTIAL IMPACTS AND MITIGATION

4.1.2.1 PETITION AREA

The Proposed Action will transform undeveloped grazing land to a visible urban, residential use once the lots are sold and homes are constructed by the owners. The subdivision will expand the existing Ka'ao Road residential area, with similar, modest single family homes. The Petitioner has no plans to expand residential use beyond the proposed 235 lots. Although the Proposed Action represents a change in land use for the subject 53 acres, residential use is compatible with the existing subdivision and consistent with the County General Plan. The Petition Area represents only a small portion (5%) of the 1,000-acre tax map parcel, the remainder of which will remain in agriculture/grazing use. The Proposed Action will not impact the ongoing grazing use on the surrounding lands.

4.1.2.2 OFF-SITE

There will be no long-term change in land use as a result of the off-site improvements. However, there will be temporary disruption to traffic flow that could affect surrounding land uses. Widening and roadwork on Keālia Road will require closure of one lane of traffic on this already narrow road, causing delays and inconvenience for Keālia Town Tract residents. Construction of the roundabout at Keālia Road and Kūhiō Highway, and installation of the sewer main will impact residents on the makai side of the highway. Sewer main installation within this one mile stretch of highway is expected to take approximately 9 months. During this time, traffic flow in the southbound direction will be slowed, and there may be temporary lane closures on Mailihuna Road near its intersection with Kūhiō Highway in order to install the sewer main. Construction work will be limited to non-peak hours. A traffic management plan (TMP) will be developed by the construction contractor and submitted to the State of Hawai'i Department of Transportation (HDOT) for review and approval prior to construction. The TMP will identify traffic control and mitigation measures to be implemented during construction. Traffic issues are discussed further in Section 4.11, Roadways and Transportation. Once the off-site improvements are completed, there will be no adverse impact to adjacent land uses.

4.2 Air Quality

4.2.1 EXISTING CONDITIONS

Air quality at a given location can be influenced by a number of factors, including geography, climate, the quantity and type of pollutants emitted locally and regionally, and the dispersion rates of these pollutants. The dispersion of pollutants is influenced by wind speed and direction, atmospheric stability, temperature, the presence or absence of inversions, and topography. Air quality is affected by both stationary sources (e.g., industrial development) and mobile sources (e.g., motor vehicles). Ambient air quality at the site is good. Portions of the property fronting Kūhiō Highway may be more impacted by vehicle emissions, but to a relatively minor degree. There is little traffic congestion in the area fronting the Petition Area.

The federal Clean Air Act (CAA), which was last amended in 1990, requires the U.S. Environmental Protection Agency (USEPA) to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. NAAQS have been established for six principal pollutants, called "criteria" pollutants: carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O₃), particulate matter smaller than 10 microns (PM₁₀), particulate matter smaller than 2.5 microns (PM_{2.5}), sulfur oxides (SO_x), and lead (Pb). The State of Hawai'i has also established its own standards for these pollutants and for hydrogen sulfide. The State AAQS are more stringent than the National AAQS for certain pollutants.

The table below shows the national and State standards for these pollutants. The "primary" standards have been established to protect the public health. The "secondary" standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the general welfare. The State of Hawai'i issues its ambient air quality standards in terms of a single standard that is designated "to protect public health and welfare and to prevent the significant deterioration of air quality."

Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m³), and micrograms per cubic meter of air (μg/m³).

TABLE 4-1: NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Standard		
	Hawai'i State	Federal Primary (Health)	Federal Secondary (Welfare)
Carbon Monoxide (CO)			
1-hour average	9 ppm	35 ppm	None
8-hour average	4.4 ppm	9 ppm	None
Lead (Pb)			
3-month average	1.5 μg/m ³ (calendar quarter)	0.15 μg/m ³ (running 3-month)	Same as primary
Nitrogen Dioxide (NO₂)			
1-hour average	None	100 ppb	None
Annual average	0.04 ppm	53 ppb	Same as primary
Particulate Matter < 10 microns (PM₁₀)			

Pollutant	Standard		
	Hawai'i State	Federal Primary (Health)	Federal Secondary (Welfare)
24-hour block average	150 µg/m ³	150 µg/m ³	Same as primary
Annual average	50 µg/m ³	None	None
Particulate Matter < 2.5 microns (PM_{2.5})			
24-hour block average	None	35 µg/m ³	Same as primary
Annual average	None	12 µg/m ³	15 µg/m ³
Ozone (O₃)			
8-hour rolling average	0.08 ppm	0.075 ppm	Same as primary
Sulfur Dioxide (SO₂)			
1-hour average	None	75 ppb	None
3-hour block average	0.5 ppm	--	0.5 ppm
24-hour block average	0.14 ppm	None	--
Annual average	0.03 ppm	None	--
Hydrogen Sulfide			
1-hour average	25 ppb	None	None

Source: State of Hawai'i, Department of Health, Clean Air Branch, NAAQS January 2013. URL=
http://health.hawaii.gov/cab/files/2013/05/naaqs_jan_2013.pdf. Accessed 9/2017.

Attainment Status of Study Area

Section 107 of the 1977 Clean Air Act Amendments requires the USEPA to publish a list of geographic areas that are not in compliance with the National AAQS, and these areas are called non-attainment areas. As noted above, the State of Hawai'i is an attainment area for CO, O₃, PM₁₀ and PM_{2.5}.

Monitored Air Quality

The State of Hawai'i Department of Health (DOH) operates a network of air quality monitoring stations at various locations around the State. Each station, however, typically does not monitor the full complement of air quality parameters. The DOH monitoring station closest to the Petition Area is located in the Niumalu residential subdivision in Līhu'e, about 13 miles southeast of Keālia. This station is considered a Special Purpose Monitoring Station established in 2011 to monitor emissions from the cruise ships in Nawiliwili Harbor, approximately 1.0 mile upwind.

The entire Island of Kaua'i, like the rest of the state, meets the NAAQS standards and is within an attainment area. As reported in the Annual Summary of Air Quality Data for 2014 (DOH, 2015) (the latest year for which annual data are available), the pollutants monitored at the Niumalu station were particulate matter less than 2.5 microns (PM_{2.5}), nitrogen dioxide (NO₂), and sulfur dioxide (SO₂). Carbon monoxide (CO) monitoring was shut down as of April 25, 2013. The readings at this location show that criteria pollutant levels were below state and federal ambient air quality standards.

4.2.2 POTENTIAL IMPACTS AND MITIGATION

4.2.2.1 CONSTRUCTION PERIOD

Petition Area

During construction of subdivision improvements, and to a lesser extent during construction of individual homes, there will be short-term, construction-related impacts to air quality. Fugitive dust will be generated by site grading and excavation, and by earthwork involved during construction of the individual homes. Dust control is of particular concern due to the proximity and downwind location of the Keālia Town Tract subdivision.

It is anticipated that the most dust generating activities will be the initial site grading, which will be accomplished in phases and is expected to last about 12 months. The first step in the construction sequence will be the installation of erosion and dust control best management practices (BMP). Grubbing will then be conducted to remove existing vegetation and top soil, followed by mass grading.

The County's Grading Ordinance allows a maximum of 10 acres to be disturbed at any time. Therefore, the 53.4-acre Petition Area would require up to six phases of grading work. The phasing of the grading work will mitigate dust impacts on the adjacent subdivision.

The developer will comply with State DOH Administrative Rules, Title 11, Chapter 60, Air Pollution, which prohibits visible dust emissions at property boundaries. Erosion and dust control BMP will include dust fences, silt fences, mud control at construction entrances, and sediment basins. Dust levels will be monitored at the project boundary fronting the residential area to evaluate the effectiveness of the project dust control program. Other BMPs include watering active work areas, keeping adjacent paved roads clean, and covering open bed trucks.

Because the finished lots will be sold undeveloped, bare areas will be hydro-seeded or mulched to protect exposed soil from wind and water erosion. Similar BMPs will be required for individual lot owners during home construction, and included in the subdivision's Covenants, Conditions and Restrictions (CC&Rs).

The use of construction equipment and vehicles may also lead to temporary increases in airborne pollutants. Exhaust emissions from construction vehicles will be mitigated by moving construction equipment and workers during off-peak traffic hours, ensuring equipment is functioning properly. With these mitigation measures, short term impacts to air quality during construction may be annoying to neighbors, but are not expected to be significant.

Off-Site

During construction of off-site improvements, air quality impacts will be similar to those discussed for the Petition Area, but to a lesser degree. Off-site improvements do not include mass grading and excavation, and will not result in large areas of bare soil as with the subdivision construction. BMPs to protect air quality will be followed, including limiting the area of disturbance, use of water, dust fences, and erosion control measures, per Kaua'i County Code Chapter 22, Article 7.

4.2.2.2 OPERATIONAL PERIOD

Petition Area

The project will create 235 individual residential lots that will be sold and developed by their owners. This will result in more cars and trucks coming to and from the area on a regular basis. Lot purchasers may also utilize other types of equipment and machinery to maintain their property and yards, which generate emissions. As a result, there will be some increase in air pollutants over current conditions. Assuming that each residence has a minimum of two vehicles, there will be an additional 470 cars and trucks traveling to the subdivision daily. Because most of the future homeowners are expected to be local residents already living on Kaua'i, there will not be a net increase in vehicles on the island.

An indirect impact is an increase in emissions associated with the subdivision's electrical power demand and solid waste disposal requirements. However, even under a maximum build out and a worst case scenario, air quality is expected to remain well within both Hawai'i state and national ambient air quality standards. Long-term impacts to air quality would be less than significant.

Various energy saving features could be implemented to reduce energy consumption, including the use of solar water heaters, energy efficient lighting systems, and designing homes to maximize natural light and ventilation. Landscaping can also be used to provide shade and reduce the use of air conditioning.

Off-Site

Once construction is complete and the infrastructure improvements are operational, there will be no long-term air quality impact.

4.3 Noise

During the comment period for the April 2018 DEIS, concerns were raised about the potential impact of roadway noise on the future residential subdivision, due to the Petition Area's proximity to Kūhiō Highway. In response, a noise measurement and evaluation study was prepared by acoustical engineers CENSEO AV+Acoustics (see Appendix J). The purpose of the noise study was to measure the existing noise in the project area, evaluate sound levels with respect to State and local noise regulations, and to provide conceptual approaches to noise mitigation. The findings and recommendations have been incorporated into this section. Newly added text is shown in double underline, and deleted text is shown with strikethrough.

4.3.1 EXISTING CONDITIONS

4.3.1.1 PROJECT LOCATION DESCRIPTION

Petition Area

The area adjacent to the Petition Area on the south is the Keālia Town Tract subdivision, and adjacent lands to the west and north are used for grazing. The Petition Area is currently used for cattle grazing, and the ambient noise environment at the site consists of the sounds of the wind, ocean, and birds, and depending on proximity to major roadways, vehicle traffic from Ka'ao Road, Keālia Road and Kūhiō Highway. In the mauka-most areas of the Petition Area which are further

from existing roadways, ambient noise is low. The eastern (makai) boundary of the Petition Area is located adjacent to Kūhiō Highway, and noise levels are higher in this area.

~~Although no noise measurements were taken at the Petition Area, a 2014 noise assessment for another proposed residential project provides comparable data on ambient highway noise. The Lima Ola Workforce Housing Development is proposed on a 75-acre site in 'Ele'ele, in west Kaua'i. The site is bordered on one side by Kaumuali'i Highway, and surrounded by agricultural fields to the south and west. A 2014 *Environmental Noise Assessment Report for the Lima Ola Workforce Housing Development* in 'Ele'ele, Kaua'i (D.L. Adams Associates, Ltd., 2014) found that project areas adjacent to Kaumuali'i Highway had high ambient noise levels during peak traffic hours, ranging from 50 to 68 dBA (dBA is an "A" weighted decibel, expressing the relatively loudness of sounds in air as perceived by the human ear). In areas of the site far from major roadways, ambient noise levels were relatively low, ranging from 44 to 70 dBA. (D.L. Adams, 2014). It is expected that similar noise conditions exist along the Petition Area's Kūhiō Highway frontage, with lower noise levels further from the highway.~~

Off-Site

Areas proposed for off-site improvements are mostly within or adjacent to the rights-of-way for Keālia Road and Kūhiō Highway. In these areas, traffic noise is the primary noise source.

4.3.1.2 NOISE STANDARDS SOUND REGULATIONS AND GUIDELINES

State of Hawai'i Administrative Rules, Department of Health (DOH)

Various local and federal agencies have established guidelines and standards for assessing environmental noise impacts, and have set noise limits as a function of land use. The State of Hawai'i's Community Noise Control Rule (HAR §11-46) identifies three classes of zoning districts and specifies maximum permissible sound levels due to stationary noise sources. The Community Noise Control Rule also regulates noise related to construction activities. For Class A zoning districts, which include residential uses, maximum levels are 55 dBA (exterior) for day hours (7 AM to 10 PM), and 45 dBA (exterior) for night hours (10 PM to 7 AM).

Federal Highway Administration and Hawai'i Department of Transportation--Traffic Noise Impacts

The eastern boundary of the Petition Area borders Kūhiō Highway, which is a source of traffic noise. The Federal Highway Administration (FHWA) regulation 23 CFR 772 contains highway traffic noise abatement criteria (NAC) for seven land use activity categories and assigns corresponding maximum hourly equivalent sound levels ($L_{eq(h)}$) for traffic noise exposure. The Keālia Mauka subdivision would fall under "Category B," defined as residential and has a corresponding maximum $L_{eq(h)}$ of 67 dBA. These limits are viewed as design goals and all projects meeting these limits are deemed in conformance with FHWA noise standards. Under 23 CFR 772, if the predicted noise level approaches or exceeds the NAC, there is considered to be a "traffic noise impact" (FHWA, 2017).

The State of Hawai'i Department of Transportation (HDOT) has implemented the requirements of the FHWA's design goals for traffic noise exposure in its noise analysis and abatement policy. According to the HDOT policy, a traffic noise impact occurs when the predicted traffic noise levels "approach" or exceed FHWA's NAC or when the predicted traffic noise levels "substantially exceed

the existing noise levels." "Approach" is defined as 1 dB less than FHWA's NAC and "substantially exceed" is defined as an increase of at least 15 dB.

A traffic noise impact requires that noise barriers be constructed if a study finds their construction to be "feasible and reasonable." Feasible and reasonable criteria include that the noise receptor be exposed to sound levels which equal or exceed the NAC for the applicable land use category; that the noise barrier provide a minimum of five (5) decibels of noise level reduction; and that the total cost of noise barrier not exceed \$60,000 per benefitted residence.

Although the Keālia Mauka noise evaluation was not conducted for a highway project and the FHWA/Department of Transportation criteria are not applicable, the criteria can be used as a guideline for assessing noise impacts due to vehicle noise (CENSEO, 2018).

~~The U.S. Environmental Protection Agency (USEPA) has identified a range of yearly day-night equivalent sound levels (Ldn) sufficient to protect public health and welfare from the effects of environmental noise. Ldn is the average equivalent sound level over a 24-hour period, with a penalty added for noise during the night time period. The EPA has established a goal to reduce exterior environmental noise to an Ldn not exceeding 65 dBA and a future goal to further reduce exterior environmental noise to an Ldn not exceeding 55 dBA. These goals are not intended as regulations, but are intended to be viewed as levels below which the general population will not be at risk from any of the identified effects of noise.~~

~~The U.S. Department of Housing and Urban Development (HUD) has noise standards for new residential construction in high noise areas. All sites whose environmental or community noise exposure exceeds the day-night average sound level (Ldn) of 65 Ldn are considered noise-impacted areas. The interior noise standard is 45 Ldn. According to HUD standards, locations with day-night average noise levels above 75 Ldn have "Unacceptable" noise exposure.~~

State DOH Noise Reference Manual, Kaua'i Edition—Construction Noise

The Hawai'i State Department of Health allows construction to occur with the appropriate community noise permits during specific hours. Normal construction equipment are allowed to operate from 7:00 am to 6:00 pm, Monday through Friday and from 9:00 am to 6:00 pm on Saturday. Noisier equipment such as pile drivers, jack hammers and demolition equipment are allowed to operate from 9:00 to 5:30 pm Monday through Friday only.

State DOH, Construction Noise Permits

A Community Noise permit will need to be submitted and approved by the State before construction can begin. Loud construction activities outside of normal construction hours require an approved Community Noise Variance.

Federal Transit Administration, Construction Noise

The State DOH does not quantify allowable construction sound levels. For their acoustical analysis, CENSEO utilized the Federal Transit Administration (FTA) noise limits as "reasonable criteria for assessment" to evaluate property line noise levels. For this project, a 1-hour L_{eq} of 90 dBA is recommended as the maximum daytime construction noise level at the project boundary to the adjacent residential land use properties. Nighttime construction activities are not recommended (CENSEO, 2018).

4.3.1.3 EXISTING AMBIENT SOUND ENVIRONMENT

Ambient noise level measurements were conducted by CENSEO AV+Acoustics to assess the existing environment and to assess potential noise impacts to the subdivision from Kūhiō Highway traffic. Long-term and short-term measurements were conducted over several days in October 2018. Measurement equipment and procedures are described in the Noise Measurement and Evaluation Report in Appendix J.

A total of two (2) long-term noise measurement locations and one (1) short term noise measurement location were selected to gather data on ambient noise conditions at the Petition Area. The primary noise source at all three locations was traffic from Kūhiō Highway. Two of the measurement locations (one short term and one long term) were located adjacent to Kūhiō Highway, and the third was located in the middle of the Petition Area, approximately 940 feet from the highway. The measurement locations are shown in Appendix J (Figure 2 of report).

The metrics used to evaluate the sound level at each site are the equivalent sound level (L_{eq}), 10% exceedance level (L_{10}), 50% exceedance level (L_{50}), and the 90% exceedance level (L_{90}). The L_{eq} is the average sound level over a specified time period, usually one-hour. A one-hour L_{eq} can also be labeled as $L_{eq}(h)$. The L_{90} is the sound level that is less than 90% of the measured sound levels over an hour, and is widely accepted as the standard for determining the background noise level. Likewise, the L_{10} is the sound level exceeded 10% of the time and L_{50} is the sound level exceeded 50% of the time. The L_{10} is a good estimate for the sound level of infrequent events, and the L_{50} is an estimate for the sound level of common events. Note that the L_{50} is not necessarily equal to the L_{eq} .

Long-Term Measurement Results

The following Table 4-2 summarizes the average 24-hour, L_{eq} , L_{10} , L_{50} , L_{90} , and peak one-hour L_{eq} during the long-term measurements. As shown in the table, all sound level measurements were between 44 and 61 dBA, depending on the time of day. The primary noise source was vehicular traffic on Kūhiō Highway. The results show higher noise levels at measurement site L1, which was located on the embankment at the Kūhiō Highway property line. Site L2 was farther from the highway and blocked by a hill.

TABLE 4-2: LONG-TERM NOISE MEASUREMENT RESULTS

<u>Measurement ID</u>	<u>Distance from Hwy</u>	<u>Average 24-Hour L_{eq}</u>	<u>Average 24-Hour L_{10}</u>	<u>Average 24-Hour L_{50}</u>	<u>Average 24-Hour L_{90}</u>	<u>Peak 1-Hour L_{eq}</u>
L1	75 ft.	56 dBA	58 dBA	54 dBA	50 dBA	61 dBA
L2	940 ft.	48 dBA	50 dBA	46 dBA	44 dBA	53 dBA

Source: CENSEO AV + Acoustics, 2018

Short-Term Measurement Results

Traffic noise from Kūhiō Highway was the primary noise source for each short-term measurement. Measurement site S1 was located 130 feet from the centerline of the southbound lane of Kūhiō Highway. The results are shown in Table 4-3 below. A 30-minute traffic count was also performed during this measurement.

TABLE 4-3: SHORT-TERM NOISE MEASUREMENT RESULTS

<u>Measurement ID</u>	<u>Distance from Hwy</u>	<u>1-Hour L_{eq}</u>	<u>1-Hour L₁₀</u>	<u>1-Hour L₅₀</u>	<u>1-Hour L₉₀</u>
S1	130 ft.	58 dBA	61 dBA	57 dBA	51 dBA

Source: CENSEO AV + Acoustics, 2018

4.3.2 POTENTIAL IMPACTS

Noise Generated by Residential Use

In the long term, noise will be generated by the residential uses, people, outdoor mechanical equipment, and by vehicles coming to and from the subdivision. All project activities will comply with the DOH Administrative Rules, Chapter 11-46, Community Noise Control. Noise from stationary mechanical equipment such as air handling equipment and condensing units will be required to meet the maximum permissible noise limits of 55 dBA during the daytime hours and 45 dBA during nighttime hours for single family residential areas.

4.3.2.1 LONG-TERM NOISE IMPACTS

There is the potential for long-term noise impacts on subdivision residents due to traffic on Kūhiō Highway. The Petition Area property line abuts the highway right-of-way (ROW) and the subdivision plan includes a row of 22 lots adjacent to the mauka edge of the highway right-of-way. In the area immediately fronting the Petition Area, the Kūhiō Highway ROW narrows from 140 feet to 100 feet in width. Per County Comprehensive Zoning Ordinance, residential structures must be set back ten feet from a rear property line. With a 100-foot highway ROW, residential structures on these 22 lots would be located 60 feet from the centerline of Kūhiō Highway. If the ROW were widened to 140 feet (as it is for other portions of the highway), structures would be 80 feet from the highway centerline.

Highway noise impact on the 22 residential lots was estimated using HUD's Day/Night Noise Level Electronic Assessment Tool provided by the HUD Environmental Planning Division. This on-line tool calculates Ldn, or noise exposure over a 24-hour period, at an effective distance. The effective distance was set for 80 feet (from the highway centerline), which assumes a "best case" 140-foot highway ROW. Traffic counts were taken from the State of Hawai'i Department of Transportation's 2015 data for the Anahola traffic station on Kūhiō Highway. The HUD model indicated that even at a distance of 80 feet, the day-night average sound level for Kūhiō Highway will exceed 65 Ldn, and be considered a noise-impacted area, requiring attenuation/mitigation. However, the projected day/night noise level is expected to be less than HUD's "unacceptable" level of 75 Ldn.

Noise Evaluation

As discussed above, CENSEO AV+Acoustics collected ambient noise data from three stations in the Petition Area. The sound data was utilized with a computer generated traffic noise model and used to calculate future noise levels for nine "receiver locations" on the makai side of the Petition Area. Receivers T3 through T8 generally reflect the locations of the 22 lots fronting the highway. Receiver T1 is at the location of a more interior lot on the southern end of Petition Area. Receivers T9 and T10 are interior lots on the northern end of the Petition Area. The locations of the receivers are

shown in Appendix J (Figure 9 of the report). Noise levels at these receivers were projected for future year 2027, both without the project and with the project.

TABLE 4-4: PREDICTED TRAFFIC NOISE

<u>Receiver ID</u>	<u>Current Conditions</u>		<u>Future 2027-No Project</u>		<u>Future 2027-With Project</u>	
	<u>AM Peak</u>	<u>PM Peak</u>	<u>AM Peak</u>	<u>PM Peak</u>	<u>AM Peak</u>	<u>PM Peak</u>
T1	<u>64 dBA</u>	<u>63 dBA</u>	<u>65 dBA</u>	<u>65 dBA</u>	<u>63 dBA</u>	<u>64 dBA</u>
T3	<u>70 dBA</u>	<u>70 dBA</u>	<u>71 dBA</u>	<u>71 dBA</u>	<u>67 dBA</u>	<u>68 dBA</u>
T4	<u>71 dBA</u>	<u>71 dBA</u>	<u>72 dBA</u>	<u>72 dBA</u>	<u>66 dBA</u>	<u>68 dBA</u>
T5	<u>71 dBA</u>	<u>71 dBA</u>	<u>72 dBA</u>	<u>72 dBA</u>	<u>67 dBA</u>	<u>69 dBA</u>
T6	<u>71 dBA</u>	<u>70 dBA</u>	<u>71 dBA</u>	<u>71 dBA</u>	<u>68 dBA</u>	<u>70 dBA</u>
T7	<u>65 dBA</u>	<u>65 dBA</u>	<u>66 dBA</u>	<u>66 dBA</u>	<u>69 dBA</u>	<u>70 dBA</u>
T8	<u>67 dBA</u>	<u>67 dBA</u>	<u>68 dBA</u>	<u>68 dBA</u>	<u>70 dBA</u>	<u>71 dBA</u>
T9	<u>52 dBA</u>	<u>52 dBA</u>	<u>53 dBA</u>	<u>53 dBA</u>	<u>62 dBA</u>	<u>62 dBA</u>
T10	<u>50 dBA</u>	<u>51 dBA</u>	<u>51 dBA</u>	<u>52 dBA</u>	<u>59 dBA</u>	<u>59 dBA</u>

Source: CENSEO AV + Acoustics, 2018

As shown in Table 4-4, estimated noise levels at the receiver locations in future year 2027 without the project are projected to be one (1) dB louder than current traffic noise levels. With the Keālia Mauka project, noise levels will be between 6 dB less and 9 dB greater than the noise levels without the project. This wide variance between with and without project is due to anticipated changes in the topography of the Petition Area. Estimated future site topography was obtained from the Preliminary Engineering Report (Kodani & Associates, 2017, Appendix G). The post-construction topography will affect the relative elevations of both vehicular noise sources on Kūhiō Highway and the future residential locations in the Petition Area (CENSEO, 2018).

Either with or without the project, the noise model shows that future traffic noise will approach or exceed 67 dB, the HDOT Noise Abatement Criteria for residential land uses. "Approach" is defined as 1 dB below the 67 dB threshold. If this were a highway project, the first row of residences along the eastern (makai) property line would be considered to be impacted by traffic noise. The CENSEO study recommended that noise mitigation be considered for any new residences fronting the highway. Recommended mitigation includes either four-foot tall earthen berms or noise barrier walls at the makai property line.

Table 4-5 below illustrates the effect of noise mitigation. The model shows that receiver locations 3 through 8, all located along the makai property line, will be impacted by traffic noise. By implementing a 4-foot tall berm or barrier wall adjacent to Kūhiō Highway, sufficient noise attenuation will be provided for the sound levels to be within the HDOT NAC residential use threshold. The study noted that the berm or barrier wall would follow the elevation of Kūhiō Highway rather than the elevation of the project site, and the barrier would only be necessary where properties are adjacent to Kūhiō Highway and not at detention basins.

TABLE 4-5: TRAFFIC NOISE MODELING WITH MITIGATION

<u>Receiver ID</u>	<u>Future 2027-with Project</u>		<u>Exceeds 66 dBA noise limit?</u>	<u>Future 2027-With Project</u>	
	<u>No Mitigation</u>	<u>AM Peak</u>		<u>PM Peak</u>	<u>With 4' tall Noise Berm/Barrier</u>
T1	63 dBA	63 dBA	No	60 dBA	60 dBA
T3	67 dBA	67 dBA	Yes	61 dBA	62 dBA
T4	66 dBA	66 dBA	Yes	59 dBA	60 dBA
T5	67 dBA	67 dBA	Yes	61 dBA	61 dBA
T6	68dBA	68 dBA	Yes	61 dBA	61 dBA
T7	69 dBA	69 dBA	Yes	62 dBA	63 dBA
T8	70 dBA	70 dBA	Yes	65 dBA	66 dBA
T9	62 dBA	62 dBA	No	61 dBA	61 dBA
T10	59 dBA	59 dBA	No	58 dBA	58 dBA

Source: CENSEO AV + Acoustics, 2018

4.3.2.2 CONSTRUCTION-RELATED NOISE

Short term impacts will be associated with the construction of subdivision infrastructure including excavation, grading, and construction of roadways, utilities, drainage, etc. These activities will generate construction-related noise that may affect surrounding land uses. Actual noise levels will depend on the methods employed during each stage of the construction process. The surrounding use most impacted by construction noise will be the adjacent Ka'ao Road subdivision. In particular, the three homes along Hopoe Road which face the Petition Area will be most impacted.

Petition Area

During the construction of the subdivision, there will be impacts on noise sensitive uses in the surrounding area, specifically the nearby residences on Ka'ao Road and Hopoe Road. The CENSEO study noted that construction noise levels at the residences can vary significantly, depending on the types and quantity of equipment used, equipment distance from the residence, and ground type. Worst-case construction noise levels were estimated to determine if noise will exceed the recommended 90 dBA threshold at the nearest residences.

The study noted that on-site construction will occur in three general phases: 1) earthwork, 2) utility installation, and 3) paving. The majority of construction work will consist of excavation and general earthwork, which will involve the use of equipment such as backhoes, bulldozers, vibratory compactors, graders, and trucks. Installation of roads and utilities will use backhoes, compactors, trucks and pavers. Construction of the two detention basins at the north and south ends of the Petition Area will require earthwork only.

The County's Grading Ordinance allows a maximum of 10 acres to be disturbed at any time. The phasing of construction will mitigate noise impacts on the adjacent subdivision by limiting the number of vehicles. Although many vehicles may be working in the project area at once, noise impacts to the existing homes will be dominated by the few vehicles working near the project boundary. It is assumed that construction vehicles will be spaced somewhat evenly throughout the project area, and only a maximum of three (3) vehicles will be working near a residential property line at any one time (CENSEO, 2018).

Table 4-6 below shows predicted construction noise levels at six receiver sites, for the various construction phases. Overall sound levels are shown in A-weighted decibels. Existing residential lots were used as the receiver sites for the noise model. Receiver R1 is a residence on Hopoe Road. Receivers R2 through R5 are residential lots on Ka'ao Road, along the boundary with the Petition Area. Receiver R6 is a residence on Kamalii Street, on the opposite (makai) side of Kūhiō Highway. The locations of the receivers are shown in the CENSEO study in Appendix J (Figure 1 of the report).

TABLE 4-6: PREDICTED CONSTRUCTION NOISE LEVELS AT NEARBY RESIDENCES

<u>Noise-Sensitive Receiver</u>	<u>Distance from Residence to Construction</u>	<u>Earthwork Phase Noise Level</u>	<u>Utility Phase Noise Level</u>	<u>Paving Phase Noise Level</u>
R1	25 ft.	97 dBA	94 dBA	91 dBA
R2	40 ft.	93 dBA	90 dBA	77 dBA
R3	35 ft.	94 dBA	91 dBA	82 dBA
R4	40 ft.	93 dBA	90 dBA	71 dBA
R5	30 ft.	96 dBA	92 dBA	68 dBA
R6	200 ft.	77 dBA	74 dBA	70 dBA

Source: CENSEO AV + Acoustics, 2018

According to CENSEO, the earthwork phase is the main noise concern. Construction noise during the earthwork phase is expected to exceed 90dBA when vehicles are within 55 feet of a residence. Utility installation noise is expected to exceed 90 dBA when vehicles are within 40 feet of a residence. Paving noise is expected to exceed 90 dBA when vehicles are within 45 feet of a residence.

During construction, earth moving equipment, e.g., bulldozers and diesel powered trucks, will likely be the loudest equipment used. In cases where construction noise is expected to exceed the Department of Health (DOH) "maximum permissible" levels at the property line, a permit will be obtained from the DOH to allow the operation of construction equipment. Additional noise mitigation such as temporary noise barriers, and limitations on work hours/days will be employed as required by DOH.

Once the roads and utilities are complete, the lots will be sold and built out by the individual lot owners. Build out of the subdivision is expected to continue over a number of years, and noise will not be continuous at any one location. However, it is difficult to predict exactly when construction

of the homes, and thus construction noise will occur. Noise impacts on the Ka'ao Road homeowners will be mitigated by the presence of the detention basin/green space buffer located along the back of the Ka'ao Road lots. There will be no green space buffer for the residences on Hopoe Road, therefore they will be impacted more when homes are constructed near them. Early occupants of the subdivision may be impacted by noise as their future neighbors build their homes. In general, residents will be most affected when construction is occurring on adjacent or nearby lots, particularly upwind.

Off-Site

The construction of off-site infrastructure (i.e., outside the Petition Area), includes improvements to Keālia Road, construction of the roundabout, and installation of the sewer main extension on Kūhiō Highway. This off-site work will generate similar construction noise, associated with earthwork, utility installation and paving. Earthwork and paving along the upper portion of Keālia Road is likely to impact homeowners on Ka'ao Road. Construction of the roundabout at Kūhiō Highway and the installation of the sewer main are not expected to have an adverse impact on nearby residences.

4.3.3 MITIGATION

4.3.3.1 GENERAL SOUND MITIGATION METHODS AND TECHNIQUES

General sound mitigation methods and techniques for traffic noise include earthen berms and barrier walls. Construction noise and vibration can be mitigated with proper planning and/or various types of barriers. Each of these conceptual approaches is discussed below.

Earthen Berms

Earthen berms are mounds of earth running between the noise source and receiver, and typically constructed at a maximum 2:1 slope. Attenuation of up to 15 dBA can be achieved with earthen berms if they are constructed several feet higher than the line of sight between the source and receiver. Because earthen berms deflect sound upwards rather than horizontally, no additional sound is reflected to the opposite side of the noise source area. However, because of the amount of land required to achieve an effective height, earthen berms are not always practical to implement.

Barrier Walls

As with earthen berms, barrier walls must interrupt the pathway of the noise between source and receiver in order to be effective. Noise attenuation can be up to 15 dBA if the wall is several feet higher than the line-of-sight between the noise source and receiver. Barrier walls must be continuous and solid, without any holes, gaps or openings, and have a minimum density of 4 pounds per square foot (psf). They may be constructed of wood, masonry, or precast concrete. Acoustically absorptive and weather resistant material should be installed on the wall surface facing the noise source in order to reduce sound energy reflections.

The appropriate type of noise mitigation along Kūhiō Highway will be determined during the subdivision approval process, and subsequent design process.

Potential Highway Noise Mitigation

~~Noise mitigation is required for the 22 impacted lots along Kūhiō Highway. Even with a 140 foot ROW, these homes will be adversely affected by highway noise. Some areas along the property boundary have existing vegetation and berms, which could provide some degree of noise mitigation, but not enough to reduce noise to acceptable levels. Potential noise mitigation may include:~~

- ~~Highway sound barriers/walls along Kūhiō Highway~~

~~Effective mitigation to reduce interior noise includes:~~

- ~~air conditioning instead of natural ventilation~~
- ~~double glazed windows and sound proofed exterior walls~~
- ~~acoustically softening interior spaces by thick carpeting with padding, acoustical tile ceiling, louvered closet doors, etc.~~

~~Other mitigation that may be considered could be to set back the 22 lots further from the highway, or completely relocate these lots to a less impacted area.~~

Construction Noise Mitigation

Construction noise is expected to impact residences within 55 feet during periods of construction work. To keep noise levels below the recommended 90 dBA threshold, construction crews should refrain from using loud equipment within 55 feet of a residence. If that is unavoidable, noise impacts can be reduced by utilizing equipment intermittently or by blocking the line-of-sight between noise sources and noise-sensitive receivers with sound-absorbing barriers, material stockpiles, or other mitigation measures. Vehicle should be spread out over the project area and not all work close to the property line simultaneously. Particularly noisy tasks and those in close proximity to the existing residences should be separated throughout the work schedule when possible. Construction work must be done during approved construction hours unless a noise variance is approved.

A commonly used noise barrier is continuous plywood barriers. However, a potential sound reflection path off the plywood barrier in the opposite direction should be considered. If barrier-reflected noise is an issue, quilted mass-loaded vinyl barriers are an effective noise mitigation option (CENSEO, 2018).

The specific noise mitigation measures will be developed by the construction contractor(s) for both on and off-site improvements. Noise variance(s), if required, will be obtained by the contractor prior to construction.

Construction Vibration Mitigation

If vibration from the vibratory compactor is disturbing to nearby residents and generating neighborhood complaints, these vibration inducing activities should be scheduled for the middle of the day when the fewest number of residents are likely to be home.

4.3.3.2 MITIGATION CONCLUSIONS AND RECOMMENDATIONS

During the construction period, construction noise may impact existing residences adjacent to the Petition Area and the upper portions of Keālia Road. Construction crews should refrain from using loud equipment within 55 feet of existing residences. If that is unavoidable, steps should be taken to mitigate noise impacts with noise barriers, sound-absorbing barriers, or other design construction mitigation measure. Limiting the number of construction vehicles operating near existing residences and the duration of those operations are also effective mitigation strategies.

Traffic noise from Kūhiō Highway is the primary noise source affecting the Petition Area. Traffic noise is expected to impact future Keālia Mauka residents closest to the highway. Berms or barrier walls should be constructed along Kūhiō Highway at the eastern (makai) property line, except along the detention basin areas.

4.4 Archaeological and Historic Resources

The April 2018 DEIS presented the findings of a 2017 Archaeological Literature Review and Field Inspection (LRFI) for the Petition Area prepared by Cultural Surveys Hawai'i (CSH). In February 2018, the LUC submitted this LRFI to the State Historic Preservation Division (SHPD) and requested confirmation that the Petition Area had been reasonably addressed in accordance with HRS Chapter 6E-8. At the time of the DEIS publication, a response from SHPD was still pending.

Subsequent to publication of the DEIS, the SHPD requested that a “supplemental Archaeological Inventory Survey (AIS)” be conducted to further record and evaluate associated features of New Kumukumu Camp. The resulting AIS report, completed by CSH (June 2019), is included in this FEIS as Appendix D2. The AIS report also addressed the off-site areas where infrastructure improvements are proposed (i.e., Keālia Road, Keālia Road-Kūhiō Highway intersection, and route of sewer main extension). The AIS findings are presented in Section 4.4.4 below. SHPD provided a comment letter on the Draft Final AIS on June 10, 2019 (Log No. 2019.00892, Doc No. 1906DB01). Acceptance of the AIS by SHPD is pending.

4.4.1 EXISTING CONDITIONS

An archaeological Literature Review and Field Inspection (LRFI) for the proposed Keālia subdivision (*i.e.*, Petition Area) was prepared by Cultural Surveys Hawai'i (CSH) in 2018 (see Appendix D1). The Area of Potential Effect (APE) and inspection area encompassed the entire Petition Area. The LRFI included historical, cultural and archaeological background research and a field inspection to identify existing resources in the Petition Area and determine the likelihood that they may be affected by the project.

The 2018 LRFI summarized all previous archeological research and historic properties identified in the Keālia *ahupua'a*. The studies included several investigations conducted in 2007 (Drennan and Dega) of a 2,008-acre property that included the current Petition Area. A summary of all previous archeological investigations is provided in the LRFI. The following provides an overview of the LRFI findings and recommendations.

4.4.1.1 BACKGROUND SUMMARY AND PREDICTIVE MODEL

The Keālia Mauka Petition Area is located in the *ahupua'a* of Keālia in the ancient district of Puna, one of five ancient districts on Kaua'i. Legends, traditional accounts and *wahi pana* (celebrated places) point to an area rich in pre-Contact history, although much less than that of nearby Wailua. Historic records list a number of *heiau* (temples, non-Christian places of worship) in Keālia. This suggests that Keālia, as well as the Kapa'a *ahupua'a*, were probably more politically significant in ancient times. The specific locations of most of these *heiau* are unknown. According to historic documents, the plateau areas north of Keālia Valley were sparsely inhabited with areas bordering Kumukumu and Hōmaikawa'a Streams hosting the largest settlements.

The earliest successful economic enterprise by a Westerner in the *ahupua'a* was the Krull Ranch and Dairy, which operated in the Kumukumu area in the 1860s. In 1877, the Makee Sugar Plantation was established. The Makee Plantation built a mill and landing at Kapa'a as part of the plantation infrastructure. Following the move of the Kapa'a mill to Keālia in 1885, a railroad was built from Makee Landing to Keālia with another railroad arm leading into the mauka regions of Kapa'a.

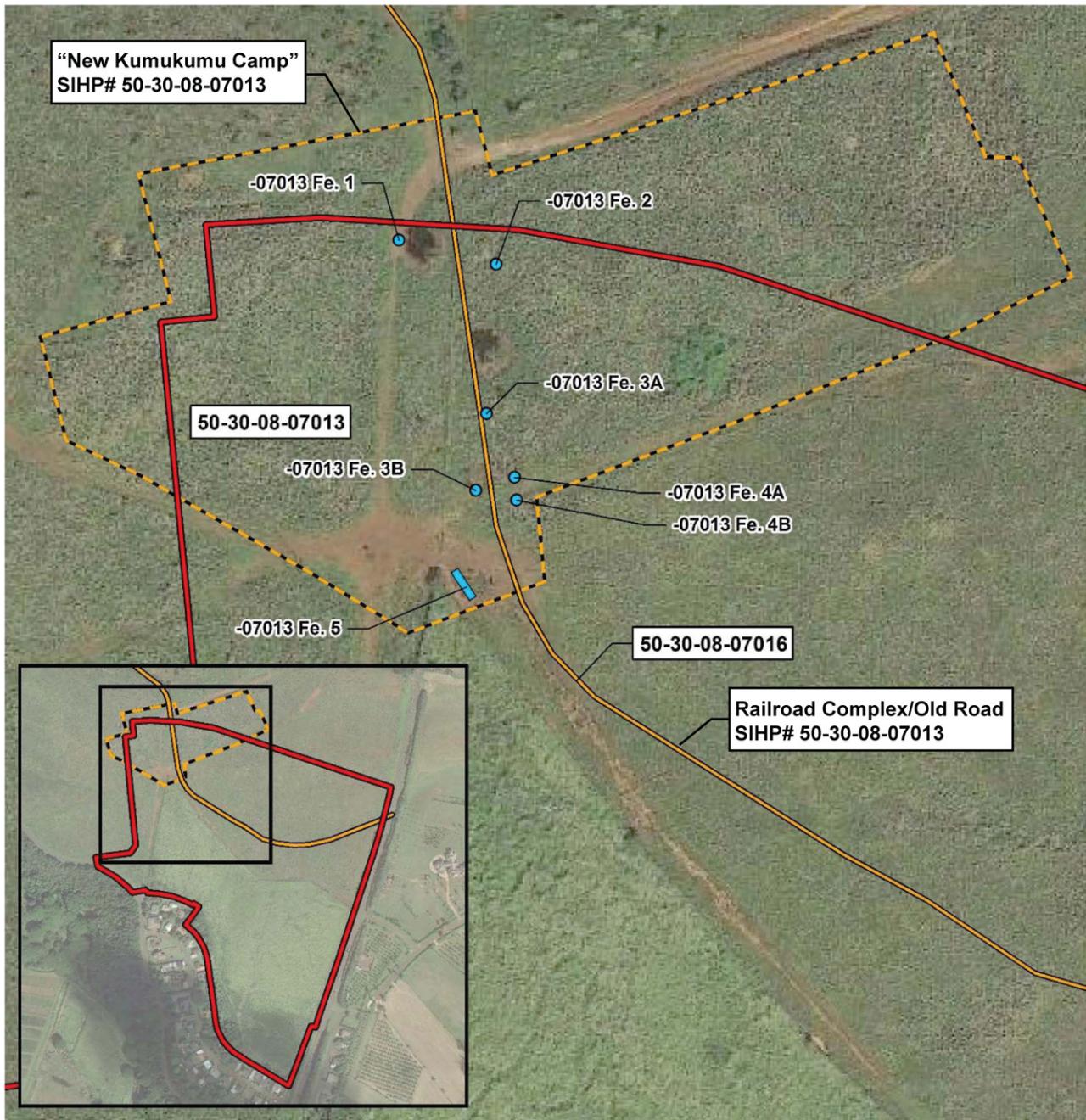
The Makee Sugar Plantation, operating out of Keālia, attracted hundreds of immigrant workers, first the Portuguese and Japanese and later, Filipinos. Keālia town sprang up around these immigrant groups. In addition, there were several plantation camps in Keālia, including in the plateau lands of Kumukumu and Hōmaikawa'a. Commercial sugarcane cultivation and milling initiated in the mid-to late 1800s was a primary factor in the changes in settlement patterns in the Keālia area. Housing patterns were based on plantation camps of mainly immigrant laborers. A pre-contact subsistence economy was replaced by the market-based economy. Transportation became mechanized, with rail lines from the fields to the mills, and to new landings.

The demise of sugar in the late 20th century occurred concurrently with an increase in tourism and a service-oriented economy. Plantation-era transportation routes were abandoned or were incorporated into present transportation infrastructure. The LRFI notes that modern construction activities in coastal Keālia, however, continue to unearth evidence of pre-Contact, early historic, and plantation era activities (Cultural Surveys Hawai'i, 2017).

4.4.1.2 PREVIOUSLY IDENTIFIED HISTORIC SITES

The LRFI noted that based on background research, the Keālia Mauka Petition Area was part of an area under sugarcane cultivation between the late nineteenth century and 2000. Previous archaeological studies in the *ahupua'a* have identified numerous archaeological sites around the Petition Area, many associated with post-contact agricultural use. Within the current Petition Area, there are two previously identified historic sites: "New Kumukumu Camp" (State Inventory of Historic Places (SIHP) # 50-30-08-07013) and an old road/railroad complex (SIHP #50-30-08-07016). The locations of these sites is shown in Figure 4-1. The two sites were evaluated during Phase I of a four phase *Archaeological Inventory Survey (AIS)* in the Keālia Ahupua'a (Drennan et al. 2006).

The Drennan et al. AIS recommended no further archaeological work for the two historic properties (-07013 and -07016). That AIS was reviewed and accepted by the State Historic Preservation Division (SHPD) in an April 12, 2007 review. The recommendation for no further work may also be reasonably understood to be accepted by the SHPD.



Legend

Petition Area

Historic Property (prev. identified)

SIHP #07016

SIHP #07013

Historic Property

Newly Identified Feature

Base Map: Google Earth Aerial Imagery (2013)
Data Sources: CSH



Source: Cultural Surveys Hawai'i, Inc., 2018

Historic Features Within The Petition Area

Keālia Mauka Homesites

Final Environmental Impact Statement

Kealia Properties, LLC

Figure 4-1

4.4.1.3 RESULTS OF 2017 FIELD WORK

Field work for the 2018 LRFI was conducted in 2017 and focused on the area of the proposed subdivision (Petition Area). The study characterized the Petition Area as consisting of relatively level areas along the western portion and gentle to moderate slope areas to the east. The pedestrian survey was accomplished through systematic sweeps spaced 10 to 15 meters apart due to the low vegetation.

Historic properties observed within the northwest corner of the project area are features associated with the "New Kumukumu Camp" (SIHP # 50-30-08-07013). A total of five newly identified features of New Kumukumu Camp within the Petition Area were given feature numbers (SIHP # 50-30-08-07013 Features 1 through 5), as shown in Table 4-7 below. The features are associated with the plantation as seen in previous archaeological studies as well as the similar style of construction associated with water control in sugar plantation systems on Kaua'i. The features also include material composition in construction such as basalt boulders and mortar, a name inscribed concrete slab and the polygonal cross section of the concrete power/communication cable poles.

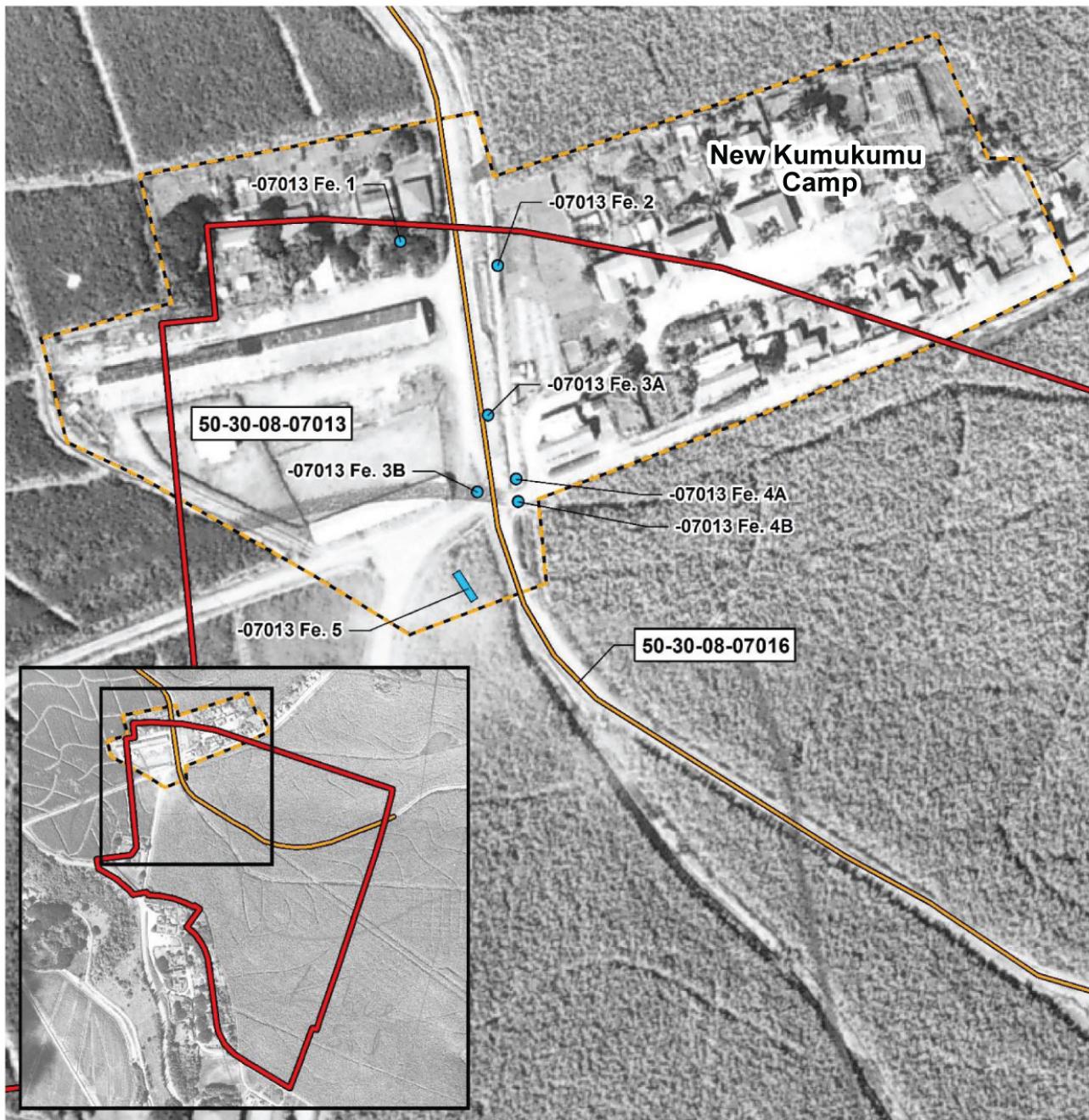
The 1950 aerial photograph in Figure 4-7 shows a portion of the New Kumukumu Camp with the location of the newly identified features. During the current inspection, SIHP #-07016 could not be re-identified.

TABLE 4-7: HISTORIC FEATURES OF NEW KUMUKUMU CAMP (SIHP #50-30-08-07013)

SIHP #	Feature Type	Function	Age	Notes
50-30-08-07013 Feature 1	Alignment	Transportation	Plantation era	Abandoned
50-30-08-07013 Feature 2	Concrete slab	Indeterminate	Plantation era	Abandoned
50-30-08-07013 Features 3A and 3B	Concrete posts	Communication	Plantation era	Abandoned
50-30-08-07013 Features 4A and 4B	Culverts	Water Control	Plantation era	Abandoned
50-30-08-07013 Feature 5	Concrete	Indeterminate	Plantation era	Abandoned

Source: Cultural Surveys Hawai'i, 2017 and 2018

Drennan and Dega (2007) assessed SIHP #50-30-08-07013 as significant under Criterion D [per CSH, meant to reference Criterion d pursuant to HRS Chapter 6E]. The CSH AIS concurs with this significance assessment, and evaluates the newly documented features as significant under Criterion d also.



Base Map: 1950 Kealia Coast Aerial Photograph (UH SOEST)
Data Sources: CSH



Source: Cultural Surveys Hawai'i, Inc., 2018

1950 Aerial Photo Showing Historic Features

Keālia Mauka Homesites

Final Environmental Impact Statement

Kealia Properties, LLC

Figure 4-2

The following are descriptions of the newly identified features, which are thought to be features of the New Kumukumu Camp's irrigation, communication and transport system. Photographs of the features are included in the LRFI (Appendix D1).

SIHP #50-30-08-07013, Feature 1, Alignment. This feature is a remnant alignment of concrete, brick, and metal that measures 2.1 m in length by 0.30 m in width and runs in a rough north/south direction. The alignment is in extremely poor condition and the function of the historic property could not be determined. It parallels a dirt road currently in use.

SIHP #50-30-08-07013, Feature 2, Unknown. This feature is a concrete slab measuring 1.49 m in length by 0.42 m in width with a thickness of 0.36 m. The concrete slab was observed along a gently sloping area. Due to its present condition and lack of other information including figures, the formal type and function of this slab is unknown.

SIHP #50-30-08-07013, Feature 3, Posts. This feature consists of two concrete posts (Features 3A and 3B) measuring approximately 30 feet high. Feature 3A is square-shaped and measures 0.20 cm by 0.20 m. The base of the post is thicker at the bottom and tapers at the top. Feature 3B is an octagon-shaped concrete post measuring 0.25 m in radius.

SIHP #50-30-08-07013, Feature-4, Culverts. This feature consists of two remnant culverts (Features 4A and 4B) constructed of basalt and mortar. Feature 3A is located to the north and measures 3.5 m by 3.5 m with a depth of 0.83 m along the north face. Feature 4A is in extremely poor condition. Feature 4B measures 4.1 m in length (in an east/west direction) by 3.2 m in width (in a north/south direction) and walls measuring from 0.22 m to 0.37 m thick. Feature 4B appears to have been at one time a four-way culvert. Sluice gate slots were observed as well as a single culvert opening on the west side. The opening measures 0.43 m wide by 0.26 m high.

SIHP #50-30-08-07013, Feature 5, Foundation. This feature consists of a large rectangular-shaped concrete slab measuring 10.0 m by 2.45 m with heights from 0.0 m at the northwest corner to 0.43 m at the central-east area. The thickness of the slab varies from 0.12 m to 0.20 m. On the southeast corner of CSH-5, the name "GOMES" was observed. The function of the slab is indeterminate but is understood as related to plantation activities.

4.4.2 POTENTIAL IMPACTS AND MITIGATION

4.4.2.1 SIGNIFICANCE ASSESSMENT

The five features of a previously designated historic property, "New Kumukumu Camp" (SIHP #50-30-08-07013), were identified within the current Petition Area and were evaluated for significance according to the broad criteria established by HAR §13-284-6. The five significance criteria are:

- a. Be associated with events that have made an important contribution to the broad patterns of our history;
- b. Be associated with the lives of persons important in our past;
- c. Embody the distinctive characteristics of a type, period, or method of construction, represents the work of a master, or possesses high artistic value;
- d. Have yielded, or is likely to yield information important for research on prehistory or history;

- e. Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once carried out, or still carried out, at the property or due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity.

SIHP #50-30-08-07013, remnants of a former plantation camp, is assessed as significant under Criterion d (have yielded, or is likely to yield information important for research on prehistory or history). This reflects its value to our understanding of plantation era infrastructure. Water control was essential for sugarcane cultivation, as evidenced by the fact that water was transferred from as far away as Hanalei (Wilcox 1996:70). Communication within the plantation was also important. This is consistent with the significance assessment in Drennan and Dega (2007:110-111) that concluded that SIHP # -07013 was significant under Criterion d (only) of the Hawai'i State Register of Historic Places.

4.4.2.2 SUMMARY AND RECOMMENDATIONS

The 2017 CSH inspection of the Petition Area identified five historic features that are associated with previously designated SIHP # 50-30-08-07013. The newly identified features consist of basalt and mortar culverts, concrete posts, and concrete slabs. Due to its inclusion in, or close proximity to previous archaeological studies, the features identified during the current investigation most likely date to the early twentieth century and are part of the Keālia and Līhu'e Plantations' irrigation, communication, and transport system.

The Proposed Action, development of the Keālia Mauka Homesites, will require demolition of the five newly identified site features. As such, the Proposed Action may have an adverse effect on the plantation era infrastructure features of SIHP # 50-30-08-07013. The April 2018 LRFI supported the recommendation of Drennan and Dega 2007 for no additional archaeological work at this historic property. No additional archaeological work is was recommended for the Petition Area (CSH, 2018). The LRFI recommended consultation with SHPD to gain clarity regarding State requirements prior to the Proposed Action. This recommended consultation was conducted as discussed in Section 4.4.3 below.

~~In a letter dated February 27, 2018, the State of Hawai'i Land Use Commission, the EIS accepting agency, notified the SHPD of the Proposed Action and the Petitioner's request for a Land Use District Boundary Amendment. The LUC requested confirmation from SHPD that the entire Petition Area has been reasonably addressed in the prior AIS which recommended no further work or mitigation. A response from SHPD is pending.~~

4.4.3 CHAPTER 6E-8 HISTORIC PRESERVATION REVIEW

~~On February 27, 2018, the State of Hawai'i Land Use Commission sent a letter to the SHPD notifying them of the Proposed Action and the Petitioner's request for a Land Use District Boundary Amendment. The LUC requested confirmation from SHPD that the entire Petition Area has been reasonably addressed in the prior Drennan and Dega AIS, and that the requirements of Hawai'i Revised Statutes Section 6E have been met. At the time the DEIS was published in April 2018, a response from SHPD was still pending.~~

~~In letters to Daniel E. Orodener, Executive Officer, Land Use Commission dated May 29, 2018 (Log No. 2018.00602, Doc. No. 1805GC09) and October 3, 2018 (Log. No. 2018.00602, Doc. No. 1810DB01) the SHPD provided comments regarding 1) the Petition for Land use District Boundary~~

amendment and 2) confirmation that the proposed Petition Area has been reasonably addressed in the prior AIS and that the requirements of HRS Section 6E have been met. The SHPD letters, as well as LUC's original February 27, 2018 letter, are included in Appendix D1. The October 3, 2018 letter states:

"Based on the information provided, the SHPD's comments are as follows:

1) SHPD has no objection to the Petition for Land Use District Boundary Amendment to reclassify approximately 53.361 acres of land from agricultural district to urban district.

2) SHPD requests an AIS and Archaeological Monitoring Plan (AMP) be completed for the current Project Area.

SHPD's request for a supplemental AIS is based on the results of the Kamai and Hammatt (2017) field inspection, which indicates that the prior AIS studies did not adequately document all surface historic properties. Subsurface testing was not conducted within the footprint of the proposed residential development. Additionally, it remains unclear whether all historic roads have been adequately identified and inventoried.

The AIS shall be conducted by a qualified archaeologist in order to adequately identify and document any archaeological historic properties that may be present, to assess their significance, to determine the potential impacts of this project on any identified archaeological historic properties, and to identify and ensure appropriate mitigation is implemented, if needed.

SHPD has agreed to the supplemental AIS strategy provided by the project proponent and contracted archaeological firm and to their proposed initiation of the AIS on September 4, 2018. This includes the understanding that no subsurface testing will be required based on documentation provided in the Kamai and Hammatt (2017) Literature Review and Field Inspection report. In addition, SHPD has agreed that an Archaeological Monitoring Plan (AMP) shall be created and approved prior to the start of project work by the project proponent.

SHPD shall notify the LUC when the AIS is accepted and the LUC permit may be issued."

4.4.4 ARCHAEOLOGICAL INVENTORY SURVEY (AIS) REPORT (2019)

As requested in SHPD's October 3, 2018 letter to the LUC, an archaeological inventory survey (AIS) was conducted for the project and the AIS report (CSH, April 2019) is included as Appendix D2. The AIS included further recording of associated features of New Kumukumu Camp (SIHP #-07013), and evaluation of their significance and integrity. In addition to New Kumukumu Camp in the Petition Area, off-site project areas were also evaluated.

Inventory fieldwork consisted of a 100 percent pedestrian survey of the Petition Area, the sewer line corridor along Keālia Road to Kūhiō Highway, then proceeding along Kūhiō Highway south to a proposed connection point to the existing County sewer system. The AIS covered a total of 74.7 acres, including the 53.4 acre Petition Area and another 21.3 acres that included the areas where off-site improvements are proposed. No excavations were conducted, no cultural materials or middens were collected during this AIS, and no laboratory work was conducted.

Prior to the AIS, consultation was conducted with SHPD on 26 September 2018 and 2 October 2018 to facilitate the conditions under which the AIS was conducted. Consultation with the public was not undertaken as part of the AIS. (Note: Public outreach and interviews were conducted as part of a separate Cultural Impact Assessment (CIA), see Section 4.5, Cultural Resources, and Appendix E).

The June 2019 AIS Report incorporates review comments from SHPD provided on June 10, 2019 (Log No. 2019.00892, Doc N. 1906DB01). A summary of the SHPD review comments and documentation of all correspondence with SHPD is provided in Appendix D3.

4.4.4.1 HISTORIC PROPERTIES

Archaeological inventory survey field work was conducted in the Petition area, as well as two off-site areas: the Keālia Road section between the Petition Area and Kūhiō Highway, and the Kūhiō Highway section where the sewer main extension will be installed.

Petition Area

Within the Petition Area, the AIS recorded and evaluated the features of the razed New Kumukumu Camp (SIHP # 50-30-08-07013, Features 1 through 5) to AIS level standards of documentation. The railroad path (SIHP #50-30-08-07016 Feature 1) previously identified by Drennan and Dega within the Petition Area could not be re-located during the AIS fieldwork.

Off-Site Areas

Within the off-site areas, one newly identified historic property was Keālia Road itself, extending from the Petition Area down to Kūhiō Highway, and an associated large basalt boulder and mortar backslope retaining wall, Feature A, along a section of the road (temporary site numbers CSH 5 and CSH 5A, respectively).

Field work for the AIS included the re-location and further documentation as appropriate of four previously identified surface historic properties in the sewer line section of the Project Area. These four properties are SIHP # 50-30-08-07015-a short remnant of railroad tracks located at the intersection of Keālia Road and Kūhiō Highway; SIHP # 50-30-08-07021 Features 5 and 6-a box culvert for drainage with a large steel pipe alongside, near the makai and south end of Keālia Road; SIHP # 50-30-08-2278-the Kapa'a Stream Bridge (soon to be replaced by the Hawai'i Department of Transportation); and SIHP # 50-30-08-2279-a water control complex consisting of an earthen ditch (Feature A) and the remnant of a culvert (Feature B).

Previously-identified historic properties that were not re-located during this survey include: SIHP # 50-30-08-7016-a railroad complex that was deconstructed in the 1950s; # 50-30-08-7034-concrete steps that were removed during the KIUC Keālia Beach corridor transmission line reconfiguration project; and # 50-30-08-0735, staircase.

Additionally, there are seven subsurface, previously-identified historic properties that are located in the off-site (sewer line) project areas. These subsurface properties were not confirmed in the field during the surface survey. Their locations and descriptions are derived from previous archaeological studies. The sites include SIHP # 50-30-08-0884-Burial site; SIHP # 50-30-0884 (duplicate number)-buried A-horizon; SIHP #50-30-08-2161-Burial site; SIHP # 50-30-08-2162-Burial site and cultural midden; SIHP # 50-30-08-2163- fire-pit feature; SIHP # 50-30-08-2165-traditional Hawaiian cultural deposit; and SIHP # 50-30-08-2279 Feature B, water control.

The historic properties and associated features within the Petition Area and off-site project areas are listed in Table 4-8 below, and their locations are shown in Figure 4-3.

TABLE 4-8: HISTORIC PROPERTIES IDENTIFIED WITHIN THE PETITION AREA AND OFF-SITE PROJECT AREAS

<u>SHIP # 50-30-08-</u> <u>XXX</u>	<u>Site Type</u>	<u>Function</u>	<u>Age</u>	<u>Notes</u>	<u>Significance Assess</u> <u>-ment*</u>	<u>Mitigation Recommendation</u>
PETITION AREA						
<u>7013</u> <u>New Kumukumu</u> <u>Camp, Feature 1</u>	<u>Alignment</u>	<u>Transportation</u>	<u>Plantation era</u>	<u>Abandoned</u>	<u>d</u>	<u>No further work</u> <u>(Kamai & Hammatt 2017)</u>
<u>7013</u> <u>New Kumukumu</u> <u>Camp, Feature 2</u>	<u>Concrete slab</u>	<u>Indeterminate</u>	<u>Plantation era</u>	<u>Abandoned</u>	<u>d</u>	<u>No further work</u> <u>(Kamai & Hammatt 2017)</u>
<u>7013</u> <u>New Kumukumu</u> <u>Camp, Features 3A and 3B</u>	<u>Concrete posts</u>	<u>Communication</u>	<u>Plantation era</u>	<u>Abandoned</u>	<u>d</u>	<u>No further work</u> <u>(Kamai & Hammatt 2017)</u>
<u>7013</u> <u>New Kumukumu</u> <u>Camp, Features 4A and 4B</u>	<u>Culverts</u>	<u>Water Control</u>	<u>Plantation era</u>	<u>Abandoned</u>	<u>d</u>	<u>No further work</u> <u>(Kamai & Hammatt 2017)</u>
<u>7013</u> <u>New Kumukumu</u> <u>Camp, Feature 5</u>	<u>Concrete</u>	<u>Indeterminate</u>	<u>Plantation era</u>	<u>Abandoned</u>	<u>d</u>	<u>No further work</u> <u>(Kamai & Hammatt 2017)</u>
<u>07016</u>	<u>Railroad path</u>	<u>Former Sugar cane rail transport</u>	<u>Plantation era</u>	<u>Deconstructed, not re-located in 2017/ 2018</u>	<u>n/a</u>	<u>n/a</u>
OFF-SITE PROJECT AREAS						
<u>Surface features</u>						
<u>7015</u>	<u>Train track remnant</u> <u>(Keālia Rd-Kūhiō Hwy intersection)</u>	<u>Transportation</u>	<u>Plantation era</u>	<u>Remnant</u>	<u>d</u>	<u>No further work</u> <u>(Kamai & Hammatt 2017)</u>
<u>7021</u>	<u>Box Culvert/Pipe</u>	<u>Transportation/Water control</u>	<u>Plantation era</u>	<u>In use</u>	<u>d</u>	<u>No further work</u> <u>(Kamai & Hammatt 2017)</u>
<u>CSH 5A</u>	<u>Retaining wall, Keālia Road</u>	<u>Backslope retention</u>	<u>Historic</u>	<u>In use</u>	<u>d</u>	<u>No further work</u> <u>(Kamai & Hammatt 2017)</u>

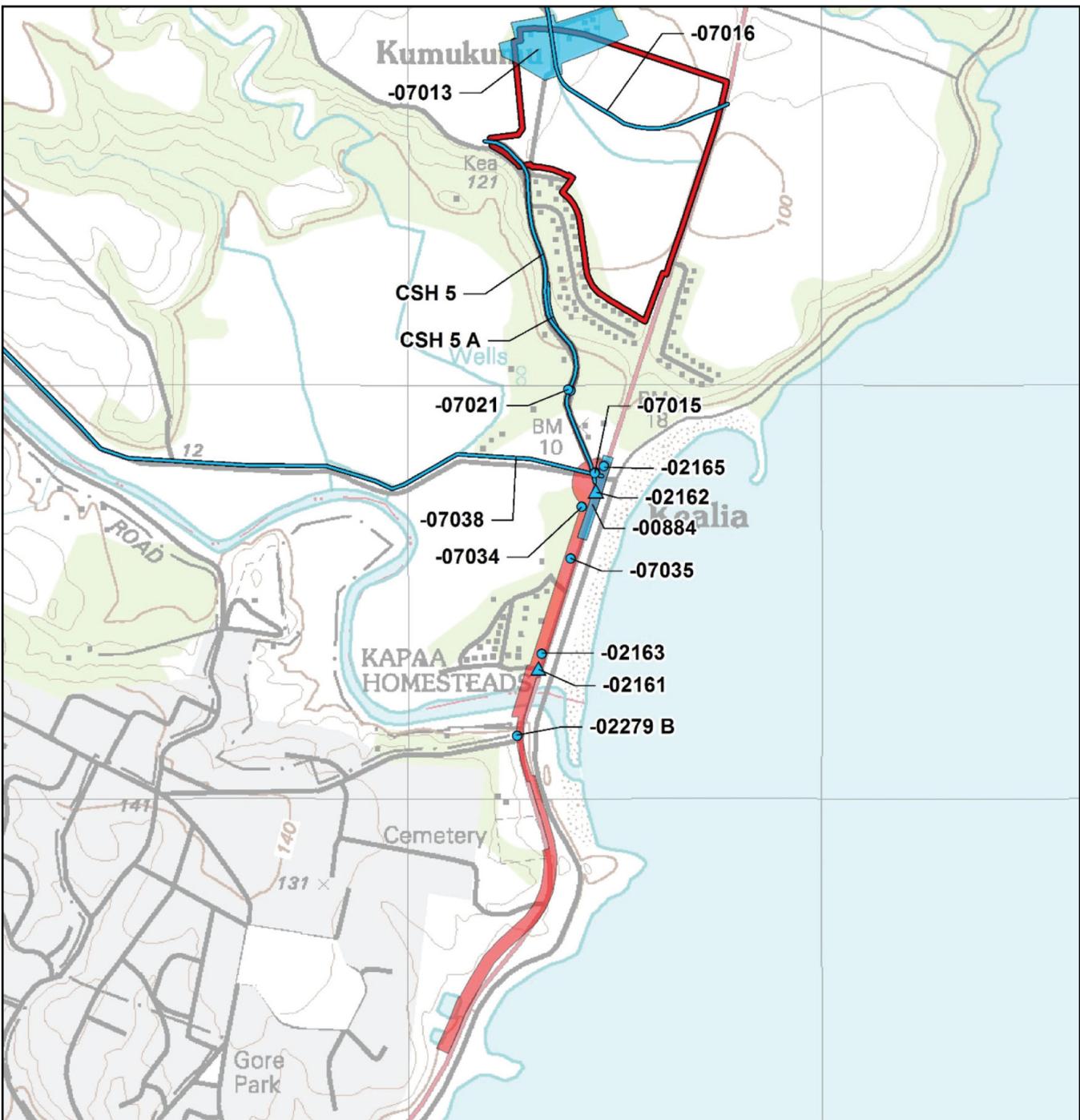
<u>SIHP # 50-30-08- XXXX</u>	<u>Site Type</u>	<u>Function</u>	<u>Age</u>	<u>Notes</u>	<u>Signifi- cance Assess- ment*</u>	<u>Mitigation Recommendation</u>
<u>CSH 5</u>	<u>Road</u>	<u>Keālia Road, vehicular corridor</u>	<u>Historic</u>	<u>In use</u>	<u>d</u>	<u>No further work (Kamai & Hammatt 2017)</u>
<u>2278</u>	<u>Bridge</u>	<u>Transportation/ Kapa'a Stream bridge crossing</u>	<u>Historic</u>	<u>In use, deteriorated and planned for replace- ment</u>	<u>d</u>	<u>No further work (Belluomini et al. 2016)</u>
<u>2279 Feature A and Feature B</u>	<u>Complex</u>	<u>Water control</u>	<u>Historic</u>	<u>Roadside ditch (A) and drain (B)</u>	<u>d</u>	<u>Monitoring (Belluomini et al. 2016)</u>
<u>7034</u>	<u>Concrete steps</u>	<u>Stair</u>	<u>Plantation era</u>	<u>Destroyed.</u>	<u>n/a</u>	<u>n/a</u>
<u>7035</u>	<u>Staircase</u>	<u>Habitation</u>	<u>Historic</u>	<u>Not re- located</u>	<u>n/a</u>	<u>n/a</u>

Subsurface features

<u>0884</u>	<u>Burial site</u>	<u>Pre-Contact human remains</u>	<u>Pre- Contact</u>	<u>Inadvertent find</u>	<u>d, e</u>	<u>Preservation (Bushnell et al. 2003): consultation</u>
<u>0844</u>	<u>Cultural layer,</u>	<u>Habitation</u>	<u>Pre- Contact</u>	<u>Buried A- horizon</u>	<u>d</u>	<u>Full-time monitoring (Dega & Powell 2003; Sholin et al. 2012)</u>
<u>2161</u>	<u>Human Skeletal remains</u>	<u>Secondary deposition of human bone fragments</u>	<u>unknown</u>	<u>Secondary deposition of bone fragments</u>	<u>d, e</u>	<u>Monitoring (Sholin et al. 2012)</u>
<u>2162</u>	<u>Burial site and cultural midden</u>	<u>Human burial and habitation</u>	<u>Pre or post- Contact</u>	<u>Poor and fragmented buried A- horizon</u>	<u>d, e</u>	<u>Monitoring (Sholin et al. 2012)</u>
<u>2163</u>	<u>Fire pit</u>	<u>Habitation</u>	<u>Pre- Contact</u>	<u>Poor condition</u>	<u>d</u>	<u>Monitoring (Sholin et al. 2012)</u>
<u>2165</u>	<u>Cultural deposit</u>	<u>Habitation</u>	<u>Pre- Contact</u>	<u>Good condition</u>	<u>d</u>	<u>Monitoring (Sholin et al. 2012)</u>

Source: Cultural Surveys Hawai‘i, 2019

***Significance assessment d:** *Have yielded, or is likely to yield information important for research on prehistory or history.* **Significance assessment e:** *Have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with cultural practices once or still carried out.*



Legend

- | | |
|-------------------------------------|-------------------|
| Kealia Subdivision AIS Project Area | Historic Property |
| Project Area Addition | Burial Site |

Base Map: USGS Topographic Map, Kapaa (1996) Quadrangle
 Data Sources: CSH



Source: Cultural Surveys Hawai'i, Inc., 2019

Historic Properties Within Petition Area and Off-Site Area

Keālia Mauka Homesites

Final Environmental Impact Statement

Kealia Properties, LLC

Figure 4-3

4.4.4.2 SIGNIFICANCE ASSESSMENTS

Historic property significance assessment is shown in the last column of Table 4-8. As noted previously, historic property significance is evaluated and assessed based on the five State of Hawai'i historic property significance criteria (see Section 4.4.4.2 above). Table 4-8 identifies the mitigation recommendations for the sites.

All previously-identified historic properties in the Petition Area and off-site project areas are assessed as significant under Criterion d (have yielded or is likely to yield, information important for research on prehistory or history). The newly-identified historic property CSH 5 (Feature A), Keālia Road, is also assessed significant under Criterion d. All three burials sites (SIHP # 50-30-08-084; # -2161; and #-2162) along the route of the proposed sewer line also meet significance Criterion e, due to the identification of human remains.

Petition Area

As noted above in Section 4.4.2.1, the features of SIHP #50-30-08-07013 (New Kumukumu Camp) are assessed as significant under Criterion d, (have yielded, or is likely to yield information important for research on prehistory or history) of the Hawai'i Register of Historic Places.

Off-Site Areas

Outside the Petition Area, SIHP # 50-30-08-07015, train track remnant, is assessed as significant under Criterion d. Site CSH 5 (Keālia Road) provides evidence of Makee Sugar Company's 1910 and 1926 railroad that conveyed sugar cane from the fields in Kapa'a and Keālia across the Keālia railroad bridge to the mill, and was later utilized by Lihue Plantation in late 1930s. SIHP # -07015 is a portion of the track.

SIHP # 50-30-08-07021 Features 5 and 6 (box culvert/pipe) are assessed as significant under Criterion d of HAR §13-275-6(b)(4) (Have yielded information important for research on prehistory or history). This reflects its value to our understanding of plantation era infrastructure. Water is essential for life and water control was essential for not only sugarcane cultivation but also as a means to transport water to residential houses of former plantation workers. Pedestrian and vehicular transportation was also important.

4.4.4.3 EFFECT RECOMMENDATION

In accordance with Hawai'i State historic preservation review legislation, HAR §13-275-7 the project's effect recommendation is "effect, with proposed mitigation commitments."

4.4.4.4 MITIGATION RECOMMENDATIONS

Pursuant to HAR §13-284-8 (private projects), the Petitioner agrees that mitigation for the effect of the project on historic properties will consist of archaeological monitoring in accordance with an archaeological monitoring plan (AMP). The AMP will be submitted for review and acceptance by SHPD prior to any site work and construction.

The AMP will provide for on-site monitoring at two locations agreed upon by the Petitioner. One location is within the northwest corner of the Petition Area, at the location of SIHP # -07013-New Kumukumu Camp. The second location is on the proposed sewer line corridor from the vicinity of SIHP # -7021 in the north to the south terminus at the County sewer hookup in Kapa'a.

Archaeological monitoring will be carried out in accordance with the AMP. The AMP shall be reviewed and accepted by the SHPD prior to ground-disturbing activities.

4.4.4.5 SHPD REVIEW AND ACCEPTANCE OF AIS

On April 17, 2019, the LUC submitted a Draft AIS report to SHPD for review and acceptance. A copy of the LUC transmittal letter is included in Appendix D2 and D3. The LUC requested SHPD concurrence with the project's effect on historic properties with a determination of "effect with agreed upon mitigation commitments, pursuant to HRS Chapter 6E-42 and HAR 13-284-7.

In a letter dated June 10, 2019 (Log No. 2019.00892, Doc No. 1906DB01), the SHPD requested several revisions to the Draft AIS report. The revisions were completed and the AIS was resubmitted to SHPD on June 25, 2019. The SHPD concurrence with the determination is pending.

4.5 Cultural Resources

During the DEIS comment period, a request was made that the Cultural Impact Assessment (CIA) include an expanded discussion of Keālia's plantation history from the 1950s through the 1970s. Additional research and interviews were conducted and the CIA was revised to include this information. The revised CIA also addressed the areas where off-site improvements are proposed. The new information is referenced below in Section 4.5.1 (Existing Conditions) and Section 4.5.2.4 (Analysis). The revised CIA (March 2019) is included as Appendix E of this FEIS.

4.5.1 EXISTING CONDITIONS

4.5.1.1 DOCUMENT PURPOSE AND BACKGROUND

A Cultural Impact Assessment (CIA) for the project was conducted by Cultural Surveys Hawai‘i (CSH) (CSH, 2018) and is included as Appendix E. The CIA was prepared to comply with the State of Hawai‘i’s environmental review process under Hawai‘i Revised Statutes (HRS) §343, which requires consideration of the proposed project’s potential effect on cultural beliefs, practices, and resources. Act 50, Sessions Laws of Hawai‘i 2000, amended Chapter 343 HRS to require that environmental impact statements assess the effects of a proposed action on the cultural practices of the community and State, and acknowledged the State’s responsibility to protect native Hawaiian cultural practices.

Through document research and ongoing cultural consultation efforts, this report provides information pertinent to the assessment of the Proposed Action’s impacts to cultural practices and resources (per the *Office of Environmental Quality Control’s Guidelines for Assessing Cultural Impacts*), which may include Traditional Cultural Properties (TCP) of ongoing cultural significance that may be eligible for inclusion on the State Register of Historic Places. The document is intended to support the project’s environmental review and may also serve to support the project’s historic preservation review under HRS §6E-42 and I Administrative Rules (HAR) §13-284.

Native Hawaiian Rights

In *Ka Pa‘akai O Ka ‘Aina v. Land Use Commission*, 94 Hawai‘i 31, 74, 7 P.3d 1068, 1084 (2000), the Hawai‘i Supreme Court held the following analysis be conducted:

- (1) The identity and scope of valued cultural, historical, or natural resources in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area;
- (2) The extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action; and
- (3) The feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights if they are found to exist.

Under the Ka Pa'akai case, the required analysis shall end upon the determination that there are no known traditional and customary Native Hawaiian rights exercised in the 53.4-acre project area. The CIA makes a good faith effort to identify the nature and scope of valued cultural, historical, or natural resources in the project area; determine the extent to which these resources will be affected or impaired by the Proposed Action; and recommend feasible action, if any, to be taken by the Land Use Commission (LUC) to reasonably protect Native Hawaiian rights if they are found to exist.

Community Consultations

As part of the CIA, Hawaiian organizations, agencies and community members were contacted in order to identify potentially knowledgeable individuals with cultural expertise and/or knowledge of the Petition Area and the vicinity. Outreach was initiated in April 2017 through letters, email, telephone calls and in-person contact. CSH attempted to contact 41 individuals and agencies. The organizations consulted included the State Historic Preservation Division (SHPD), the Office of Hawaiian Affairs (OHA), the Kaua'i/Ni'ihau Island Burial Council (KNIBC), Kaua'i Historic Preservation Review Commission, Kapule Hawaiian Civic Club, and Kaua'i Council of Hawaiian Civic Clubs, and community members in the Kawaihau District. Four individuals agreed to be interviewed and share their *mana'o* (thoughts, opinions) and *'ike* (knowledge) about the Petition Area and the Keālia *ahupua'a*.

In July 2018, CSH reinitiated community consultation in response to comments made during the DEIS public comment period. During the comment period, concerns were raised about the documentation of Keālia's plantation history during the 1950's, 1960s and 1970s. Commenters noted that no one from Keālia Town Tract was interviewed, and suggested that there be more information on the history and culture of immigrant groups, settlement patterns, New Kumukumu Camp, and important plantation structure such as the Keālia Dispensary.

In response, CSH reached out to several individuals recommended by the Wailua-Kapa'a Neighborhood Association, and additional individuals known to have once been affiliated with Lihu'e Plantation. The additional outreach was completed in October 2018, and the information was incorporated into the CIA (Appendix E), which includes a summary of all consultations and interviews.

In November 2018, CSH was asked to address the project's off-site improvements (Keālia Road improvements, roundabout, sewer line extension) in addition to the Petition Area improvements. Consultation was reinitiated to notify the community of these additional project areas. Because the proposed sewer line extension extends into the adjacent Kapa'a *ahupua'a*, the consultation effort was expanded to reach out to 64 individuals and organizations from this *ahupua'a*. Comments were received from two additional individuals and are included in the CIA.

4.5.1.2 RESULTS OF BACKGROUND RESEARCH AND COMMUNITY CONSULTATION

The background research for the CIA summarized both pre- and post-contact land uses within the Keālia *ahupua'a*, as described previously in Section 4.4. The CIA (see Appendix E) includes an extensive traditional and historical account of Keālia, covering the periods of pre-contact to the early 1800s; mid to late 1800s and the Māhele; and the 1900s. The revised (October 2018) CIA also expanded the discussion of traditional cultural practices, with a new section on the gathering of plant and food resources and a discussion of religious practice and burials.

The explosive growth of the sugar industry within Keālia (as well as the rest of East Kaua'i) starting in the mid to late 1800's, led to the development of a small town comprised mainly of sugar plantation workers, many of whom were immigrants from Portugal, Puerto Rico, the Philippines, Japan, and China (Kaua'i Historical Society n.d.). The revised CIA includes a detailed description of Keālia Town in the late 1900s, and its "unique culture and identity during the 1940s, 1950s, 1960s and 1970s," which the reports notes "was laid during the early days of the sugar industry."

However, the decline of sugar also marked the end of Keālia Town. The CIA notes that "although recollections of Keālia in the 1940's, 1950s, and 1960s recall a vibrant multi-ethnic community, population numbers within the community were steadily declining for nearly 30 years." The town slowly dispersed after the incorporation of the Makee Sugar Company into the Lihue Plantation in the 1930s. Many of the plantation workers bought property of their own and moved out of plantation camps. The plantation camps that bordered Kūhiō Highway were disbanded in the 1980s. In 1997, the entire *ahupua'a* of Keālia was sold off as an effort to downsize Amfac's landholdings and because Keālia is the most distant from the Lihue Plantation sugar mill, it was considered the least profitable (Honolulu Advertiser, 7 July 1997). The Līhu'e Plantation completely folded at the end of the twentieth century.

As discussed in Section 4.4 above, previous archaeological studies identified two historic properties within the boundaries of the current Petition Area: "New Kumukumu Camp" (State Inventory of Historic Places (SIHP) # 50-30-08-07013) and an old road/railroad complex (SIHP #50-30-08-07016). Five new features were identified during a 2017 archaeological field inventory.

4.5.2 POTENTIAL IMPACTS AND MITIGATION

4.5.2.1 KA PA'AKAI V. LAND USE COMMISSION ANALYSIS

Based on its findings, the CIA evaluated the Proposed Action using the three required components of the Hawai'i Supreme Court's Ka Pa'akai v. Land Use Commission ruling. In evaluating the first criteria of the Ka Pa'akai analysis ("the identity and scope of valued cultural, historical, or natural resources in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area") the CIA found there are no known traditional and customary Native Hawaiian rights exercised in the Petition Area. Under Ka Pa'akai, the required analysis ends after the determination that there are no known traditional and customary Native Hawaiian rights in the Petition Area.

Although the Ka Pa'akai analysis is complete, the CIA's community consultations revealed concerns about cultural and non-cultural impacts outside of the Petition Area. The CIA categorized these into "non-culturally relevant" and "culturally relevant" community concerns. They are discussed further in the CIA and summarized below.

4.5.2.2 NON-CULTURALLY RELEVANT COMMUNITY CONCERNS AND RECOMMENDATIONS

Integrity of Hala'ula Reservoir

A concern expressed during the CIA consultation was the integrity of the Hala'ula Reservoir located mauka of the current Petition Area. Comparisons were drawn to the Kaloko Dam catastrophe, and a request was made by one informant that efforts be made to prevent a similar tragedy from occurring within Keālia.

Discussion: As discussed in Section 3.5.1.5 of this DEIS, the privately-owned Hala'ula Reservoir, as well as other mauka dams, are regulated by the State Department of Land and Natural Resources Dam Safety Program. The Dam Safety Program maintains a data base of the dam characteristics and physical conditions. The Petition Area is not within the State-designated dam evacuation zone, the area where the public would be evacuated in the event of a potential or actual dam failure. The Petition Area is not in an at risk area in the event of a potential dam breach. As required by law, Keālia Properties LLC, as the dam/reservoir owner, maintains the dam structures to required standards and has prepared an emergency response plan for use by State and County emergency management agencies.

Chemicals and Pesticides in Petition Area Soils

One CIA informant expressed a concern about the presence of chemical fertilizers and pesticides within the soil. As former sugar cane lands, chemicals once utilized for this industry may be present within Petition Area soils.

Discussion: As discussed in Section 4.8 of this ~~Draft~~ FEIS, prior agricultural activity in the Petition Area creates the potential for the presence of hazardous substances in the soil which present unacceptable health risks to future residents, especially children. A Phase I Environmental Site Assessment (ESA) was conducted for the Petition Area (Appendix K), and indicates that this is considered a historical “recognized environmental condition (REC).” As recommended by the Hawai‘i Department of Health and in accordance with State policies, soil testing will be conducted in areas of the Petition Area proposed for residential or recreational use. If identified, contaminated soils and materials will be handled, transported, stored, disposed of and/or remediated in place to levels appropriate for residential use.

Lack of Studies on Local Infrastructure and Roadways

One informant expressed concern regarding the lack of studies on the integrity of local infrastructure and roadways, and whether infrastructure can support the proposed subdivision population.

Discussion: A Traffic Impact Analysis Report (TIAR) was conducted for the proposed Keālia Mauka Homesites project to evaluate the project’s impact and recommend mitigation. This is discussed in Section 4.11 of this EIS. Infrastructure studies were conducted and are discussed in Section 4.10.

Need for Corrosion Resistant Sewer Line

One CIA informant noted the location of the proposed sewer line near the coast and mentioned the need for a corrosion resistant material to avoid deterioration of the sewer line.

Discussion: The proposed eight-inch sewer line will be constructed of PVC or other corrosion-resistant material.

4.5.2.3 CULTURALLY RELEVANT COMMUNITY CONCERNS AND RECOMMENDATIONS

Potential for Subsurface Cultural Deposits, Including *Iwi Kūpuna*

Despite the lack of ongoing traditional cultural practices and above ground cultural sites, several individuals expressed concerns that subsurface cultural deposits (i.e., *iwi kūpuna, imu, pōhaku*) may be impacted by the Proposed Action.

Discussion: The CIA notes that although the Keālia *Ahupua'a* has a rich cultural history, evidence of pre-contact settlement and land use has largely been obliterated by historic era sugar planting activities. The Petition Area has been highly disturbed through decades of mechanized and intensive agriculture-related activity. Background research indicates that the area was heavily plowed in the historic era, typically to depths of 18 to 24 inches. Due to this disturbance, the likelihood of encountering subsurface cultural deposits (i.e., *iwi kūpuna, imu, pōhaku*) remains low. No burials or traditional cultural material have yet been encountered within the Petition Area.

Although the likelihood of finds remains low, project construction workers will be informed of the possibility of inadvertent cultural finds, including human remains during a preconstruction meeting. Personnel will be educated on the types of cultural materials that may be encountered during ground disturbance. In the event that any potential historic properties are identified, all activity in the area will cease and the State Historic Preservation Division will be notified pursuant to HAR §13-280-3. In the event that *iwi kūpuna* are identified, all earth moving activities in the area will stop, the area will be cordoned off, and the SHPD and Police Department will be notified pursuant to HAR §13-300-40. Remains will be reinterred in accordance with an agreed upon burial treatment plan.

Potential Impact to Groundwater Resources

One individual interviewed for the CIA expressed concern about the potential impacts to groundwater resources and the aquifer. Specifically, this individual suggested that the Proposed Action could impact a natural spring feeding his taro *lo'i*, which is located in Keahapana Valley, approximately one mile southeast of the Petition Area.

Discussion: During the preparation of the CIA, the cultural researcher was not able to gain access to the property to verify the location of the *lo'i* or its water source. Subsequently a hydrogeologist was hired to further evaluate this issue. The findings were discussed in Section 3.4 (Water Resources) of this DEIS, and the hydrogeologist's letter report is included as Appendix I. The report states that the source of water for this particular *lo'i* is estimated to be about 200 yards from the *lo'i* at a higher elevation. It is either a spring source, as represented by the cultural informant, or is the discharge from the still active plantation irrigation system on the land immediately above.

If the water source is an actual spring at that elevation, it would be a discharge of perched groundwater with no hydrologic connection to the groundwater pumped by the wells supplying

~~Keālia Mauka. The water use by the proposed subdivision would have no impact on the discharge rate of such a spring. If the *lo‘i*’s water supply is from the plantation irrigation system, it is a surface water source, and increased pumping of groundwater for Keālia Mauka would have no impact on its flowrate (TNWRE, 2018, see Appendix I). In either case, the Proposed Action will have no impact on the water source used by the cultural informant.~~

Discussion: Following publication of the DEIS, hydrogeologist Tom Nance (TNWRE) conducted a follow up field investigation of the *lo‘i* water source in September 2019. During that visit, he was able to access the site and confirmed that the irrigation source for the *lo‘i* is a small perennial stream, not a true spring. Due to the stream’s location, its elevation and manner of its source of supply, Mr. Nance concluded there is no possibility that use of the Keālia wells would impact the flow in the stream. This issue is discussed in Section 3.4.2.3 of this FEIS, and the updated TNWRE letter report is included as Appendix I.

As discussed in Section 3.4, the Petitioner’s water service agreement with Keālia Water Company allocates more than enough water to accommodate the subdivision’s needs. The project’s water demand is also well below the State-approved pump capacity for these two wells. No adverse impacts to the groundwater aquifer is anticipated.

Access Rights to Cultural Resources throughout the Keālia *Ahupua‘a*

The CIA indicates that the community expressed a concern about access rights to cultural resources located throughout the Keālia *ahupua‘a*. A letter submitted to CSH stated that should the subject site be developed “rights to access the parcel for the exercise of traditional and customary rights will be extinguished.” However, CSH noted that the letter did not state whether the property is currently accessed for traditional and customary rights nor did it describe the nature of this activity. The letter did state that that “our primary concern is about preserving access to the land and resources in Keālia that our descendants will need...Most of these resources may occur outside the area proposed to develop.”

Discussion: The CIA stated that based on information gathered from the cultural and historical background studies and the community consultation, no culturally significant resources were identified within the Petition Area.

Potential to Encounter Burials near Proposed Roundabout

Two informants discussed the potential to encounter burials near the proposed roundabout at the intersection of Keālia Road and Kūhiō Highway. The presence of subsurface cultural deposits and documented burials in the area was noted. One informant commented that burials will most likely be encountered during ground disturbing activities.

Discussion: Section 4.4.4 of this FEIS discusses the findings of the Archaeological Inventory Survey (AIS), and includes a discussion of previously identified historic properties located along the sewer line corridor. The AIS recommends mitigation in the form of archaeological monitoring during ground disturbing activities in this area. The monitoring will be conducted in accordance with an archaeological monitoring plan (AMP), which will be reviewed and approved by SHPD.

Concern about Proximity of Sewer Line Extension to Saint Catherine's Church

A CIA informant expressed concern about the proximity of the sewer line extension to Saint Catherine's cemetery and potential to enter this private property. She also expressed concern about project-related construction blocking access to the cemetery from Kūhiō Highway.

Discussion: The sewer line extension will be located entirely within the Kūhiō Highway right-of-way, and will not impact Saint Catherine's cemetery. During construction, vehicle access to the cemetery will be maintained.

4.5.2.4 ANALYSIS

The revised (October 2018) CIA includes an expanded Analysis section summarizing its findings and recommendations. Those findings and recommendations are summarized here. As noted above, no culturally significant resources were identified within the current project area. At present, there is no documentation nor testimony indicating that traditional or customary native Hawaiian rights are currently being exercised "for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778" (Hawai'i State Constitution, Article XII, Section 7) within the current project area. Additionally, no traditional cultural practices are known to currently occur within the project area.

While no cultural resources, practices, or beliefs were identified as currently existing, the Keālia ahupua'a has a rich cultural history. The Keālia ahupua'a was "home to a large, settled population of farmers and fishermen, who exploited the coastal areas abundant natural resources, as well as the land that contained nutrient rich soil immediately inland and mauka (upland) from the coasts" (Drennen et al., 2007).

Evidence of pre-contact settlement and land use, however, has most likely been obliterated by historic-era sugar plantation activities. The post-contact period brought numerous changes throughout the Hawaiian Islands. By the early twentieth century, the entire makai half of the Keālia ahupua'a was covered in sugarcane, and dominated by plantation infrastructure. Traditional sites and resources were most likely altered or removed entirely to make way for the sugar industry. Combined with these landscape changes were changes to Keālia's racial and ethnic demographics. The importation of immigrant workers by the plantations led to the development of a small, diverse plantation town in Keālia. Currently, some descendants of Keālia's plantation workers still reside within the neighboring Keālia Town Tract.

4.5.2.5 RECOMMENDATIONS

The CIA included the following recommendations:

1. The proposed project may have an adverse effect on SIHP #'s -7013 and -7016, historic properties related to sugarcane plantation operations. Consultation with SHPD is recommended to determine if additional archaeological work is required.
2. Construction workers and other personnel involved in construction must be informed of the possibility of inadvertent cultural finds, including human remains during a preconstruction meeting. Personnel should be educated on the types of cultural material that may be encountered during ground disturbance.

3. In the event that potential historic properties are identified during construction, all activities will cease and the SHPD will be notified.
4. In the event that *iwi kupuna* and/or cultural finds are encountered during construction, project proponents should consult with cultural and lineal descendants of the area to develop a reinterment and/or preservation plan. Reinterment sites must be located within Keālia *ahupua'a*.
5. Although analysis places water well within pump capacity approved by the DLNR Commission on Water Resource Management, it is recommended that a hydrogeologist investigate this situation, and results included in Final EIS.

Discussion: In response to Recommendation #1, Section 6E-8 consultation with SHPD was conducted and an AIS report prepared by CSH. Documentation of the consultation is included in Appendix D1 and Appendix D3. The AIS report is included as Appendix D2. Recommendations #2, #3 and #4 will be followed.

In response to Recommendation #5 and as noted above, a follow up investigation was conducted by hydrogeologist Tom Nance and confirmed that the irrigation source for the *lo'i* is a small perennial stream. Due to the stream's location, its elevation and manner of its source of supply, there is no possibility that use of the Keālia wells would impact the flow in the stream. This issue is discussed in Section 3.4.2.3 of this FEIS, and the TNWRE letter report is included as Appendix I.

4.5.2.6 AHA MOKU ADVISORY COMMITTEE

Act 288, Session Laws of Hawai'i (SLH) 2012, Relating to Native Hawaiians, formally recognized the aha moku system and established the Aha Moku Advisory Committee (AMAC) within the State of Hawai'i Department of Land and Natural Resources. The purpose of the eight-member AMAC is to serve in an advisory capacity on issues related to land and natural resource management, through the aha moku system. This is a system of best practices that is based on the indigenous resource management practices of moku (regional) boundaries, which acknowledge the natural contours of land, the specific resources located within those areas, and the methodology necessary to sustain resources and the community.

In June 2019, at the request of LUC staff, the CIA was sent to the AMAC for their review and comment. Documentation of correspondence is included with the CIA in Appendix E.

4.6 Visual and Scenic Resources

4.6.1 EXISTING CONDITIONS

4.6.1.1 PETITION AREA

In the Petition Area vicinity, public views from Kūhiō Highway include the open pasture lands in the mauka areas to the northwest and southwest. In the far distance, there are views of Mt. Kalalea and the Nounou mountain range to the southwest, and the Keālia Forest Reserve to the northwest. Although Kūhiō Highway closely parallels the coastline north of Kapa'a Town, offering shoreline views, past Keālia Road, the shoreline jogs to the east, and Kūhiō Highway continues its northerly route.

The Petition Area is located on the west (mauka) side of Kūhiō Highway, just north of the intersection with Keālia Road. The Petition Area is at an elevation of about 100 feet, slightly above the elevation of the highway. In this area, there are no coastal views. The view looking makai from the highway is of the manicured landscape of the oceanfront Keālia Kai subdivision.

The Keālia Mauka Petition Area slopes gently upward from Kūhiō Highway toward the mountains, reaching an elevation of about 125 feet at its mauka boundary. From Kūhiō Highway, views of the Petition Area are limited due to the presence of thick, overgrown vegetation alongside much of the highway. However, there are several sections without this vegetation with unobstructed views of vast pasture lands and the Keālia Town Tract subdivision on Ka'ao Road, located about a half mile up Keālia Road.

From Keālia Road, there are expansive views of vacant pasture land beyond the Ka'ao Road subdivision, including the Petition Area. Grazing cattle, fencing, water tanks and gently rolling terrain are clearly visible, with the mountain ranges in the mauka areas. Residents on Ka'ao Road and the shorter Hopoe Road currently have an unobstructed view of these mauka pasture lands, which include the future subdivision. The photos in [Figure 4-4](#) show the view of the Petition Area from public roads.

The Petition Area is not visible from the Keālia Kai subdivision or from the coastal multi-use path which is at a lower elevation along the shoreline. Scenic views up and down the coast, as well as the distant mountains are available to the public from the County's Ke Ala Hele Makalae multi-use path.

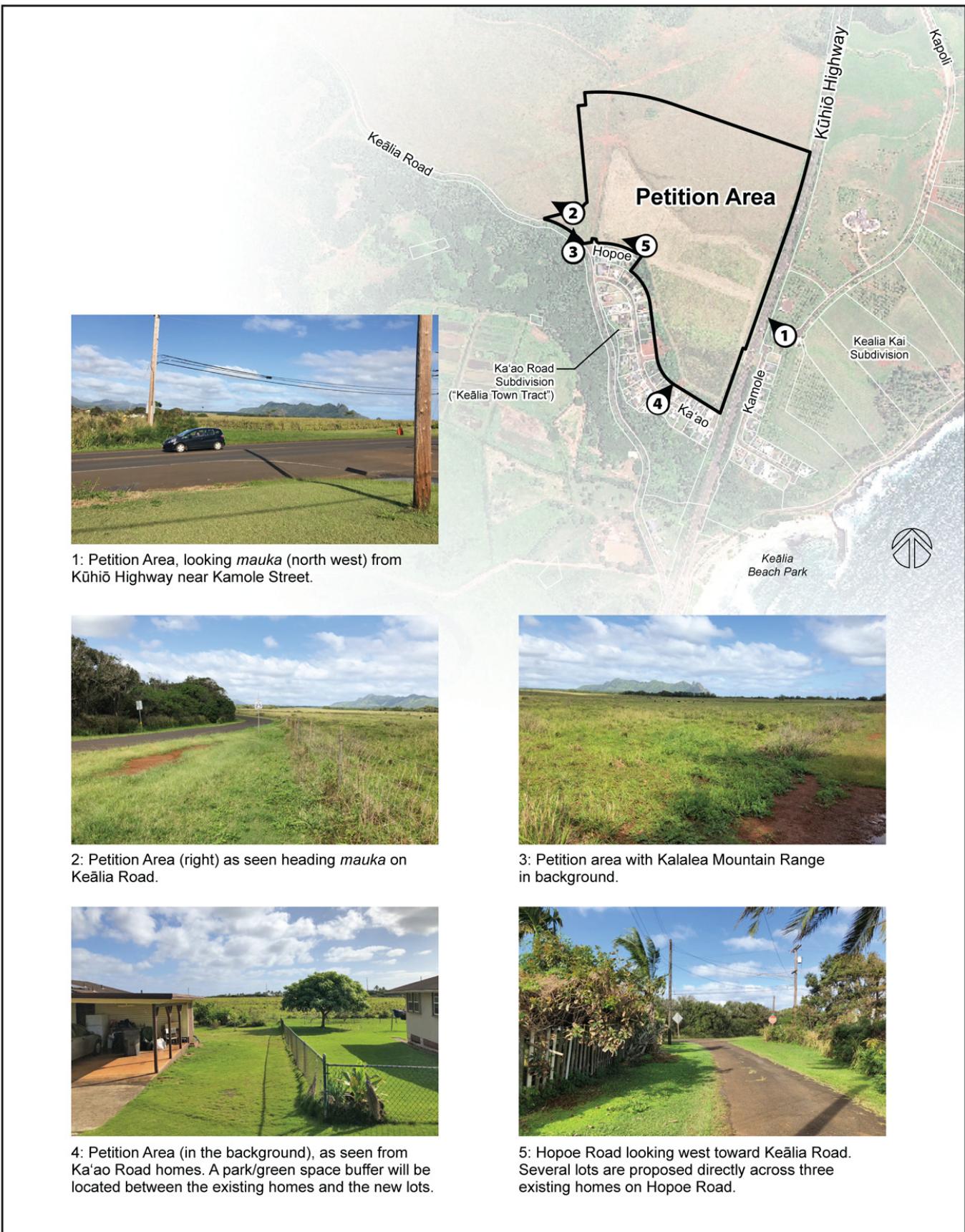
4.6.1.2 OFF-SITE

The one mile section of Kūhiō Highway where the new sewer main will be installed is a portion of a scenic roadway corridor identified in the Kaua'i General Plan. In addition to motorists driving on the highway, this corridor is viewed by Keālia Beach visitors and those who use Ke Ala Hele Makalae coastal path.

4.6.2 POTENTIAL IMPACTS AND MITIGATION

4.6.2.1 PETITION AREA

The subdivision will include 22 house lots that will back onto a 1,400-foot stretch of Kūhiō Highway. The eastern boundary of the Petition Area is located about 70 feet from the centerline of Kūhiō Highway, which has a 140-foot right-of-way. The County Zoning Ordinance requires structures to be setback a minimum of 10 feet from this (rear) property line. The future homes will be visible when looking mauka from the highway. Because there are no sidewalks or pedestrian paths along this stretch of Kūhiō Highway, the visual impact will be to individuals driving by. Where new homes are built along the highway frontage, the distant mountains will no longer be visible. Although the change in the mauka view will be noticeable, existing terrain and vegetation intermittently obscure the view. The impact to mauka views from Kūhiō Highway will only be experienced for a few seconds from a moving car. Posted speeds along this segment of Kūhiō Highway are 50 mph in the northbound direction and 40 mph in the southbound direction. A vehicle moving at 40 mph will take about 23 seconds to drive past the entire 1,400 foot frontage of the site.



Views of the Petition Area

Keālia Mauka Homesites

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Figure 4-4

From Keālia Road, the transformation of an undeveloped grazing area into a residential subdivision will have a very noticeable impact. The future subdivision will be clearly visible to residents living on Ka'ao Road, particularly from the backyards of homes on the north side. The visual impact will be most profound for the residents of the three lots on Hopoe Road, whose front yards will directly face the subdivision. To mitigate the visual impact to residents along Ka'ao Road, the subdivision will be separated by a 4.3-acre detention basin and green space that will serve as an open space buffer. The visual buffer does not extend to the three lots on Hopoe Road.

The proposed subdivision will have no impact on mauka views from the Keālia Kai residences, from Keālia Beach or the Ke Ala Hele Makalae multi-use path. The Petition Area is not visible from these areas due to the existing topography, elevations and vegetation.

The visual impact of the development from Keālia Road and Kūhiō Highway can be mitigated through the use of landscaping and screening vegetation. A landscape plan should will be prepared and include vegetation adjacent to the subdivision's major entry point (roundabout); along public road frontages; and on major roads within the subdivision. The landscaping should also include screening vegetation in the detention basin/park to minimize impact to Ka'ao Road residents. The landscape plan should will be submitted to the County as part of the project's subdivision application.

4.6.2.2 OFF-SITE

Construction activity in off-site areas will result in temporary visual impacts due to the presence of exposed earth and trenches, construction personnel, heavy equipment, and construction vehicles. Once infrastructure improvements are complete, the appearance of Keālia Road will be noticeably changed due to the widening and installation of new sidewalk and road shoulders.

The appearance of the Keālia Road and Kūhiō Highway intersection will be altered by the construction of the proposed roundabout. The modified traffic and pedestrian movement through the roundabout will also be a dramatic visual change for motorists, who currently pass rapidly past Keālia Road intersection. Vehicles will be forced to slow down to navigate the roundabout, and there will be designated areas for pedestrian crossing. The landscaping in the center of the roundabout will become a visually prominent element in this section of Kūhiō Highway. The details of the landscaping will be determined during the final roundabout design. There will be no long-term visual change to the one mile stretch of Kūhiō Highway once the new sewer line is installed.

4.7 Agriculture

Consideration of the Petition Area as an agricultural resource is complex. Issues relating to agricultural rating systems, the State's effort to identify Important Agricultural Lands (IAL), productivity, and food security are important considerations when discussing the potential impacts of the Proposed Action.

4.7.1 EXISTING CONDITIONS

4.7.1.1 HISTORIC AGRICULTURE USE

Little is little known about land use in the Keālia *ahupua'a* prior to western contact in the late eighteenth century. A twentieth century description of the *ahupua'a* described it as being:

...rather dry, with small streams and gulches and only a few *lo'i* areas. Where Keālia and Kapa'a Streams join inland there are wide flats that were terraced. Seaward there were formerly many terraced areas. There are clumps of coconut and mango trees where formerly were *kuleana* with their *lo'i*. Inland there were a number of small streams which doubtless once had small *lo'i* developments. (Handy and Handy, 1972).

The Petition Area and surrounding Keālia lands were under active sugar cultivation from the late 1800's, when the Makee Sugar Company began operations in Kapa'a in 1877. The Makee Sugar Company was later absorbed by Lihu'e Sugar Company, which then closed in 2000. As far back as the 1930's the project vicinity has been used for housing for sugar company employees. Since the closure of Lihu'e Sugar Company, the Petition Area has been used for cattle grazing.

4.7.1.2 IMPORTANT AGRICULTURAL LANDS

Background

In the years following World War II, Hawai'i experienced a shift from a plantation-dominated economy to one of tourism and federal spending. In response to this economic shift, plus growing public concern about maintaining the viability of agriculture and protecting the State's agricultural lands, the 1978 State Constitutional Convention proposed the identification and designation of Important Agricultural Lands (IAL).

Article XI, Section 3 of the Constitution of the State of Hawai'i sets out the framework for state policies to promote agriculture and the conservation of productive agricultural lands in the State:

"The State shall conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands. The legislature shall provide standards and criteria to accomplish the foregoing."

Lands identified by the State as important agricultural lands needed to fulfill the purposes above shall not be reclassified by the State or rezoned by its political subdivisions without meeting the standards and criteria established by the legislature and approved by a two-thirds vote of the body responsible for the reclassification or rezoning action."

Nearly 30 years after Hawai'i's voters ratified this 1978 constitutional amendments, the State Legislature adopted legislation to fulfill its intent and purpose. With the passage of Act 183 (Session Laws of Hawai'i (SLH) 2005) and Act 233 (SLH 2008), Hawai'i Revised Statutes (HRS) Chapter 205 was amended to describe the framework for the identification and designation of IAL, and the associated landowner incentives. Pursuant to Chapter 205, each county is required to identify and map lands within its jurisdiction that have the potential for designation as IAL.

Definition of IAL

Important agricultural lands have been defined as those that:

- are capable of producing sustained high agricultural yields when treated and managed according to accepted farming methods and technology;
- contribute to the State's economic base and produce agricultural commodities for export or local consumption; or

- are needed to promote the expansion of agricultural activities and income for the future, even if currently not in production.

IAL Designation Process

The purposes of the IAL process are to identify the best agricultural land in the State; provide incentives for landowners to keep their land in agricultural use; increase the availability of locally-produced food crops; and discourage the urbanization of our best agricultural land.

There are two processes in which important agricultural lands can be designated. A landowner or farmer has the opportunity to voluntarily petition the State Land Use Commission (LUC) directly to designate agricultural lands. The counties can also recommend land for IAL designation to the LUC. Each County is to develop maps of potential lands to be considered for IAL, to be adopted by a county council resolution and submitted to the LUC.

In 2009, the County of Kaua'i initiated an *Important Agricultural Land (IAL) Study*, which was finalized in July 2015. As a primary goal of the County's IAL initiative, the study recommended an initial designation goal of a minimum of 21,158 acres to establish self-sufficiency, based on what it estimated was needed to feed a population of approximately 70,000 people (County of Kaua'i, 2015).

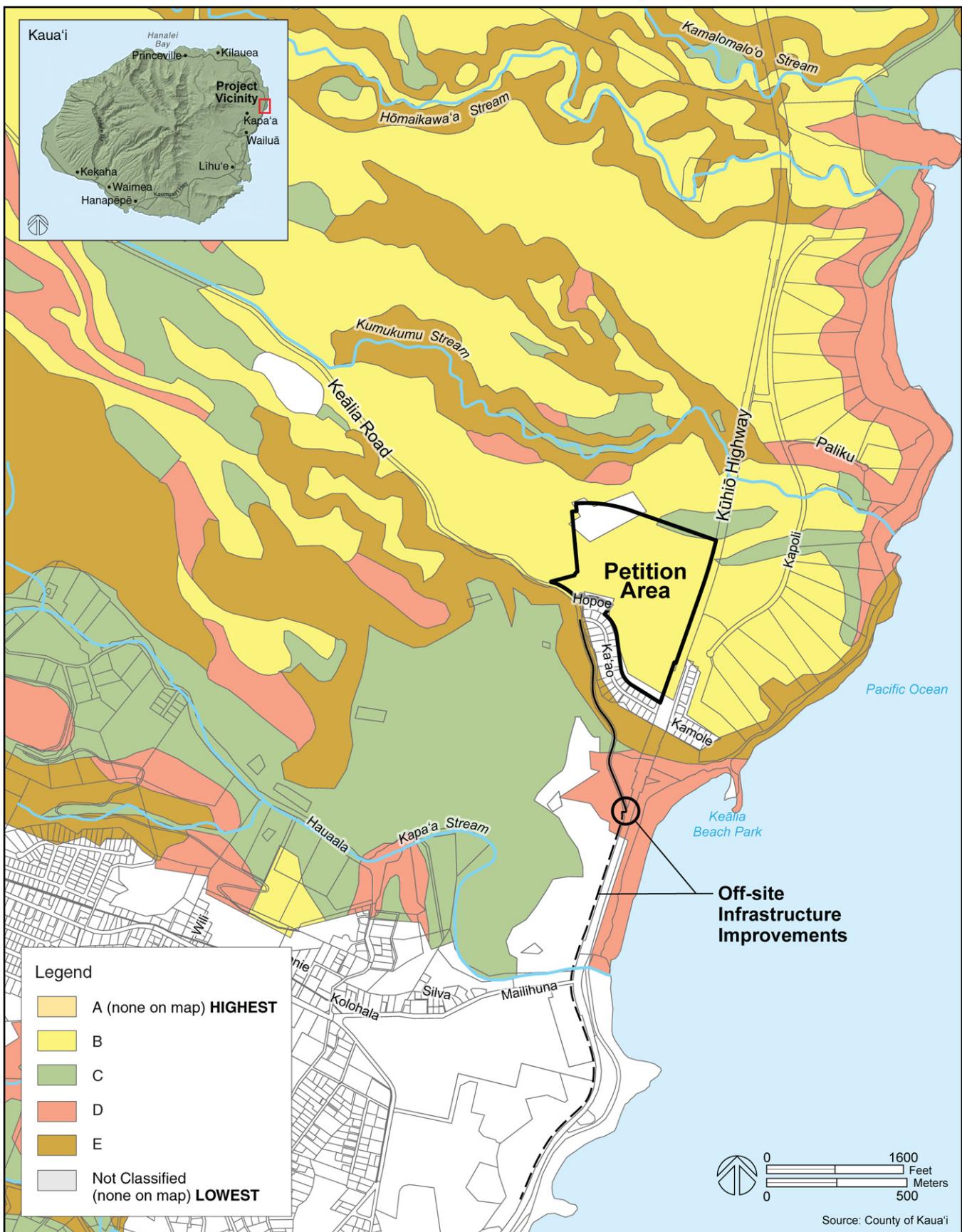
The 2015 IAL study evaluated all agricultural land on Kaua'i based on eight criteria, and identified lands meeting the threshold score of 28 or above. The lands meeting or exceeding the threshold were shown on a map in Appendix C of the IAL study. A total of 53,547 acres met or exceeded the threshold. The Petition Area is shown on the map as meeting the IAL threshold criteria. Although the final IAL study was completed in July 2015, it has yet to be transmitted to the Kaua'i County Council, and the County has not adopted the report as policy or designated any land for IAL.

At present, the only land on Kaua'i to be designated as IAL is the result of landowner self-designation. As of February 2017 Four major landowners on Kaua'i have received approval from the LUC for IAL designation of nearly 36,000 acres of land, exceeding the minimum of 21,158 acres identified in the 2015 IAL study. The subject Keālia Mauka site is not part of the designated IAL lands, currently designated IAL. The County has indicated that it does not intend to pursue designation of additional IAL lands beyond what has already been designated under the voluntary landowner process. The use of the Petition Area for residential use will not have an adverse impact on the County's efforts to establish food self-sufficiency.

4.7.1.3 SOIL CLASSIFICATION SYSTEMS

Land Study Bureau (LSB) Soil Productivity

The University of Hawai'i Land Study Bureau (LSB)'s 1967 *Detailed Land Classification* provided an inventory and evaluation of the State's land resources. All lands in the State were grouped into similar units of land types, except those in the State Urban District. The LSB also described their condition and environment; rated the overall quality of the land in terms of agricultural productivity; assessed its capabilities for selected alternative crops; and defined land types and groupings based on their soil properties and productive capabilities. A five-tier productivity rating system was developed with "A" representing the highest level of productivity and "E" the lowest. As shown in Figure 4-5, the lands within the Project Area have a productivity rating of B, a fairly high level of productivity.



Land Study Bureau Agricultural Productivity Ratings

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

The Agricultural Lands of Importance to the State of Hawai'i (ALISH) Classification System was developed and compiled in 1977 by the State Department of Agriculture with assistance from the Natural Resources Conservation Service, U.S. Department of Agriculture (formerly the Soil Conservation Service) and the College of Tropical Agriculture, University of Hawai'i. This classification system was developed to identify three classes of agriculturally important lands for Hawai'i as part of a national effort to inventory important farmlands. The Hawai'i classification system established three classes of agricultural lands that are important to the State: "Prime," "Unique," and "Other." Residual lands that are less suitable for agriculture are "Unclassified."

As shown in [Figure 4-6](#), the ALISH system classifies the entire Project Area as Prime agricultural land, defined as "land which has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed according to modern farming methods" (NRCS, 2008).

4.7.1.4 FOOD SECURITY

The State of Hawai'i is placing an increased emphasis on the concept of food security and food self-sufficiency, with the goal of increasing the amount of locally grown food consumed by Hawai'i residents. Currently, about 85 to 90 percent of Hawai'i's food is imported, making the state particularly vulnerable to natural disasters and global events that disrupt shipping and the food supply. The State Department of Business, Economic Development and Tourism, in conjunction with the State Department of Agriculture, has prepared the *Increased Food Security and Food Self-Sufficiency Strategy* (DBEDT, 2012), a State strategic functional plan focusing on increasing food security and food self-sufficiency. The strategy emphasizes increasing production by strengthening agricultural infrastructure and actions to provide for food safety, pest prevention and control, workforce training, research and extension services, and policy and organizational support. Among its objectives are to increase demand for and access to locally grown foods, and increase production of locally grown foods. The strategy is intended to set an overall direction toward food self-sufficiency, but does not address the issue of how much land is necessary for self-sufficiency. The strategy identifies action and projects that will provide more land for food commodities.

4.7.2 POTENTIAL IMPACTS AND MITIGATION

4.7.2.1 PETITION AREA

The use of the Petition Area for residential use will remove 53.4 acres of agricultural land from active cattle grazing. While the Petition Area meets several of the eight criteria for Important Agricultural Lands, it represents only a small percentage of the suitable agricultural land available in the East Kaua'i region. The Petition Area is a portion of a 1,000-acre TMK parcel ((4)4-7-004:001) that is currently leased to three private entities for agricultural/grazing purposes. In order to accommodate the loss of project acreage, an additional 86 acres has been added to one of the leases ([RKL Ranch, LLC](#)) for an 11 year term. [This additional 86 acres is located in the adjacent Makee parcel \(TMK \(4\) 4-7-003:002\)](#), which was shown in Figure 1-3. The lease specifies that the acreage is to be used solely for agricultural activity consisting of pasture use.



Figure 4-6

The Petition Area is adjacent to an existing residential subdivision. Although the Petition Area is in the State Agricultural District, the County has determined that residential use is consistent with the County of Kaua'i General Plan. The County Planning Department has made a written determination (Departmental Determination DD-2016-70) that the Petition Area is located within the area earmarked on the General Plan Land Use Plan for "Residential Community." Since the closure of Lihu'e Plantation, there is more than adequate agricultural land available in the East Kaua'i region for current and foreseeable future agricultural activity. The loss of 53 acres will not have an adverse impact on the region's agricultural resources.

The conversion of the Petition Area to residential use will not negatively affect the County and State efforts toward food self-sufficiency. Private landowners on the island have already completed designation of nearly 36,000 acres for IAL, exceeding the goal set by the County's 2015 IAL study. In addition, Keālia Mauka lot purchasers will always have the option to grow backyard crops and establish family gardens. In a small way, these actions can contribute to food security of the local population.

4.7.2.2 OFF-SITE

Off-site areas where infrastructure improvements are proposed are not, and have never been used for agricultural activity. There will be no impact to agricultural resources by these off-site improvements.

4.8 Hazardous and Regulated Materials and Waste

The April 2018 DEIS presented the findings of a 2005 Phase I Environmental Site Assessment (ESA) prepared for the previous landowner, which covered some 2,000 acres of land, including the Petition Area. Subsequent to the DEIS, a second Phase I ESA was done to focus specifically on the Petition Area. Both studies and their findings are discussed below.

4.8.1 EXISTING CONDITIONS

2005 Phase I Environmental Site Assessment

A Phase I Environmental Site Assessment (ESA) was prepared for the previous landowners as part of due diligence activities prior to their purchase of some 2,000 acres of land (Belt Collins Hawai'i Ltd., 2005). The 2,000 acre study area included several TMK parcels, including TMK (4) 4-7-004, which includes the subject 53.4-acre Petition Area. The purpose of the Phase I ESA was to identify "recognized environmental conditions" (REC), meaning the presence or likely presence of hazardous substances or petroleum products on a property under conditions that indicate an existing release, past release, or material threat of a release.

The Phase I ESA included a review of historic property uses, review of regulatory data bases, site reconnaissance, and interviews with persons associated with the property. The 2,000-acre ESA study area has a history of use throughout the twentieth century for commercial agricultural activities. These activities included the use of fertilizers, herbicides and pesticides (Belt Collins Hawai'i Ltd., 2005). There is a possibility that waste products have been disposed or stored on site, and that the operation of machinery resulted in released fuel, oil, or solvents into the environment. The ESA revealed previous land uses within the 2,000-acre study area included a sugar mill, vehicle storage and maintenance, service station, and rodeo ring. The ESA study area included above and underground storage tanks. According to maps provided in the document, the sugar mill, vehicle

maintenance activities and other activities were unlikely to have been conducted within the current Petition Area, which appears to have been limited to sugar cultivation and plantation housing.

2018 Phase I Environmental Site Assessment

In response to a comment received during the DEIS comment period, a new Phase I ESA was completed for the Petition Area by EnviroServices & Training Center, LLC (ETC). Unlike the 2005 study that focused on a larger 2,000 acre study area (that included the Keālia Mauka site), the 2018 study focused specifically on the 53.4 acre Petition Area. The study is included as Appendix K. As with the 2005 study, the purpose and goal of this Phase I ESA was to conduct an inquiry to identify recognized environmental conditions (REC). The scope of work included a review of property information, regulatory data base, a visual site reconnaissance of the site and adjacent properties, and interviews with owner(s), site manager(s), occupant(s), local government officials, and others with past and prior use history.

4.8.2 POTENTIAL IMPACTS AND MITIGATION

4.8.2.1 PETITION AREA

The DEIS evaluated potential impacts and mitigation based on the 2005 Phase I ESA, and concluded that during construction of the subdivision improvements, there is the potential for ground disturbing activities to encounter areas with existing environmental contamination. Historic herbicide application practices create the potential for heavy metals (specifically arsenic) in the soil. In its EISPN comment letter (see Chapter 9), the State of Hawai'i Department of Health (DOH), Hazard Evaluation and Emergency Response (HEER) office noted that "agricultural lands, especially those that were in production after about 1912, may include arsenic and pentachlorophenol (with dioxin contaminants) and possibly organochlorine pesticides which were used for weed or insect control." These chemicals are now generally banned due to unacceptable human or environmental health risks, but may persist in the environment for decades at levels that present unacceptable health risks, especially for children. The potential presence of these hazardous substances could pose health concerns for future residential and recreational use.

The findings of the 2018 Phase I ESA support the conclusions and recommendations presented in the DEIS. Document review and visual inspection of the property showed no evidence of the generation, storage, or disposal of hazardous or regulated wastes.

At the same time, historical real property tax records, aerial photographs, document review, and user provided documentation indicate past use of the subject property for sugarcane cultivation and plantation housing. Historical sugarcane production in Hawai'i (i.e., pre-World War II) included the application of arsenic-containing pesticides/herbicides, even though no pesticide mixing areas were found in connection with the subject property and surrounding areas. This finding is considered a historical REC. The Phase I ESA states that "Based on the past and prior use of the subject property coupled with the DOH HEER Office's comment letter, [we] cannot dismiss the potential presence of contamination from this historical REC and as such this past use is considered a REC for the subject property. No other significant findings to indicate suspect RECs, historical RECs, controlled RECs or *de minimis* conditions were identified." (ETC, 2018)

As recommended by the DOH HEER office, and in accordance with current State policies, soil testing will be conducted in the Petition Areas proposed for residential or recreational use. A soil sampling plan identifying chemicals of potential concern and the proposed testing methodology will be

developed based on guidance in the DOH HEER Office's Technical Guidance Manual. The sampling plan will be submitted to the DOH HEER office for review and approval. Test results and recommendations will be submitted to the DOH HEER office for review and approval prior to construction.

If identified, contaminated soils and materials will be handled, transported, stored, disposed of and/or remediated in place to levels appropriate for residential use, and a "No Further Action Letter" will be obtained from the DOH. All removal and remedial actions to clean up hazardous substance or oil releases will comply with Chapter 128D, Environmental Response Law, HRS, and Title 11, Chapter 451, HAR, State Contingency Plan. With this mitigation, there is unlikely to be an adverse effect on construction workers, project residents or other members of the public from residual soil contamination.

During construction of the subdivision improvements, there is also a potential for release of petroleum products by construction vehicles and equipment. This will be mitigated by implementing best management practices such as proper maintenance of construction vehicles, and regular inspection for leaks. During occupancy of the subdivision, there is also potential for environmental contamination caused by future residents (e.g., vehicle leaks and improper disposal of hazardous materials). These potential impacts would be reduced by following applicable county and state regulations. Development and occupancy of the proposed subdivision is not expected to have a significant impacts associated with hazardous materials and wastes.

4.8.2.2 OFF-SITE

The off-site areas are not proposed for residential use and will be limited to roadway and utility infrastructure use. The Phase I ESA focused on the Petition Area, but evaluated existing data and reports for surrounding land areas, including the off-site areas. The 2005 Phase I ESA evaluated a 2,000 acre area that included most of the Kūhiō Highway corridor where the sewer line will be installed. None of the off-site areas have a REC, as defined above. None of the off-site areas were used for activities involving the generation or storage of hazardous materials. The off-site areas were not used for sugar cane cultivation, which is considered a historical REC. No hazardous materials are expected to be encountered during construction in the off-site areas.

4.9 Social and Economic factors

4.9.1 POPULATION

4.9.1.1 EXISTING CONDITIONS

According to the 2010 U.S. Census, the population of the State of Hawai'i was 1,360,301, with the population of the County of Kaua'i accounting for approximately 67,091 (4.9%) of those residents. The population on Kaua'i in 2010 was almost 15% more than that in 2000 (U.S. Census Bureau, 2016).

The Keālia area is within the Census Bureau's Wailua-Anahola Census County Division (CCD). A CCD is a census subdivision of a county used to present statistical data, and may consist of multiple census tracts. In 2010, the total population of the Wailua-Anahola CCD was 12,607 persons, with a median age of 42.5 years. Racial make-up of the CCD was 39.6% white, 38.6% Asian, 13.0% Native Hawaiian and other Pacific Islander, and 27.3% of two or more races. The average household size

was 2.7 persons, and median household income (in 2009 inflation-adjusted dollars) was \$70,408. Of the housing stock within the CCD, 61.4% was owner-occupied.

Market and Econometric Studies of the Proposed Action were conducted by CBRE in 2017 (Appendix F). The study area for the market study extended beyond the Wailua-Anahola CCD, and encompassed a 16-mile near-coastal and lower elevation corridor along the eastern shore of Kaua‘i, stretching from Līhu‘e to Moloa‘a. In addition to the Wailua-Anahola CCD, this larger “market study area” included the CCDs of Wailua Homesteads, Līhu‘e, Kapa‘a, and Wailua.

Within this East Kaua‘i market study area, there were 34,467 residents in 2010, representing 51.4% of the County total. By the first quarter of 2017, the estimated population of this region had grown to 38,101 persons, or 51.8% of the island. The market study notes that population growth was limited by lack of available housing supply more so than demand. The market study forecast the resident population in this Līhu‘e to Moloa‘a corridor (or greater East Kaua‘i) will increase by 2040 to between 51,650 persons (a gain of 35.6% over 2017 estimate) and 53,554 persons (up 40.6%) (CBRE, 2017).

The current average resident household size in the Līhu‘e to Moloa‘a Corridor is about 2.94 persons (among the largest for the island). Average household size is forecast to decline in coming decades as a result of evolving family/household trends and an increasingly diverse mix of unit types from new development. By 2040, the average household size in the study area is anticipated to lower to 2.85 persons (CBRE, 2017).

4.9.1.2 POTENTIAL IMPACTS

The Proposed Action is expected to have a negligible direct and indirect effect on the population and population growth within the County of Kaua‘i and the State. CBRE market study projections indicate that over the next 20 years, the population of the East Kaua‘i area is expected to increase between 35 and 40 percent, even without the Proposed Action.

The Keālia Mauka residential lots are targeted primarily toward Kaua‘i residents. The market study estimated that approximately 82% of the single family homes at Keālia Mauka (194) will be occupied by full-time Kaua‘i resident families with an average household size of 3.4 persons, totaling 658 full-time residents at buildout and full occupancy.

Because sale of the lots cannot be restricted to Kaua‘i residents, there will inevitably be some non-resident, second home purchasers. This group of part-time, second/vacation homeowners was estimated at 18 percent (42 lots). They are expected to occupy their residential unit 30 percent of the year, and have an average household size of 3.6 persons. This equates to an average of 42 persons daily. Together, the full time resident and non-resident groups will result in an average daily “de facto” population at build-out of 700 persons (658 full time residents and 42 vacationers).

Although it responds to the existing and future market demand for housing, the project will not generate or cause population growth in East Kaua‘i. It is expected that the house lots will respond to the demand for new housing product generated by 1) on-island population growth and 2) new household formation. The Proposed Action is not expected to have an impact on the in-migration of individuals from out of state.

4.9.2 HOUSING

4.9.2.1 EXISTING CONDITIONS

The CBRE Market Study evaluated housing conditions within the 16-mile Līhu'e to Moloa'a corridor. Within this region, there are an estimated 19,428 single and multifamily housing units, of which 3,428 (or 17.6%) are registered as vacation rentals. Many of these vacation rentals are within the Coconut Plantation community, located about two miles south of Kapa'a Town. The remaining 16,000 housing units in the study area are considered to be standard residential (non-resort) use. Of these units, 13,120 (82%) house full-time Kaua'i resident households, with the remaining 2,880 units (18%) used by non-resident second/vacation home owners.

In the first quarter of 2017, the median sales price for a single family residential unit in the East Kaua'i area was \$574,000, a 5.6% increase from the previous year. This compares to a median sales price of \$500,000 in Līhu'e. The CBRE market study indicates that median sale prices are expected to continue to increase into the long-term.

4.9.2.2 POTENTIAL IMPACTS AND MITIGATION

The Proposed Action will create 235 improved residential lots which will be available for sale to Kaua'i residents. The Petition Area is appropriate for this use based on its physical conditions, location adjacent to an existing subdivision, proximity to supporting services, and its designation for residential use in the County General Plan.

The Keālia Mauka Homesites will comply with the County's Housing Policy for workforce housing. This policy requires that a percentage of the units (lots) be sold at prices affordable to households that earn from eighty percent (80%) and below of the Kaua'i median household income to one-hundred forty percent (140%) of the Kaua'i median household income. As discussed in Section 2.3.1 and Section 5.2.5, after factoring in applicable developer incentives, it is estimated that there will be approximately 36 workforce housing lots at Keālia Mauka. Prices for these lots will range from \$81,000 to \$110,900 (targeting families earning 80 to 140% of median income). The sales prices for the remaining market priced lots would range from \$190,000 to \$235,000, based on current (2019) market conditions.

4.9.3 ECONOMY AND EMPLOYMENT

The CBRE Market and Econometric Studies in Appendix F includes three elements: 1) market study; 2) economic impact analysis; and 3) public cost/benefit assessment. The following sections are based on the economic impact analysis and public cost/benefit assessment.

4.9.3.1 EXISTING CONDITIONS

The Līhu'e/East Kaua'i area is one of the three centers of the island's tourism industry, called "the Coconut Coast." Along with Poipu/South Kaua'i and the North Shore (Princeville/Hanalei), East Kaua'i has evolved into a primary region for economic activity and employment; attracting significant development and capital investment over the past four-plus decades. This trend is anticipated to continue over the long-term, increasing in cumulative attraction as the economy strengthens further. East Kaua'i is also the region with most of the commercial and industrial space on the island, the most businesses, and most employment opportunities. It is currently Kaua'i's focus of economic activity and will continue to be an expanding, increasingly diversified market.

The unemployment rate on Kaua‘i is about 2.4% (approaching effective full employment), down from a high of some nine percent during the depths of the 2008-2009 recession. Median household income has grown at a rate approaching 4.0% compounded annually since 2014; there has been major positive absorption of retail and industrial space since the beginning of 2016 (with some 200,000 square feet absorbed in the first half of 2017), increasing velocity of commercial space development; and, record growth in tourism. Total visitor days and visitor spending have grown at compounded annual rates above five percent and eight percent respectively since 2009.

Though not issued on a County-basis, the most recent State of Hawai‘i Department of Business, Economic Development & Tourism (DBEDT) *Quarterly Outlook for the Economy* (2nd Quarter 2017) statewide forecasts show continuing gains in 12 economic indicators¹ through 2020. The projections are more optimistic than their prior forecasts, and have been gaining upward momentum for the past several years (CBRE, 2017).

The Petition Area is a former agricultural parcel that is currently leased out for grazing. There is no other revenue generated by the property.

4.9.3.2 POTENTIAL IMPACTS AND MITIGATION

CBRE developed a computer model to estimate the economic impact of the Keālia Mauka project on the Kaua‘i and Statewide community during its “lifespan,” from commencement of site work and infrastructure emplacement through absorption/sell out of the finished lots. The findings are briefly summarized here, with further details and tables provided in the study. No mitigation is required for impacts on employment or the economy.

Economic Impacts

Direct and Indirect Expenditures. The development of the proposed subdivision will generate significant expenditures that will have a positive direct and indirect impact on the Kaua‘i economy. These expenditures will increase the level of capital investment and capital flow in the region, which will in turn create employment and widen the tax base.

Direct expenditures will be associated with the creation of the 235 house lots as well as the eventual construction of homes on the lots. These expenditures include building materials and supplies and construction services. CBRE has estimated that over the project build-out period (estimated to extend to year 2030), the Proposed Action will bring approximately \$121 million in new, direct development capital into the Kaua‘i economy, along with significant unquantified indirect expenditures. The Proposed Action will generate an estimated \$226 million in total new economic activity islandwide during its build out. Following build out, Keālia Mauka will contribute some \$13.7 million in annual economic activity on a stabilized basis, due largely to the discretionary spending by full and part-time residents.

Employment. The project’s economic impact includes the creation of employment opportunities by the installation of project infrastructure, the construction of the homes, and in the long term, the

¹ DBEDT economic indicators include 1) total population; 2) visitor arrivals; 3) visitor days; 4) visitor expenditure; 5) Honolulu Consumer Price Index; 6) personal income; 7) real personal income; 8) non-agricultural wage and salary jobs; 9) civilian unemployment rate; 10) gross domestic product; 11) real gross domestic product, and 12) gross domestic product deflator.

provision of continuing services to the community and occupied residences. These jobs will include construction, equipment operators, and specialty trade jobs on- and off-site, directly and indirectly.

CBRE estimated that the construction of project infrastructure and finished single family homes will directly create an estimated 1,048 "worker-years" of employment (the equivalent of 52 work weeks at 40 hours per week) in the trades and supply businesses during build-out, averaging about 81 worker-years annually, with an estimated \$55 million in wages (averaging about \$4.2 million per year).

Once infrastructure is installed and the individual house lots are developed, there will be some limited permanent jobs associated with the operation of the homeowners association, and related to the upkeep, maintenance, and renovations of the homes. CBRE has estimated that the community homeowners association and the upkeep, maintenance, and renovations of the 235 homes will create 59 worker-years of employment from 2021 through 2030 and associated wages of \$3 million. Once stabilized, the project will support 15 full time equivalent (FTE) positions (most made up of many short-term workers) and annual wages of \$492,000 (CBRE, 2017).

Associated secondary/off-site employment during the overall development and absorption time frame (estimated through year 2030) will total 262 worker-years with wages of \$14.2 million and a stabilized FTE job-count of 5, with total wages of \$267,000 per year.

Islandwide Economic Impact. The general island economy also will benefit from the Proposed Action, as Keālia Mauka's full and part-time residents will spend discretionary income on goods and services and in shops, restaurants, and service establishments. It should be noted that because most future subdivision residents are expected to be current Kaua'i residents, much of this discretionary spending is not "new," but rather continued spending from existing households. The only "new" spending will come from non-resident second-home owners. The market study estimated that about 42 of the expected population of 700 will be new non-resident second-home owners and their guests.

Islandwide economic impacts will result as wages, profits and expenditures associated with the project move through the regional economy, having a ripple or multiplier effect which increases the amount of capital flowing to the entire community.

Secondary Impacts. The Proposed Action will have nominal to minor impacts on the real estate market and on home prices in the region. The subdivision lots are sized to appeal primarily to local buyers, and the project is located adjacent to an existing subdivision of comparable density and moderate price. The new subdivision is not expected to contribute to upward pricing pressures in the region. The Keālia Mauka Homesites will not itself drive regional market values or real property assessments of nearby real estate. The Proposed Action is not expected to cause in-migration to Kaua'i, as it is intended to provide housing for existing island residents.

Public Fiscal Impacts

Public fiscal impacts looks at the public costs and benefits of the proposed development. Many of the government costs associated with the projected 658 current Kaua'i residents will not be "new," but are already factored into existing County and State budgets. The only new fiscal contributions from the full-time resident households will be:

- Additional assessments to the County real property tax rolls; and,

- Maintenance/renovations associated with the houses, which will expand general economic activity.

The fiscal impacts associated with the estimated 42 non-resident, second home owners and their guests do represent "new" costs and benefits for the State and County. CBRE applied the Hawai'i State Input-Output model which estimates primary tax receipts generated during the project life. The model used a conservative assumption that each new person added to the Kauai community is "responsible for" a similar tax cost/obligation as every other person on the island. CBRE noted the actual additional costs and impact on services from the estimated 42 part-time residents will be minimal. Typically, part-time residents place limited demands on schools, administrative infrastructure, most governmental services and facilities, and are unlikely to push emergency services beyond an expansion-requiring threshold. The conclusions of the analysis are:

- The County of Kaua'i will realize "new" real property taxes (\$5.4 million), and other secondary receipts and development fees totaling \$9 million during the build-out projection period (estimated at 2018-2030), and \$1.3 million annually on a stabilized basis thereafter. These figures incorporate exemptions for real property tax resident owner-occupants.
- The State of Hawai'i will receive "new" gross excise and income taxes and secondary revenues, of \$12.7 million during the 2018-2030 modeling period, and \$276,000 per year thereafter.

Economic Impact of Off-Site Improvements

Subsequent to the publication of the DEIS, the Proposed Action was revised to include off-site improvements in addition to those within the Petition Area. The off-site improvements include widening and sidewalks along Keālia Road; construction of a roundabout at the Keālia Road-Kūhiō Highway intersection; and the installation of a sewer main extension within the Kūhiō Highway right-of-way, and are estimated to increase development costs by approximately \$10 million. The off-site improvements will result in construction period impacts to employment, local expenditures, and the local economy. In a April 9, 2019 letter addressing this issue (see Appendix F), CBRE stated, "The \$10 million increase will favorably create a five to ten percent increase in capital investment, construction jobs, taxes, and economic activity."

4.9.4 MARKET ASSESSMENT

The purpose of the market assessment was to determine whether there will be sufficient demand in the (Lihue to Moloa'a) study corridor single family residential real estate market sector to absorb the finished vacant house lots in a timely manner. The time frame for the market study was to 2040, although it is anticipated that the 235 subject lots will be absorbed by the market in a much shorter period.

4.9.4.1 EXISTING CONDITIONS

Housing Market

The State of Hawai'i has steadily rebounded from the 2008-09 recession and associated down-cycle in the real estate market. On Kaua'i, favorable economic indicators and trends include a decrease in the unemployment rate, the growth in median household income, and positive absorption of retail and industrial space since the beginning of 2016. Tourism continues to reach all-time records with increases in total visitor days and visitor spending.

Although experiencing some instability in the first quarter of 2017, the Kaua'i residential real estate market has also shown post-recession recovery and growth. Island-wide, the single family residential, condominium and vacant lot sectors are experiencing the highest level of sales activity since 2004-07. In the Līhu'e/East Kaua'i area, median single-family home prices in Kapa'a were up by nearly six percent in 2016 (over 2015) and are continuing to rise. General indicators point to continued increase in demand, sales velocity, and prices, particularly given the limited supply of new residential inventory.

Residential Demand

The market study estimated that the demand for new residential (non-vacation rental) units in the Lihue/East Kaua'i region through 2040 will be between 6,654 and 8,240 units (mid-point of 7,447 units). The demand projection was based on the County's regional population projections to 2040. It also considered recent trends, including a declining average household size, and an increasing share of units being used by non-residents and visitors.

The CBRE study estimated that about 66% of the total future demand will be for single family homes and lots, with about 34% for condominium units. CBRE estimated that approximately 72% of the demand for finished single family homes in the primary study area over the next 24 years will be for houses with a current price of \$539,000 or less. This price is approximately the upper-price threshold that will meet County affordability standards (i.e., affordable to those earning 140% of median household income). For multifamily units, CBRE estimated that 76% will need to be priced at \$480,000 or less (consistent with household incomes at 140% or below of median).

Existing and Projected Inventory

As discussed in Section 4.9.2 (Housing) above, of the 19,428 housing units in the study area, 17.6% (3,428 units) are registered as transient vacation rentals (TVR) and unavailable for meeting standard residential housing needs. Of the remaining 16,000 non-resort units, 18 percent (2,880 units) are used by non-resident second/vacation home owners.

According to the County Planning Department, there are there are up to 5,197 single and multi-family residential units proposed for the Lihue/East Kauai study region, not including the Keālia Mauka lots. Approximately 30% of these proposed units are resort residential and oriented toward visitors and vacation/second home buyers.

Even if all 5,197 proposed residential units were offered as non-resort product and constructed in a timely manner, the supply would still be insufficient to meet anticipated demand, with a shortfall of approximately 2,250 units (5,197 unit proposed vs. 7,447 unit demand). In reality, many proposed units will not be completed within the projection period, and others will be priced at levels that are unaffordable to virtually all Kaua'i resident households. The market study forecast a shortfall of more than 3,500 single and multi-family residential units in the study corridor through 2040. The shortfall in the single-family sector will be more than 2,000 home/lots.

4.9.4.2 POTENTIAL IMPACTS AND MITIGATION

The Proposed Action will create 235 finished house lots. Although this offering will not come close to meeting the significant anticipated shortfall of single family homes/lots, it will have a beneficial impact on the supply of residential housing in the Līhu'e/East Kaua'i region.

Residential development in the East Kaua‘i region is appropriate due to the area’s desirable climate, expanding population, and a favorable economic outlook. Residential development on the Petition Area is compatible with adjacent residential use, and consistent with County of Kaua‘i General Plan land use guidance. The Petition Area provides convenient access to Kūhiō Highway, Kapa‘a Town, schools and other supporting services. The subdivision will provide homeownership opportunity for large numbers of Kaua‘i residents and households. The market study indicates that the subdivision will have the attributes necessary to be competitive in the workforce and market single family housing product sectors, and will capture a reasonable market share during its offering period. Although the home sites will be somewhat desirable for non-resident second-home purchasers, it will be less so than other projects with large lots, ocean views or in resort communities (CBRE, 2017). No mitigation is required.

4.10 Infrastructure and Utilities

The information in this Infrastructure and Utilities section is from a Preliminary Engineering Report (PER) for the Proposed Action prepared by Kodani & Associates (2017), included as Appendix G, as well as more recent consultation with Kodani and Associates.

4.10.1 ELECTRICAL AND COMMUNICATIONS

4.10.1.1 EXISTING CONDITIONS

Kaua‘i Island Utility Cooperative (KIUC) is Hawai‘i’s only member-owned electric utility. The utility currently has a generating capacity of 125 megawatts (MW). More than 40% of the electricity generated by KIUC comes from renewable energy resources.

The Keālia Mauka Homesites project is part of the KIUC’s Kawaihau region. According to the Kaua‘i General Plan, this region is served via a tap off of the mauka transmission line that connects the Wainiha Hydroelectric Plant with Port Allen. This tap provides power via the Kapa‘a Switchyard to 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. Power is also supplied through the Anahola Substation, which was recently completed.

KIUC transmission lines are located along Kūhiō Highway in the vicinity of the Petition Area. Within the last five years, KIUC completed a project relocating overhead lines along Kūhiō Highway to underground. This project was part of an effort to reduce harm to endangered seabirds such as the Newell’s shearwater, which often collide with overhead power lines. There are still overhead electrical distribution lines serving residences along Keālia Road, Ka‘ao Road, and Hopoe Roads.

Telephone service to the area is provided by Hawaiian Telcom and cable service is provided by Spectrum (formerly Oceanic Time Warner).

4.10.1.2 POTENTIAL IMPACTS AND MITIGATION

KIUC representatives have indicated that there is sufficient generating capacity to serve the proposed residential development. Standard electrical power transmission improvements would be required to serve the proposed project. However the improvement would likely be limited to the distance from Kūhiō Highway to the Petition Area (Kodani & Associates, 2017).

For planning purposes, KIUC utilizes a unit demand of 3 kilovolt amps (KVA) of power per lot. KIUC typically provides 100 amp services for lots of the size proposed for this development. For 235 lots, electrical demand is estimated at 705 KVA. The utilities for the subdivision will mainly be placed underground. KIUC may utilize the remnant lot near the proposed roundabout that intersects with Keālia Road for switchgear equipment.

Currently, there are overhead utility lines in place that serve the existing lots along Keālia Road and the existing dwellings on Ka'ao and Hopoe Roads. With the proposed subdivision, these overhead lines will need to be upgraded to accommodate the new development. When off-site improvements are made to Keālia Road, the overhead electrical, telephone and cable line will be extended from Kūhiō Highway to the project site. With these upgrades to the utilities, Keālia Road will also need to be improved to further accommodate the new development. The cost of these improvements will be paid for by the developer. The development will tie into KIUC's existing main line that runs along Kūhiō Highway (Kodani & Associates, 2017).

4.10.2 POTABLE DRINKING WATER²

4.10.2.1 EXISTING CONDITIONS

The Kaua'i County Department of Water does not provide water service to the Keālia Mauka area. Existing residential uses in the vicinity, including lots along Ka'ao and Hopoe Road, are serviced through a private domestic water system called the Keālia Water System (KWS). The KWS is owned by the entity, Keālia Water Company Holdings, LLC (Water Company). It is identified by the State of Hawai'i Department of Health as Public Water System #423.

Source water is provided by two wells located on the western side of Keālia Road on TMK (4) 4-7-003:002. Keālia Wells 1A and 2A (State Well No. 3-0618-009 and 010, respectively) currently report average use between 30,000 to 40,000 gallons per day (gpd) since 2008. (Kodani & Associates, 2017). According to the State of Hawai'i Department of Land and Natural Resources (DLNR) Commission on Water Resource Management (CWRM), certificates of well construction and ³pump installation for these two wells were issued on 9/19/2008. The approval pump capacity is 650 gallons per minute (gpm) for well 3-0618-009 (936,000 gpd) and 540 gpm for well 3-0618-010 (777,600 gpd) (personal communication with Queenie Komori, CWRM, 3/12/2018).

A 12-inch waterline runs north along Keālia Road and connects the wells to two 67,000 gallon water tanks. This water system services lots along Ka'ao and Hopoe Road with an 8-inch waterline branching off from Keālia Road. There is also a 12-inch waterline that branches off of Keālia Road to serve the Kealia Kai Subdivision on the makai side of Kūhiō Highway. This waterline intersects the proposed Petition Area.

Community water systems that serve the same people year-round are required to provide an annual Consumer Confidence Report (CCR) or annual drinking water quality report to their customers. According to the Keālia Water System 2017 Consumer Confidence Report, water for the System is obtained via a groundwater source. The Water System provides water to approximately 60 homes in the former Keālia Plantation Camp and has 35 service connections at the Keālia Makai Subdivision. Water from the Keālia Water System met all U.S. Environmental Protection Agency and

² This document uses the term "drinking water" rather than "potable water" to be consistent with terminology used by the State of Hawai'i Department of Health (DOH), indicating water for human consumption that is derived from surface water and/or groundwater and is regulated by the DOH pursuant to HAR Chapter 11-20.

state drinking water health standards. Data was collected from testing done from January 1, 2016 through December 31, 2016 (Kodani & Associates, 2017).

According to the DLNR CWRM, there are two other wells, Keālia 6 and 7 (Well No. 3-0618-006 and 005, respectively) that are reporting no use and are not part of the Keālia Public Water System. There are also five abandoned wells in the vicinity of the water system wells. Two have been properly sealed and three which cannot be found are considered lost. If any of these three wells are discovered they should be properly sealed in accordance with the Hawai'i Well construction and Pump Installation Standards, 2004, with work permitted through the DLNR Commission on Water Resource Management.

4.10.2.2 POTENTIAL IMPACTS AND MITIGATION

The Petitioner has a water service agreement with Keālia Water Company which allows a daily aggregate of 300,000 gallons per day (gpd) of potable water to be reserved for the use of the future owners in the Petition Area.

Proposed Water System

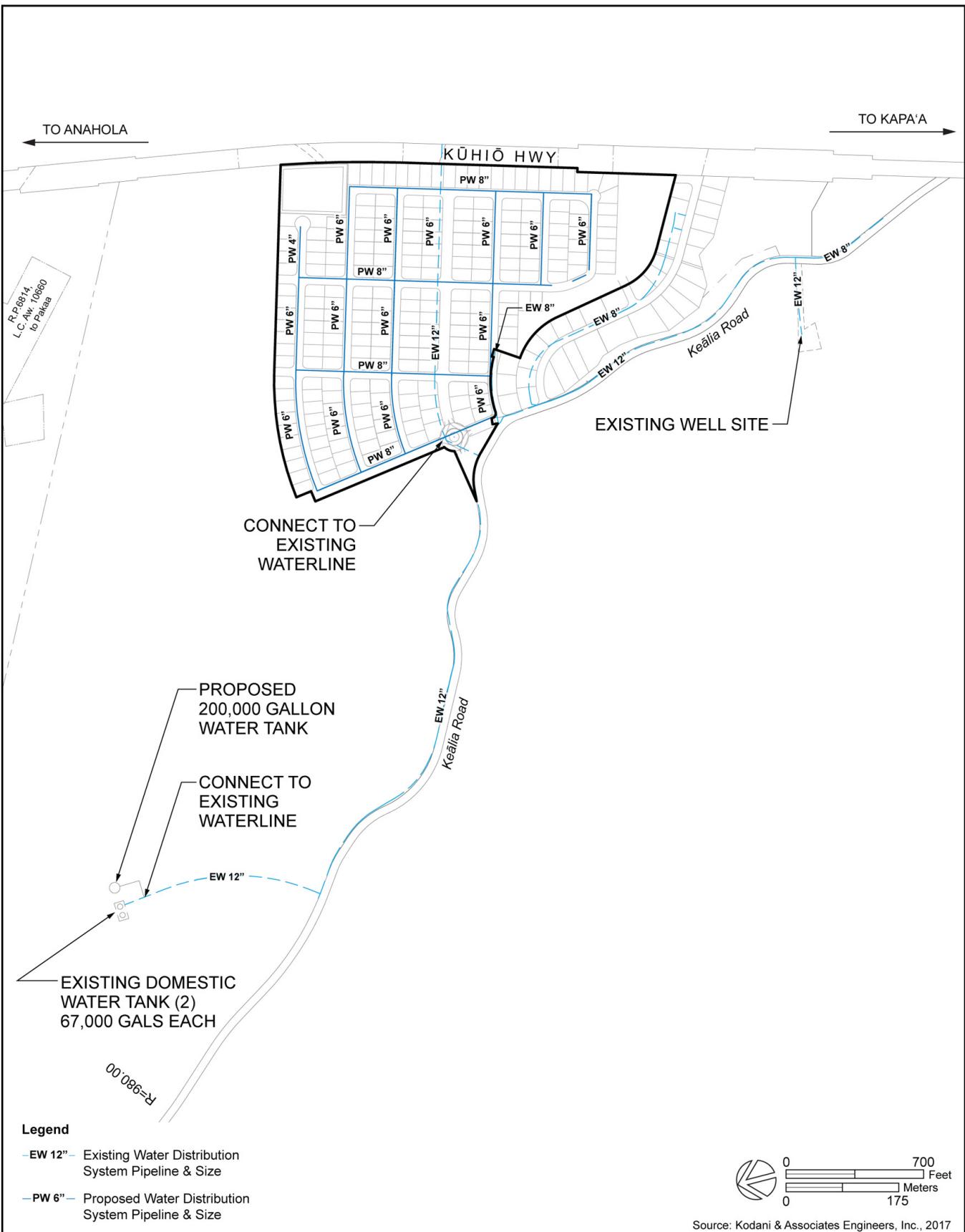
Figure 4-7 shows the existing and proposed water system. The State of Hawai'i, Water System Standards is the guiding standard for potable water systems. The standards require that the planning and design of a water system allocate each single family unit an average of 500 gallons of water per day. Furthermore, the maximum daily demand calculations require that the average daily demand allocation be multiplied by a factor of 1.5. Based on the Water System Standards, domestic water demand was estimated at 118,000 gallons/day (average daily demand) with a maximum daily demand of 177,250 gpd (*note: PER calculated water demand for 236 housing units*).

The existing water wells within the KWS will provide the required source capacity of 177,250 gallons per day. Upgrading of the existing well pump assembly may be necessary to achieve the required demand. As noted previously, the existing water service agreement allows for drawing up to 300,000 gallons per day, which will meet project demand.

Groundwater Capacity

The existing and proposed pumpage quantities from the two Keālia wells 1A and 2A will be well within the CWRM's approved pump capacity of 936,000 gpd for Well 1A (3-0618-009) and 777,600 gpd for Well 2A (3-0618-010). The Proposed Action is not expected to have an adverse impact on the groundwater aquifer.

There have been concerns raised by an individual farmer about the impact of groundwater use on a spring-fed taro lo'i located approximately one mile southwest from the wells. As discussed in Chapter 3.4, Water Resources and Hydrology, this issue was investigated by hydrogeologist Tom Nance Water Resource Engineering (TNWRE). A field investigation revealed that the source of irrigation supply for the lo'i is not a spring but a perennial stream. Due to the stream's location, its elevation, and manner of its source of supply, TNWRE concluded that there is no possibility that increased use of Keālia wells 1A and 2A will impact the flow in the stream. The TNWRE findings are included in Appendix I.



Existing and Proposed Water System

Keālia Mauka Homesites

Final Environmental Impact Statement

Kealia Properties, LLC

Figure 4-7

Storage Requirements

The State's Water System Standards also have standards for the sizing of water storage reservoirs. The standards require that the water reservoir for the development have enough capacity to meet fire flow requirements in addition to the maximum daily demand. Fire flow requirements are based on land use and zoning. The proposed subdivision will have density that is roughly equivalent to R-6 zoning. Accordingly, the fire flow requirements include being able to produce a flow of 1,000 gallons per minute, for a duration of 2 hours.

The Water System Standards require that the reservoir capacity will be sized as follows:

1. Meet maximum daily consumption. Reservoir full at the beginning of the 24-hour period with no source input to the reservoir.
2. Meet maximum day rate plus fire flow for duration of fire. Reservoir $\frac{3}{4}$ full at start of fire, with credit for incoming flow from pumps, one (1) maximum size pump out of service.
3. Minimum size reservoir shall be 0.1 MG. Reservoir size shall be as specified in Section 105.10 – RESERVOIR. Subsection A – Size.

The proposed Keālia Mauka subdivision will have a maximum daily demand of 177,250 gallons per day. Therefore, in accordance with the Water System Standards sizing method, 177,250 gallons water storage capacity is needed. It is proposed that a 200,000 gallon tank be installed adjacent to the two (2) existing 67,500 gallon tanks to satisfy the storage requirements. The proposed water tank will also connect to the existing water system.

The existing potable water transmission and distributions system will be upgraded to service the proposed development. All expansions and improvements of the Keālia Water System shall be in accordance with the Water Service Agreement and the Water System Standards (Kodani & Associates, 2017).

4.10.3 WASTEWATER

4.10.3.1 EXISTING CONDITIONS

The County of Kaua'i operates four wastewater systems serving: 1) Waimea; 2) Hanapepe-‘Ele’ele; 3) Līhu’e-Hanama’ulu; and the 4) Kūhiō Highway corridor between Wailua and Kapa’a. All but the Waimea plant have substantial amounts of available treatment capacity, but this capacity is already committed to existing and planned developments (Kodani & Associates, 2017).

In the Wailua-Kapa’a area, where the Petition Area is located, wastewater treatment is accomplished with either Individual Wastewater Systems (IWS), such as cesspools or septic tanks, or at the County-owned and operated Wailua Wastewater Treatment Plant (WWTP). IWSs generally used in the parcels that have water service but no sewer service. Because the discharge of raw waste into the ground is not beneficial to the environment, the State of Hawai‘i Department of Health prohibits the construction of any new cesspools. According to the Wailua Facility Plan, approximately 12% of the cesspools in the Wailua-Kapa’a area have reported cesspool failures, i.e., when a cesspool overflows and is reported to the Department of Health.

The County Department of Public Works, Wastewater Management Division completed a 2008 study of the Wailua-Kapa'a wastewater system, the Wailua Facility Plan. The Preliminary Engineering Report for the Keālia Mauka Homesites project utilized data and analysis from this study. According to the Wailua Facility Plan, the Wailua Wastewater Treatment Plant (WWTP) was originally constructed in 1964, and is located on approximately 2.1 acres of County owned land next to Lydgate Beach Park. It receives wastewater from Kapa'a, Papaloa, Waipouli, and Wailua areas. It was originally designed to treat an average flow of 0.5 mgd, but the plant has gone through four (4) phases of construction to expand. The treatment plant's current average daily flow capacity is 1.5 mgd, with a peak flow capacity of 5.03 mgd. The wastewater treatment plant currently receives about 0.7 million gallons per day (mgd) of flow. However, it is considered to have a capacity of about 1.0 mgd due to the estimated treatment capacity of the aeration basins and the chlorine contact tank.

The Wailua Facility Plan, Chapter 5 (Capacity Analysis), contains a detailed capacity analysis. The general conclusion of the study is that the plant is currently operating within its operational capacity. The study, however, describes the limitation of the current WWTP and provides recommended improvements. The improvements are categorized as Near Term, Middle Term, and Far Term.

At present, there are two capital improvement projects underway at the Wailua WWTP. These projects will improve the treatment process to provide more stability and efficiency in the treatment of raw wastewater to R-2 recycled water standards. The projects will also promote more use of R-2 recycled water at the Wailua Golf Course

Chapter 6 of the Wailua Facility Plan (Population Projection and Future Flows) provided detailed analysis of projected demand on the WWTP, including from proposed developments such as Coco Palms, Coconut Plantation, and Coconut Village. The County is currently updating and reevaluating the 2008 Wailua Facility Plan flow projections. The subject Keālia Mauka Homesites development has been added to the list of future projects with anticipated future demands.

4.10.3.2 POTENTIAL IMPACTS AND MITIGATION

Based on preliminary discussions with representatives from the County of Kaua'i, Department of Public Works, Wastewater Management Division, the County will provide service to the proposed subdivision. The County indicated that a "will serve" letter will be issued after the project has received zoning approval (Kodani & Associates, 2017).

Wastewater generation by the project was estimated using the County of Kaua'i, Department of Public Works, Sewer Design Standards. According to the standards, it is assumed each household has four (4) occupants, with an average daily per capita flow of 100 gallons per day, or an average of 400 gallons of wastewater per household per day. At total build out, the Keālia Mauka subdivision will produce an average daily flow of approximately 94,400 gallons of wastewater per day. The maximum flow of sewage from the development is approximately 472,000 gallons per day (0.472 mgd), calculated by multiplying the average daily flow by a flow factor of 5 (from Sewer Design Standards). The peak flow of sewage is the sum of the maximum flow of sewage and the rate of groundwater infiltration. (*Note: PER calculated wastewater demand for 236 housing units*).

The Preliminary Engineering Report (PER) by Kodani & Associates, Engineers (Appendix G) includes illustrations of the proposed sewer collection layout on site and the location of off-site improvements is shown in Figure 4-8. The project proposes construction of a new 8-inch diameter gravity main on Keālia Road. The proposed Keālia Mauka Homesites will connect to the County's Wailua-Kapa'a system. It is anticipated that construction of a wastewater lift station and transmission pipeline on Kūhiō Highway will be necessary for connection to the County system.

Project civil engineers have consulted with the County's Wastewater Management Division to determine the feasibility of utilizing the existing municipal wastewater collection system and the Wailua Wastewater Treatment Plant (WWTP) for the Keālia Mauka Homesites. The Wastewater Management Division has indicated that service to the subject development is feasible, but that detailed studies and agreements will be necessarily in order to obtain County commitments for service.

The on-site wastewater collection system and off-site improvements will be designed and constructed in accordance with County of Kaua'i standards. It is anticipated that the wastewater collection system and off-site improvements will be dedicated to the County of Kaua'i after completion of the construction and after final inspection by the County.

Petition Area

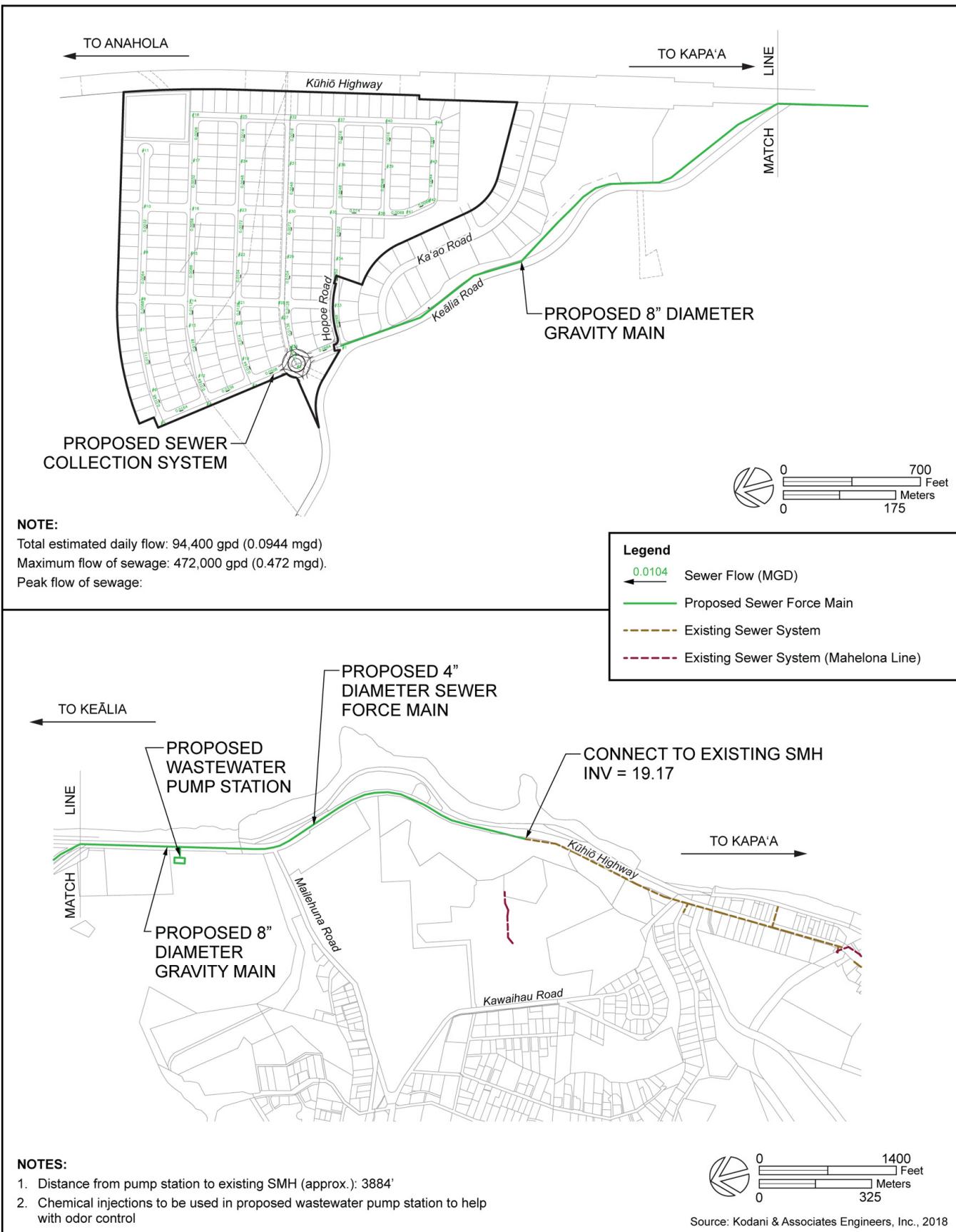
The on-site wastewater collection system will be a standard "grid-type" system in which wastewater service laterals originating at each homesite connect to wastewater main lines located under the project streets and intersect other wastewater mains at street intersections. Standard wastewater manholes will be required at all intersections. The terminus of the collection system will be at the Hopoe/Keālia Road intersection where the collection system will connect to the off-site wastewater improvements.

Off-Site

Off-site wastewater improvements include the installation of a new 8-inch wastewater main from the project site to an existing manhole nearby the Kaiakea Fire Station located on Kūhiō Highway. The existing manhole is the current terminus of the County of Kaua'i's Wailua-Kapa'a Wastewater System. It is anticipated that a wastewater pump (lift) station will be required in order to transmit the wastewater from the project site to the County's existing wastewater system.

The anticipated route of the wastewater main, beginning at the project site, is down Keālia Road from its intersection with Hopoe Road. The wastewater main would most likely be located within the Keālia Road right-of-way. This segment of the main would be primarily gravity flow and therefore wastewater manholes, with standard spacing, would be required. The Keālia Road wastewater main would terminate at the intersection with Kūhiō Highway.

The proposed wastewater main along Kūhiō Highway would begin at the intersection with Keālia Road and continue to the connection point at the existing manhole near the Kaiakea Fire Station. The main will be located within the Kūhiō Highway right-of-way.



Existing and Proposed Sewer Improvements

Keālia Mauka Homesites

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Figure 4-8

The exact location of the wastewater pump station will be determined in consultation and with the approval of the County of Kaua'i Wastewater Management Division. The pump station generally consists of a manhole (wet well), pumping apparatus, piping and electrical equipment. Most of the equipment will be underground, however, electrical controls will likely be above ground. An emergency generator will be required in order to power the station during electrical outages. The pump station will be located on land owned by the Petitioner, and the site will be dedicated to the County of Kaua'i at the completion of the project. Mitigation measures will be implemented during design and construction to minimize visual, noise and odor issues.

At the crossing of Kapa'a Stream, the sewer main will be attached to the future Kapa'a Stream Bridge, currently planned by the State of Hawai'i Department of Transportation (HDOT). In a letter dated February 25, 2019 to Ms. Moana Palama, Hawai'i Management Services, LLC, the HDOT Kaua'i District Engineer confirmed that the proposed Kapa'a Stream Bridge will be able to accommodate the installation of an eight inch sewer force main mounted to the side of the bridge (see Appendix M). The letter stated that approval of the installation of the sewer force main is subject to the following conditions:

1. The developer shall submit construction drawings prepared by a licensed professional engineer for the proposed improvements for review and approval by [Hawaii] DOT.
2. The developer shall execute a Use and Occupancy Agreement for installation of the proposed sewer line within the Kūhiō Highway right-of-way.
3. The developer shall bear all costs associated with the sewer force main.

A Section 9 Bridge Permit from the U.S. Coast Guard may be required for the inclusion of the sewer main on the bridge, if the Coast Guard determines it is not covered in the permit for the Kapa'a Stream Bridge project.

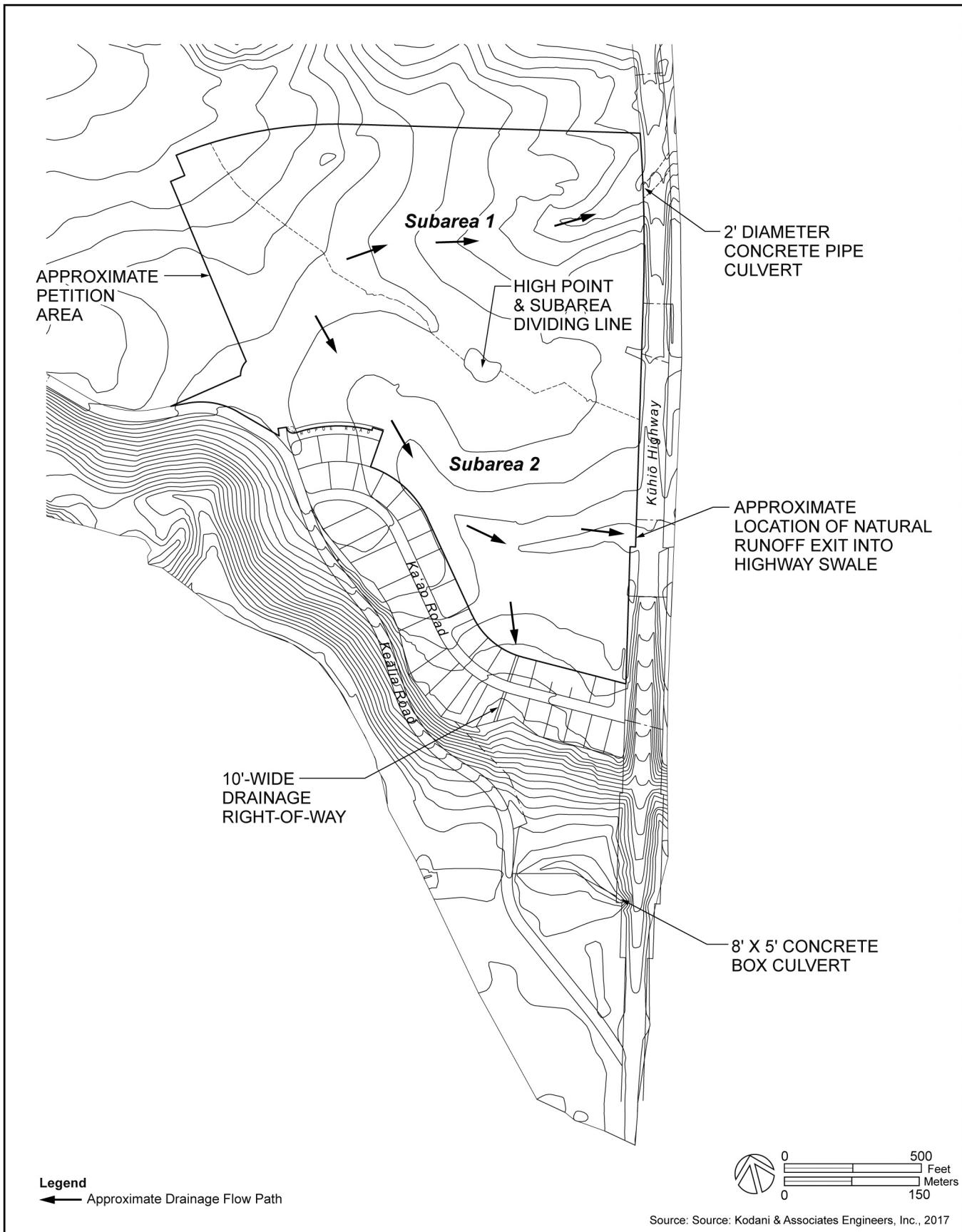
4.10.4 DRAINAGE

The PER includes a preliminary drainage study which estimates existing flow patterns and runoff quantities, as well as post-development flow patterns and runoff quantities. The drainage study looked at the entire 1,000-acre "Kumukumu parcel" [(4) 4-7-004:001], which contains the 53.4 acre Petition Area. The U.S. Department of Agriculture, Soil Conservation Service, Technical Report #5510 (TR-55), a hydrologic modeling program, was used to study drainage patterns for the existing and proposed conditions of the Petition Area. A detailed Drainage and Erosion Mitigation Plan will be prepared and submitted to the County Engineer for approval during the design and development stages (Kodani & Associates, 2017).

4.10.4.1 EXISTING CONDITIONS

The larger "Kumukumu parcel," which includes the 53.4-acre Petition Area, is mostly pasture land that is utilized for cattle ranching. The entire parcel is undeveloped and the few existing drainage structures are remnants of an old irrigation system from the plantation era.

Figure 4-9 illustrates existing drainage conditions on the Keālia Mauka Petition Area. The site generally drains from the mauka side towards Kūhiō Highway. A relatively mild ridgeline aligned in the east-west direction causes water north of the ridgeline to run off to a northern exit, and water south of the ridgeline to run off to a southern exit. For analysis purposes, the engineers split the



Existing Site Drainage Pattern

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Figure 4-9

Petition Area into two (2) subareas, Subarea 1 and Subarea 2, with the high ground as the dividing point as shown in the figure. Stormwater runoff was estimated using the TR-55 model.

Subarea 1 had a land area of 25.44 acres. Two-year storm runoff was calculated at 14.32 cubic feet per second (cfs). Subarea 2 had a land area of 28.10 acres, and two-year storm runoff was calculated at 13.69 CFS. The figure shows three (3) existing drainage outlet points from the Petition Area:

- Subarea 1 outlets to a two (2) foot diameter concrete pipe culvert on the north-east end of the proposed development area that runs under Kūhiō Highway and outlets on the makai side of the highway,
- Subarea 2 partially outlets with overland flow via a natural drainage way that spills into an existing concrete swale on the mauka side of Kūhiō Highway, and
- Subarea 2 remainder outlets to a 10 foot wide Drainage Right-of-Way that connects with the Petition Area, crosses Ka'ao Road via a 2 foot diameter concrete pipe culvert and outlets on a hillside within the large lot.

Runoff that is transmitted by Subarea 2 combines with other drainage areas and is conveyed by an existing 8 foot by 5 foot rectangular concrete drainage box culvert beyond the south end of the proposed Petition Area and within the large lot that runs under Kūhiō Highway and outlets on the Keālia Beach side of the highway. The location of the box culvert is shown in [Figure 4-9](#).

4.10.4.2 POTENTIAL IMPACTS AND MITIGATION

Petition Area

[Figure 4-10](#) shows proposed drainage patterns within the developed Petition Area. Storm water generated from each individual lot within the Petition Area will be directed to the nearest downstream street or natural drainage way that will collect the storm water and convey it to the most appropriate of two proposed detention basins on site. The detention basins are intended to moderate the storm flows and allow infiltration back into the soil. They are sized in accordance with the existing peak flows for both the 2-year and 100-year storm events. Detention Basin 2 on the southern end of the Petition Area, will also provide a multiple purpose of green space/park, and provide a buffer between the new subdivision and the existing residential area on Ka'ao Road.

Kodani & Associates utilized the TR-55 model to estimate post-development storm water runoff from the Petition Area. According to the County's Storm Water Runoff System Manual, storm water runoff cannot exceed the predevelopment conditions. The analysis of post-development conditions estimated a runoff flow of 13.52 CFS and 12.99 cfs for the first and second sub areas, respectively. This post-development flow for both subareas is less than that of current undeveloped conditions. Therefore, the proposed Keālia Mauka subdivision is not expected to have a negative drainage impact on the surrounding and downstream lands.



Proposed Drainage

Keālia Mauka Homesites

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Figure 4-10

Off-Site

The proposed improvements to Keālia Road, which include resurfacing, widening and addition of sidewalks and shoulders, will improve existing drainage conditions. The road will be designed to direct stormwater away from the travel surfaces, and the roadway will include green space between the shoulder and sidewalk to mitigate roadside ponding. The design of the roundabout at Keālia Road and Kūhiō Highway will include appropriate drainage structures such as catch basins, drain inlets, and manholes to ensure that flooding is minimized at this low lying intersection. Drainage improvements will be identified during the design phases for the Keālia Road improvements and Kūhiō Highway roundabout.

There will be no change to drainage conditions along Kūhiō Highway as a result of the sewerline installation. There will be, however, drainage improvements proposed as part of HDOT's proposed reconfiguration of the Mailihuna Road intersection.

4.10.5 SOLID WASTE

4.10.5.1 EXISTING CONDITIONS

The County Department of Public Works (DPW) refuse collection crews operate out of three baseyards on Kaua'i. The Kapa'a Baseyard collects trash from Puhi to Anahola, and includes the Keālia Project Area. There is currently one sanitary landfill and four refuse transfer stations on the island. The transfer stations are at Hanapepe, Līhu'e, Hanalei, and Kapa'a, with the latter the closest to the Project Area. The County's single landfill, the Central Kaua'i Landfill, is located in Kekaha and services the entire island. According to the County's Integrated Solid Waste Management Plan, the landfill will need to be expanded to increase capacity. The County Department of Public Works, Solid Waste Division has indicated there are plans to expand the landfill to provide capacity until 2027 (Kodani & Associates, 2017).

Residential waste is collected via the County of Kaua'i's Residential Refuse Collection program. Adjacent residential areas along Ka'ao and Hopoe Roads are served by the County. Currently, there is no solid waste generation from the Petition Area.

The Kaua'i County Recycling Office is a division of the DPW Solid Waste Division and oversees County recycling programs. Paper, aluminum, other metals, glass, plastic, motor oil, household hazardous waste and green waste are recycled. There are also green waste diversion sites located in Hanapepe, Līhu'e and Kapa'a.

4.10.5.2 POTENTIAL IMPACTS AND MITIGATION

Petition Area

The Petition Area is undeveloped and as such, there are few fixed structures that would need to be disposed as construction waste. There are remnants of current and past irrigation systems onsite, such as pipes and small concrete headwalls. Waste generated during subdivision construction will consist primarily 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. Construction materials that are rendered un-recyclable will be disposed of in the Central Kaua'i Landfill.

The County would provide solid waste disposal service for the subdivision residents. The County of Kaua'i provides Residential Refuse Collection via a Pay as You Throw (PAYT) program. Curbside refuse collection is offered on a once-per-week basis, and customers are able to choose a refuse cart size. A representative of the County of Kaua'i's Solid Waste Management Division has indicated that the County would service the proposed subdivision (Kodani & Associates, 2017).

The quantity of solid waste generated from the Proposed Action was estimated by assuming that each household will fill the 64 gallon cart each week. The project is estimated to generate approximately 8.02 tons of waste per year. This compares to the estimated islandwide generation quantity of 157,130 tons per year for the year 2013 (County of Kaua'i, 2009) and represents an increase of 0.005% in solid waste generation on Kaua'i. Residents will be required to comply with existing regulations and requirements. The project will not have a significant impact on solid waste management.

Off-Site

Off-site construction will generate construction-period debris that will need to be disposed. Debris will be handled, transported and disposed of in accordance with all applicable regulations.

4.11 Roadways and Transportation

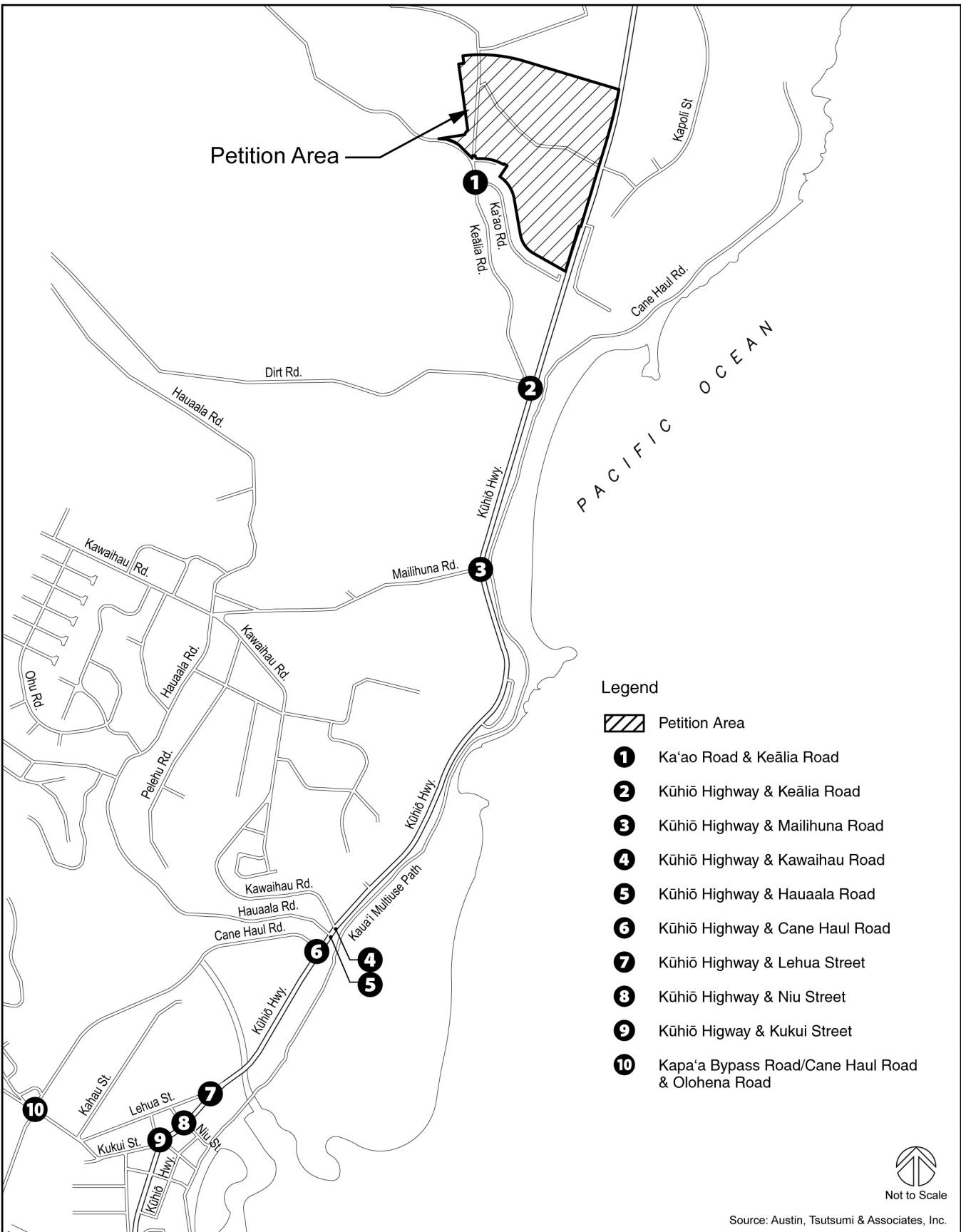
A Traffic Impact Analysis Report (TIAR) was prepared for the proposed Keālia Mauka Homesites project by Austin, Tsutsumi & Associates, Inc. (ATA). The report is included as Appendix H. The TIAR described existing roadways and traffic conditions, anticipated future traffic conditions, and the potential traffic impacts resulting from the project. The findings are summarized below.

4.11.1 EXISTING CONDITIONS

4.11.1.1 ROADWAY SYSTEM

The following are brief descriptions of the existing roadways in the project vicinity. The locations of these roads and the TIAR study intersections are shown in Figure 4-11.

- **Kūhiō Highway** – is generally a north-south, two-way, two-lane principal arterial in the vicinity of the Petition Area. The roadway begins in Līhu'e at its connection with Kaumuali'i Highway and travels along the coast before terminating at Ke'e Beach in Hā'ena. Kūhiō Highway is a State roadway and is the major thoroughfare in the East Kaua'i regions. In the vicinity of the project, Kūhiō Highway has a posted speed limit of 25 to 50 miles per hour (mph) depending on the surrounding land uses. In the immediate vicinity of the project, the highway has a speed limit of 50 mph in the northbound direction and 40 mph in the southbound direction.
- **Keālia Road** – is generally a northwest-southeast, two-way, two-lane roadway in the vicinity of the Petition Area. The roadway begins at its intersection with Kūhiō Highway in the east and extends to the northwest to its intersection with Hauaala Road. The roadway then travels to the northeast where it reconnects to Kūhiō Highway in Anahola. In the vicinity of the Project, Keālia Road has a posted speed limit of 25 mph.



Roadways and Traffic Study Intersections

Keālia Mauka Homesites

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Figure 4-11

- **Ka'ao Road** – is generally an east-west, two-way, two-lane roadway in the vicinity of the Petition Area. The roadway begins at its intersection with Keālia Road to the west and travels to the east to provide access to the existing residential neighborhood. In the vicinity of the Petition Area, Ka'ao Road has a posted speed limit of 15 mph.
- **Mailihuna Road** – is generally an east-west (makai-makai), two-way, two-lane roadway in the vicinity of the Petition Area. The roadway begins on the east end at its intersection with Kūhiō Highway, about a half mile south of the Kūhiō Highway-Keālia Road intersection. Mailihuna Road terminates on the west at its intersection with Kawaihau Road. Mailihuna Road provides access to Kapa'a High School and residential areas. Closer to Kūhiō Highway, Mailihuna Road has a posted speed limit of 25 mph which drops to 15 mph near Kapa'a High School.
- **Kawaihau Road** – is generally an east-west (makai-makai), two-way, two-lane roadway in the vicinity of the Petition Area. The roadway begins on the east end at its intersection with Kūhiō Highway, about 1.3 miles south of the Kūhiō Highway-Keālia Road intersection. Kawaihau Road terminates to the west at its intersection with Kahuna Road and Pililiamoo Road. Kawaihau Road provides access to Kapa'a High School, Kapa'a Elementary School and residential areas. In the vicinity of the Petition Area, Kawaihau Road has a posted speed limit of 25 mph.
- **Hauaala Road** – ~~is generally an east-west (makai-mauka), two-way, two-lane roadway in the vicinity of the Petition Area. The roadway begins to the east at its intersection with Kūhiō Highway (about 1.4 miles south of the Kūhiō Highway-Keālia Road intersection) and terminates to the northwest at its intersection with Keālia Road, at the Spalding Monument. Hauaala Road provides access to mauka residential areas. In the vicinity of the Petition Area, Hauaala Road has a posted speed limit of 25 mph.~~
- **Cane Haul Road** – is generally a north-south, one-way, one-lane roadway in the vicinity of the Petition Area. The roadway begins to the northeast at its intersection with Kūhiō Highway (about 1.4 miles south of the Kūhiō Highway-Keālia Road intersection) and terminates to the south at the roundabout on Olohena Road where it connects to the two-way Kapa'a Bypass Road. The roadway provides travel in the southbound direction only. In the vicinity of the Petition Area, Cane Haul Road has a posted speed limit of 25 mph.
- **Kapa'a Bypass Road** – is a three mile long bypass road providing an alternate to Kūhiō Highway for travelers passing through Kapa'a and Waipouli. The bypass road is a north-south, two-way, two-lane roadway. The roadway begins to the north at the roundabout on Olohena Road where it connects to the one-way Cane Haul Road. The Olohena Road roundabout is approximately two miles south of the Kūhiō Highway-Keālia Road intersection. The Kapa'a Bypass Road terminates to the south at its intersection with Kūhiō Highway in Wailua. In the vicinity of the Petition Area, it has a posted speed limit of 25 to 35 mph.
- **Olohena Road** – is generally an east-west, two-way, two-lane roadway. The roadway begins in Kapa'a Town at Kūhiō Highway, near its connection with Kukui Street, about two miles south of the Kūhiō Highway-Keālia Road intersection. Olohena Road provides access to Kapa'a Middle School. In the Kapa'a Town area, Olohena Road has a posted speed limit of 25 mph.

- **Lehua Street** – is generally an east-west, two-way, two-lane roadway in Kapa‘a Town. The roadway begins to the east at its intersection with Kūhiō Highway and terminates to the west at its intersection with Olorena Road, and has a posted speed limit of 25 mph.
- **Niu Street** – is generally a northwest-southeast, two-way, two-lane roadway in Kapa‘a Town. The roadway begins to the northwest at its intersection with Lehua Street and terminates on the makai end at the Ke Ala Hele Makalae Multi-Use Path. There is no posted speed limit.
- **Kukui Street** – is generally an east-west, two-way, two-lane roadway in Kapa‘a Town. The roadway begins to the west at its connection with Olorena Road and terminates on the makai end at the Ke Ala Hele Makalae Multi-Use Path. Kukui Street has a posted speed limit of 15 mph.

4.11.1.2 SUSTAINABLE TRANSPORTATION INFRASTRUCTURE

Complete Streets

While transportation planning has traditionally focused on automobile travel, recently enacted “Complete Streets” policies also recognize the numerous benefits of encouraging alternative modes of transportation. Complete Streets policies encourage the provision of equitable, accessible, and safe transportation for all modes. Hawai‘i State Senate Bill 718 (2009) required that the Hawai‘i Department of Transportation (HDOT) and the County transportation departments:

“...adopt a complete streets policy that seeks to reasonably accommodate convenient access and mobility for all users of the public highways within their respective jurisdictions...”

Pedestrian Accessibility

Within Kapa‘a Town, Kūhiō Highway has sidewalks on both sides of the road from the Kukui Street intersection to just north of the Kūhiō Highway/Lehua Street intersection. The sidewalk continues north along the mauka side of Kūhiō Highway until the Kawaihau Road intersection. Beyond that, there is no sidewalk until after the Kapa‘a Stream bridge, where the sidewalk on the mauka side of the highway resumes until the intersection with Keālia Road. HDOT’s Kapa‘a Stream Bridge project will continue the mauka sidewalk and connect to Mailihuna Road, creating a continuous mauka sidewalk.

Other pedestrian infrastructure in the vicinity includes a narrow, at times overgrown asphalt path along Mailihuna Road, which provides access between Kūhiō Highway and Kapa‘a High School. Beyond Kapa‘a High School and Elementary School, the Kawaihau Bike Path, a designated shared use path for bicyclists and pedestrians, provides access through the residential area up to Kapahi Park. Along Olorena Road at the existing roundabout, a sidewalk is provided along the mauka bound direction and eventually transitions into an asphalt path separated from the roadway by a guardrail. Near the Kapa‘a Middle School, the sidewalk transitions to the makai-bound side of the roadway.

Keālia Road, from Kūhiō Highway up to the existing Ka‘ao Keālia Town Tract subdivision, is a narrow two lane road without sidewalks or shoulders. There is minimal pedestrian activity along Kūhiō Highway near the Keālia Road intersection, and no limited pedestrian activity along Keālia Road. Despite the lack of sidewalks, pedestrians occasionally travel between the existing residential

areas along Keālia Road and the post office, food truck and farmer's market located near Kūhiō Highway. In addition, walkers, runner and bicyclists regularly use the road to access Spalding Monument, located at the mauka end of Keālia Road, for fitness and recreation.

Ke Ala Hele Makalae multi-use path provides pedestrians and bicyclists with an alternative to travel along Kūhiō Highway. The TIAR observed that most pedestrian activity in this area was along the path rather than the highway. The multi-use coastal path begins at Lihi Park in Kapa'a and travels north to Kuna Bay in Keālia on the makai side of Kūhiō Highway. Ke Ala Hele Makalae also has a Kawaihau Road spur that provides access from the main pathway to the Mahelona Medical Center, Kapa'a Elementary School and Kapa'a High School.

The TIAR (Appendix H) includes a figure (Figure 3.1) showing existing pedestrian facilities in the vicinity and major destinations.

Bicycle Accessibility

Bike Plan Hawai'i (HDOT, 2003) is the State's bicycle master plan, and outlines how the State intends to accommodate and promote bicycling. *Bike Plan Hawai'i* identifies existing and proposed bicycle routes that could potentially be implemented in the future. Kūhiō Highway is a two-lane road in the project vicinity, and is the principal north-south arterial. Bike Plan Hawai'i identifies Kūhiō Highway between Wailua and Keālia as a proposed "signed shared roadway," that is, a roadway that is open to both bicycle and motor vehicle travel, and that has been designated by signage as a preferred route for bicycle use. Keālia Road is also identified as a proposed signed shared roadway. The TIAR (Figure 3.2) shows existing bicycle facilities in the vicinity.

The TIAR observed minimal, if any bicycle activity along Kūhiō Highway near the Petition Area. Bicycle use was noted along Ke Ala Hele Makalae, which provides coastal pedestrian and bicycle access from Kapa'a Town through Keālia. From Keālia Mauka, it is a just over a 10 minute walk or 5 minute bike ride on a slight downhill grade to access the multi-use path.

As noted above, bicyclists sometimes use Keālia Road to access Spaulding Monument for fitness and recreation, and the Kawaihau Bike Path provides a 3.0 mile long shared use path from Kapa'a Elementary School to Kapahi Park.

A total of 20 bicycle routes and upgrades are proposed for the Kawaihau region of East Kaua'i. In the vicinity of the Petition Area, five (5) signed shared roadways and three (3) bicycle paths are proposed. Priority I projects are considered near-term, Priority II are considered mid-term, and Priority III are long-term projects. The projects involve roadway segments under both State and County jurisdiction.

- Signed Shared Road--Kūhiō Highway (Keālia to Anahola) (Priority Level II)
- Signed Shared Road--Kūhiō Highway (Wailua to Keālia) (Priority Level II)
- Signed Shared Road--Keālia Road (Ko'olau to Kūhiō Highway) (Priority Level III)
- Signed Shared Road--Mailihuna Road (Kawaihau Road to Kūhiō Highway) (Priority Level III)
- Signed Shared Road--Olorena Road/Kukui Street (Kamalu Road to Kūhiō Highway) (Priority Level III)
- Bike Path--Extension of Ke Ala Hele Makalae Multi-Use Path (Kuna Bay to Anahola) (Priority Level I)

- Bike Path--Extension of Kawaihau Bike Path (Kapa'a Elementary School to Kūhiō Highway) (Priority Level II)
- Bike Path--Upgrade of Kawaihau Bike Path (Kapa'a Elementary School to Kapahi Park) (Priority Level II)

Public Transit

The Kaua'i Bus public transit system offers several routes that provide service from Kekaha to Hanalei. The location of existing bus stops and routes are shown in the TIAR (Figure 3.3). Routes 400 and 500 serve Lihu'e to Hanalei, providing several stops in the project vicinity along Kūhiō Highway. There are bus stops on both sides of Kūhiō Highway near the Keālia Road intersection. These stops are a half-mile away from the proposed subdivision, and just over a ten minute walk. However, given Keālia Road's narrow width and lack of sidewalk or shoulders, it is unlikely that many residents of the existing Ka'ao Road subdivision walk between the subdivision and the bus stop.

Route 60 (Kapahi Shuttle) provides service within the Kapa'a region, including to Mahelona Hospital, Kapa'a High School, and Kapa'a Middle School. This route includes several stops along Kūhiō Highway in Kapa'a Town between the Kukui Street and Kawaihau Road, and along Kawaihau Road. Buses run every hour throughout the day. The Kapahi Shuttle does not stop near the Keālia Road intersection with Kūhiō Highway. In order to access the Kapahi Shuttle, Ka'ao subdivision residents would need to get to a Route 60 stop within Kapa'a Town, over a mile away. On foot, this would require a half-hour walk along a section of Kūhiō Highway with no sidewalks. Unless they are dropped off in Kapa'a Town near a Kapahi Shuttle stop, it is unlikely that many existing residents regularly utilize this bus route to get to the high or middle school.

4.11.1.3 EXISTING TRAFFIC VOLUMES

The hourly turning movement data was collected at the following intersections, which are located in proximity to the Petition Area. The numbers correspond to the numbers shown in Figure 4-11

- [1] Ka'ao Road/Keālia Road (unsignalized)
- [2] Kūhiō Highway/Keālia Road (unsignalized)
- [3] Kūhiō Highway/Mailihuna Road (unsignalized)
- [4] Kūhiō Highway/Kawaihau Road (unsignalized)
- [5] Kūhiō Highway/Hauaala Road (unsignalized)
- [6] Kūhiō Highway/Cane Haul Road (unsignalized)
- [7] Kūhiō Highway/Lehua Street (unsignalized)
- [8] Kūhiō Highway/Niu Street (unsignalized)
- [9] Kūhiō Highway/Kukui Street (signalized)
- [10] Kapa'a Bypass Road/Cane Haul Road/Olorena Road (roundabout)⁴

⁴ For intersection [10] Kapa'a Bypass Road/Cane Haul Road/Olorena Road, turning movement data was obtained from the 2015 Kapa'a Transportation Solutions report and calibrated to collected existing conditions data.

Based on the count data, it was determined that the AM peak hour of traffic occurs between 7:15 AM and 8:15 AM and the PM peak hour of traffic occurs between 3:45 PM and 4:45 PM.

4.11.1.4 EXISTING TRAFFIC CONDITIONS

Regional Analysis

Kūhiō Highway serves as the main thoroughfare for regional traffic in East Kaua'i. The highway is contra flowed on Monday through Saturday from 7:00 AM to 1:30 PM to provide two (2) southbound lanes and one (1) northbound lane from the Kapa'a Bypass south junction to Kapule Highway to accommodate heavier southbound volumes.

During the AM and PM peak hours of traffic, volumes along Kūhiō Highway are generally balanced in both the northbound and southbound directions within the project vicinity. Although southbound traffic is generally higher during the AM peak, volume on Kūhiō Highway is reduced by the use of the Kapa'a Bypass Road.

Within the region, queuing along southbound Kūhiō Highway was observed to occur during the PM peak hour when contraflow operations were not in place. Occasionally, queues were observed to also form along southbound Kapa'a Bypass Road during the PM peak hour.

The proposed Keālia Mauka subdivision will be accessed from Kūhiō Highway via Keālia Road. Keālia Road also provides access to the existing residences on Ka'ao Road and Hopoe Road. The entry to the proposed subdivision will be located mauka of Hopoe Road.

Currently, there is an existing, unused gated access on the property, on the mauka side of Kūhiō Highway, north of the Keālia Road intersection. This is a former plantation era gate and has been chained since the plantation closed. This access point onto Kūhiō Highway will be eliminated. The State Department of Transportation has indicated it will not allow direct access from the Petition Area onto Kūhiō Highway.

Existing Intersection Analysis

The observations and analysis described below are based on observations at the time the TIAR was prepared. Within Kapa'a Town, queuing was observed during both the AM and PM peak hours of traffic. Queues began near the Kūhiō Highway/Kawaihau Road intersection and extended in both the northbound and southbound directions. Queuing during the AM peak hour was mainly the result of traffic from the nearby Kapa'a High School (Mailihuna Road) and Kapa'a Elementary School (Kawaihau Road).

Level of service (LOS) is a term used to describe traffic operating conditions that may occur on a given travel lane or roadway when it is subjected to various traffic volumes. LOS also measures the effect of various factors on traffic such as space, speed, travel time, traffic interruptions, safety, driving comfort, convenience, and freedom to maneuver. LOS is expressed in a qualitative manner through the use of six levels ranging from "A" through "F." LOS "A" represents free-flowing traffic and no congestion. LOS "F" reflects severe traffic congestion with stop and go conditions.

Study intersections were analyzed using the traffic analysis software Synchro. Because Synchro does not report LOS for uncontrolled movements at unsignalized intersections, LOS is not given for

the through movements along Kūhiō Highway. Therefore, existing congestion along Kūhiō Highway at the study intersections is based solely on observations at the time of the traffic counts. Traffic count information for these intersections can be found in the TIAR in Appendix H.

[1] Ka'ao Road/Keālia Road. This intersection has low volumes of traffic, with 46(62) vehicles during the AM(PM) peak hour of traffic. All movements operate at LOS A with minimal delay.

[2] Kūhiō Highway/Keālia Road. The eastbound approach of this intersection operated at LOS C(C) and the westbound approach operated at LOS E(F) during the AM(PM) peak hour of traffic. Delay to the westbound approach was mainly caused by the larger percentage of vehicles making a left-turn onto Kūhiō Highway. However, the number of vehicles making the left-turn was low (≤ 26 vehicles) and adequate gaps were observed along Kūhiō Highway to complete the maneuver. The northbound and southbound left-turn movements from Kūhiō Highway onto Keālia Road operated at LOS A during both peak hours and experienced minimal delay. Although minor street movements and major street left-turn movements were able to proceed during gaps in traffic along Kūhiō Highway, the high speeds along the highway increased the difficulty of these maneuvers.

Although the posted speed limit is 40 mph in the southbound direction and 50 mph in the northbound direction, southbound vehicle speeds were observed to be higher. This is due to a hill on the northbound approach. No congestion along Kūhiō Highway near the Keālia Road intersection was observed during either peak hour.

[3] Kūhiō Highway/Mailihuna Road. The eastbound approach of this intersection operated at LOS F during both peak hours of traffic and at overcapacity conditions during the AM peak hour because of the high volume of vehicles making the left-turn onto Kūhiō Highway. Much of this traffic is associated with the elementary and high schools in the area. Vehicles had difficulty making the eastbound left-turn because of the high speeds of the vehicles on Kūhiō Highway. The northbound and left-turn from Kūhiō Highway onto Mailihuna Road operated at LOS A during both peak hours and experienced minimal delay. No congestion along Kūhiō Highway was observed at this intersection during either peak hour.

[4] Kūhiō Highway/Kawaihau Road. The eastbound approach of this intersection operated at LOS F(C) and the northbound left-turn movement operated at LOS B(B) during the AM(PM) peak hour of traffic. Because of the high volume of eastbound right-turns and northbound left-turns, the vehicles heading southbound along Kūhiō Highway often stopped to allow these vehicles to proceed, and the intersection was observed to self-regulate and operate similar to an all-way stop controlled intersection during the heaviest periods of congestion. During less congested periods, minor movements were able to use gaps in traffic to proceed. Because of the large number of turning movements at this intersection and the proximity of this intersection to the Hauaala Road intersection, Kūhiō Highway became congested in both the northbound and southbound directions.

[5] Kūhiō Highway/Hauaala Road. The eastbound approach of this intersection operated at LOS F(D) and the northbound left-turn movement operated at LOS B(B) during the AM(PM) peak hour of traffic. Additionally, the eastbound approach operated under overcapacity conditions during the AM peak hour. Operations at this intersection behaved similarly to the Kūhiō Highway/Kawaihau Road intersection.

[6] Kūhiō Highway/Cane Haul Road. Because Cane Haul Road is one-way and does not allow traffic to enter Kūhiō Highway, minimal delay was observed at this intersection. Many vehicles were observed to make a southbound right-turn onto Cane Haul Road in order to access the Kapa'a

Bypass Road. The majority of Kūhiō Highway congestion in the southbound direction cleared in the vicinity of this intersection. However, congestion in the northbound direction remained due to queues extending from the Kūhiō Highway/Kawaihau Road and Kūhiō Highway/Hauaala Road intersections.

[7] Kūhiō Highway/Lehua Street. The eastbound approach of this intersection operated at LOS F and overcapacity during both peak hours of traffic. Because Kapa'a Bypass Road terminates at the Olohena Road roundabout, vehicles heading farther north must reenter Kūhiō Highway. The majority of these vehicles use Lehua Street to make a left-turn onto Kūhiō Highway. The high volume of left-turns caused increased delay for the eastbound approach. At this intersection, congestion was observed along Kūhiō Highway in the northbound direction due to queues extending from Kawaihau Road and Hauaala Road intersections during both peak hours of traffic.

[8] Kūhiō Highway/Niu Street. The eastbound approach of this intersection operated at LOS E(C) and the westbound approach operated at LOS C(C) during the AM(PM) peak hours of traffic. At this intersection, congestion was observed along Kūhiō Highway in the northbound direction due to queues extending from the Kawaihau Road and Hauaala Road intersections.

[9] Kūhiō Highway/Kukui Street. The minor street movements operated at LOS F(D) during the AM(PM) peak hours of traffic. Delay to the minor movements was mainly caused by the long coordinated signal favoring the Kūhiō Highway through movements. All movements generally cleared in one cycle. However, during the most congested AM and PM periods, queues from the Kawaihau Road and Hauaala Road intersections caused slow moving traffic heading northbound.

[10] Kapa'a Bypass Road/Cane Haul Road/Olohena Road. Data from the Kapa'a Transportation Solutions report indicates the roundabout at this intersection generally operates smoothly during the PM peak hour of traffic, with all approaches operating at LOS C or better. However, during the AM peak hour, the eastbound approach operates at LOS E, near overcapacity conditions. The high volume of traffic is due to vehicles from residential areas and Kapa'a Middle School entering Kūhiō Highway and Kapa'a Bypass Road.

4.11.2 POTENTIAL IMPACTS AND MITIGATION

The TIAR evaluated traffic conditions in a future base year without the project, and then again with the project. The analysis below for "Base Year 2027" represents future conditions without the project. The analysis for "Future Year 2027" represents future conditions with the project.

4.11.2.1 BASE YEAR 2027 (FUTURE CONDITIONS WITHOUT PROJECT)

For the TIAR analysis, a Base Year 2027 was selected to represent the full build out and occupancy of the project. The actual construction of the infrastructure improvements and the commencement of lot sales will occur prior to 2027. However, because homes will be constructed by the individual lot purchasers, it is difficult to know when full build out will occur. Year 2027 represents a reasonable estimate for purposes of the TIAR.

The Base Year 2027 scenario represents the traffic conditions within the study area without the project. Base Year traffic projections were formulated by applying a defacto growth rate to the existing 2017 traffic count volumes, and adding trips generated by known future developments in the vicinity.

Defacto Growth Rate

Projections for Base Year 2027 traffic were based upon existing traffic counts performed by ATA for the TIAR, the State of Hawai'i Department of Transportation (HDOT)'s Kaua'i Regional Travel Demand Model (KRTDM) growth for forecast years between 2007 and 2035, and known developments proposed in the vicinity. A 1% annual growth rate was applied to Kūhiō Highway, Cane Haul Road and Olohenā Road, and a 2% annual growth rate was applied to Kukui Street.

Other Known Developments

By Year 2027, traffic in the project vicinity is expected to experience significant growth due to several residential and commercial developments proposed in the surrounding regions. The trips generated by these developments are already accounted for in the KRTDM growth forecast.

The locations of these known developments are shown in the TIAR. They are briefly described below.

- Pi'ilani Mai Ke Kai – This project is located in Anahola on the makai side of Kūhiō Highway on land owned by the Department of Hawaiian Home Lands (DHHL). The project began in 2006 and includes 181 single-family lots. The majority of the lots have already been awarded. It is assumed by 2027, all lots will be built out. This development is already accounted for in the KRTDM growth projections.
- Kulana Subdivision – This project is located north of Olohenā Road and east of Hauiki Road. This agricultural subdivision will contain 172 single family houses at full buildout. There is currently no expected completion date, however, the project is included in KRTDM forecasts.
- Hokua Place – This project is located between Olohenā Road and Kapa'a Bypass Road near Kapa'a Middle School. The project plans to develop 100 single-family units, 700 multi-family units and 8,000 square feet of neighborhood retail. The project also proposes to construct a roadway, Road "A", through the subdivision connecting Kapa'a Bypass Road to Olohenā Road just west of Kapa'a Middle School. Once constructed, the roadway is expected to reduce traffic volumes at the Kapa'a Bypass Road/Cane Haul Road/Olohenā Road roundabout. The Hokua Place project was previously known as Kapa'a Highlands Phase II. A TIAR completed for Kapa'a Highlands dated December 2013, assumes a completion year of 2020. The Kapa'a Highlands TIAR was used to determine trips generated and rerouted in the study area.
- Coconut Plantation – This project is located along the makai side of Kūhiō Highway between the Courtyard by Marriott Kauai at Coconut Beach Hotel and the Mokihana Lodge. The project proposes to develop 192 resort units. There is currently no expected completion date, however, for the purposes of this TIAR, the project was assumed to be completed by 2027.
- Coconut Beach Resort – This project is located along the makai side of Kūhiō Highway between the Courtyard by Marriott Kaua'i at Coconut Beach Hotel and Kaua'i Coast Resort at the Beachboy. The project proposes to develop 330 condo units as part of a new beachfront timeshare. Completion is anticipated in 2019.

- Coco Palms – This project is located along the mauka side of Kūhiō Highway north of Kuamo'o Road. The project proposes to restore the old Coco Palms hotel into a 350-room resort. These units were factored into traffic projections for 2027.

Planned Roadway Improvements

Roadway projects that are currently planned include a proposed roundabout at Kūhiō Highway and Mailihuna Road. For the purposes of the TIAR, it was assumed that the roundabout will be implemented by Base Year 2027. The existing three-legged intersection on Mailihuna Road, which currently has stop control only, would be reconfigured to improve safety by constructing a roundabout.

There are a number of other proposals to relieve congestion along Kūhiō Highway in the Wailua and Kapa'a regions that are currently in the planning stages. They include major undertakings such as widening Kūhiō Highway from Kapa'a Bypass Road to Kuamo'o Road to include an additional southbound lane; widening Kūhiō Highway from Kuamo'o Road to Kapule Highway; and extending the Kapa'a Bypass Road from Olohena Road to Kūhiō Highway by adding a northbound lane. Other proposed improvements include closing the east leg of Kukui Street; improving the Kūhiō Highway/Niu Street intersection; and eliminating the connection from Hauaala Road to Kūhiō Highway and creating a new connection to the Kapa'a Bypass road. These roadway improvements are not expected to be completed by Year 2027 and therefore were not included in Base Year 2027 traffic predictions.

Base Year 2027 Analysis

It is anticipated that by Base Year 2027, traffic will have increased by approximately 18%(24%) along Kūhiō Highway and by approximately 9%(14%) along Cane Haul Road/Kapa'a Bypass Road during the AM(PM) peak hour over existing conditions. This is due to the development in the surrounding regions, though actual growth may vary based upon the approval process of the proposed developments.

Peak hour queuing along Kūhiō Highway is expected to operate similar to existing conditions. Although not expected to be completed by Year 2027, the planned widening of Kūhiō Highway from Kapa'a Bypass Road to Kuamo'o Road would reduce queues along Kūhiō Highway south of the study intersections. Queuing along Kūhiō Highway near Kawaihau Road is expected to remain in Base Year 2027.

Many minor street movements are expected to experience increases in delay due to the increase in traffic along Kūhiō Highway. However, the Kūhiō Highway/Mailihuna Rd intersection is expected to operate with all movements at LOS C or better due to the construction of the planned roundabout.

The following intersections are expected to continue operating at or worsen to LOS E/F during Base Year 2027 conditions.

- [2] Kūhiō Highway/Keālia Road
- [4] Kūhiō Highway/Kawaihau Road
- [5] Kūhiō Highway/Hauaala Road
- [7] Kūhiō Highway/Lehua Street
- [8] Kūhiō Highway/Niu Street
- [9] Kūhiō Highway/Kukui Street

- [10] Kapa'a Bypass Road/Cane Haul Road/Oloheña Road

Base Year 2027 With Mitigation

The TIAR notes that in order to improve Base Year 2027 traffic operations at the study intersections, the preferred mitigation would be a Kapa'a Bypass Road extension and the relocation of the Hauala Road connection, as described under "Planned Roadway Improvements" above. Although the Kapa'a Bypass Road extension is currently planned by HDOT, the project is not expected to be completed by Year 2027. The TIAR describes 2027 scenarios with and without the Bypass Road Extension completed.

4.11.2.2 FUTURE YEAR 2027 (FUTURE CONDITIONS WITH PROJECT)

The Future Year 2027 scenario represents the traffic conditions in the area with the full build out of the proposed Keālia Mauka Homesites project. Access to the 235 lots will be provided via Keālia Road from Kūhiō Highway. A new four-way, one-lane roundabout will be constructed north of the Keālia Road/Hopoe Road intersection to connect Keālia Road to the subdivision. Both the southern and western approaches of the roundabout will have connections to Keālia Road.

There will be no other direct vehicle access to Kūhiō Highway from the Petition Area. An existing, unused gated access along Kūhiō Highway from the plantation era will be removed. By 2027, the 235 house lots will be sold, and homes will be constructed and occupied.

Travel Demand Estimates

In order to project the increase in vehicle trips generated by the project, the TIAR utilized trip rates and formulae from the Institute of Transportation Engineers (ITE) *Trip Generation Manual*. The standard rates selected were based on the future land use (single-family detached housing) and the number of dwelling units (235). The generated trips can be found in Table 5.2 of the TIAR. The traffic generated by the project was added to the forecast Base Year 2027 traffic volumes to estimate "Future Year 2027" traffic conditions.

At full build out, the project is estimated to generate a total of 172(231) net external trips during the AM(PM) peak hour of traffic. Traffic from the project is expected to generate growth along major roadways in the study area.

Future Year 2027 Analysis

The TIAR evaluated traffic conditions at the ten study intersections under two scenarios: 1) With the Kapa'a Bypass Road Extension and 2) Without the Kapa'a Bypass Road Extension. The findings are discussed below.

Future Year 2027 With Kapa'a Bypass Road Extension. Similar to Base Year 2027 (i.e., without project), there will continue to be queuing along Kūhiō Highway south of the study intersections until the widening of the roadway is completed. A decrease in traffic queuing is expected in Kapa'a town when the extension of the Kapa'a Bypass Road and relocation of the Hauala Road connection are complete.

The majority of study intersections are expected to experience increased delays compared to Base Year 2027. The following intersections are projected to either continue operating at or worsen to LOS E/F during the AM and/or PM peak hours. Traffic volume counts can be found in the TIAR,

[2] Kūhiō Highway/Keālia Road. Because Kūhiō Highway/Keālia Road is the only access point to the project from Kūhiō Highway, this intersection is expected to experience a significant increase in traffic. During both peak hours of traffic, the eastbound approach is expected to worsen to LOS F and overcapacity conditions. The westbound approach is also expected to operate at overcapacity conditions. Proposed mitigation is discussed below.

[4] Kūhiō Highway/Kawaihau Road. The eastbound approach is expected to continue operating at LOS F during the AM peak hour. However, the intersection is expected to self-regulate as in existing conditions to reduce delay to the eastbound approach. Because of a lack of feasible alternatives, no mitigation is proposed for this intersection.

[5] Kapa'a Bypass Road/Hauaala Road. The southbound approach is expected to continue operating at LOS E during the AM peak hour. Because the approach will continue to operate under capacity as in Base Year 2027 with mitigation conditions, no mitigation is proposed for this intersection.

[6] Kūhiō Highway/Kapa'a Bypass Road. The eastbound approach is expected to continue operating at or worsen to LOS F during both peak hours of traffic. Although the eastbound approach is expected to experience delays over Base Year 2027 conditions, the proposed refuge lane is anticipated to help minimize delays to the eastbound left-turn movement. Additionally, the approach will continue to operate under capacity, and no mitigation is proposed at this intersection during the PM peak hour. Mitigation is proposed in Section 5.4 below.

[7] Kūhiō Highway/Lehua Street. The eastbound approach is expected to continue operating at LOS E during the AM peak hour and worsen to LOS F during the PM peak hour. However, the intersection is expected to self-regulate as in existing conditions to reduce delay to the eastbound approach. All movements will continue to operate under capacity, and no mitigation is proposed at this intersection.

[8] Kūhiō Highway/Niu Street. The eastbound approach is expected to worsen to LOS F during the AM peak hour and continue operating at LOS E during the PM peak hour. As in Base Year 2027 conditions, adequate gaps in traffic are expected due the intersection's proximity to the Kukui Street signal and the minor street movements are expected to continue operating adequately. No mitigation is proposed at this intersection.

[9] Kūhiō Highway/Kukui Street. Both minor street approaches are expected to continue operating at LOS F during the AM peak hour of traffic due to a longer green time being allotted to the Kūhiō Highway through movements. Because the minor streets will continue to operate under capacity, no mitigation is proposed for this intersection.

Future Year 2027 Without Kapa'a Bypass Extension. Similar to Base Year 2027, queuing along Kūhiō Highway within and south of the Project area is expected to remain until congestion relief projects are completed in Kapa'a and Wailua. In the Project area, while major through movements are expected to continue allowing other movements to proceed during congested periods to reduce

major left-turn and minor movement delay, all movements are expected to experience longer delays over existing conditions.

The majority of study intersections are expected to experience increased delays compared to Base Year 2027. The following intersections are projected to either continue operating at or worsen to LOS E/F during the AM and/or PM peak hours. Traffic volume counts can be found in the TIAR.

[2] Kūhiō Highway/Keālia Road. Because Kūhiō Highway/Keālia Road is the only access point to the project from Kūhiō Highway, this intersection is expected to experience a significant increase in traffic. During both peak hours of traffic, the eastbound approach is expected to worsen to LOS F and overcapacity conditions. The westbound approach is also expected to operate at overcapacity conditions. Proposed mitigation is discussed below.

[3] Kūhiō Highway/Mailihuna Road. The eastbound approach is expected to worsen to LOS E during the AM peak hour of traffic due to anticipated reroutes of vehicles to this intersection from the congested Kawaihau Road and Hauaala Road. This intersection is expected to continue operating adequately with minimal increases in overall delay. No mitigation is proposed for this intersection.

[4] Kūhiō Highway/Kawaihau Road. The eastbound approach is expected to continue operating overcapacity at LOS F during the AM peak hour and LOS E during the PM peak hour. Similar to Base Year 2027, although a signal may be warranted at this intersection, it may create longer delays. However, the intersection is expected to self-regulate as in existing conditions to reduce delay to the eastbound approach. Additionally, a larger portion of vehicles may use Mailihuna Road to access Kūhiō Highway due to the improved conditions at that intersection with the roundabout. No mitigation is proposed for this intersection.

[5] Kūhiō Highway/Hauaala Road. The eastbound approach is expected to continue operating at LOS F during both peak hours and at overcapacity during the AM peak hour. Similar to Base Year 2027, although a signal may be warranted at this intersection, it may create longer delays. However, the intersection is expected to self-regulate as in existing conditions to reduce delay to the eastbound approach. Additionally, a larger portion of vehicles may use Mailihuna Road to access Kūhiō Highway due to the improved conditions at that intersection with the roundabout. No mitigation is proposed for this intersection.

[7] Kūhiō Highway/Lehua Street. The eastbound approach is expected to continue operating at LOS F and under capacity during both peak hours of traffic. The intersection is expected to self-regulate as in existing conditions to reduce delay to the eastbound approach. No mitigation is proposed for this intersection.

[8] Kūhiō Highway/Niu Street. The minor street approaches are expected to continue operating at or worsen to LOS E(F) during both peak hours of traffic. As in Base Year 2027 conditions, adequate gaps in traffic are expected due the intersection's proximity to the Kukui Street signal, and the minor street movements are expected to continue operating adequately. No mitigation is proposed at this intersection.

[9] Kūhiō Highway/Kukui Street. The northbound shared through/right-turn movement will continue operating at overcapacity during both peak hours of traffic with increases in delay. Additionally, both minor street approaches are expected to continue operating at LOS

E or F during both peak hours of traffic. Because there is limited right of way (ROW) to improve capacity along Kūhiō Highway and the minor streets will continue to operate under capacity, no mitigation is proposed for this intersection.

Future Year 2027 With Proposed Mitigation. The TIAR evaluated two potential mitigations for the Kūhiō Highway and Keālia Road intersection: ~~The first was to construct a roundabout. However, this option is problematic from a design standpoint due to the skew of the intersection.~~

1. Install a traffic signal
2. Construct a roundabout

The April 2018 DEIS presented a traffic signal as the recommended mitigation for this intersection, primarily due to its expected lower design and construction costs. During the DEIS comment period, the County of Kaua'i indicated that a roundabout is their preferred option. In response to the County's preference, the roundabout is presented in this FEIS as part of the "Proposed Action." Because a traffic signal remains a viable option, it is also discussed here.

~~The preferred mitigation is to install a traffic signal to improve operations along Keālia Road. Based on projections for Future Year 2027 and the Four Hour Vehicular Volume signal warrant condition (Warrant 2) in the Manual on Uniform Traffic Control Devices (MUTCD) (FHWA, 2009), a signal will likely be warranted at this intersection. Although a signal would slow through progression along Kūhiō Highway when vehicles actuate the signal on Keālia Road, the signal would be designed to provide Kūhiō Highway with the majority of green time. Additionally, because the Kūhiō Highway/Keālia Road intersection is relatively isolated, queuing at the signal is not expected to affect traffic operations in the area.~~

1. Kūhiō Highway/Keālia Road Traffic Signal

This improvement would install a traffic signal along with pedestrian signals and crosswalks and a southbound right-turn acceleration lane onto Keālia Road. Figure 4-12 illustrates the proposed traffic mitigation a traffic signal and potential improvements recommended with the signal at this intersection.

Based on the TIAR traffic projections for Future Year 2027, a signal is anticipated to be warranted at this intersection with the Proposed Action given the existing land configuration. Although a signal would slow through traffic along Kūhiō Highway when vehicles on Keālia Road actuate the signal, the signal would be designed to provide Kūhiō Highway with the majority of green light time. Additionally, because this intersection is relatively isolated, queuing at the signal is not expected to negatively impact traffic operations in the area. A southbound right-turn lane is also proposed with the traffic signal to remove right-turning vehicles from the flow of through traffic and provide a deceleration lane (ATA, 2018).



Source: Austin, Tsutsumi & Associates, Inc., January 2019

FIGURE 4-12: KŪHIŌ HIGHWAY AND KEĀLIA ROAD SIGNAL

A traffic signal would provide pedestrians and bicyclists with a designated crossing time, which is expected to reduce the potential for vehicular conflicts. At the Kūhiō Highway/Keālia Road intersection, pedestrians and bicyclists would be able to cross Kūhiō Highway to access Ke Ala Hele Makalae multi-use path, or cross Keālia Road to the sidewalk along the mauka side of the highway.

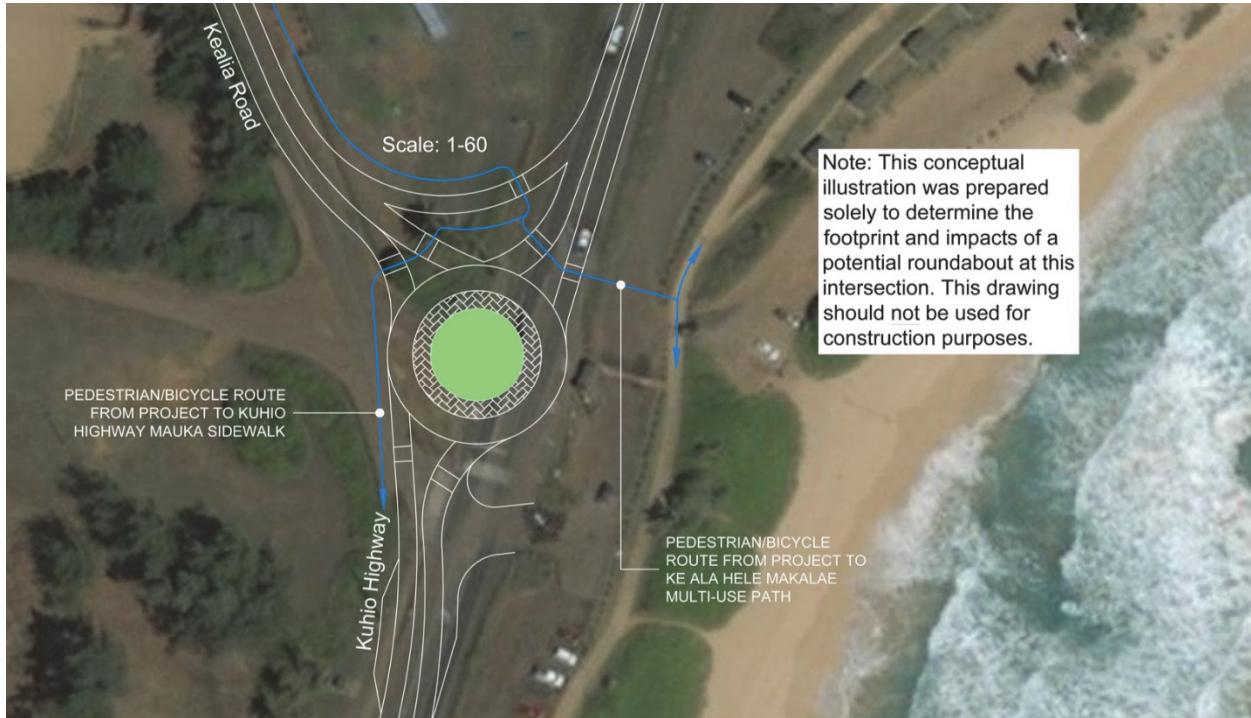
Realignment of Keālia Road to eliminate the existing skewed approach at the intersection was initially considered, but was ultimately not evaluated due to the required utility relocations and impact on the southbound left turn storage lane.

The TIAR notes that although the initial construction costs for a traffic signal and southbound right-turn deceleration lane (without intersection realignment) are expected to be lower than for a roundabout, the County of Kaua'i has indicated a preference for a roundabout at this intersection.

With a traffic signal, the intersection is expected to operate with all movements at LOS C or better during both peak hours of traffic. Additionally, the intersection will operate with overall LOS B during both peak hours. Delay to the mainline Kūhiō Highway movements are anticipated to operate, on average, with less than 15 seconds of delay. A southbound left turn storage of 60 feet is needed, and 225 feet is needed for the northbound left-turn storage. For the northbound left-turn lane, it appears that additional length for deceleration can be provided through restriping.

2. Kūhiō Highway/Keālia Road Roundabout (County-preferred mitigation)

In response to DEIS comments from the County of Kaua'i, the TIAR evaluated a roundabout concept for the Kūhiō Highway/Keālia Road intersection. Although many alternative layouts are possible, the purpose of the concept shown in Figure 4-13 was to demonstrate some of the issues that may be encountered as a result of the roundabout's larger footprint and roadway realignments. The concept presented strives to generally maintain the existing alignment of the approach roadways, while keeping the roundabout footprint within the existing pavement on the makai side of the intersection.



Source: Austin, Tsutsumi & Associates, Inc., May 2019

Source: Austin Tsutsumi & Associates, January, 2019

FIGURE 4-13: KŪHIŌ HIGHWAY AND KEĀLIA ROAD ROUNDABOUT (PREFERRED MITIGATION)

The following impacts are anticipated, and are likely to make the roundabout significantly more costly to construct than a traffic signal:

- Realignment of the northbound approach of Kūhiō Highway to keep the roundabout footprint within the existing pavement on the makai side.
- Southbound right-turn bypass lane required due to acute angle between Keālia Road and Kūhiō Highway
- Bus stop/shelter relocation
- Electrical utility pole relocation
- Reconstruction of Keālia Surf Shack signs and fences

The TIAR noted that other design enhancements may be required to reduce speed upstream of the roundabout, particularly in the southbound direction where speeds are higher. Positioning the roundabout more inland would also likely require areas mauka of Kūhiō Highway to be re-graded as a result of the steep slope that exists mauka of the highway.

With a roundabout, pedestrians and bicyclists will have shorter crossing distances with the provision of medians and removal of left-turn lanes along the highway. The medians will allow pedestrians to cross Kūhiō Highway in two stages. Crosswalks are proposed along the northbound, southbound, and eastbound approaches, allowing pedestrians and bicyclists to cross the highway to access Ke Ala Hele Makalae multi-use path, or cross Keālia Road to access the mauka sidewalk. Bicyclists traveling in the vehicular lanes would follow the same paths through the roundabout as vehicles.

With a roundabout, all vehicle movements are anticipated to operate at LOS B or better during the AM peak hour of traffic. During the PM peak hour, the southbound through movement is anticipated to operate at LOS D. Increased delay is expected for the southbound approach due to the high volumes along Kūhiō Highway required to share priority with the lower volume Keālia Road. LOS projections for the roundabout are provided in the TIAR, Appendix H.

Future Year 2027 Recommendations. In summary, the TIAR concluded that either a traffic signal or roundabout would provide adequate traffic mitigation at the Keālia Road/Kūhiō Highway intersection for vehicular, bicycle and pedestrian traffic. Both a signal and roundabout are feasible options. Due to the County of Kaua‘i’s stated preference for a roundabout, this FEIS presents the roundabout as the proposed mitigation for the Proposed Action.

Anticipated mitigation measures required as part of the roundabout are listed below. The proposed mitigation is based on the single conceptual roundabout design evaluated in the TIAR and shown in Figure 4-13. Actual improvements required will depend on the final roundabout design.

- Construct a single-lane, three-leg roundabout.
 - Realign the skewed eastbound approach of Keālia Road.
 - Realign the northbound approach of Kūhiō Highway.
 - Provide a southbound right-turn bypass onto Keālia Road prior to the roundabout.

- Relocate the existing northbound and southbound bus stops/bus bays along Keālia Road to south of the intersection.
- Relocate electrical utility poles.
- Reconstruct the Keālia Surf Shack signs and fences at the northwest corner of the intersection.
- Provide crosswalks along all three (3) approaches.

With the proposed mitigation, all approaches will operate at LOS D or better during both peak hours of traffic. Additionally, the intersection will operate with overall LOS B/C during the AM/PM peak hours.

Forecast traffic volumes and LOS for the study intersection movements are found in the TIAR, Appendix H.

Future Year 2027 Sustainable Transportation

The proposed traffic mitigation for the project will include improvements to the eastbound approach of Keālia Road between the Petition Area and Kūhiō Highway. Proposed improvements include widening the right of way from 40 feet to 56 feet, and the addition of shoulders and sidewalks. The road will include two 10-foot vehicle travel lanes, 5-foot paved shoulders, a 5-foot wide concrete sidewalk and green space between the paved road shoulder and sidewalk. The paved shoulder may be used by bicyclists who are uncomfortable using the vehicular travel lane.

The installation of a traffic signal roundabout at the Kūhiō Highway/Keālia Road intersection will provide shorter crossing distances with median refuges along all approaches. A roundabout may also help to reduce speeds along the highway at this intersection, although additional design enhancements may be necessary to reduce speeds prior to entering the roundabout. The existing bus stops at the intersection will continue to be provided. However, the existing bus bays for the northbound and southbound approaches of Kūhiō Highway will be relocated just south of the intersection, provide signalized crossings along the southbound, eastbound and westbound approaches. These will improve conditions for pedestrians. The existing bus stops at the intersection will be relocated but will continue to be available.

As noted previously, although a roundabout is the County's preferred mitigation at this intersection, a traffic signal would also provide adequate mitigation and remains an option. A traffic signal would also benefit pedestrians by providing signalized crossings along all approaches. As with the roundabout, the existing southbound bus stop/bus bays would need to be relocated south of the intersection.

The County has proposals to modify bus routes to improve access from the project vicinity to Kapa'a Middle and High Schools. The State Bike Plan has identified Kūhiō Highway near Keālia Road as a future signed shared roadway, furthering the goal of regional bicycle connectivity. Ke Ala Hele Makalae will continue provide a nearby amenity for walking, jogging, or recreational bike riding, and could also provide a transportation option into Kapa'a.

With the proposed improvements to Keālia Road, pedestrian and bicycle connectivity between the subdivision, Kūhiō Highway, public transportation, and Ke Ala Hele Makalae path will be improved. Pedestrians and cyclists will be able to travel further north and south of the Petition Area. Nearby residential areas and schools will be accessible from the multi-use path via the Kawaihau Road spur or via the Mailihuna Road connection proposed with the construction of the Mailihuna roundabout.

These improvements to sustainable transportation modes will benefit future residents of Keālia Mauka. No additional improvements to pedestrian and bicycle facilities are recommended for Future Year 2027.

That said, the major constraint to the use of sustainable mode of transportation by residents will continue to be the poor connectivity between the subdivision and Kūhiō Highway. The narrow width of Keālia Road, lack of sidewalks or shoulders, combined with the uphill terrain and roadway curves make this segment uninviting—and potentially dangerous—for bicycling and walking. Starting from the Keālia Road and Kūhiō Highway intersection, walking, bicycling, and public transit are more attractive and realistic transportation options.

4.11.2.3 CONSTRUCTION PERIOD IMPACTS

Petition Area

Construction activity within the Petition Area will have a minor traffic impact on Keālia Town Tract residents due to the increased presence of construction personnel, vehicles and equipment, and the transport of construction materials. Access along Keālia Road, Ka'ao Road and Hopoe Road will not be impeded by subdivision construction.

Off-Site

There will be disruption to traffic during the construction of off-site improvements on Keālia Road and Kūhiō Highway. The off-site improvements are expected to take between 9 and 12 months to complete, assuming they are constructed simultaneously. There will be temporary lane closures on Keālia Road while the right-of-way is widened and sidewalks and shoulders are being installed. This will inconvenience residents of Keālia Town Tract who depend on Keālia Road for access. A traffic management plan for Keālia Road construction will be developed by the construction contractor and approved by the County (which has jurisdiction over this road) prior to the commencement of construction. Construction activity will avoid the peak morning and afternoon traffic periods to minimize traffic disruption for residents.

The construction of the new roundabout at the Kūhiō Highway intersection will affect through traffic on Kūhiō Highway. There may be limited periods during the roundabout construction when Kūhiō Highway is restricted to one lane of travel through the intersection. Flow in both directions will be maintained by implementing an alternative one-way movement through the construction area, directed by on-site traffic control personnel. Construction and lane closures will be avoided during the peak morning and afternoon periods to the extent possible. Access to Keālia Beach Park will be maintained at all times to the extent possible.

Installation of the sewer main along Kūhiō Highway between Keālia Road and the Kaiakea Fire Station will take place in the road shoulder, and lane closures may not be required. However, there may be underground utilities or other obstructions in the shoulder that require the alignment of the main to be shifted into the highway pavement. In this event, the construction contractor will notify HDOT and the County and provide advance public notice to motorists. When the sewer main installation crosses Mailihuna Road, there may be temporary lane closures on Mailihuna Road at the intersection. Approximately one week of Mailihuna Road lane closures should be expected. Construction along Kūhiō Highway is expected to take about 9 months.

A traffic management plan will be developed by the construction contractor and approved by the HDOT prior to the commencement of construction along Kūhiō Highway. Construction will avoid the peak morning and afternoon traffic period to minimize disruption for Kūhiō Highway users. Through traffic will be maintained at all times.

4.12 Public Services

There will be an estimated 700 residents of the subdivision that will move into the Keālia region. The project impacts and any recommended mitigation for public services are discussed in the following sub sections.

4.12.1 POLICE PROTECTION

4.12.1.1 EXISTING CONDITIONS

The County of Kaua'i Police Department has three stations located approximately 25 miles apart. The main station and administrative headquarters is located in Līhu'e, and collocated with the County Civil Defense and County Prosecuting Attorney's office. District stations are located at Waimea in West Kaua'i and Hanalei on the north shore. A small substation is located in Kapa'a adjacent to Kapa'a Beach Park.

The Project Area is under the jurisdiction of the Hanalei District, which extends north from Oloheña Road in Kapa'a and covers the entire northern end of the island. The Hanalei District covers the communities of Kapa'a, Keālia, Anahola, Kīlauea, Princeville, Hanalei, Wainiha and Hā'ena. The district substation is located on Kūhiō Highway just north of the Princeville Shopping Center. The Hanalei District is comprised of three squads of officers, responsible for staffing three "beats" with 24 hour coverage, 7 days a week. When fully staffed, personnel include one Lieutenant (District Commander), three sergeants, 21 police officers, and a senior clerk.

4.12.1.2 POTENTIAL IMPACTS AND MITIGATION

Petition Area

The increased number of residents associated with the project is not likely to have a significant impact on the overall need for police services. The majority of future residents (approximately 658 of 700) are expected to be existing Kaua'i residents, so the project will not result in a large net increase in population. The proposed traffic improvements (~~signal~~ roundabout) will mitigate the impact of increased traffic at the Kūhiō Highway and Keālia Road intersection.

Off-Site

During installation of the new sewer main along Kūhiō Highway, there may be temporary traffic impacts and the need for additional police attention. Construction traffic control personnel will be provided in accordance with the approved traffic management plan. There will be no long-term impact on police services once the off-site improvements are completed.

4.12.2 FIRE PROTECTION

4.12.2.1 EXISTING CONDITIONS

The Kaua'i County Fire Department has eight fire stations islandwide: Hanalei (Princeville), Kaiakea, Kapa'a, Līhu'e, Koloa, Kalaheo, Hanapēpē and Waimea. The station nearest the Petition Area is Station 8, Kaiakea Station located in Kapa'a. The county has a unified, island-wide system of fire protection and rescue services. Satellite stations typically have two to three personnel per station and provide quick response to medical emergencies. The Kaiakea Station is staffed with three to five fire fighters. Firefighting apparatus include one engine (pumper), one truck, and one hazmat vehicle (personal communication with Kalani Abreu, Kaiakea Station, March 6, 2018).

4.12.2.2 POTENTIAL IMPACTS AND MITIGATION

Petition Area

The project proposes 235 additional homes which will need fire protection from the Kaiakea Station in Kapa'a. Because most of the 700 subdivision residents are expected to be current Kaua'i residents, there will not be a significant net population increase to the island. The Proposed Action should not have a significant impact on fire protection resources or service. The subdivision roads will be designed to accommodate fire vehicle access and equipment, and the water system will be designed to provide adequate firefighting and storage capacity. No additional mitigation is required.

Off-Site

During installation of the new sewer main along Kūhiō Highway, there may be temporary traffic impacts which have the potential to affect fire response time. The new sewer main will be installed in the vicinity of the Kaiakea Fire Station. Access into and out of the fire station driveway and along Kūhiō Highway will be maintained at all times. Any traffic delays are not expected to adversely impact fire response times. There will be no long-term impact once the new sewer main is installed.

4.12.3 EMERGENCY MANAGEMENT FACILITIES

4.12.3.1 EXISTING CONDITIONS

The Kaua'i Emergency Management Agency (formerly Civil Defense) is responsible for coordinating and integrating efforts among all levels of government and the private sector to mitigate against, prepare for, respond to, and recover from natural disasters, acts of terrorism, and other threats and hazards. Natural hazards including flood, tsunami, seismic activity and dam-related flooding were discussed in Section 3.5 of this FEIS.

The County of Kaua'i's Multi-Hazard Mitigation and Resilience Plan (County of Kaua'i, 2015) identifies emergency services infrastructure in the County. These include the emergency operations center in Līhu'e; police and fire stations; hospitals, clinics and dispensaries; civil defense sirens; tsunami signs and warnings; and community shelters. The Multi-Hazard Mitigation and Resilience Plan is discussed in Section 5.2.6.3 of this FEIS.

Outdoor warning sirens are maintained throughout the island to alert the public to emergencies. The nearest emergency siren for the Keālia area is located on Kamole Road, on the makai side of Kūhiō Highway, approximately 1,200 feet from the center of the Petition Area. Monthly tests of the

Statewide Outdoor Warning Siren System are conducted by the State. The County has also implemented Connect 5, a mass notification system allowing the County to disseminate voice and text messages regarding civil defense emergencies in minutes.

Emergency shelters have also been identified by the Hawai‘i State Civil Defense and Kauai Emergency Management Agency. The nearest official emergency shelters, according to the Multi-Hazard Mitigation and Resilience Plan, are at Kapa‘a Elementary School and Kapa‘a High School, both located about one mile south of the project area. The elementary school has a shelter capacity of 1,209 occupants and the high school has a capacity of 3,569 occupants (County of Kaua‘i, 2015). The schools are approved as shelters for tsunami, flooding, and hurricane.

4.12.3.1 POTENTIAL IMPACTS AND MITIGATION

Petition Area

As stated previously, it is expected that the majority of the future Keālia Mauka residents are already living on island, many in East Kaua‘i, and the new subdivision would not generate a significant net increase in population. There is not expected to be a significant impact to emergency management facilities. Existing warning sirens and emergency shelters will be adequate to accommodate the new subdivision residents.

Off-Site

Construction of off-site infrastructure improvements will not impact emergency management facilities or services.

4.12.4 MEDICAL SERVICES AND FACILITIES

4.12.4.1 EXISTING CONDITIONS

The Mahelona Medical Center is Kaua‘i’s eastside critical access hospital. The facilities are part of the Kaua‘i region of Hawai‘i Health Systems Corporation, headquartered at a sister facility, West Kaua‘i Medical Center in Waimea. Services include 24 hour emergency services, imaging (digital x-ray), rehabilitation therapies (occupational, physical, and recreational), skilled nursing, intermediate, long term and acute care. The medical center has approximately 145 employees.

The medical facilities include the Samuel Mahelona Memorial Hospital, which was founded in 1917. The medical campus also includes the East Kaua‘i Clinic, and Ho‘ola Lahui Hawai‘i (Federally Qualified Health Clinic), Kaua‘i Police Athletic League, and state and hospital housing.

4.12.4.2 POTENTIAL IMPACTS AND MITIGATION

Petition Area

The addition of 235 new housing units will not have an impact on the Mahelona Medical Center or other medical services on the island. The majority of the prospective homeowners are already Kaua‘i residents, and there will be only a negligible increase in demand for medical services, if at all. No mitigation measures are required.

Off-Site

The construction of off-site infrastructure improvements will have no impact on medical services and facilities.

4.12.5 SCHOOLS

4.12.5.1 EXISTING CONDITIONS

Public schools serving the Keālia area include Kapa'a Elementary School, Kapa'a Middle School and Kapa'a High School, as well as the Kanuikapono Public Charter School in Anahola, which serves Grades K-12. According to the State of Hawai'i Department of Education (DOE), Kapa'a Elementary School currently has capacity for approximately 29 additional students. However, excess capacity is expected to be eliminated over the next five years. Kapa'a Intermediate School has classroom capacity for roughly 125 additional students, which is expected to remain the same for the next five years. Kapa'a High School is over capacity by 100 students. The over-capacity condition will continue over the next five years (correspondence from DOE dated December 22, 2017, see Chapter 9).

Independent (private) schools in the area include the Anahola campus of Kamehameha Schools Preschool. There are also several private pre-schools located in Kapa'a.

4.12.5.2 POTENTIAL IMPACTS AND MITIGATION

Public school enrollment generated by the Proposed Action was estimated using student generation rates provided by the DOE Office of School Facilities and Support Services. The student generation rates (SGR) for elementary, middle, and high school students were calculated by the DOE using the Kealaula Subdivision in Ele'ele as a comparable. This subdivision targets a similar sales demographic and has lot sizes similar to the Proposed Action.

Level	Student Generation		
	Rate (SGR)	Hsg Units	# Students
Elementary	0.2241	235	53
Middle	0.0345	235	11
High School	0.1552	235	<u>37</u>
Total			101

The SGR are subject to the following disclaimers:

1. That the SGR is based on student addresses currently in the HIDOE system and may not be accurate due to inaccurate student addresses (i.e. data entry errors);
2. That Pre-K and Charter school students are excluded from the SGR calculations;
3. That it is assumed that the information regarding street names, addresses, and number of built units are accurate; and
4. That the project is not at mature build out as the subdivision has 61 lots with 58 housing units built.

Utilizing these SGR, the proposed 235 residential lots may generate a total of 101 school-aged children. This includes 53 elementary school age children ($235 \times 0.2241 = 53$ students); 11 middle school age students ($235 \times 0.345 = 11$ students); and 37 high school age students ($235 \times 0.1552 = 37$ students). The student estimates based on the SGR are long term projections covering a time frame that goes beyond project build out. When the project is mature and unit turnover is stabilized, approximately 101 Hawai'i DOE students will reside there.

~~These projections represent the anticipated number of students at full subdivision build out, which could occur over the next 10 years. The proposed lot sizes do not allow Additional Dwelling Units (ADU) per the County's zoning ordinance. There will be restrictive covenants prohibiting Additional Dwelling Units (ADU) for this development, so no more than one single-family home would be built on each lot.~~

Because the Keālia Mauka residential lots are targeted to local residents, most of these 101 students are already attending Kaua'i public schools, although not necessarily in the Kapa'a schools complex. The economic and market study estimates that over 80 percent of the prospective buyers will be existing Kaua'i residents, and the remaining 20 percent expected to be non-resident second/vacation home buyers (CBRE, 2017). ~~Using this assumption, 20 percent of the total 235 lots, or 47 lots could be purchased by an off island buyer. Applying the DOE standard multipliers to these 47 households, the potential new students to the Kaua'i island school system is estimated to be eleven elementary school aged children ($47 \times 0.2241 = 11$ students); two intermediate school students ($47 \times 0.345 = 2$ students); and eight high school students ($47 \times 0.1552 = 8$). This results in a total of 21 students who are "new" to the Kaua'i school system. In reality, many Many, if not most of the non-resident second/vacation home buyers off island purchasers will be empty nesters without school aged children. Those with school-aged children may also choose to send their children to Kaua'i's private, rather than public schools. A nominal to negligible number of public school students will be generated by these households (CBRE, 2019).~~

~~In summary, a worst case estimate of 21 new students to the Kaua'i public schools over a ten year build out period will not have a significant adverse impact.~~

The proposed off-site improvements are roadway and utility infrastructure, and will have no impact on school enrollment or facilities.

Educational Contribution Agreement

Educational Contribution Agreements (ECA's) are legal agreements between the DOE and a developer detailing how a developer will mitigate impacts to public school capacity via cash, land, or combination of both. They are executed for developments with a residential component 1) located in a designated School Impact Fee District, or 2) to implement a fair share contribution to the DOE condition on a discretionary approval. When a development is not located within a designated School Impact Fee District, and subject to a discretionary approval, the DOE determines on a case by case basis the impacts to school facilities and whether a fair share contribution is required.

In an email dated August 1, 2018, the DOE indicated that it would not be requesting a fair share contribution for the Keālia Mauka project (see Appendix M).

4.12.6 PARKS AND RECREATIONAL FACILITIES

4.12.6.1 EXISTING CONDITIONS

There are 15 parks within the County of Kaua‘i’s Kawaihau Planning District, which includes the Keālia Petition Area. These County parks encompass 211 acres of land and include athletic fields, playgrounds, beach parks, and playing courts. Keālia Beach Park, located across Kūhiō Highway from the Petition Area, is 66 acres in size and is serviced by County lifeguards, with portable toilets only. The County’s multi-use path, Ke Ala Hele Makalae, extends from Lydgate Park in Kapa‘a to Ahihi Point, and is proposed to continue northward to Anahola. This 6.2 mile multi-use path runs along the coastline and provides a major recreation resource for walking, jogging and bicycling.

The Keālia coastline is used for a number of recreational activities, despite the lack of County facilities. Keālia Beach is a long strip of sandy beach located on the makai side of the highway providing scenic views of the coastline. Strip parking occurs along gravel and dirt areas of this beach park from Kapa‘a Stream up to the northern end of the park. The southern section of this beach is commonly used for surfing and fishing. The only public facilities present are a temporary lifeguard stand and a few picnic tables. At the northern end of this beach is an unpaved parking area. This portion of the beach is used for swimming, picnicking, surfing and fishing.

4.12.6.2 POTENTIAL IMPACTS AND MITIGATION

Petition Area

The Proposed Action will not adversely impact County parks and other public recreation facilities in the area. The majority of subdivision residents are already Kaua‘i residents, so the net increase in demand on County recreational facilities will be minimal. However, there will be more residents in the Keālia area, which could increase use of nearby Keālia Beach and Ke Ala Hele Makalae path.

The proposed subdivision will include a 4.32-acre detention basin and green space on the south side that can be used for recreation. This area is appropriate for use for ballfields, playgrounds, and passive recreation space for Keālia Mauka and surrounding residents.

Off-Site

The proposed improvements to Keālia Road include enhanced travel lanes, shoulders and sidewalks, which will improve pedestrian and bicycle infrastructure. This could increase the number of pedestrians, joggers, and bicyclists in the vicinity. The new roundabout will provide areas for safe crossing of Kūhiō Highway, providing greater connectivity between mauka residential areas and the shoreline, as well as with Ke Ala Hele Makalae multi-use path.

4.12.7 POSTAL SERVICE

4.12.7.1 EXISTING CONDITIONS

Currently, there is no U.S. Postal Service delivery to the Keālia Town Tract subdivision, and residents use the Keālia Post Office near the intersection of Keālia Road and Kūhiō Highway.

4.12.7.2 POTENTIAL IMPACTS AND MITIGATION

There will be no postal delivery to the new subdivision. Residents will use the Keālia Post Office. The Petitioner will pay for the construction of additional post office boxes to accommodate the new residents.