Draft Environmental Assessment

Barry Family Project

October 2019

Tax Map Key No.: (3) 1-5-059:059
Kea‘au, Puna, County of Hawai‘i, State of Hawai‘i

APPLICANT:

Kevin M. Barry and Monica S. Barry, Trustees of
the Barry Family Trust Dated November 15, 2006
P.O. Box 247
Kea‘au, Hawai‘i 96749

APPROVING
AGENCY:

State of Hawai‘i Land Use Commission
Department of Business, Economic Development & Tourism
P.O. Box 2359
Honolulu, Hawai‘i 96804-2359

Preliminary - Draft Environmental Assessment

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CONSULTANTS:

Carlsmith Ball LLP
1001 Bishop Street, Suite 2100
Honolulu, Hawai‘i 96813

And

Geometrician Associates LLC
P.O. Box 396
Hilo, Hawai‘i 96721

CLASS OF ACTION:

Reclassification of State Land Use Conservation District Lands

This document is prepared pursuant to:
The Hawai‘i Environmental Protection Act,
Chapter 343, Hawai‘i Revised Statutes (HRS), and
Title 11, Chapter 200.1, Hawai‘i Department of Health Administrative Rules (HAR)

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SUMMARY OF PROJECT, ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

Kevin M. and Monica S. Barry, as Trustees of the Barry Family Trust dated November 15, 2006, have petitioned the Land Use Commission of the State of Hawai‘i (LUC) for a State Land Use (SLU) District Boundary Amendment (DBA) to reclassify approximately 0.51 acres of land located within the Hawaiian Paradise Park subdivision on the shoreline in Kea‘au, Puna, County and State of Hawai‘i (Property or Barry Property), from SLU Conservation District to the SLU Agricultural District. The reclassification of land from the SLU Conservation District is a trigger requiring environmental review under Chapter 343 of the Hawai‘i Revised Statutes (HRS).

The Barrys are pursing the DBA to allow for the construction of a modest three (3) bedroom, two (2) bath, approximately 1,800 sq. ft. single-story dwelling and associated agricultural uses that the Barrys will use as their primary personal residence (Project). The Project is proposed to also include a two-car garage, a lanai on the makai side of the dwelling facing the Pacific Ocean, a courtyard on the mauka side of the home fronting Paradise Ala Kai Drive, a small swimming pool, infrastructure (*i.e.*, private water well, including an underground water storage tank, or private catchment system, underground individual wastewater system (IWS), photovoltaic solar system), and appropriate landscaping. The Project would be similar to and consistent with the existing uses of the neighboring SLU Agricultural District lands within the Hawaiian Paradise Park subdivision.

The Project is not anticipated to have significant adverse impacts on biological resources. With respect to flora, the Barry Property is dominated by alien plants, with the only native ecosystem being the shoreline vegetation, where common native plants are present. The Barrys are proposing to site all Project improvements mauka and outside of these resources, and therefore no adverse impacts to vegetation or habitat is expected. With respect to fauna, no threatened or endangered species were observed to be present on the Barry Property when surveyed, although it is acknowledged that some endangered but regionally widespread terrestrial vertebrates could occasionally overfly the Barry Property. In order to mitigate any potential impact to these species, the Barrys will refrain from activities that disturb or remove woody vegetation taller than fifteen (15) feet in height between June 1st and September 15th, and all exterior lighting should be shielded from shining upwards in conformance with the applicable provisions of the Hawai‘i County Code.

The Barry Property was also surveyed for archaeological and cultural resources. An archaeological field inspection was conducted and revealed no archaeological features present on the Barry Property. These findings are consistent with the findings of surveys previously conducted for twenty-two other properties within Hawaiian Paradise Park, all of which reported negative findings with respect to the presence of archaeological sites and features. In the unlikely event that unanticipated archaeological resources are unearthed within the Barry Property, work in the immediate vicinity of those resources would be halted and the appropriate authorities notified.

A cultural impact assessment focusing on identification and impact analysis of valued cultural, historical, and natural resources was also conducted. That assessment concluded that there are no such resources present on the Barry Property, although the coastline makai of the Barry Property has been and continues to be used by local fishermen and gatherers to procure a variety of marine resources. The Barrys are aware of these activities, and the siting of the Project's improvements will ensure that these activities will not be adversely affected.

The Barrys also commissioned a coastal erosion study, which included an assessment of other geologic and coastal hazards potentially affecting the Barry Property. In general, geologic conditions do not impose undue constraints on the Project, as much of the Puna District and nearly all of Hilo face similar volcanic and seismic hazards. The potential for damage to the Project from coastal erosion and other coastal hazards can be minimized or avoided altogether through the appropriate siting of the Project's improvements.

The Project will not affect any designated scenic vistas or viewplanes. Intermittent scenic views of the shoreline and Pacific Ocean along Paradise Ala Kai Drive are present between the dozens of existing dwellings. Currently, heavy vegetation blocks all views through the Barry Property, and development of the Project would likely open up at least some coastal views. Air quality in Hawaiian Paradise Park is generally excellent, except when Kona winds bring vog (volcanic fog) to the area. Noise at the Barry Property is moderate, partly derived from natural sources such as surf, birds and wind, with some contributions from neighboring dwellings and traffic on Paradise Ala Kai Drive. Brief and minor adverse effects would occur during construction of the Project; however, given its small scale and consistency with neighboring land uses, the Project is not anticipated to affect air quality or noise levels in any substantial ways, and no mitigation measures are necessary.

Based upon onsite inspection and the lack of any known former or current uses of the Barry Property, it appears that the site contains no hazardous or toxic substances and exhibits no other hazardous conditions. All site work performed in connection with the Project will be conducted in conformance with applicable Federal, State and County regulations. The general shoreline area in Hawaiian Paradise Park already supports hundreds of dwellings and is utilized by residents and property owners to park vehicles and fish, and there are no reported water quality problems associated with these uses. Upon completion, the Project would similar to the existing dwellings and associated uses in the area, and is not expected to contribute to sedimentation, erosion or pollution of coastal waters.

The Project is also not expected to adversely affect public roads, services or utilities. Road access to the Barry Property is provided via Paradise Ala Kai Drive and a driveway connecting the Barry Property is proposed as part of the Project. Electrical power and landline telephone service to lots in the area is provided by Hawai‘i Electric Light poles; however, the Barrys are proposing to install a photovoltaic solar system that will allow the Project to be powered completely, or at least partially, "off-grid." Potable and wastewater will be handled on site in

conformance with all applicable State and County regulations. Police, fire and emergency medical services are available approximately ten (10) miles away on Highway 130 in Pahoa. The addition of one single-story dwelling and associated agricultural uses will have no measurable adverse impact to or create an additional demand on public facilities such as schools, police or fire services, or recreational areas.

Finally, due to its small scale, the construction and occupation of the Project in this rural-agricultural neighborhood would not produce any major secondary impacts, such as population changes or effects on public facilities and infrastructure. At any given time, it is normal to have a number of lots under some form of development in Hawaiian Paradise Park. Other than precautions for preventing adverse impacts during construction, no special mitigation measures should be required to counteract small cumulative effects.

PART 1: PROJECT DESCRIPTION AND ENVIRONMENTAL ASSESSMENT PROCESS

1.1 Location and Project Description

The Barry Property is a single tax map parcel located within the Hawaiian Paradise Park subdivision on the shoreline in Kea‘au, Puna, County and State of Hawai‘i, and consists approximately 0.51 acres of land. The Barry Property is located adjacent to an existing dwelling, is currently undeveloped and vacant, and is identified by Tax Map Key No. (3) 1-5-059:059. The Barrys acquired the property in 2007.

The Barry Property is presently within the State Land Use (SLU) Conservation District, Resource Subzone. The Barrys have petitioned the LUC for a DBA to reclassify the Barry Property from the SLU Conservation District to the SLU Agricultural District. The Barry Property was initially within the SLU Agricultural District when the SLU districts were originally drawn, but was later reclassified into the SLU Conservation District as a part of the LUC’s 1969 five-year boundary review. In 1977, virtually all of the coastal lands surrounding the Barry Property were reclassified from the SLU Conservation District back to the SLU Agricultural District pursuant to the LUC’s Decision and Order in Docket No. A76-419 (1977 D&O). The Barry Property was originally included in Docket No. A76-419, but was later removed because the LUC was unable to obtain the participation of the then-owner of the Barry Property. A significant number of the parcels reclassified under the 1977 D&O have since been developed with dwellings.

The Barrys are pursuing the DBA from the LUC to allow for the construction of a modest three (3) bedroom, two (2) bath, approximately 1,800 sq. ft. single-story dwelling and related agricultural uses that the Barrys will use as their primary personal residence. The Project would be similar to and consistent with the existing uses of the neighboring SLU Agricultural District lands.

The Project is proposed to include a two-car garage, a lanai on the makai side of the dwelling facing the Pacific Ocean, a courtyard on the mauka side of the dwelling fronting Paradise Ala Kai Drive, a small swimming pool, infrastructure (*i.e.*, private water well, including an underground water storage tank, or private catchment system, underground individual wastewater system (IWS), photovoltaic solar system), and landscaping, including a driveway. Access to and from the nearest government road and the Barry Property is provided via the adjacent Paradise Ala Kai Drive.

The dwelling will be sited towards the ocean, but well behind the shoreline area of the Barry Property, and any development on the Barry Property will be set back outside the lava shelf and shoreline shrub zones, thus avoiding these resources. The style of the dwelling will be contemporary Hawaiian consistent with the overall style of dwellings in Hawaiian Paradise Park. The landscaping plan for the Project will also be consistent with the existing Hawaiian Paradise Park neighborhood, and will leave some exposed lava (if permitted by the Property’s topography) and include appropriate salt-tolerant ground cover and tropical plants. Although some non-native species may be removed, appropriate native species may be planted and a narrow trail to the shoreline may be established, taking care to minimize any potential harm to native species.

The intent is that the Project will receive its potable water from a well drilled on site with treatment through a reverse-osmosis or similar purification system, although the Project will alternatively utilize a catchment system if necessary. The wastewater generated by the Project will be processed through a modern IWS (septic) system designed by a licensed engineer and approved by the State of Hawai‘i Department of Health (DOH). Electrical service is available in the area from Hawai‘i Electric Light Company, Inc. (HELCO); however, the Barrys intend to install a photovoltaic solar system that will allow the Project to be powered completely, or at least partially, "off-grid."

At this preliminary stage of the planning and entitlements process, and in light of the Barry Property's poor soils, small size and close proximity to the Pacific Ocean, the Barrys propose to implement appropriate agricultural uses as part of the Project. The Barrys' proposed agricultural use will comply with the requirements of HRS Chapter 205 and the Hawai‘i County Code related to permissible uses in the SLU Agricultural District, and will not have substantial adverse environmental impacts. The Barrys are in the process of determining the most appropriate agricultural use for the Property. Mrs. Barry has been an active participant in University of Hawai‘i at Hilo's "East Hawai‘i Master Gardeners" program since January 2018. The agricultural uses being considered include a greenhouse nursery, aquaponics, native plant propagation, and apiculture (beekeeping). The Barrys will generate income from the agricultural use through sales at either local farmers' markets, through a roadside stand, or a combination of both.

Figure 1 Project Location Map

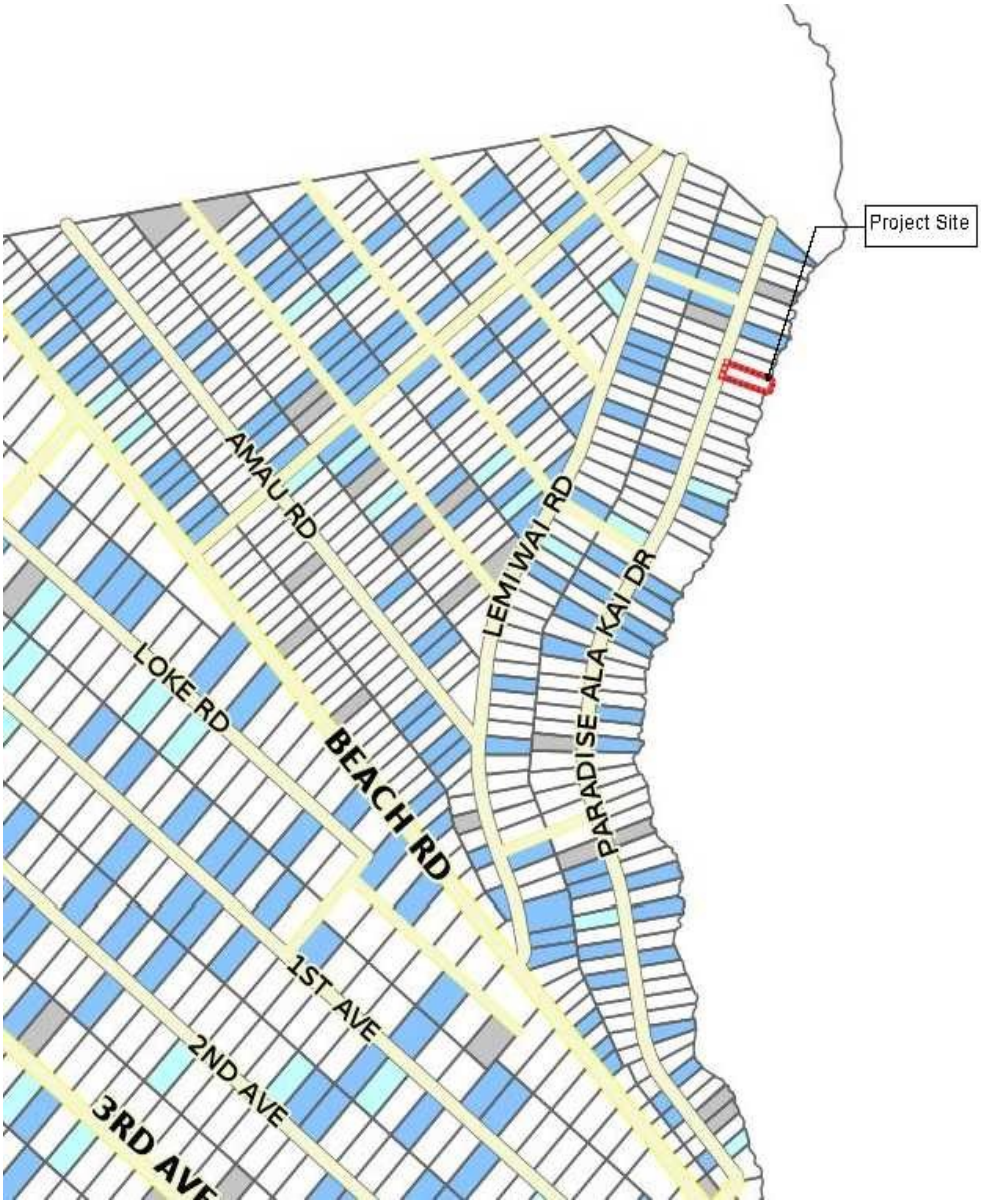


Figure 2 Site Photos

2a, Above: Aerial Image Base Map © Digital Globe, HERE (from BING Maps)

Figure 2. Property Photos

2b. Lava shelf (with shoreline shrub zone on right) ▲

▼ 2c. Shoreline shrub zone

Figure 2. Property Vegetation Photos

2d. Property interior ▲ ▼ 2d. Road fringe

1.2 Environmental Assessment Process

This Environmental Assessment (EA) process is being conducted in accordance with Chapter 343 of the Hawai‘i Revised Statutes (HRS). This law, along with its implementing regulations found at Title 11, Chapter 200.1, of the Hawai‘i Administrative Rules (HAR), is the basis for the environmental impact assessment process in the State of Hawai‘i. This EA is required because the Barrys are proposing to reclassify the Barry Property from the SLU Conservation District to the SLU Agricultural District, which is a trigger for environmental review under Chapter 343 and its implementing regulations.

According to Chapter 343, an EA is prepared to determine impacts associated with an action, to develop mitigation measures for adverse impacts, and to determine whether any of the impacts are significant according to thirteen specific criteria. Part 4 of this document supports the anticipated finding that no significant impacts are expected to occur, based on the preliminary findings for each criterion made by the consultants in consultation with the LUC, the Approving Agency. If, after considering comments to the Draft EA, the LUC concludes that, as anticipated, no significant impacts would be expected to occur, then the agency will issue a Finding of No Significant Impact (FONSI), and the action will be permitted to proceed to other necessary permits. If, on the other hand, the LUC concludes that significant impacts are expected to occur as a result of the proposed action, then an Environmental Impact Statement (EIS) will be prepared.

1.3 Public Involvement and Agency Coordination

The following agencies, organizations and individuals have been consulted during the Environmental Assessment Process:

County of Hawai‘i:

Planning Department	Windward Planning Commission	Department of Public Works
Civil Defense Agency	Police Department	Fire Department
Department of Parks and Recreation	Department of Corporation Counsel	County Council

State of Hawai‘i:

Department of Land and Natural Resources (DLNR), Office of Conservation and Coastal Lands	DLNR, Land Division	DLNR, State Historic Preservation Division (SHPD)
Office of Hawaiian Affairs	Department of Hawaiian Homelands	Department of Health (DOH), Clean Water Branch

DOH, Wastewater Branch	DOH, Safe Drinking Water Branch	DOH, Office of Environmental Quality Control
Office of Planning	Department of Agriculture	Department of Education
Office of the Attorney General	Hawai‘i State Senate	Hawai‘i State House of Representatives

Neighboring Landowners:

Shirley Jean Taylor (TMK No. (3) 1-5-059-32)	Stephen C. Pfeiffer & Stephanie A. Foster (TMK No. (3) 1-5-059-33)	Glen Alan Burris (TMK No. (3) 1-5-059-34)
Mark Lawley Heritage & Donna Ann Chalmers (TMK No. (3) 1-5-059-35)	Franklin T. M. & Carlene J. Lee (TMK No. (3) 1-5-059-36)	Allan Edgar Burr & Connie Lynn Bouchard (TMK No. (3) 1-5-059-57)
Suzanne H. Christian Trust (TMK No. (3) 1-5-059-58)	Coffee Dolphin Inc. (TMK No. (3) 1-5-059-60)	Ninh Minh Le & Xuan Dao Mai (TMK No. (3) 1-5-059-61)

Utilities:

Hawaii Electric Light Company, Inc.

Organizations:

Hawaiian Paradise Park Owners Association	Sierra Club of Hawai‘i	Malama O Puna

Copies of communications received during the early consultation process, as well as the Barrys' responses, are contained in Appendix 1a.

PART 2: ALTERNATIVES

2.1 The Proposed Project and Alternative Uses and Sites

The Project and its location are described in detail in Section 1.1, above, and illustrated in Figures 1-3. The Barrys purchased the Barry Property over ten years ago with the hope and intention of one day retiring in the rural-agricultural setting that the Hawai‘i Paradise Park subdivision offers. The Barrys remain committed to doing so, and therefore an alternative site for the Project or alternative use of the Barry Property are not deemed to be feasible or considered further in this EA.

2.2 The No Action Alternative

Under the No Action Alternative, the Barry Property would not be reclassified to the SLU Agricultural District. It would still be possible to receive a Conservation District Use Permit (CDUP) to construct and occupy a single-family dwelling, utilize the Barry Property for temporary camping and picnicking, and any other use that is permitted in the Resource Subzone. For the purposes of this EA, however, it will be assumed that the Barry Property would remain vacant and unused under the No Action Alternative. This EA considers the No Action Alternative as the baseline by which to compare environmental effects of the Project.

2.3 The CDUP Alternative

Under the CDUP Alternative, the Barrys would submit an application to the State of Hawai‘i Board of Land and Natural Resources (BLNR) to obtain a CDUP. A CDUP would allow for the construction of a single-family dwelling substantially similar in size and characteristics as the Project. Thus, it is assumed that the CDUP Alternative would have substantially similar environmental effects as the Project.

Under the CDUP Alternative, the Barrys would not be required to implement an agricultural use as proposed under the Project. In addition, the CDUP Alternative would result in the Barry Property's land use designation being inconsistent with surrounding lands, as virtually all of the coastal lands surrounding the Barry Property are already within the SLU Agricultural District, and the existing dwellings on neighboring parcels were not constructed pursuant to CDUPs.

Based on a number of factors, including the administrative burdens associated with a CDUP and a desire for the Barry Property to be consistent with the neighboring lands and uses, the Barrys have made the decision to pursue the proposed reclassification from the LUC, instead of obtaining a CDUP from the BLNR.

PART 3: ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION

The 22,216-square foot (sf) Barry Property is located between Paradise Ala Kai Road, a private road of the Hawaiian Paradise Park subdivision, on the *mauka* side and the shoreline of the Pacific Ocean on the *makai* side (see Fig. 1). It is vacant and flanked by similarly sized private parcels, one of which contains a single-family dwelling (see Fig. 2). U.S. Geological Survey maps and Google Earth images indicate that elevations on the Barry Property vary from about 12 to 25 feet above sea level.

3.1 Physical Environment

3.1.1 Climate, Geology, Soils and Geologic Hazards

Environmental Setting

The Barry Property is located on the flank of Kilauea, a highly active volcano, in the *ahupua'a* of Kea'au within the Puna District. This area receives an average of about 124 inches of rain annually, with a mean annual temperature of approximately 75 degrees Fahrenheit (Giambelluca et al 2014; UH Hilo-Geography 1998:57).

Guidance to federal agencies for addressing climate change issues in environmental reviews was released in August 2016 by the Council on Environmental Quality (US CEQ 2016). The guidance urged that when addressing climate change, agencies should consider: (1) the potential effects of a proposed action on climate change as indicated by assessing greenhouse gas emissions in a qualitative, or if reasonable, quantitative way; and, (2) the effects of climate change on a proposed action and its environmental impacts. It recommends that agencies consider the short- and long-term effects and benefits in the alternatives and mitigation analysis in terms of climate change effects and resiliency to the effects of a changing climate. Although this guidance has since been withdrawn for political reasons, the State of Hawai'i, through HRS § 226-109, encourages a similar analysis, and HAR § 11-200.1-13 includes significance criteria that consider the hazardousness of sea level rise. In terms of climate, it is possible, and even likely, that larger and more frequent tropical storms and even hurricanes will affect the Hawaiian Islands in the future. In addition, as discussed in Section 3.1.2, accelerating sea level rise is expected.

It has been long assumed that the lava flows that underlie the Barry Property both erupted sometime between 200 and 400 years ago, from the Ai La'au Lava Flow, according to the general geology map of Kilauea by Moore and Trusdell (1991). Recent work documented in Appendix 2, however, indicates that these flows may be older, and that the lava flow directly underlying the Barry Property is approximately 550 years old. Soil in the area is classified as Opihikao highly decomposed plant material. This is a well-drained, thin organic soil developed over pahoehoe bedrock. It is found from sea level to 1,000 feet in elevation and is rapidly permeable, with slow run-off, and a slight erosion hazard. This soil is within subclass VIIs, which means it has limitations that make it unsuitable for intensive cultivation and restrict its use to pasture, range, woodland or wildlife (U.S. Soil Conservation Service 1973).

The entire Island of Hawai‘i is subject to geologic hazards, especially lava flows and earthquakes. Volcanic hazard as assessed by the U.S. Geological Survey in this area of Puna, including the Property, is Zone 3 on a scale of ascending risk 9 to 1 (Heliker 1990:23). The relatively high hazard risk is because Kilauea is an active volcano. Zone 3 includes areas less hazardous than Zone 2, which is adjacent to the summit and East Rift Zone (ERZ), because of greater distance from recently active vents and/or because of topography. One to five percent of Zone 3 has been covered since 1800, and 15 to 75 percent has been covered within the past 750 years. The recent eruptions of the East Rift Zone near Leilani Estates have demonstrated that although centuries may pass between eruptions in any given area, there is always a danger of an eruption On Kilauea.

The Island of Hawai‘i experiences high seismic activity and is at risk from major earthquake damage (USGS 2000), especially to structures that are poorly designed or built, as the 6.7-magnitude quake of October 2006 and the 6.9 magnitude quake of May 2018 demonstrated. The Barry Property is flat to low-sloping, with no surrounding steeper slopes. There does not appear to be a substantial risk at the site from subsidence, landslides or other forms of mass wasting.

Impacts and Mitigation Measures

In order to deal with the potential for larger and more frequent tropical storms that could be part of a changing climate, any future dwelling should be designed to withstand hurricane force winds. In addition, all Project improvements will be appropriately sited mauka and outside of the portion of the Barry Property most affected by hurricane winds. The Barry Property would be maintained in a state without tall trees (particularly the invasive ironwood). Prior to any construction, all trees with the potential to fall on the dwelling would be removed. The implications of climate change for the shoreline setting are dealt with in the next section.

In general, geologic conditions do not impose undue constraints on the Project, as much of the Puna District faces similar volcanic and seismic hazards and yet continues to be an important residential area. There are currently efforts by planners and government officials to restrict or prohibit altogether any new development in Zone 1 and Zone 2 lava flow hazard areas. The Barry Property is in Zone 3, along with most of the settled area of Puna and nearly all of Hilo, and it is unlikely that prohibitions on homes in Zone 3 will be adopted as a reaction to the recent lava flows of Kilauea. Nevertheless, it must be acknowledged that lava flow hazard exists, and that responding to disasters has fiscal consequences for government agencies. The Barrys understand that there are hazards associated with dwellings in this geologic setting, and have made the decision that the Project is not imprudent to construct and inhabit as their primary residence.

3.1.2 Flood Zones and Shoreline Setting

Floodplain Environmental Setting, Impacts and Mitigation Measures

A bare pahoehoe shelf with a low sea cliff lies *makai* of the Barry Property as defined by the original metes and bounds description in the conveyance documents. The legal shoreline of the Barry Property has not recently been certified, but it is presumed to lie at the sharp boundary between the pahoehoe shelf and

the vegetation line.

Floodplain status for many areas of the island of Hawai‘i has been determined by the Federal Emergency Management Agency (FEMA), which produces the National Flood Insurance Program's Flood Insurance Rate Maps (FIRM). The flood zones for this region were recently mapped, and digital maps are available from the Department of Land and Natural Resources at http://gis.hawaiinfip.org/fhat/ (Figure 3). Unfortunately, a systematic error in the registration of the TMK layer and the Google Earth © layer (clearly visible by examining the offset of Paradise Ala Kai Road) affects direct interpretation of the map, but the pahoehoe shelf located in the *makai* part of the Barry Property and *makai* of the presumed legal shoreline is clearly within the VE flood zone. There is no direct evidence of tsunami inundation in this location, although storm waves of the magnitude generated by Tropical Storm Iselle, which hit the Puna coastline on August 8, 2014, have affected the pahoehoe platform *makai* of the shoreline.

The VE Flood Zone, also known as the coastal high hazard area, is the area subject to high velocity water including waves and tsunami; it is defined by the 1% annual chance (base) flood limits (also known as the 100-year flood) and wave effects can be 3 feet or greater. All Project improvements would be sited *mauka* of the VE Flood Zone and entirely within Flood Zone X, which consists of areas outside the mapped 500-year floodplain and imposes no constraints on development.

Coastal Erosion Issues: Background

Property near the shoreline is subject to natural coastal processes including erosion and accretion, which can be affected by human actions such as removal of sand or shoreline hardening. Erosion may adversely affect not only a lot owner's improvements but also State land and coastal waters, along with the recreational and ecosystem values they support.

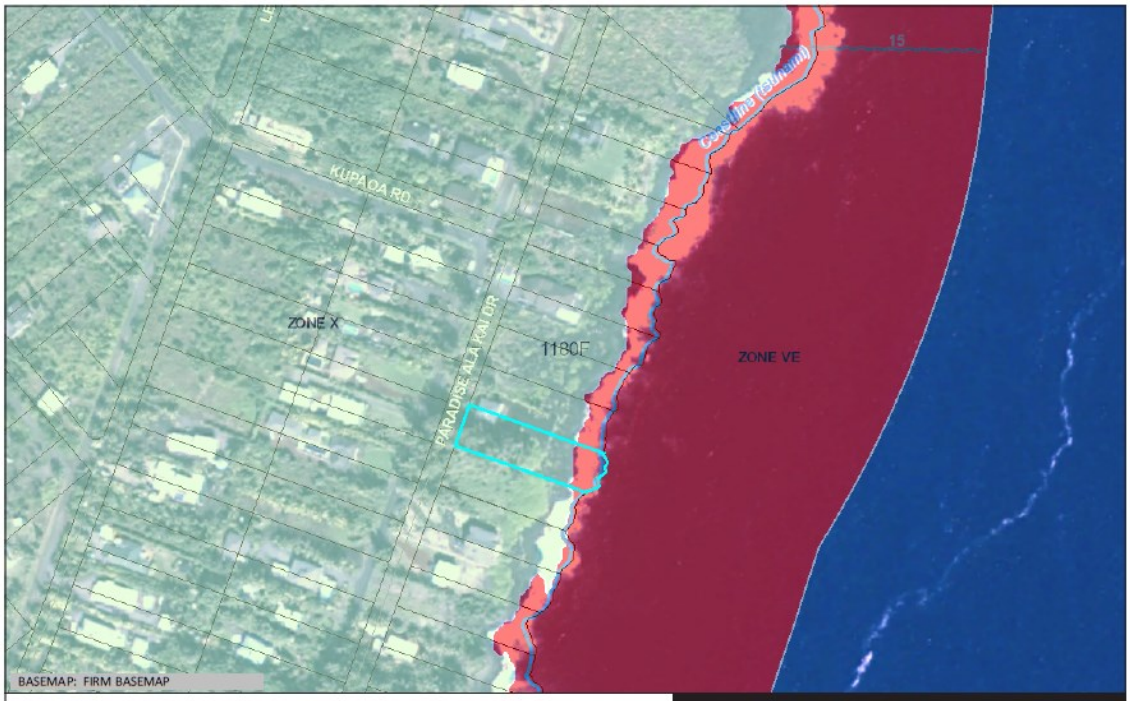
A coastal erosion study, which includes an analysis of other coastal hazards, was prepared for the Barry Property by Geohazards Consultants International, Inc. The full report is attached as Appendix 2, with portions summarized in the material below. The reader is referred to Appendix 2 for additional detailed descriptions, maps and photos.

Sea Level Rise

Because the proposed use of a single-family dwelling on this coastal property has an expected useful lifetime of 40 to 70 years, it is important to first examine the potential for future sea level rise. Sea level rise also factors into future rates of coastal retreat and erosion.

There is a scientific consensus that the earth is warming due to manmade increases in greenhouse gases in the atmosphere, according to the United Nations' Intergovernmental Panel on Climate Change (UH

Figure 3. Flood Zone Map



Flood Hazard Assessment Report

www.hawaiinfip.org

Property Information

COUNTY:	HAWAII
TMK NO:	(3) 1-5-059:059
WATERSHED:	KAAHAKINI
PARCEL ADDRESS:	UNKNOWN ADDRESS KEAAU, HI 96749

Notes:

Flood Hazard Information

FIRM INDEX DATE:	SEPTEMBER 29, 2017
LETTER OF MAP CHANGE(S):	NONE
FEMA FIRM PANEL:	1551661180F
PANEL EFFECTIVE DATE:	SEPTEMBER 29, 2017

THIS PROPERTY IS WITHIN A TSUNAMI EVACUTION ZONE: YES
FOR MORE INFO, VISIT: http://www.scd.hawaii.gov/

THIS PROPERTY IS WITHIN A DAM EVACUATION ZONE: NO
FOR MORE INFO, VISIT: http://dlnreng.hawaii.gov/dam/

0 200 400 ft

Disclaimer: The Hawaii Department of Land and Natural Resources (DLNR) assumes no responsibility arising from the use, accuracy, completeness, and timeliness of any information contained in this report. Viewers/Users are responsible for verifying the accuracy of the information and agree to indemnify the DLNR, its officers, and employees from any liability which may arise from its use of its data or information.

If this map has been identified as 'PRELIMINARY', please note that it is being provided for informational purposes and is not to be used for flood insurance rating. Contact your county floodplain manager for flood zone determinations to be used for compliance with local floodplain management regulations.

FLOOD HAZARD ASSESSMENT TOOL LAYER LEGEND
(Note: legend does not correspond with NFHL)

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD - The 1% annual chance flood (100-year), also know as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. SFHAs include Zone A, AE, AH, AO, V, and VE. The Base Flood Elevation (BFE) is the water surface elevation of the 1% annual chance flood. Mandatory flood insurance purchase applies in these zones:

- **Zone A**: No BFE determined.
- **Zone AE**: BFE determined.
- **Zone AH**: Flood depths of 1 to 3 feet (usually areas of ponding); BFE determined.
- **Zone AO**: Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined.
- **Zone V**: Coastal flood zone with velocity hazard (wave action); no BFE determined.
- **Zone VE**: Coastal flood zone with velocity hazard (wave action); BFE determined.
- **Zone AEF**: Floodway areas in Zone AE. The floodway is the channel of stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without increasing the BFE.

NON-SPECIAL FLOOD HAZARD AREA - An area in a low-to-moderate risk flood zone. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

- **Zone XS (X shaded)**: Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
- **Zone X**: Areas determined to be outside the 0.2% annual chance floodplain.

OTHER FLOOD AREAS

- **Zone D**: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase apply, but coverage is available in participating communities.

Source: DLNR − http://gis.hawaiinfip.org/fhat/

Manoa Sea Grant 2014). Global mean air temperatures are projected to increase by at least 2.7°F by the end of the century. This will be accompanied by the warming of ocean waters, expected to be highest in tropical and subtropical seas of the Northern Hemisphere. Wet and dry season contrasts will increase, and wet tropical areas in particular are likely to experience more frequent and extreme precipitation. For Hawai‘i, where warming air temperatures are already quite apparent, not only is the equable climate at risk, but also agriculture, ecosystems, the visitor industry and public health.

No one can predict with any certainty how high sea levels will rise within 10 years, 20 years or 50 years. An overall global rise in sea level of 3.3 feet by the end of the 21st century was proposed by Fletcher (2010) and others. A 2012 scientific assessment (Rahmstorf et al. 2012) posited 4 feet as a reasonable upper bound. Some recent research that concentrates on the potential for Antarctic melting to contribute more to sea level than generally modeled envisions as much as an additional meter (3.3 feet) of sea level rise (DeConto and Pollard 2016). Relative sea-level rise, of course, is a result of the combined eustatic water rise and land subsidence. In some locations, the effects of eustatic sea level rise can be magnified substantially. The 1975 Kalapana earthquake on Kilauea's rift caused land in Kapoho to drop 0.8 feet (based on Hawaii Volcano Observatory (USGS) data in Hwang et al (2007:6)). This episodic, seismic-induced subsistence is difficult to anticipate or measure over long periods of time. On the basis of InSAR (Synthetic Aperture Radar Interferometry) remote sensing data, Hwang et al (ibid.) state that the coastline at Kapoho may be subsiding at a continuous rate of between 0.31-0.67 in/yr. Rates of subsidence at the Barry property are certainly much lower as a result of its distance from Kilauea's tectonically active rift zone, as well as its position on the west side of the rift zone, where land is supported by the bulk of Mauna Loa. A rate in the middle of this estimate, or a little less than 0.3 in/yr., is probably conservative. A highly conservative estimate of overall sea level change by the year 2100, accounting for a eustatic rise of 5 feet and local tectonic sinking of about 2 feet, is 7 feet. The greatest rate of SLR will take place during the second half of this century according to recent modeling (*e.g.*, Cazenave and Le Cozannet 2014).

Not only is the magnitude of sea level rise subject of debate, but so too is its timing. According to the Hawai‘i Climate Change Mitigation and Adaptation Commission (HCCMAC) (2017:v):

> While the [United Nations' Intergovernmental Panel on Climate Change]'s "business as usual" scenario, where [greenhouse gas] emissions continue at the current rate of increase, predicts up to 3.2 feet of global sea level rise by year 2100 (IPCC 2014), recent observations and projections suggest that this magnitude of sea level rise could occur as early as year 2060 under more recently published highest-end scenarios . . . .

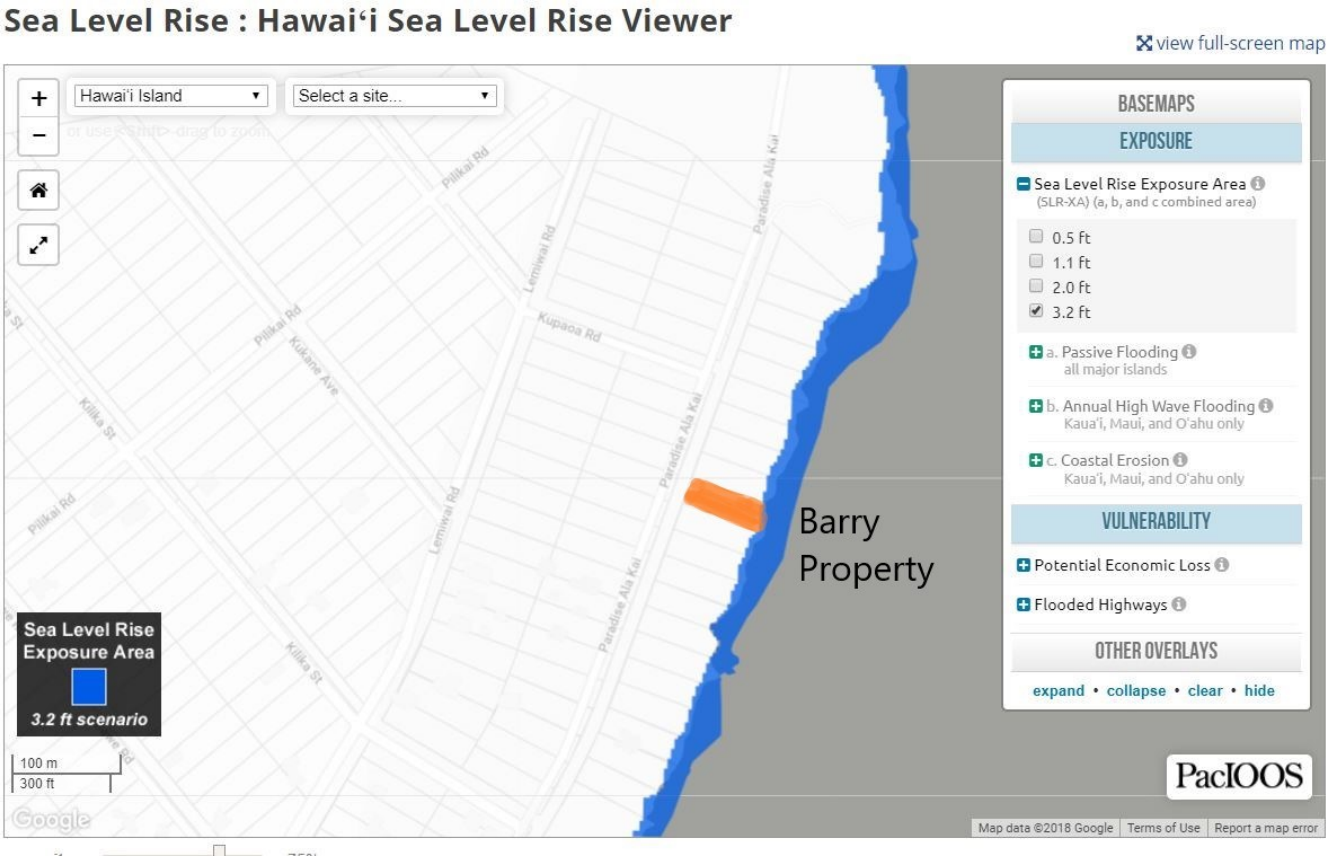
The HCCMAC report goes on to state that the Island of Hawai‘i is in many senses the least vulnerable of the main Hawaiian Islands to the impacts of sea level rise, but that certain areas – particularly Kona, Puakō, Kapoho and Hilo Bay − "face serious threats. It is estimated that at least 130 existing structures would experience chronic flooding if there were 3.2 feet of sea level rise."

The Hawai‘i Sea Level Rise Viewer (Viewer) is an online atlas to support the Hawai‘i Sea Level Rise Vulnerability and Adaptation Report (Report) that was mandated by Act 83, Session Laws of Hawai‘i (SLH) 2014 and Act 32, SLH (https://www.pacioos.hawaii.edu/shoreline/slr-hawaii/). It provides a

graphic representation of how regions will be affected by sea level rise, particularly through passive flooding (still water high tide flooding). The Hawaiian Paradise Park area contains cliffs between 10 and 30 feet in height, so a sea level rise of 3.2 feet (or even 7 feet) in itself will only inundate relatively small areas. This is unlike Waikiki, *e.g.*, where a 3.2 foot rise in sea level would inundate large areas. Figure 4 is an image from the Viewer in the vicinity of the Barry Property, indicating that only the immediate shoreline area would be affected. In reality, passive flooding would only affect the area *makai* of the cliffs.

However, aside from simple inundation, a rise in sea level also raises the level of threat from high waves and tsunami. As reported in the online Science Daily based on an article in the Nature journal, *Scientific Reports* (https://www.sciencedaily.com/releases/2018/09/180927164230.htm), a research team including UH Manoa and DLNR determined that sea level rise effects will be much more wide reaching. "By including models of dynamical physical processes such as erosion and wave run-up, a team of researchers has determined that land area in Hawai'i vulnerable to future sea level rise may be double previous estimates."

Figure 4. Sea Level Rise Viewer Image for Property



Coastal Erosion: Physical Setting

Geologist Dr. Jack Lockwood of Geohazards Consultants International, Inc. inspected the Barry Property on several occasions with varying tidal and wave conditions in June and September 2018.

A shelf of nearly bare pahoehoe lava is present at the front of the Barry Property, bordered by a roughly 18-foot tall sea cliff. The naupaka vegetation line provides a good indicator of the shoreline ("highest reach of waves") fronting the Barry Property, and varies in width from the cliff's edge (Figure 5). Normal surf does not reach above the coastal cliff, but angular boulders on the shelf attest to the fact that exceptionally large storms can dislodge cliff edge pahoehoe, place blocks short distances inland, and scour vegetation inland from the cliff face. The coastal bench of bare pahoehoe is as much as 30 feet wide at the north Barry Property boundary (Figure 6). The surface lava flows consist of multiple flow sheets of dense, aphanitic (crystal-free) basalt pahoehoe, all emplaced during the same eruption. The pahoehoe flow at the Barry Property appears to be too thin to contain pyroducts ("lava tubes"). Wave erosion of the sea cliff fronting the Barry Property has revealed that the pahoehoe lava lobes from the +/- 550-year old eruption overlie an older, massive, dense lava, along a sharp contact (see Figures 5 and 6). The uppermost pahoehoe flow is overlain by three types of sedimentary deposits – coeval remnants of fragmental volcanic glass debris (*limu o Pele*), scattered patches of cobbles, gravel and sand that have been deposited by exceptional storm wave activity, and a colluvial, organic rich soil found inland beneath vegetation.

Coastal Erosion Rate

The sea cliff fronting the Barry Property is resistant to erosion, and negligible erosion occurs during normal sea conditions. During times of major storms, however, the impact of waves can cause mechanical and abrasional erosion, although even this is likely rare. Cracks near the edge of the sea cliff in several places indicate where the cliff edge is unstable, and susceptible to failure when impacted by powerful storm waves. A few scattered blocks of angular pahoehoe up to two feet diameter were noted above the coastal plain and as much as ten feet inland of the shoreline (see Figure 5). These were formed when powerful waves impacted the top of the sea cliff, injected high-pressure water into the contacts between flow lobes, and through the process of "hydraulic ramming" loosened blocks and moved them short distances inland.

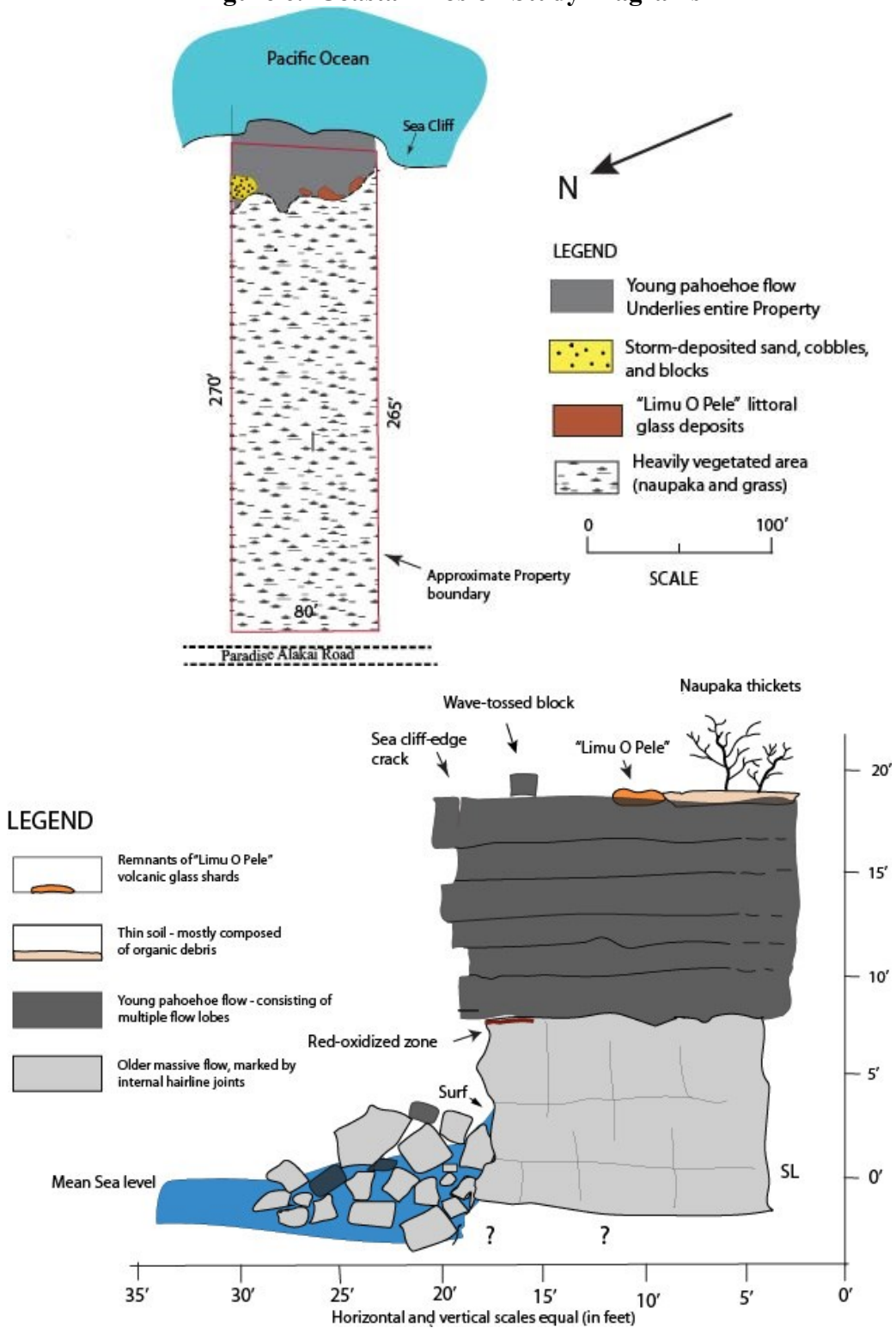
Careful inspection of available aerial photographs (as documented in detail in Appendix 2) to measure coastline positions relative to internal fixed distances suggests slight erosion of the sea cliffs has occurred since the earliest 1954 photos. Migration of the actual shoreline (vegetation line) is so slight as to not be measurable. The large scale and limited resolution of the available aerial photographs makes accurate analyses of fine-scale morphological changes of the shoreline or sea-cliff impossible, but there is a variable trend suggesting an average erosion rate of the coastline cliff at 3.0 inches/year.

A quantitative approximation of the shoreline erosion rate at the Barry Property and most other hard lava coastlines in Hawai‘i is not statistically feasible using the methods outlined by Hwang (2005), which are generally used to the fulfill the requirements imposed by the Hawai‘i Administrative Rules governing

Figure 5. Photos of Sea Cliff in Front of Property

Lava flow contact zone indicated by arrow.

Figure 6. Coastal Erosion Study Diagrams



development of shoreline properties in the SLU Conservation District. Coastal erosion studies in shoreline determinations must rely upon alternative indicators – primarily observation of active erosion of the coastal sea cliff makai of the shoreline − and factors such as freshly cut cliff faces or presence of angular erosional debris as discussed above. Shoreline erosion is not a continuous process that can be characterized by simple "erosion rates." Mechanical erosion of the coastline is episodic, related to the uncommon impact of especially strong storm activity.

A longer term perspective can be derived from estimates of the coastal erosion that has taken place since the emplacement of these lava flows. The uppermost pahoehoe flow has obviously been eroded back since emplacement an estimated 550 years ago, but the distance eroded is not precisely quantifiable. The presence of littoral explosion-derived "*limu O Pele*" above the pahoehoe shelf suggests the original coastline was not far away. Assuming that coastline was 100' away at the time of flow emplacement (an estimate based on observations of historical *limu o Pele* deposits associated with recent pahoehoe ocean entries associated with the Pu'u O'o eruption (Mattox and Mangan 1997)) would imply an overall erosion rate of 0.18 feet, or 2.2 inches/year over the past 550 years.

The combined effects of land subsidence and rising sea levels suggests an overall (relative) drop in the shoreline elevation of between 0.2 - 0.3 in/yr. The durability and height of the coastal sea cliff fronting the Barry Property (greater than 16 feet at even the highest tides) ensures that combined sea level change and land subsidence will not cause significant shoreline transgression in this area, although it will slowly increase the erosive action of storm waves over the next several decades and centuries.

Overall Assessment of Coastal Hazard: Impacts and Mitigation Measures

Hwang (2005) recommends that all hazards facing coastal areas should be considered when planning for land-use zoning in Hawai'i, and not just erosion. Fletcher *et al.* (2002) portray generalized hazards assessments for long areas of Hawai'i's coastlines; they rate the specific hazards (Column A) for the area of Puna fronting the Barry Property as shown in Table 1 (Column B):

Table 1. Coastal Natural Hazards Affecting Property

A **Hazard Type**	B **Relative Threat**	C **GCI-determined Threat Value**
Tsunami	High	Medium
Stream Flooding	Medium-high	Low
High Waves	Medium-high	Medium-High
Storms	High	Medium
Erosion	Medium-low	Medium-Low
Sea Level Change	Medium-high	Low
Volcanic/Seismic	High	Medium
Overall Hazard Assessment	Medium	Medium

The values assigned by Fletcher *et al.* above are generalized for long stretches of Hawaiian coastlines. Geohazards Consultants International, Inc.'s site-specific hazard appraisals for the Barry Property differ in some regards from the published values (lesser perceived risk), and are given above for comparison

(Column C).

This hazard appraisal reinforces the importance of setting any future dwelling at an appropriate distance from the sea cliff and shoreline.

3.1.3 Water Quality

No natural water features such as streams, springs, or anchialine ponds are found on or near the Barry Property.

Eventual land clearing and construction activities would occur on an area of less than a quarter acre. The grading work would be limited to the dwelling site, its related spaces for driveway/parking, a septic system, a possible pool, and the construction staging area. The Barry Property is flat, and grading can easily be conducted to balance cut and fill material for the graded area in order to avoid the need to import or export soils to and from the site. Related to the trenching required for the septic system, excavated materials will be used to refill the trenched areas and to blend the areas with the surrounding topography.

At the time development is proposed, the Barrys and their engineer will determine whether the area of disturbance is sufficiently large to require a County grading permit or National Pollutant Discharge Elimination System (NPDES) permit. Grading for the driveway and dwelling site will include practices to minimize the potential for sedimentation, erosion and pollution of coastal waters. The Barrys will be required to ensure that their contractor performs all earthwork and grading in conformance with the following:

- "Storm Drainage Standards," County of Hawai‘i, October, 1970, and as revised.
- Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawai‘i County Code.
- Applicable FEMA standards and regulations.
- Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawai‘i County Code.
- Conditions of an NPDES permit, if required.

The general shoreline area in Hawaiian Paradise Park already supports hundreds of dwellings and is utilized by residents and property owners to park vehicles and fish, and there are no reported water quality problems from these uses. Upon completion, the Project would be similar to the existing dwellings on shoreline lots in the area, and would not be expected to contribute to sedimentation, erosion, and pollution of coastal waters.

3.1.4 Flora and Fauna

The Barry Property was systematically inspected for biological resources by Dr. Ron Terry in May 2018, who concluded that other than the hoary bat, no rare, threatened or endangered species of flora and fauna are known to exist on or near the project site, and none would be affected by any project activities. Dr.

Terry's full report is contained in Appendix 3 and summarized below.

Environmental Setting: Flora

Prior to the use for agriculture, ranching, and lot subdivision, the natural vegetation of this part of the Puna shoreline was mostly coastal forest and strand vegetation, dominated by naupaka (*Scaevola taccada*), hala (*Pandanus tectorius*), ʻōhiʻa (*Metrosideros polymorpha*), nanea (*Vigna marina*) and various ferns, sedges and grasses (Gagne and Cuddihy 1990). Some locations on the coastline also host a rare plant found only in the Hilo and Puna Districts: *Ischaemum byrone,* an endangered grass known to grow on pahoehoe close the edge of sea cliffs, where salt spray may limit other plants.

Aside from the road verge, the lava flow underlying the Barry Property does not appear to have been ripped by heavy equipment or otherwise disturbed, although the heavy vegetation makes that difficult to ascertain. Large ironwood (*Casuarina equisetifolia*) trees previously grew on the Barry Property and appear to have been felled, and this has provided a substrate for dense vine growth.

The vegetation on the long, narrow rectangular parcel is divided into four basic zones. The lava shelf zone consists of about 50 feet of nearly bare pahoehoe, with scattered, low clumps of akulikuli (*Sesuvium portulacastrum*) and mauʻu ʻakiʻaki (*Fimbristylis cymosa*), two common indigenous herbs. Occasional surges from large waves during storms scour this zone and keep it largely vegetation free. The shoreline shrub zone just behind, heavily affected by constant sea spray and roughly 60 feet in depth, is dominated by the common indigenous shrub naupaka. Also present are ironwood, coconut palms, the indigenous sedge pycreus (*Cyperus polystachyos*), and various non-native grasses, vines, herbs and ferns.

The majority of the Barry Property – varying from about 180 to 200 feet in depth – contains the other two vegetation zones. The interior of the Barry Property is a secondary growth of almost entirely non-native grasses, shrubs, trees, herbs, vines and ferns. Prominent among them are lantana (*Lantana camara*), Guinea grass, red tower ginger (*Costus comosus*), sensitive plant (*Mimosa pudica*), sword fern (*Nephrolepis multiflora*), autograph tree (*Clusia rosea*), and maile pilau (*Paederia foetida*). A few native hala trees appear to be encroaching on the Barry Property from a neighbor's landscape. Seedlings of the highly invasive albizia tree (*Falcataria moluccana*) are emerging in various locations. The narrow road fringe area is dominated by Guinea grass (*Megathyrsus maximus*) and a number of other weedy grasses, herbs and vines. There is little of value for biological conservation in the areas behind the shoreline shrub zone. A full list of plant species detected on the Barry Property is found in Table 1 of Appendix 3.

No individuals of *Ischaemum byrone* were found. The extremely heavy sea spray in the *makai* edge of the lot might tend to discourage this grass, salt-tolerant though it is. *Mauka* of here the vegetation is so dense with naupaka and other plants that clusters of this grass would not tend to thrive. No other rare, threatened or endangered plants are present. Although dominated by common native plants, with no rare species, the two *makai* zones – the lava shelf zone and shoreline shrub zone – represent native habitat with at least some conservation value. No development is proposed in these two zones.

Environmental Setting: Vertebrate Fauna

Very few birds were observed during the site visit, which took place in rainy, windy conditions at mid-day, during the summer season, a month after most migratory birds had already departed for the Arctic. At other times of the day or year, a variety of resident or migratory shorebirds could be present. These include the Pacific golden-plover or kolea (*Pluvialis fulva*), ruddy turnstone (*Arenaria interpres*), and wandering tattler (*Heteroscelus incanus*), which are often seen on the Puna coastline feeding on shoreline resources. They would be unlikely to make much use of most of the Barry Property, which is densely vegetated and offers no habitat for them. The seabird black noddy (*Anous minutus melanogenys*) was observed flying near the cliffs and over the nearshore waters, as it frequently does in the cliffed coasts of the main Hawaiian Islands. It nests in crevices and caves in lava (especially pahoehoe) seacliffs; no black noddy nests were observed on the cliffs in front of the Barry Property, but openings in the rock might offer areas for nests.

Although no land birds were seen, during previous reconnaissance of shoreline properties in the Puna District, Geometrician Associates has noted a number of non-native land birds. These include common mynas (*Acridotheres tristis*), northern cardinals (*Cardinalis cardinalis*), spotted doves (*Streptopelia chinensis*), striped doves (*Geopilia striata*), Kalij pheasants (*Lophura leucomelanos*) Japanese white-eyes (*Zosterops japonicus*), and house finches (*Carpodacus mexicanus*), among other birds.

It is unlikely that many native forest birds would be expected to use the Barry Property due to its low elevation, alien vegetation and lack of adequate forest resources. However, it is likely that Hawai'i ‘amakihi (*Hemignathus virens*) are sometimes present in the general area, as some populations of this native honeycreeper appear to have adapted to the mosquito borne diseases of the Hawaiian lowlands. The Barry Property itself lacks habitat for ‘amakihi.

As with all of East Hawai‘i, several endangered native terrestrial vertebrates may be present in the general area and may overfly, roost, nest, or utilize resources of the Barry Property.

The endangered Hawaiian hawk (*Buteo solitarius*) is widespread, hunting throughout forested, agricultural and even residential areas of the island of Hawai‘i. It nests in large trees and can be vulnerable during the summer nesting season. However, the Barry Property does not contain, nor is it near, large trees suitable for hawk nests, and therefore the hawk would be very unlikely to be affected by activities on the Barry Property.

The Hawaiian petrel (*Pterodroma sandwichensis*), the Hawaiian sub-species of Newell's shearwater (*Puffinus newelli*), and the band-rumped storm-petrel (*Oceanodroma castro*) have been recorded over-flying various areas on the Island of Hawai‘i between late April and the middle of December each year. The Hawaiian petrel and band-rumped storm-petrel are listed as endangered, and Newell's shearwater as threatened, under both federal and State of Hawai‘i endangered species statutes. The petrels and shearwaters hunt over the ocean during the day and fly to higher elevations at night to roost and nest. The Hawaiian petrel and the band-rumped storm petrel are known to nest at elevations well above 5,000 feet on the Big Island, not within the project area. But during it breeding season from April through November, the Newell's shearwater burrows under ferns on forested mountain slopes. These burrows are

used year after year and usually by the same pair of birds. Although capable of climbing shrubs and trees before taking flight, it needs an open downhill flight path through which it can become airborne. Although once abundant on all the main Hawaiian Islands, most birds today are found in the steep terrain between 500 to 2,300 feet on Kauaʻi (https://www.fws.gov/pacificislands/fauna/newellsshearwater.html). The primary cause of mortality in these species in Hawaiʻi is thought to be predation by alien mammalian species at the nesting colonies. Collision with man-made structures is another significant cause. Nocturnally flying seabirds, especially fledglings on their way to sea in the summer and fall, can become disoriented by exterior lighting. Disoriented seabirds may collide with manmade structures and, if not killed outright, become easy targets of predatory mammals. These listed seabirds would not directly utilize the Barry Property but could occasionally overfly it.

Only one native land mammal is present in the Hawaiian Islands, the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*). Found in all environments on the island of Hawaiʻi, this bat roosts in tall shrubs or trees and is vulnerable to disturbance during its roosting season of June 1 to September 15.

Aside from the Hawaiian hoary bat, all other mammals in the Hawaiian Paradise Park area are introduced species, including feral cats (*Felis catus*), feral pigs (*Sus scrofa*), small Indian mongooses (*Herpestes a. auropunctatus*) and various species of rats (*Rattus* spp.). None are of conservation concern and all are deleterious to native flora and fauna.

There are no native terrestrial reptiles or amphibians in Hawaiʻi. The only reptile observed on the Barry Property was an unidentified species of skink (Family: Scincidae). Various gecko species (Family: Gekkonidae) are also known to be present in the area. No other reptiles or amphibians were detected during the survey, but Geometrician Associates has observed the highly invasive coqui frog (*Eleutherodactylus coqui*) in the area. It is likely that bufo toads (*Bufo marinus*) are occasionally present.

No invertebrate survey was undertaken as part of the survey, but rare native invertebrates tend to be associated with tracts of native vegetation and are not highly likely to be present on the Barry Property. Although no lava tube openings were observed, if caves or voids are present, native invertebrates including spiders and insects could be present.

Impacts and Mitigation Measures

Most of the Barry Property is dominated by alien plants, with the only native ecosystem being the shoreline vegetation, where common native plants are present. Because of the location and nature of the Project relative to sensitive vegetation and species, construction and use of a single-story dwelling and associated agricultural uses, or other similar uses, would not be likely to cause adverse impacts to vegetation or habitat. All Project improvements would be set outside the lava shelf and shoreline shrub zone, thus avoiding these resources. It is expected that some non-native species would be removed, appropriate native species planted and a narrow trail to the shoreline established, taking care to minimize harm to native species. As such, no adverse impact upon vegetation or endangered plant species should occur.

In order to avoid impacts to the endangered but regionally widespread terrestrial vertebrates listed above,

the Barrys will commit to several additional conditions:

- Construction will refrain from activities that disturb or remove the woody vegetation taller than 15 feet between June 1 and September 15, when Hawaiian hoary bats may be sensitive to disturbance.
- All exterior lighting will be shielded from shining upward, in conformance with Hawai‘i County Code § 14 – 50 et seq., to minimize the potential for disorientation of seabirds.

3.1.5 Air Quality, Noise, and Scenic Resources

Environmental Setting

Air quality in the Hawaiian Paradise Park area is generally excellent, due to its rural-agricultural nature and minimal degree of human activity, although vog from Kilauea volcano is occasionally blown into this part of Puna. Noise on the site is moderate, partly derived from natural sources such as surf, birds and wind, and also some contribution from dwellings and traffic on Paradise Ala Kai Road.

The area shares the quality of scenic beauty along with most of the Puna coastline. The County of Hawai‘i General Plan contains Goals, Policies and Standards intended to preserve areas of natural beauty and scenic vistas from encroachment. The General Plan discusses view of Mauna Kea and Mauna Loa from various subdivisions as noted features of natural beauty in Puna, but among specific examples of natural beauty, it does not identify any features or views in the Hawaiian Paradise Park area. Shoreline views from Paradise Ala Kai Road through the lot are currently blocked by existing heavy vegetation.

Impacts and Mitigation Measures

The project would not affect air quality or noise levels in any substantial ways. Brief and minor adverse effects would occur during construction of the Project. Given the small scale and short duration of any noise impacts, coupled with the lack of sensitive receptors such as parks, schools or hospitals, noise mitigation would not be necessary.

No designated scenic vistas or viewplanes would be affected. Currently, heavy vegetation blocks all views through the Barry Property; development of a dwelling on the site would likely open up at least some coastal views. Construction and occupation of the Project would be in harmony with the rural-agricultural landscape of Hawaiian Paradise Park.

3.1.6 Hazardous Substances, Toxic Waste and Hazardous Conditions

Based on onsite inspection and the lack of any known former and current uses on the Barry Property, it appears that the site contains no hazardous or toxic substances and exhibits no other hazardous conditions. In addition to the measures related to water quality detailed in Section 3.1.3, in order to ensure to minimize the possibility for spills of hazardous materials, the applicant proposes the following if and when the Project, or other permitted land use, is implemented:

- Unused materials and excess fill will be disposed of at an authorized waste disposal site.

- During construction, emergency spill treatment, storage, and disposal of all hazardous materials, will be explicitly required to meet all State and County requirements, and the contractor will adhere to "Good Housekeeping" for all appropriate substances, with the following instructions:
    - Onsite storage of the minimum practical quantity of hazardous materials necessary to complete the job;
    - Fuel storage and use will be conducted to prevent leaks, spills or fires;
    - Products will be kept in their original containers unless unresealable, and original labels and safety data will be retained;
    - Disposal of surplus will follow manufacturer's recommendation and all regulations;
    - Manufacturers' instructions for proper use and disposal will be strictly followed;
    - Regular inspection by contractor to ensure proper use and disposal;
    - Onsite vehicles and machinery will be monitored for leaks and receive regular maintenance to minimize leakage;
    - Construction materials, petroleum products, wastes, debris, and landscaping substances (herbicides, pesticides, and fertilizers) will be prevented from blowing, falling, flowing, washing or leaching into the ocean;
    - All spills will be cleaned up immediately after discovery, using proper materials that will be properly disposed of; and
    - Should spills occur, the spill prevention plan will be adjusted to include measures to prevent spills from re-occurring and for modified clean-up procedures.

3.2 Socioeconomic and Cultural

3.2.1 Land Use, Socioeconomic Characteristics and Recreation

Existing Environment

Because of the gradual occupation of lots developed during widespread land subdivision about sixty years ago, the Puna District has been the Big Island's fastest-growing district over the last thirty years. Population as measured in the 2010 U.S. Census was 45,326, a 66 percent increase over the 2000 count of 27,232. Despite a lack of basic infrastructure such as paved roads and water in most subdivisions, the relatively inexpensive lots, which typically range in size from one to three acres, have attracted residents from the U.S. mainland and other parts of the State of Hawai'i who seek affordable property. The basis of the economy of Puna has evolved from cattle ranching and sugar to diversified agriculture, various services for the growing populations, commuting to Hilo, and tourism, which has been stimulated (until the devastating eruption of May 2018) by being home to Kilauea, one of the world's most active volcanoes. Many Puna subdivisions, including Hawaiian Paradise Park, are now partially bedroom communities for Hilo's workforce, as evidenced by the flow of Hilo-bound traffic during the morning rush hour.

The Barry Property is located between Paradise Ala Kai Road on the *mauka* side and the Pacific Ocean on the *makai* side, and is flanked by similarly sized private parcels, one of which contains an existing single-family dwelling.

Puna experiences a high demand for coastal recreation, especially in calmer shoreline areas near population centers. Despite the long coastline, there are few beaches in Puna, and none in the vicinity of the Barry Property. Along most of the Puna shoreline, ocean recreation consists primarily of fishing from the cliffs. There is moderate use of the rough and irregular shoreline in this area. Maps of public accesses produced by the County of Hawai‘i do not indicate any nearby official *mauka-makai* shoreline public accesses along Paradise Ala Kai Drive (http://www.hawaiicounty.gov/pl-shoreline-access-big-island). However, an unpaved road located at the north end of Paradise Ala Kai Drive provides pedestrian access to the coast where one can then walk south along the coastline. There are also two County-owned parcels within a quarter mile of the Barry Property that also provide access to the coast. Fisherman and *opihi* pickers access fishing and gathering spots all along the coast.

The Barry Property does not have an official or unofficial shoreline trail either above or below the sea cliff. The area below the cliff is topographically difficult and no continuous access is possible. The pahoehoe shelf *mauka* of the sea cliff is easily walkable (see photos in Figure 2) and is occasionally used by fishermen who are traversing the coast looking for ulua fishing or opihi gathering sites.

Impacts and Mitigation Measures

No adverse socioeconomic impacts are expected to result from the Project. The project will have a small but positive economic impact for the County of Hawai‘i through increase in the tax base and employment and sales generated by construction. The Project would not adversely affect recreation, as lateral shoreline access would not be affected. The Barrys are Hawai‘i residents who are well aware of the rights of the public to utilize these areas and the cultural and subsistence importance of these practices.

3.2.2 Archaeology and Historic Resources

An archaeological field inspection was conducted by ASM Affiliates and is attached as Appendix 4. In the interest of readability, the summary below does not include all scholarly references; readers interested in extended discussion and sources may consult the appendix. Note that historical and cultural background information is contained in Section 3.2.4.

Existing Environment

Records on file at DLNR-State Historic Preservation Division (SHPD) indicate that 22 properties within the Hawaiian Paradise Park subdivision (totaling 22 acres) have been previously surveyed for archaeological sites. Each of these studies, all conducted at locations inland of the Barry Property, reported negative findings with regards to the presence of archaeological sites and features.

A survey of coastal lands within Kea‘au Ahupua‘a, conducted by Lass (1997), along the route of the Old Government Road to the northwest of Hawaiian Paradise Park, identified fifteen archaeological sites, including the Old Government Road/Puna Trail (Site 50-10-36-21273), which once passed inland of the current study area, along with numerous rock walls, enclosures, rock piles, modified bedrock features, and several concrete structures (Sites 50-10-36-21259 to 21273). These sites were interpreted as having been used for Precontact to early Historic Period habitation, burial, and agricultural purposes, Historic

ranching purposes, and World War II-era coastal defense purposes. Although not previously recorded, it is likely that similar sites were once common along the coast of Hawaiian Paradise Park as well, prior to the development of the subdivision's roads and lots.

A field inspection of the Barry Property parcel was conducted on June 6, 2018 by Matthew R. Clark, M.A., of ASM Affiliates. The field inspection revealed that no archaeological features are present on the surface of the parcel, and determined that the likelihood of encountering subsurface resources is extremely remote given the exposed bedrock ground surface.

Impacts and Mitigation Measures

Given the absence of archaeological resources or other historic features, there should be no impact to significant historic sites. The survey was provided to SHPD for their review and comment on June 10, 2018. To date, there has been no response. Although no archaeological sites or other historic properties appear to present, in the unlikely event that any unanticipated archaeological resources are unearthed within the Barry Property during the proposed development activities, work in the immediate vicinity of those resources should be halted and SHPD should be contacted in compliance with Hawai‘i Administrative Rules Title 13, Subtitle 13, Chapter 280.

3.2.3 Cultural Resources

A cultural impact assessment focusing on identification and impact analysis for valued cultural, historical, or natural resources was conducted by ASM Affiliates and is attached as Appendix 5. In the interest of readability, the summary below does not include all scholarly references; readers interested in extended discussion and sources may consult the appendix. Separately, the Office of Hawaiian Affairs, other agency officials and neighbors were also consulted by mail, email, and/or telephone as part of this EA to determine whether they had any information on natural or cultural resources that might be present or affected.

Cultural Background

The Barry Property is located within Kea‘au Ahupua‘a, a traditional land unit of the Puna District, which is one of six major districts on the island of Hawai‘i. The *ahupua‘a* of Kea‘au is one of fifty traditional land divisions found in the *moku* (district) of Puna on the eastern shores of Hawai‘i Island. The Hawaiian proverb “Puna, mai ‘Oki‘okiaho a Māwae” describes the extent of the district spanning from ‘Oki‘okiaho, the southern boundary, to Māwae, the northern boundary. In the book, *Native Planters in Old Hawaii*, Handy and Handy (1991) described Puna as an agriculturally fertile land that has repeatedly been devastated by lava flows. Writing during the 1930s, they relate that:

> The land division named Puna—one of the six chiefdoms of the island of Hawaii said to have been cut (‘oki) by the son and successor of the island's first unifier, Umi-a-Liloa—lies between Hilo to the north and Ka‘u to the south, and it projects sharply to the east as a great promontory into the Pacific. Kapoho is its most easterly point, at Cape Kumukahi. The uplands of Puna extend back toward the great central heights of Mauna Loa, and in

> the past its lands have been built, and devastated, and built again by that mountain's fires. In the long intervals, vegetation took hold, beginning with miniscule mosses and lichens, then ferns and hardier shrubs, until the uplands became green and forested and good earth and humus covered much of the lava-strewn terrain, making interior Puna a place of great beauty . . . .
>
> One of the most interesting things about Puna is that Hawaiians believe, and their traditions imply that this was once Hawaii's richest agricultural region and that it is only in relatively recent time that volcanic eruption has destroyed much of its best land. Unquestionably lava flows in historic times have covered more good gardening land here than in any other district. But the present desolation was largely brought about by the gradual abandonment of their country by Hawaiians after sugar and ranching came in . . .

(Handy and Handy 1991:539-542).

As suggested in the above passage, Puna was a region famed in legendary history for its associations with the goddess Pele and god Kāne (Maly 1998). Because of the relatively young geological history and persistent volcanic activity, the region's association with Pele has been a strong one. However, the association with Kāne is perhaps more ancient. Kāne, ancestor to both chiefs and commoners, is the god of sunlight, fresh water, verdant growth, and forests (Pukui 1983). It is said that before Pele migrated to Hawai‘i from Kahiki, there was "no place in the islands . . . more beautiful than Puna" (Pukui 1983:11). Contributing to that beauty were the groves of fragrant *hala* and forests of *‘ōhi‘a* lehua for which Puna was famous, and the inhabitants of Puna were likewise famous for their expertise and skill in *lauhala* weaving.

In Precontact and early Historic times the people of Puna lived primarily in small settlements along the coast with access to fresh water, where they subsisted on marine resources and agricultural products. According to McEldowney (1979), six coastal villages were traditionally present between Hilo and Cape Kumukahi (Kea‘au or Hā‘ena, Maku‘u, Waiakahiula, Honolulu, Kahuwai, and Kula or Koa‘e). The Barry Property is located between Hā‘ena and Maku‘u Villages. As described by McEldowney, each of the villages:

> seems to have comprised the same complex of huts, gardens, windbreaking shrubs, and utilized groves, although the form and overall size of each appear to differ. The major differences between this portion of the coast and Hilo occurred in the type of agriculture practiced and structural forms reflecting the uneven nature of the young terrain. Platforms and walls were built to include and abut outcrops, crevices were filled and paved for burials, and the large numbers of loose surface stones were arranged into terraces. To supplement the limited and often spotty deposits of soil, mounds were built of gathered soil, mulch, sorted sizes of stones, and in many circumstances, from burnt brush and surrounding the gardens. Although all major cultigens appear to have been present in these gardens, sweet potatoes, ti (*Cordyline terminalis*), *noni (Morinda citrifolia*), and gourds (*Lagenaria siceraria*) seem to have been more conspicuous. Breadfruit, pandanus, and mountain apple (*Eugenia malaccensis*) were the more

> significant components of the groves that grew in more disjunct patterns than those in Hilo Bay.

(McEldowney 1979:17).

Ka Moʻolelo O Hiʻiakaikapoliopele (The story of Hiʻiakaikapoliopele), initially published in the Hawaiian language newspaper *Ka Naʻi Aupuni* between the years 1905-1906, tells a story of Pele and her siblings that takes place at Hāʻena, located to the northwest of the Barry Property. The story relates that after settling on Hawaiʻi Island, Pele and her siblings ventured down to Hāʻena in Keaʻau to bathe in the sea. While there, Pele was overcome with the desire to sleep. She informed her youngest sister, Hiʻiaka, not to allow any of their siblings to awaken her. Hiʻiaka consented to her sister's commands. In her dream state, Pele followed the sound of a *pahu* (drum), which carried her spirit to the island of Kauaʻi, where she met a striking man named Lohiʻau. The two fell madly in love, but since Pele was in her spirit form, she made it clear to Lohiʻau that she must return to Hawaiʻi Island. Pele's long sleep was cause for concern and although tempted to awaken her sister, Hiʻiaka held true to her sister's commands and let her sleep.

When she awoke, Pele called upon each of her sisters and made a proposition, asking which one of them would fetch her dream lover Lohiʻau from Kauaʻi. Knowing Pele's tempestuous temper, each feared possible repercussions and refused to go, except for her youngest sister, Hiʻiaka. Pele demanded that Hiʻiaka travel to Kauaʻi to fetch Lohiʻau, and sent her on her way with strict instructions; Hiʻiaka was not to take him as her husband, she was not to touch him, and she was to take no longer than forty days on her journey. While Hiʻiaka agreed to her sister's demands, she realized that in her absence, Pele would become incensed with a burning and vehement fury and destroy whatever she desired. So Hiʻiaka set forth two stipulations of her own; her beloved *ʻōhiʻa lehua* grove in Puna was to be spared from destruction, and Pele was to protect her dear friend Hōpoe in her absence. In this version of the story, Hōpoe is described as a young girl from Keaʻau who was skilled at riding the surf of Hāʻena, and who was the one that taught Hiʻiaka the art of *hula*. Pele agreed to Hiʻiaka's requests, and Hiʻiaka departed on her journey to retrieve Pele's lover. In a sympathetic act, Pele bestowed supernatural powers upon Hiʻiaka so that she would be protected against the dangers she would undoubtedly meet along the way.

Hiʻiaka hadn't ventured very far on her journey when she realized that the volcano had begun to smoke thickly, trailing lava towards Hōpoe's home of Keaʻau. It was not long before the smolder of smoke burst into a scorching fire. Despite being filled with a sense of dread, sensing that her sister had betrayed her promise, Hiʻiaka continued her journey. At last, Hiʻiaka found Lohiʻau, unfortunately, all that remained of him was his lifeless corpse. Keenly aware that she could not return Lohiʻau to her sister in such a state, Hiʻiaka used her healing powers to return his wandering spirit back into his body.

By this time, because of the amount of time taken by Hiʻiaka, Pele was furious. She shook the earth with great ferocity and heaved her lava in a torrent of devastation, annihilating Hiʻiaka's *ʻōhiʻa lehua* forest, obliterating all of Puna, and finally consuming Hōpoe as she lingered by the sea. In her death, Hōpoe was transformed into a stone at the coast of Keaʻau; a stone, carefully balanced alongside the sea, that would dance gracefully when touched by the surf. Hiʻiaka, her heart bitter with her sister's betrayal, brought Lohiʻau back to Puna as she swore she would. There, enraged by her sister's spiteful acts,

Hi‘iaka fought a brutal battle with Pele. Fearing that the two sisters would destroy the entire island, the elder gods finally intervened and ended the battle.

A map prepared in 1930 and filed with Land Court Application 1053 (see Figure 5 of Appendix 5), labels the coastal lands on the eastern side of Kaloli Point as “Hopoe,” suggesting that the events of *Ka Mo‘olelo O Hi‘iakaikapoliopele* may have occurred in the general vicinity of the Barry Property. Maly (1999:138) indicated that “Hōpoe embodied the *lehua* forest of Kea‘au that extended across the flats that make up what is now called Kaloli Point.” The stone believed to be Hi‘iaka’s companion, Hōpoe, was moved by a *tsunami* in 1946 (Maly 1999:134; Pukui et al. 1974:52), and no longer dances along the shore of Kea‘au Ahupua‘a.

In 1823, British missionary William Ellis and members of the American Board of Commissioners for Foreign Missions toured the island of Hawai‘i seeking out communities in which to establish church centers for the growing Calvinist mission. Ellis recorded observations made during this tour in a journal (Ellis 2004). Walking southwest to northeast along the southeastern shore of the District of Puna with his missionary companions Asa Thurston and Artemas Bishop, Ellis described residences and practices in the district, and provided the first written description of Kea‘au (or Hā‘ena) Village and its environs:

> The country was populous, but the houses stood singly, or in small clusters, generally on the plantations, which were scattered over the whole country. Grass and herbage were abundant, vegetation in many places luxuriant, and the soil, though shallow, was light and fertile.
>
> Soon after 5 P.M., we reached Kaau [Kea‘au], the last village in the division of Puna. It was extensive and populous, abounding well with cultivated plantations of taro, sweet potatoes, and sugar-cane, and probably owes its fertility to a fine rapid stream, which, descending from the mountains, runs through it into the sea.

(Ellis 2004:296).

When Ellis visited Puna, less than fifty years after the arrival of the first Europeans, the population of Hawai‘i was already beginning to decline (Maly 1998). By the mid-nineteenth century, the ever-growing population of Westerners in the Hawaiian Islands forced socioeconomic and demographic changes that promoted the establishment of a Euro-American style of land ownership, and the *Māhele ‘Āina* (Land Division) of 1848 became the vehicle for determining the ownership of native lands within the island kingdom. During the *Māhele*, native tenants could also claim, and acquire title to, *kuleana* parcels that they actively lived on or farmed. As a result of the *Māhele*, Kea‘au Ahupua‘a was awarded to William C. Lunalilo (the future, and first elected, monarch of the Hawaiian Islands) as *‘āpana* (parcel) 16 of Land Commission Award 8559B. Kea‘au was one of sixty-five *ahupua‘a* maintained by Lunalilo following the *Māhele*. In Puna, very few claims for *kuleana* were submitted. Maly (1998:37) notes that with the exception of the islands of Kaho‘olawe and Ni‘ihau, no other land division of comparable size had fewer claims for *kuleana* from native tenants than the district of Puna. Only two *kuleana* (LCAw. 2327 to Barenaba and LCAw. 8081 to Hewahewa) were awarded within Kea‘au Ahupua‘a, neither of which is in close proximity to the Barry Property (Maly 1999).

Although Puna had been exposed to missionary presence since the 1820s, early pre-*Māhele* narratives portray the district as still heavily rooted in tradition, and only marginally impacted by foreign influence. While earlier narratives describe the region as densely populated with settlements in both coastal and inland settings, subsequent accounts reveal a sharp decline in the native population throughout the nineteenth century, with Hawaiians maintaining marginalized communities outside of the population centers. During the middle part of the nineteenth century, Puna's population declined by more than half, from 4,800 in 1835 to 2,158 in 1860 (Anderson 1865), and continued decreasing to a mere 1,043 by 1878 and 944 by 1884 (Thrum 1885 and 1886). Lifeways for the Hawaiian population still residing in Puna underwent drastic changes during the second half of the nineteenth century, as the traditional villages and subsistence activities were mostly abandoned.

By the beginning of the twentieth century, Puna was on the verge of major economic growth, spurred by the booming sugar and lumber industries. Increasing urbanization of Puna, and particularly Kea'au, were initially propelled by the sale of the *ahupua'a* to William Herbert (W.H.) Shipman, J. Eldarts, and Samuel Damon by the King Lunalilo Estate in 1882. Campbell and Ogburn (1992) relate that with land leased from Shipman, a small group of investors (B.F. Dillingham, Lorrin A. Thurston, Alfred W. Carter, and Samuel M. Damon) created and developed the 'Ōla'a Sugar Company, which operated on lands *mauka* of the Barry Property between 1899 and 1984. The immediate area near the Barry Property was too rocky for the cultivation of sugarcane, and was used by the Shipman family as ranch/grazing land until the late 1950s, when it was subdivided into Hawaiian Paradise Park and sold as individual lots.

Kepā Maly conducted archival-historical research, consultation, and a limited site preservation plan in 1999 for the Kea'au section of the Puna Trail-Old Government Road for *Nā Ala Hele*, the Hawai'i Statewide Trail and Access System. Maly's study identified traditions and practices associated with Kea'au Ahupua'a, including travel along the Puna Trail. As part of the work he identified significant features along the coastal landscape. The oral history component focused on recording the accounts of four individuals who utilized the Puna Trail and were knowledgeable about the coastal portion of Kea'au. Maly (1999) indicated that the Puna Trail evolved from the trail system known as the *ala loa*, which passed through the Puna District, and connected to the various districts on the island.

In 1998, Maly conducted an interview with John Ka'iewe Jr., who identified several old villages in the coastal section of Kea'au that had not been noted by McEldowney (1979), namely Pākī and Keauhou, both located between Kaloli Point and Hā'ena. Mr. Ka'iewe described the cultivating grounds for these villages being between the shore and the Old Government Road, as well as on the *mauka* side of the road. Mr. Ka'iewe also described gathering marine resources in this area including *'opihi*, *wana*, and *limu*. Following World War II, Mr. Ka'iewe specified that access had become restricted on the Old Government Road and that "the section of the road from Kaloli to Hā'ena was opened up for military vehicles" (Maly 1999:133). The presence of burials along the coast between Kea'au to Maku'u was also noted by Mr. Ka'iewe.

Roy Shipman Blackshear, a descendant of William H. and Mary Shipman, was also interviewed by Maly (1999). Mr. Blackshear described traveling along the Old Government Road and coastal lands of Kea'au. With respect to coastal sites, Mr. Blackshear described the fishpond and *kū'ula* (fishing shrines) stones at

Kea‘au Bay, a possible burial site on the *mauka* side of the Puna Trail near the Hōpoe vicinity, and old house sites and walls located along the portion of the trail extending from Hā‘ena to Pākī and Keauhou. Mr. Blackshear also noted an old *heiau* and burial sites crossed by the Puna Trail in Waikahekahe Nui. As part of this same study, Maly (1999) conducted an interview with a father and son, Albert Haa Sr. and Albert Haa Jr, who shared their experiences in traveling along the entire Kea‘au shoreline for fishing. Mr. Haa described traveling along the shoreline trail from Hā‘ena to Pākī instead of using the old Government Road. Mr. Haa also noted the presence of a large coastal cave but did not specify its location.

Existing Environment: Cultural, Historical or Natural Resources

The cultural-historical, archaeological, and ethnographic studies reviewed for this analysis revealed the cultural context of the Barry Property and surrounding properties are located in the vicinity of Hōpoe, a place described in the epic account of *Pele and Hi‘iaka*. Hōpoe was the name of Hi‘iaka’s companion and also the name of her beloved *‘ōhi‘a* grove, both of which were destroyed by her sister Pele. On a mythic level, this Hawaiian legendary account explains the major transformation of the Puna landscape through the interaction of gods and goddesses associated with the islands’ volcanic and geological forces. Culturally significant trails connected traditional settlements and villages established in areas with favorable conditions for both marine resources collection and horticultural activities. The nearby Puna Trail-Old Government Road, a marked trail currently managed by *Nā Ala Hele*, is a historic site. Although a variety of marine resources may be procured from the coast near the Barry Property, the absence of cultivatable soil made this area a less favorable location for permanent settlement and traditional habitation.

The Barry Property itself has limited value in terms of these resources. As discussed in the previous section, an archaeological field inspection of the Barry Property by ASM Affiliates determined that no archaeological features are present on the surface of the Barry Property. No specific cultural sites were identified by any sources or informants. However, the context of the Barry Property along the Kaloli Point coastline puts it within an area frequently accessed for subsistence marine resource collection, including, but not limited to, fishing and the collection of *‘opihi* (*Cellana sp.*). An unpaved road located at the north end of Paradise Ala Kai Street and two County-owned parcels within a quarter mile of the Barry Property provide pedestrian access to the coast where fishermen can walk south along the coastline.

Impacts and Mitigation Measures

Given the distance between the Barry Property and any identified natural, cultural, and historical resources, the proposed DBA and construction and occupation of the Project would not adversely affect any of these valued resources. The shoreline has been and continues to be accessed by local fishermen to procure a variety of marine resources. The collection of marine resources for subsistence purposes is a traditional and customary practice. The Barrys are Hawai‘i residents who are well aware of the rights of the public to utilize the area *makai* of the shoreline and the subsistence and cultural importance of these practices. Given this, there should be no adverse impact to valued cultural, historical, or natural resources, or any cultural practice, and therefore no mitigation measures are necessary or appropriate.

3.3 Public Roads, Services and Utilities

3.3.1 Roads and Access

Existing Environment, Impacts and Mitigation Measures

Road access to the Barry Property is provided via Paradise Ala Kai Drive, the most *makai* road in this portion of Hawaiian Paradise Park. Construction of a driveway would be required to build and occupy a dwelling. No impact on road networks or traffic would occur.

3.3.2 Public Utilities and Services

Environmental Setting, Impacts and Mitigation Measures

Electrical power to all the lots in the area is provided by HELCO poles, which also support landline telephone service. Domestic water for households in the majority of Hawaiian Paradise Park, including this area, is through catchment or wells. Wastewater from a future dwelling would require a septic system in conformance with requirements of the State Department of Health, found at Hawai‘i Administrative Rules Title 11, Chapter 62 (Wastewater Systems).

Police, fire and emergency medical service are available about ten road miles away at new facilities on Highway 130 in Pahoa. For fire protection, the applicant proposes use of water tanks. No parks, schools or other public facilities are present nearby.

There will be no adverse impact to any public or private utilities. The addition of one dwelling will have no measurable adverse impact to or additional demand on public facilities such as schools, police or fire services, or recreational areas. The Barrys acknowledge and understand that this lot, along with almost all other residences in the Puna District, is not located within a mile of emergency services.

3.4 Secondary and Cumulative Impacts

Due to its small scale, the construction and occupation of the Project in this rural-agricultural neighborhood would not produce any major secondary impacts, such as population changes or effects on public facilities.

Cumulative impacts result when implementation of several projects that individually have limited impacts combine to produce more severe impacts or conflicts in mitigation measures. The County of Hawai‘i occasionally performs road maintenance on the Government Beach Road, located about two miles east. No substantial government or private projects such as roadways, schools, businesses, or subdivisions, are known to be occurring or in planning for this portion of Puna. There are thousands of vacant lots in Hawaiian Paradise Park. At any given time, it is normal to have a number of dwellings under construction. The adverse effects of building a single-family dwelling in this context are very minor and involve temporary disturbances to air quality, noise, traffic and visual quality during construction. Even if

several dwellings are under construction simultaneously in the same general area, there should be no accumulation of substantial adverse impacts. Other than the precautions for preventing adverse impacts during construction listed above in Sections 3.1.3 and 3.1.6, no special mitigation measures should be required to counteract the small adverse cumulative effect.

3.5 Required Permits and Approvals

Under the assumption that the Project would eventually be built on the Barry Property, the following permits would be required:

County of Hawai'i:

Special Management Area Permit or Exemption
Grubbing, Grading and Building Permits

State of Hawai'i:

Wastewater System Approval
Water Well Permit (potential)

3.6 Consistency With Government Plans and Policies

3.6.1 Hawai'i State Plan

The Hawai'i State Planning Act, found in HRS Chapter 226 (the "**State Plan**"), is a comprehensive guide for the future long-range development of the State of Hawai'i. and provides goals, objectives, policies, and priorities for the State. Among other things, the State Plan's purposes are to identify the goals, objectives, policies, and priorities for the State of Hawai'i, provide a basis for allocating limited resources, and improve coordination between Federal, State and County agencies. The three themes underlying the State Plan are: (1) individual and family self-sufficiency; (2) social and economic mobility; and (3) community or social well-being. *See* HRS § 226-3.

The State Plan also provides numerous State goals and specific objectives and policies to achieve those goals. The State goals include a strong, viable, stable and diverse economy, the development of physical environments that are beautiful, clean and unique, and that enhance the mental and physical well-being of the residents, and the physical, social, and economic well-being for the people of Hawai'i that nourishes a sense of community responsibility and participation. *See* HRS § 226-4. The Project will further the above-described goals of the State Plan.

The State Plan is divided into three sections. Part 1 is Overall Theme, Goals, Objectives and Policies. Part 2 is Planning Coordination and Implementation. Part 3 is Priority Guidelines. The Project's consistency with applicable goals, objectives and policies of Parts 1 and 3 are discussed below; Part 2, which primarily covers internal government affairs, is not addressed.

Part I: Goals, Objectives and Policies of the Hawai‘i State Plan

The Project conforms to the following goals, objectives and policies of the State Plan:

HRS § 226-4 − State Goals

(1) A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawaii's present and future generations.

(2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people.

(3) Physical, social, and economic well-being, for individuals and families in Hawaii, that nourishes a sense of community responsibility, of caring, and of participation in community life.

HRS § 226-5 – Objectives and Policies for Population

(b)(2) Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.

(b)(3) Promote increased opportunities for Hawai'i 's people to pursue their socio-economic aspirations throughout the islands.

HRS § 226-6 – Objective and Policies for the Economy in General

(a)(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.

(b)(9) Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.

(b)(11) Encourage labor-intensive activities that are economically satisfying and which offer opportunities for upward mobility.

(b)(14) Stimulate the development and expansion of economic activities which will benefit areas with substantial or expected employment problems.

HRS § 226-11 – Objectives and Policies for the Physical Environment - Land-based, Shoreline, and Marine Resources

(a)(1) Prudent use of Hawaii's land-based, shoreline, and marine resources.

(a)(2) Effective protection of Hawaii's unique and fragile environmental resources.

(b)(3) Take into account the physical attributes of areas when planning and designing activities and facilities.

HRS § 226-12 – Objective and Policies for the Physical Environment - Scenic, Natural Beauty, and Historic Resources

(b)(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.

(b)(5) Encourage the design of developments and activities that complement the natural beauty of the islands.

The Project is in conformance with the above-quoted goals, objectives, and policies of the State Plan, HRS §§ 226-4, 226-5, 226-6, 226-11 and 226-12 in several respects. First, with respect to HRS § 226-4, the Project involves the construction of a modest single-story dwelling and related agricultural uses that are in harmony with and maintain an existing physical environment that is beautiful, clean, quiet, and unique.

Second, with respect to HRS §§ 226-5 and 226-6, the Project will have a positive economic impact for the County through an increase in the tax base and the employment and sales generated by construction. When a multiplier effect is taken into consideration, this positive impact will be magnified.

Third, with respect to HRS § 226-11, the Project's design and planning takes into account the physical attributes of the Petition Area and neighboring lands. The dwelling will be sited towards the ocean, but well behind the shoreline area of the Petition Area, and any development on the Petition Area will be set back outside the lava shelf and shoreline shrub zones, thus avoiding these resources. Once completed, the Project will be in harmony with the existing homes along the coast in Hawaiian Paradise Park.

Finally, with respect to HRS § 226-12, no designated scenic vistas or viewplanes will be affected by the Project. There are some intermittent scenic views of the shoreline and sea along Paradise Ala Kai Drive between the numerous existing homes. Currently, heavy vegetation blocks all views through the Petition Area, and development of the Project will likely open up at least some coastal views.

Part II: Priority Guidelines

The Project conforms to the following goals, objectives and policies of the State Plan Priority Guidelines:

HRS § 226-103 − Economic Priority Guidelines

HRS § 226-103(a)(1) Seek a variety of means to increase the availability of investment capital for new and expanding enterprises.

a. Encourage investments which:

(i) Reflect long term commitments to the State;

(ii) Rely on economic linkages within the local economy;

(iii) Diversify the economy;

(iv) Re-invest in the local economy;

(v) Are sensitive to community needs and priorities; and

(vi) Demonstrate a commitment to management opportunities to Hawai'i residents.

HRS § 226-104 − Population Growth and Land Resources Priority Guidelines

(a)(1) Encourage planning and resource management to insure that population growth rates throughout the State are consistent with available and planned resource capacities and reflect the needs and desires of Hawai'i's people.

(b)(1) Encourage urban growth primarily to existing urban areas where adequate public facilities are already available or can be provided with reasonable public expenditures and away from areas where other important benefits are present, such as protection of important agricultural land or preservation of lifestyles.

(b)(2) Make available marginal or non-essential agricultural lands for appropriate urban uses while maintaining agricultural lands of importance in the agricultural district.

(b)(12) Utilize Hawaii's limited land resources wisely, providing adequate land to accommodate projected population and economic growth needs while ensuring the protection of the environment and the availability of the shoreline conservation lands, and other limited resources for future generations.

The Project is in keeping with the State Plan Priority Guidelines in several respects. First, the Puna

District has been the County's fastest-growing district over the last thirty years. Second, the Hawaiian Paradise Park subdivision already has a significant number of existing dwellings, including along the coastline, and new dwellings continue to be built. Third, as discussed *supra*, the Petition Area's soils are generally poorly suited for agricultural uses, thereby making the Petition Area marginal, non-essential agricultural land that is appropriate for the Project.

3.6.2 Coastal Zone Management Area

The Hawai'i Coastal Zone Management Program, codified at Chapter 205A, HRS (CZMP), establishes objectives and policies for the preservation, protection, and restoration of natural resources of Hawai‘i Coastal Zone. The Coastal Zone Management area is defined as lands of the State and the area extending seaward from the shoreline to the limit of the State's police power and management authority, including the United States territorial sea.

The Special Management Area (SMA) Rules of the County of Hawai‘i (SMA Rules) were established to implement the CZMP. SMA Rule 9-6 adopts and implements the objectives and policies of the CZMP set forth in HRS § 205A-2, and SMA Rule 9-10(h) sets forth criteria for determining whether a proposed action may have a substantial adverse environmental or ecological effect, while also taking into account potential cumulative adverse effects. Both are discussed in turn.

HRS § 205A-2 − CZMP OBJECTIVES AND POLICIES

For the following reasons, the Project is consistent with the following objectives and policies of the CZMP set forth in HRS § 205A-2 and adopted in SMA Rule 9-6.

1. RECREATIONAL RESOURCES

   Objective: *Provide coastal recreational opportunities accessible to the public.*

   Policies: *(a) Improve coordination and funding of coastal recreational planning and management; and*

   (b) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:

   (i) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;

   (ii) Requiring replacement of coastal resources having significant recreational value including, but not limited to surfing sites, fishponds, and sand beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;

> *(iii) Providing and managing adequate public access, consistent with conservation of natural resources, to and along shorelines with recreational value;*
>
> *(iv) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;*
>
> *(v) Ensuring public recreational uses of county, state, and federally owned or controlled shoreline lands and waters having recreational value consistent with public safety standards and conservation of natural resources;*
>
> *(vi) Adopting water quality standards and regulating point and nonpoint sources of pollution to protect, and where feasible, restore the recreational value of coastal waters;*
>
> *(vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches, and artificial reefs for surfing and fishing; and*
>
> *(viii) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, and county authorities; and crediting such dedication against the requirements of section 46-6;*

The Project is consistent with the objectives and policies related to recreational resources. The Project will not adversely affect recreational opportunities accessible to the public, as lateral shoreline access would not be affected. The Barry Property does not have an official or unofficial shoreline trail either above or below the sea cliff. The area below the cliff is topographically difficult and no continuous access is possible. The pahoehoe shelf *mauka* of the sea cliff is easily walkable (see photos in Figure 2) and is occasionally used by fishermen who are traversing the coast looking for ulua fishing or opihi gathering sites. The Barrys are Hawai‘i residents who are well aware of the rights of the public to utilize these areas and the cultural and subsistence importance of these practices.

2. HISTORIC RESOURCES

> **Objective:** *Protect, preserve and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture*.
>
> **Policies:** (*a) Identify and analyze significant archeological resources*;

(b) *Maximize information retention through preservation of remains and artifacts or salvage operations; and*

(c) *Support state goals for protection, restoration, interpretation, and display of historic resources*.

The Project is consistent with the objectives and policies related to historic resources. As discussed *supra*, a field inspection of the Barry Property parcel was conducted by ASM Affiliates. The field inspection revealed that no archaeological features are present on the surface of the parcel, and determined that the likelihood of encountering subsurface resources is extremely remote given the exposed bedrock ground surface. In the unlikely event that unanticipated archaeological resources are unearthed within the Barry Property, work in the immediate vicinity of those resources would be halted and the appropriate authorities notified. The Project is not expected to have an adverse effect on historical or archaeological resources.

3. SCENIC AND OPEN SPACE RESOURCES

Objective: *Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources.*

Policies: *(a) Identify valued scenic resources in the coastal zone management area;*

(b) Ensure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;

(c) Preserve, maintain, and, where desirable, improve and restore shoreline open space and scenic resources; and

(d) Encourage those developments that are not coastal dependent to locate in inland areas.

The Project is consistent with the objectives and policies related to scenic and open space resources. No designated scenic vistas or view planes would be affected by the Project. Currently, heavy vegetation blocks all views through the Barry Property; development of a dwelling on the site would likely open up at least some coastal views.

4. COASTAL ECOSYSTEMS

Objective: *Protect valuable coastal ecosystems, including reefs, from disruption and minimize adverse impacts on all coastal ecosystems.*

Policies: *(a) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;*

(b) Improve the technical basis for natural resource management;

(c) Preserve valuable coastal ecosystems, including reefs, of significant biological or economic importance;

(d) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and

(e) Promote water quantity and quality planning and management practices that reflect the tolerance of fresh water and marine ecosystems and maintain and enhance water quality through the development and implementation of point and nonpoint source water pollution control measures.

The Project is consistent with the objectives and policies related to coastal ecosystems. The general shoreline area in Hawaiian Paradise Park already supports hundreds of dwellings and is utilized by residents and property owners to park vehicles and fish, and there are no reported water quality problems from these uses. Upon completion, the Project would be similar to the existing dwellings on shoreline lots in the area, and would not be expected to contribute to sedimentation, erosion, and pollution of coastal waters.

At the time development is proposed, the Barrys and their engineer will determine whether the area of disturbance is sufficiently large to require a County grading permit or National Pollutant Discharge Elimination System (NPDES) permit. Grading for the driveway and dwelling site will include practices to minimize the potential for sedimentation, erosion and pollution of coastal waters.

5. ECONOMIC USES

Objective: *Provide public or private facilities and improvements to the State's economy in suitable locations.*

Policies: *(a) Concentrate coastal development in appropriate areas;*

(b) Ensure that coastal development such as harbors and ports, and coastal related development such as visitor facilities and energy generating facilities, are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and

(c) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-terms growth at such areas, and permit coastal dependent development outside of presently designated areas when:

(i) Use of presently designated locations is not feasible;

(ii) Adverse environmental effects are minimized; and

(iii) The development is important to the State's economy.

The Project is consistent with the objectives and policies related to economic uses. The Barry Property is situated along the coastline in Hawaiian Paradise Park. Hawaiian Paradise Park has been in continual stages of development for decades and a significant number of shoreline lots within Hawaiian Paradise Park already have dwellings of similar size to the Project. In addition, the Project will provide a small, but positive economic benefits to the County through an increase in the tax base, and employment and sales generated by construction of the Project. When a multiplier effect is taken into consideration, this positive impact will be magnified.

6. COASTAL HAZARDS

Objectives: *Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, subsidence and pollution.*

Policies: *(a) Develop and communicate adequate information about storm wave, tsunami, flood, erosion, subsidence, and non-point source pollution hazards;*

(b) Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, point and non-point pollution hazards;

(c) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and

(d) Prevent coastal flooding from inland projects.

The Project is consistent with the objectives and policies related to coastal hazards.

The majority of the Barry Property is located in Flood Zone "X," which represents areas outside of the 0.2% annual chance flood plain. A small portion of the Property along the shoreline is within the "VE" Flood Zone (also known as the Coastal High Hazard Area), which is the area subject to high velocity water including waves and tsunamis, and is defined by the 1% annual chance (base) flood limits and wave effects of three (3) feet or greater. However, no development activities are proposed within the portion of the Property located in the "VE" Flood Zone.

As discussed *supra*, a Coastal Erosion and Volcanic Hazard Report was prepared or the Project and is included with this Draft EA as Appendix 2. That report concluded that the Barry Property is suitable for the Project.

The Property is within the County's tsunami inundation zone and is subject to tsunami evacuation. However, dwellings are very common along this portion of the coastline, and the Project does not present any extraordinary tsunami risks.

At the appropriate time, an engineer will determine whether the Project will require a County grading permit or National Pollutant Discharge Elimination System permit. Plans for grading the driveway and dwelling lot will seek to minimize the potential for sedimentation, erosion and pollution of coastal waters. The general shoreline area in Hawaiian Paradise Park already supports a significant number of dwellings, and is utilized by residents and the public to park vehicles and fish, and there are no reported water quality problems from these uses. Upon its completion, the Project would be similar to the existing dwellings on shoreline lots in this area and is not anticipated to contribute to sedimentation, erosion, or pollution of coastal waters.

7. MANAGING DEVELOPMENT

Objective: *Improve the development review process, communication, and public participation in the management of coastal resources and hazards.*

Policies: *(a) Use, implement, and enforce existing law effectively to the maximum extent possible in managing present and future coastal zone development;*

(b) Facilitate timely processing of applications for development permits and resolve overlapping or conflicting permit requirements; and

(c) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the public to facilitate public participation in the planning and review process;

The Project is consistent with the objectives and policies related to managing development. Through the EA process under HRS Chapter 343, as well as the DBA process under HRS Chapter 205, the Project will undergo review and decision by the LUC. Both processes provide opportunity for public review and comment on the Project. In addition, through these processes, the potential short- and long-term impacts of the Project will be identified and analyzed, and, to the extent necessary, appropriate mitigation measures will be presented at early stages of the Project.

8. PUBLIC PARTICIPATION

Objective: *Stimulate public awareness, education, and participation in coastal management.*

Policies: *(a) Promote public involvement in coastal zone management processes;*

(b) Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal-related issues, developments, and government activities; and

(c) Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.

The Project is consistent with the objectives and policies related to public participation. As a part of this Draft EA, Petitioners will engage in outreach efforts with community organizations, groups, interested individuals, as well as with County and State agencies. This outreach started with the early consultation process and will continue through the publication and dissemination of this Draft EA to all relevant County, State and Federal agencies and organizations, as well as community organizations, interested individuals, and elected officials.

9. BEACH PROTECTION

Objective: *Protect beaches for public use and recreation.*

Policies: *(a) Locate structures inland from the shoreline setback to conserve open space and to minimize loss of improvements due to erosion;*

(b) Prohibit construction of private erosion-protection structures seaward of the shoreline, except when they result in improved aesthetic and engineering solutions to erosion at the sites and do not interfere with existing recreational and waterline activities;

(c) Minimize the construction of public erosion-protection structures seaward of the shoreline; and

(d) Prohibit private property owners from creating a public nuisance by inducing or cultivating the private property owner's vegetation in a beach transit corridor; and

(E) Prohibit private property owners from creating a public nuisance by allowing the private property owner's unmaintained vegetation to interfere or encroach upon a beach transit corridor.

The Project is consistent with the objectives and policies related to beach protection and recreation. The Barry Property does not have an official or unofficial shoreline trail either above or below the sea cliff. The area below the cliff is topographically difficult and no continuous access is possible. The pahoehoe shelf *mauka* of the sea cliff is easily walkable (see photos in Figure 2) and is occasionally used by fishermen who are traversing the coast looking for ulua fishing or opihi gathering sites. The Barrys are Hawai‘i residents who are well aware of the rights of the public to utilize these areas and the cultural and subsistence importance of these practices.

The Project does not involve the construction of erosion-protection structures and will not result in the creation of nuisances, through uncontrolled vegetation or otherwise.

10. MARINE RESOURCES

Objective: *Implement the State's ocean resources management plan.*

Policies: *(a) Exercise an overall conservation ethic, and practice stewardship in the protection, use, and development of marine and coastal resources;*

(b) Assure the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial;

(c) Coordinate the management of marine and coastal resources and activities management to improve effectiveness and efficiency;

(d) Assert and articulate the interests of the State as a partner with federal agencies in the sound management of ocean resources within the United States exclusive economic zone;

(e) Promote research, study, and understanding of ocean processes, marine life, and other ocean resources in order to acquire and inventory information necessary to understand how ocean development activities relate to and impact upon ocean and coastal resources; and

(f) Encourage research and development of new, innovative technologies for exploring, using, or protecting marine and coastal resources.

The Project is consistent with the objectives and policies related to marine resources. The general shoreline area in Hawaiian Paradise Park already supports hundreds of dwellings and is utilized by residents and property owners to park vehicles and fish, and there are no reported water quality problems from these uses. Upon completion, the Project would be similar to the existing dwellings on shoreline lots in the area, and would not be expected to contribute to sedimentation, erosion, and pollution of coastal waters.

At the time development is proposed, the Barrys and their engineer will determine whether the area of disturbance is sufficiently large to require a County grading permit or National Pollutant Discharge Elimination System (NPDES) permit. Grading for the driveway and dwelling site will include practices to minimize the potential for sedimentation, erosion and pollution of coastal waters.

SMA RULE 9-10(H) − CRITERIA OF SUBSTANTIAL ADVERSE EFFECTS

The entire Barry Property is within the SMA. The County of Hawai‘i Planning Department requires preparation of an SMA Assessment Application to ensure that the proposed use complies with the objectives, policies and guidelines of the CZMP, and to determine whether a SMA permit is required. A single-family dwelling of the size proposed by the Barrys is usually determined to be an exempt action not requiring a SMA permit, as long as it does not have a cumulative impact, or a significant adverse

environmental or ecological effect on the SMA. In determining whether a proposed action may have substantial adverse effects pursuant to SMA Rule 9-10(h), the Planning Director will consider whether the proposed action:

> *(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource, including but not limited to, historic sites and view planes outlined in the General Plan or other adopted plans;*

The Project does not involve the irrevocable commitment to loss or destruction of any natural or cultural resource. As discussed in Sections 3.2.2 and 3.2.3, the Project will not adversely affect archaeological, historic or cultural resources. No historic sites are present or would be adversely affected by the Project. Aside from shoreline area uses, which would not be affected by the Project, there are no known cultural resources or practices. As also discussed in this Draft EA, the Project will not adversely affect any other natural resources.

No designated scenic vistas or view planes would be affected by the Project. Currently, heavy vegetation blocks all views through the Barry Property; development of a dwelling on the site would likely open up at least some coastal views.

> *(2) Curtails the range of beneficial uses of the environment;*

No restriction of the beneficial uses of the environment would occur through the construction, use and occupation of the Project. According to the 2017 State of Hawai‘i Data Book, published by the State of Hawai‘i Department of Business, Economic Development and Tourism, there are approximately 1,973,846 acres of land classified within the SLU Conservation District. The Project involves the reclassification of approximately 0.51 acres of privately-owned SLU Conservation District Land, and will, therefore, not impact the public’s access to or beneficial use of SLU Conservation District resources.

Moreover, the dwelling site would be set back from the shoreline and thus not restrict any shoreline uses such as hiking, fishing or water sports. Lateral pedestrian use of the shoreline area would not be impacted and there would be no adverse effect on the public’s access to or enjoyment of this shoreline area.

> *(3) Conflicts with the long-term environmental policies or goals of the General Plan or the State Plan;*

The State’s long-term environmental policies are set forth in Chapter 344, Hawai‘i Revised Statutes. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The Project is minor in size and scope and basically environmentally benign, and is thus consistent with all elements of the State’s long-term environmental policies. The Project’s consistency with the County General Plan is discussed *infra*.

> *(4) Substantially affects the economic or social welfare and activities of the community, County or State;*

The Project will not adversely affect the economic or social welfare and activities of the community,

County or State. The Project will have a positive economic impact for the County through an increase in the tax base and the employment and sales generated by construction. When a multiplier effect is taken into consideration, this positive impact will be magnified.

> *(5) Involves substantial secondary impacts, such as population changes and effects on public facilities;*

As discussed in Section 3.4, given its small scale, the construction and occupation of the Project in this rural-agricultural neighborhood would not produce any major secondary impacts, such as population changes or effects on public facilities.

> *(6) In itself has no substantial adverse effect but cumulatively has considerable adverse effect upon the environment or involves a commitment for larger actions;*

As also discussed in Section 3.4, the Project is not anticipated to result in substantial cumulative impacts. There are thousands of vacant lots in Hawaiian Paradise Park and, at any given time, it is normal to have a number of dwellings under construction. The adverse effects of building a single-family dwelling in this context are very minor and involve temporary disturbances to air quality, noise, traffic and visual quality during construction. Even if several dwellings are under construction simultaneously in the same general area, there should be no accumulation of substantial adverse impacts.

> *(7) Substantially affects a rare, threatened, or endangered species of animal or plant, or its habitat;*

As discussed in Section 3.1.4, the Project is not anticipated to have significant adverse impacts on any rare, threatened, or endangered species of animal or plant, or their habitat. Thorough survey has determined that no endangered plant species are present on the Barry Property. The Hawaiian hoary bat, which was not observed on the Barry Property but has been observed elsewhere in Hawaiian Paradise Park, is an island wide-ranging species that will experience no adverse impacts from the Barry Project due to mitigation in the form of timing the removal of vegetation. Other than the hoary bat, no rare, threatened or endangered species of fauna are known to exist on or near the project site, and none would be affected by any Project activities.

> *(8) Detrimentally affects air or water quality or ambient noise levels;*

The Project is not anticipated to detrimentally affect air or water quality, or ambient noises, although brief and minor adverse effects would occur during construction of the Project. Air quality in the Hawaiian Paradise Park area is generally excellent, due to its rural-agricultural nature and minimal degree of human activity. With implementation of Best Management Practices associated with grading permits, there would be no impacts from the Project on marine resources or coastal waters.

> *(9) Affects an environmentally sensitive area, such as flood plain, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water or coastal water; or*

The Project will not affect any environmentally sensitive areas. The Barry Property is not situated over

any natural drainage system or water feature that would flow into the nearby coastal system, and no floodplains are present in the area that would be expected to be developed. The threats posed by coastal hazards are addressed at length in Appendix 2 (and summarized in Section 3.1.1), which concludes that the Barry Property is suitable for the proposed Project.

> *(10) Is contrary to the objectives and policies of the Coastal Zone Management Program and the Special Management Area Guidelines of Chapter 205A, HRS.*

As discussed *supra*, the Project is consistent with the policies and objectives of the CZMP.

If and when the Barrys proceed with constructing the Project, or any other permitted use, the County Planning Director will be asked to make the determination that the Project (or other use) is not considered a "development" under SMA Rules and Regulations of the County of Hawai'i, Section 9-4 (10) (B), and is otherwise not subject to an SMA permit. If for some reason the Director determines that the proposed use does qualify as development, the Barrys would need to obtain a SMA permit.

3.6.3 Hawai'i County General Plan

The General Plan for the County of Hawai'i (General Plan) is the document expressing the broad goals and policies for the long-range development of the Island of Hawai'i. The General Plan was adopted by ordinance in 1989 and revised in 2005. The General Plan's Land Use Allocation Guide Map designates the majority of the Barry Property as Rural, with the makai-most portion designated as Open, which, for shoreline parcels, the County has consistently interpreted as covering only the forty- (40) foot shoreline setback area. The General Plan is organized into thirteen elements, with policies, objectives, standards, and principles for each. There are also discussions of the specific applicability of each element to the nine judicial districts comprising the County of Hawai'i. Listed below are pertinent sections followed by a discussion of conformance.

ECONOMIC GOALS

(a) Provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments.
(b) Economic development and improvement shall be in balance with the physical, social, and cultural environments of the island of Hawaii.
(d) Provide an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural, and social environment.

Discussion: The proposed DBA and construction and occupation of the Project would be in balance with the natural, cultural and social environment of the County. It would increase the tax base, create temporary construction jobs for local residents, and boost the economy through construction industry purchases from local suppliers. A multiplier effect takes place when these employees spend their income for food, housing, and other living expenses in the retail sector of the economy. Such activities are in keeping with the overall economic development of the island.

ENVIRONMENTAL QUALITY GOALS

(a) Define the most desirable use of land within the County that achieves an ecological balance providing residents and visitors the quality of life and an environment in which the natural resources of the island are viable and sustainable.
(b) Maintain and, if feasible, improve the existing environmental quality of the island.
(c) Control pollution.

ENVIRONMENTAL QUALITY POLICIES

(a) Take positive action to further maintain the quality of the environment.

ENVIRONMENTAL QUALITY STANDARDS

(a) Pollution shall be prevented, abated, and controlled at levels that will protect and preserve the public health and well being, through the enforcement of appropriate Federal, State and County standards.
(b) Incorporate environmental quality controls either as standards in appropriate ordinances or as conditions of approval.
(c) Federal and State environmental regulations shall be adhered to.

Discussion: The proposed DBA and construction and occupation of the Project would not have a substantial adverse effect on the environment and would not diminish the valuable natural resources of the region. The home and associated improvements would be compatible with the existing rural-agricultural uses in the area. Pertinent environmental regulations would be followed, including those for mitigation of water quality impacts.

HISTORIC SITES GOALS

(a) Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawaii.
(b) Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.

HISTORIC SITES POLICIES

(a) Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.
(b) Amend appropriate ordinances to incorporate the stewardship and protection of historic sites, buildings and objects.
(c) Require both public and private developers of land to provide historical and archaeological surveys and cultural assessments, where appropriate, prior to the clearing or development of land when there are indications that the land under consideration has historical significance.
(d) Public access to significant historic sites and objects shall be acquired, where appropriate.

Discussion: No archaeological sites are present. The only cultural resources or practices are associated

with traditional fishing and shellfish gathering *makai* of the lot, which will not be affected.

FLOOD CONTROL AND DRAINAGE GOALS

(a) Protect human life.
(b) Prevent damage to man-made improvements.
(c) Control pollution.
(d) Prevent damage from inundation.
(e) Reduce surface water and sediment runoff.
(f) Maximize soil and water conservation.

FLOOD CONTROL AND DRAINAGE POLICIES

(a) Enact restrictive land use and building structure regulations in areas vulnerable to severe damage due to the impact of wave action. Only uses that cannot be located elsewhere due to public necessity and character, such as maritime activities and the necessary public facilities and utilities, shall be allowed in these areas.
(g) Development-generated runoff shall be disposed of in a manner acceptable to the Department of Public Works and in compliance with all State and Federal laws.

FLOOD CONTROL AND DRAINAGE STANDARDS

(a) "Storm Drainage Standards," County of Hawaii, October, 1970, and as revised.
(b) Applicable standards and regulations of Chapter 27, "Flood Control," of the Hawaii County Code.
(c) Applicable standards and regulations of the Federal Emergency Management Agency (FEMA).
(d) Applicable standards and regulations of Chapter 10, "Erosion and Sedimentation Control," of the Hawaii County Code.
(e) Applicable standards and regulations of the Natural Resources Conservation Service and the Soil and Water Conservation Districts.

Discussion: The proposed Project improvements will be sited entirely within Flood Zone X, or areas outside of the 500-year floodplain as determined by detailed methods in FEMA's Flood Insurance Rate Maps. The project will conform to applicable drainage regulations and policies of the County of Hawai'i.

NATURAL BEAUTY GOALS

(a) Protect, preserve and enhance the quality of areas endowed with natural beauty, including the quality of coastal scenic resources.
(b) Protect scenic vistas and view planes from becoming obstructed.
(c) Maximize opportunities for present and future generations to appreciate and enjoy natural and scenic beauty.

NATURAL BEAUTY POLICIES

(a) Increase public pedestrian access opportunities to scenic places and vistas.
(b) Develop and establish view plane regulations to preserve and enhance views of scenic or prominent landscapes from specific locations, and coastal aesthetic values.

Discussion: The Project would be minor and in keeping with long-standing uses of the area, and would not cause scenic impacts or impede access.

NATURAL RESOURCES AND SHORELINES GOALS

(a) Protect and conserve the natural resources from undue exploitation, encroachment and damage.
(b) Provide opportunities for recreational, economic, and educational needs without despoiling or endangering natural resources.
(c) Protect and promote the prudent use of Hawaii's unique, fragile, and significant environmental and natural resources.
(d) Protect rare or endangered species and habitats native to Hawaii.
(e) Protect and effectively manage Hawaii's open space, watersheds, shoreline, and natural areas.
(f) Ensure that alterations to existing land forms, vegetation, and construction of structures cause minimum adverse effect to water resources, and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of an earthquake.

NATURAL RESOURCES AND SHORELINES POLICIES

(a) Require users of natural resources to conduct their activities in a manner that avoids or minimizes adverse effects on the environment.
(c) Maintain the shoreline for recreational, cultural, educational, and/or scientific uses in a manner that is protective of resources and is of the maximum benefit to the general public.
(d) Protect the shoreline from the encroachment of man-made improvements and structures.
(h) Encourage public and private agencies to manage the natural resources in a manner that avoids or minimizes adverse effects on the environment and depletion of energy and natural resources to the fullest extent.
(p) Encourage the use of native plants for screening and landscaping.
(r) Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.
(u) Ensure that activities authorized or funded by the County do not damage important natural resources.

Discussion: All Project improvements will be sited at appropriate distances from the shoreline to ensure that they will not affect shoreline resources or be damaged by waves or tides.

PUNA COMMUNITY DEVELOPMENT PLAN

The Puna Community Development Plan (CDP) encompasses the judicial district of Puna, and was developed under the framework of the General Plan. Community Development Plans are intended to translate broad General Plan Goals, Policies, and Standards into implementation actions as they apply to specific geographical regions around the County. CDPs are also intended to serve as a forum for

community input into land-use, delivery of government services and any other matters relating to the planning area.

The Puna CDP does not specify land use in the project area, but contains the following Goals for Managing Growth that are relevant to the action.

> 3.1.1 Goals (for Managing Growth)
> a. Puna retains a rural character while it protects its native natural and cultural resources.
> b. The quality of life improves and economic opportunity expands for Puna's residents.
> d. Exposure to high risk from natural hazards situations is reduced.
> f. Native vegetation, coastal and historic resources are provided new forms of protection.

Discussion: The proposed DBA and the Project would not degrade the rural-agricultural character of the area, as the neighborhood is composed of similar dwellings and uses, all in the SLU Agricultural District. The Barry Property is within Volcanic Hazard Zone 3, and shares the same lava flow and seismic hazards as the rest of Hawaiian Paradise Park. The expected location of the dwelling on the Barry Property, well set back from the shoreline, would avoid coastal hazards. No native vegetation, rare species, coastal resources or historic sites will be adversely affected.

The construction of the Project is consistent with the Puna CDP.

3.6.4 Hawai‘i County Zoning

The Barry Property is currently within the SLU Conservation District. The Barry Property is zoned by the County of Hawai‘i within the Agricultural District, minimum lot size of one acre (A-1a), although County zoning per se does not apply in the Conservation District. The proposed DBA and the Project are consistent with the A1-a County zoning district.

PART 4: DETERMINATION, FINDINGS AND REASONS

4.1 Determination

The Barrys expect that the LUC will determine that the proposed action will not significantly alter the environment, as impacts will be minimal, and that this agency will accordingly issue a Finding of No Significant Impact (FONSI). This determination will be based on comments to the Draft EA, and the Final EA will present the LUC's final determination.

4.2 Findings and Supporting Reasons

HAR § 11-200.1-13 outlines the factors agencies must consider when determining whether an Action has significant effects:

> (a) In considering the significance of potential environmental effects, agencies shall consider and evaluate the sum of effects of the proposed action on the quality of the environment.

(b) In determining whether an action may have a significant effect on the environment, the agency shall consider every phase of a proposed action, the expected impacts, and the proposed mitigation measures. In most instances, an action shall be determined to have a significant effect on the environment if it may:

1. *Irrevocably commit a natural, cultural, or historic resource.*

The Project will not involve an irrevocable commitment, loss or destruction of any natural, cultural, or historic resources. No valuable natural or cultural resource would be committed or lost. Common native plants are present but native ecosystems would not be adversely affected. The Property is dominated by alien vegetation, with the only sensitive ecosystem being the shoreline vegetation, where common native plants mixed with weeds are present. It is expected that future development of the Project would avoid this area. No adverse impact upon vegetation or endangered species would occur. Because of the location and nature of the Project relative to sensitive vegetation and species, its construction, use and occupation are not likely to cause adverse biological impacts. No archaeological sites are present. The only cultural resources or practices are associated with traditional fishing and shellfish gathering makai of the Barry Property, which will not be affected.

2. *Curtail the range of beneficial uses of the environment.*

The construction, use and occupation of the Project will not curtail the range of beneficial uses of the environment. According to the 2017 State of Hawai‘i Data Book, published by the State of Hawai‘i Department of Business, Economic Development and Tourism, there are approximately 1,973,846 acres of land classified within the SLU Conservation District. The Project involves the reclassification of 0.51 acres of privately-owned SLU Conservation District Land, and will, therefore, not impact the public’s access to or beneficial use of conservation resources.

3. *Conflict with the State’s environmental policies or long-term governmental goals established by law.*

The Project will not conflict with the State’s long-term environmental policies. The State’s long-term environmental policies are set forth in Chapter 344, Hawai‘i Revised Statutes. The broad goals of this policy are to conserve natural resources and enhance the quality of life. The Project is minor and basically environmentally benign, and it is thus consistent with all elements of the State’s long-term environmental policies.

4. *Have a substantial adverse effect on the economic welfare, social welfare, or cultural practices of the community and State.*

The Project will not have a substantial adverse effect the economic welfare, social welfare or cultural practices of the community or State of Hawai‘i. The Project will not affect cultural practices on or around the Property. The Project would also not adversely affect recreation, as lateral shoreline access would not be affected. The Project will have a small but positive economic impact for the County of Hawai‘i

through increase in the tax base and employment and sales generated by construction.

5. *Have a substantial adverse effect on public health.*

The Project would not substantially affect public health in any detrimental way. Wastewater will be disposed of in conformance with State of Hawai‘i Department of Health regulations.

6. *Involve adverse secondary impacts, such as population changes or effects on public facilities.*

Given its small scale, the Project would not produce any major secondary impacts, such as population changes, or result in any adverse effects on public facilities.

7. *Involve a substantial degradation environmental quality.*

The Project is minor and essentially environmentally benign, and thus it would not contribute to environmental degradation.

8. *Be individually limited but cumulatively have substantial adverse effect upon the environment or involves a commitment for larger actions.*

The Project is not one which is individually limited but cumulatively may have considerable effect upon the environment or involves a commitment for larger actions. The adverse effects of building the Project are limited to very minor and temporary disturbances to traffic, air quality, noise, and visual quality. There are no substantial government or private projects in construction or planning in the area, and no accumulation of adverse construction effects would be expected. Other than the precautions for preventing adverse effects during construction listed above, no special mitigation measures should be required to counteract the small adverse cumulative effect.

9. *Have a substantial adverse effect on a rare, threatened, or endangered species, or its habitat.*

The Project will not substantially affect any rare, threatened or endangered species of flora or fauna, or their habitat. Thorough survey has determined that no endangered plant species are present on the Barry Property. The Hawaiian hoary bat, which was not observed on the Barry Property but has been observed elsewhere in Hawaiian Paradise Park, is an island wide-ranging species that will experience no adverse impacts from the Project due to mitigation in the form of timing the removal of vegetation. Other than the hoary bat, no rare, threatened or endangered species of fauna are known to exist on or near the Barry Property, and none would be affected by any project activities.

10. *Have a substantial adverse effect on air or water quality or ambient noise levels.*

The Project will not detrimentally affect air or water quality or ambient noise levels. No direct effects to air, water, or ambient noise would occur from the SLU District Boundary Amendment. Eventual construction of the Project would involve brief, temporary and very minor effects that would occur during construction and would be mitigated. Future uses would be in harmony with neighboring land uses.

11. *Have a substantial adverse effect on or be likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters.*

The Project would not affect, nor would it likely to be damaged as a result of being located in, environmentally sensitive areas such as a flood plain, tsunami zone, sea level rise exposure area, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters. In general, geologic conditions do not impose undue constraints on the Project, as much of the Puna District faces similar volcanic and seismic hazard. With respect to volcanic hazard, the Barry Property is in Zone 3, along with most of the settled area of Puna and nearly all of Hilo, and it is unlikely that prohibitions on dwellings in Zone 3 will be adopted as a reaction to the recent lava flows of Kilauea. Nevertheless, it must be acknowledged that lava flow hazard exists, and that responding to disasters has fiscal consequences for government agencies. The Barrys understand that there are hazards associated with developing in this geologic setting, and have made the decision that the Project is not imprudent to construct or inhabit. Damage to any future home from coastal erosion and other coastal hazards, including sea level rise, can be minimized or avoided altogether by appropriate siting of Project improvements as determined at the time of construction. In addition, the elevations on the Barry Property vary from about 12 to 25 feet above sea level, which further reduces the risks from such hazards.

12. *Have a substantial adverse effect on scenic vistas and viewplanes, during day or night, identified in county or state plans or studies.*

No scenic vistas or viewplanes identified on State or County plans or studies would be affected, day or night, by the Project. Intermittent scenic views of the shoreline and sea along Paradise Ala Kai Drive are present between the dozens of existing dwellings. Currently, heavy vegetation blocks all views through the Barry Property, so development of the Project would likely open up at least some coastal views through the Barry Property.

13. *Require substantial energy consumption or emit substantial greenhouse gases.*

The project would not require substantial energy consumption or emit substantial greenhouse gases. Negligible amounts of energy input would be required for the construction, use and occupation of the Project. Electrical power is available in the area from HELCO poles; however, the Barrys intend to install a solar photovoltaic (PV) system that will allow the Project to be powered completely, or at least partially, "off-grid."

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