

Kona Kai Ola



FINAL ENVIRONMENTAL IMPACT STATEMENT

VOLUME 1: FEIS REPORT

Kealakehe, North Kona District, Island of Hawaii



Prepared for:
Jacoby Development, Inc.
171 17th Street, NW, Suite 1550
Atlanta, GA 30363

For Accepting Authority:
Hawai'i State Department
of Hawaiian Home Lands
1099 Alakea Street, Suite 2000
Honolulu, HI 96813

Prepared by:
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In Cooperation with:
Hawai'i State Department
of Land and Natural Resources
1151 Punchbowl Street, Room 130
Honolulu, HI 96813

JULY 2007

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I indicate that this Final Environmental Statement and all ancillary documents were prepared under my direction or supervision and that the information submitted, to the best of my knowledge, fully addresses the document content requirements as set forth in Chapter 343, Hawai'i Revised Statutes, and Section 11-200-18, Hawai'i Administrative Rules.

KONA MARINA DEVELOPMENT GROUP LLC,
A Hawai'i limited liability company

By: JACOBY MARINA MANAGEMENT LLC,
A Hawai'i limited liability company
Its Manager

By: 

JACOBY DEVELOPMENT, INC.,
A Georgia corporation
Its Manager
Name: Scott Condra
Title: Senior Vice President of Development

Executive Summary

Description of the Action

Jacoby Development, Inc. and Kona Marina Development Group, LLC, an affiliate of Jacoby Development, Inc., herein collectively referred to as JDI, have been selected by the State of Hawai'i to develop Kona Kai Ola on approximately 530 acres in Kealakehe, Kona, Island of Hawai'i. The project site comprises 200 acres owned by the State Department of Hawaiian Home Lands, or DHHL, and 330 adjacent acres under the State ~~Board~~ Department of Land and Natural Resources, or ~~BLNR~~ DLNR. This project will not involve development of the Kaloko-Honokōhau National Historical Park. However, the proposed marina within the project will share the or the existing Honokōhau Harbor, except for the shared entrance channel to Honokōhau Harbor.

The State of Hawai'i has expressed a desire to create and expand income-generating uses on the subject lands and provide expanded recreational ~~and~~ options for the surrounding community through the use of private investment.

The vision for Kona Kai Ola is an environmentally sustainable marina-focused development featuring a mix of uses including visitor and resident-serving commercial enterprises, hotels and time-share units, marina services, open space and community-benefiting facilities including public infrastructure improvements in a pedestrian friendly setting surrounding the marina and seawater lagoons.

The proposed Kona Kai Ola Master Plan includes a new 45-acre 800-slip marina that will meet an increasing public demand for boat facilities on the west side of the Island of Hawai'i. The project has a strong ocean and cultural orientation and these themes will be reflected in several proposed ways. A marine science center and a cultural park are proposed along with public access, public water features, community gathering areas, a yacht club, a big game fishing club, and a proposed canoe park.

Commercial areas will feature large retailers and local residential services intended to serve the local residential market, and commercial development near the proposed marina will focus on meeting the needs of residential and visitor markets with smaller shops and unique restaurants and boutiques.

The State agreements allow for the development of the lands for such uses as commercial, resort (hotel and time-share units), and light industrial. Although the agreements between the State and JDI prohibit the development of residences that are marketed or intended for use as primary or permanent residences, JDI is planning to construct worker housing on a nearby site that will be leased at below market rents. Although a separate resort development is not proposed, the hotel and time-share units constitute transient accommodation facilities that are usually found in resort destination areas and, within the scope of this document, the word "resort" is used interchangeably with "hotel units" and "time-share units" and does not connote the intent to design this component as a self-contained, exclusive resort development. Proposed transient accommodations include up to 700 hotel units that are expected to meet a wide range of demands, thereby providing employment, increasing the tax base, and providing entrepreneurial opportunities. Per requirements of the State agreements, a vacation ownership or time--share ownership plan could be developed and 1,803 units are proposed.

In keeping with the ocean and recreation orientation, the project will feature approximately 224 acres of developer-initiated green space, open space, public spaces, and view corridors. Kona Kai Ola will feature lagoons, water features, and ponds throughout a substantial portion of the development.

Integral throughout Kona Kai Ola is JDI's commitment to incorporate environmental sustainability. The project will be developed in a manner to take advantage of feature—the latest in environmental design and technology to create an energy efficient, low environmental impact, sustainable development at Kona Kai Ola. These efforts will help to optimize site potential and minimize non-renewable energy consumption, as well as protect and conserve water and enhance indoor environmental quality.

Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. Kona Kai Ola does not follow this same pattern of alternatives evaluation. The agreements and leases between the State and JDI set forth specific stipulate the parameters for the of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer JDI's perspective, the agreements must also provide sufficient flexibility to allow for a development product project design that responds to market needs and provides a reasonable rate of return on the private investment that is required in this project.~~

The agreement between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this FEIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor.

Three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin and a decrease in hotel and time-share units, Alternative 2, which is an alternative that had been previously discussed, but not included in the proposed project, that includes an 800-slip harbor and a golf course, and Alternative 3, the no-project alternative.

In response to the water quality study results and DEIS comments, an alternative plan was developed with a smaller marina with a lower number of boat slips, and a related decrease in hotel and time-share units. Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. Other project components include 400 hotel units, 1,100 time-share units, 143 acres of commercial uses, eleven acres of marina support facilities, and 214 acres of developer-initiated parks, roads, open spaces, swim lagoons, and community use areas. These community uses include a marine science center, a yacht club, a fishing club, and a Hawaiian cultural center.

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. Like the proposed project, Alternative 1 would have a strong ocean orientation, and community features similar to the proposed project.

Alternative 2 was discussed as an alternative in a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres. To support the economic viability of the project, other Alternative 2 uses include a golf course clubhouse, 2,500 visitor units, and 126 acres of commercial uses. Alternative 2 uses would also have community features similar to the proposed project. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

In Alternative 3, the no-project scenario, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

The proposed Kona Kai Ola project is conceptually designed on development parameters related to the marina and the related uses that would be needed to promote economic feasibility of the project. Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units. Due to the decreased number of hotel and time-share units, this alternative would generate significantly less environmental and socio-economic impacts. Harbor and nearshore water quality would be maintained and the reduced boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by widening the existing harbor channel.

Likewise, reduced hotel and time-share unit density would require less water and generate less traffic, air, noise and other impacts. While there would be a reduction in economic return related to lease and tax revenues to the State and County, there would be a decrease in social impacts related to overall de facto and secondary population impacts. A project with fewer hotel and time-share units would also generate fewer jobs for the community, and less revenue to the DHHL and DLNR.

While many might consider the 25-acre marina in Alternative 1 as the preferred size, an amendment to the DLNR agreement would be needed to allow Alternative 1 to proceed with its reduced-marina and reduced number of transient accommodation units. Hence, selection of this alternative lies within the discretion and judgment of DLNR and is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, is a less feasible alternative primarily because of doubtful market support for another golf course in the region. Further, DHHL has a strategic goal to have more revenue-generating activities on the leased commercial lands within the project area.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options, and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

Further, the creation of revenue producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians. Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

~~The only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized. While the no-action alternative would not generate related adverse impacts, the creation of a master-planned State-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would also not occur. Privately-funded improvements, such as the marina and regional roadway improvements, would not be implemented, and neither would other community-based improvements. Further, the creation of revenue producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.~~

~~Hence, the agreements and leases between the State and JDI indicate that the no-action alternative has been rejected at this time.~~

Significant Beneficial and Adverse Impacts

The State of Hawai'i has expressed a desire to create and expand income-generating uses on the subject lands; and to provide expanded recreational and options for the surrounding community.

Kona Kai Ola will generate significant tax and base lease revenues that will increase State fiscal resources and help to fund efforts such as the financing of DHHL housing programs on other DHHL land. Regional public facilities, including an 800-slip marina, the extension of Kuakini Highway and other infrastructure improvements, will be privately funded, thereby contributing to the State economy and providing significant regional benefits. The project will create an attractive market for environmentally and socially sound investment activities for the West Hawai'i community. It will generate diverse employment and business opportunities.

Development of the ~~552-530 acres study area and adjacent, which includes~~ 22 acres owned by the Queen Lili'uokalani Trust for the proposed Kealakehe Parkway extension to Kuakini Highway, will impact physical resources. There are potential environmental impacts, including noise, soil erosion, and fugitive dust and exhaust emissions that will mostly occur during the construction period. Mitigation measures will be implemented and, once developed, the project will have no significant impact on noise, air quality, water quality, and archaeological and cultural resources. No endangered or threatened fauna are expected to be impacted by the project.

There is an unresolved issue regarding potential impacts on green sea turtles due to construction activities as related to the marina. The creation of 19 acres of lagoons may result in impacts to two listed endemic endangered waterbird species, Black-necked Stilt (*Himantopus mexicanus knudseni*), and Hawaiian Coot (*Fulica alai*). The proposed brackish water pond area will provide additional foraging and resting habitat for migratory shorebirds and waterfowl, many of which are protected under the Migratory Bird Treaty Act (MBTA). The U.S. Fish and Wildlife Service will be consulted under the Endangered Species Act, as well as the DLNR under HRS Section 195D.

The development of the new 800-slip private marina would cause a significant increase of boater activity in the harbor entrance and possible severe congestion during peak use periods. Mitigation measures could include traffic control, such as staggering of sport fish tournament traffic, implementation of a permanent manned traffic control tower or harbor patrol, and limiting vessel size. Other possible mitigation measures include widening the entrance channel or reducing the number of slips ~~to 600~~. Regarding the reduction of boat slips, the development agreement with DLNR presently requires that JDI develop and construct a new marina basin containing not less than 800 new boat slips. Alternative 1 would reduce the number of boat slips from 800 to 400 slips and this would result in a 21 percent reduction in boat traffic congestion under average existing conditions, and ten percent during peak existing conditions. The volume of boat traffic related to Alternative 1 would not create the level of impact as the proposed project, and would not warrant widening of the entrance channel.

The DEIS identified 22 anchialine pools. Further studies determined that three of these pools are actually part of an estuary complex with direct connection to the ocean. Of the 19 anchialine pools, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Of the 19 anchialine pools, three pools with a combined surface area of 20m² would be eliminated due to the harbor construction.

The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 ppt. and that the anchialine biology would then perish. There is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and final determination of anchialine salinity following the harbor construction. The assessment that all anchialine pools will be barren with the construction of the harbor may be premature. *Halocaridina rubra* ('ōpae'ula) are routinely drawn from high salinity wells at 30-32 ppt.

The proposed marina will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance. There will be an expanded zone of mixing between the brackish effluent and the surrounding ocean waters due to the concentration of flows at the harbor mouth. The addition of effluent water from the marine water features, which includes lagoons and a marine park, will result in an additional increase in outflow across the marina entrance from an estimated 30 mgd to an expected value of greater than 135 mgd after development of the marine water features. The water features in Alternative 1 would significantly decrease by 74 percent, from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. ~~rather a concentration of the existing flows to the harbor entrance. Large quantities of seawater will be pumped up from the sea and flow through the proposed sea water lagoons and into the proposed new marina basin. This will result in extreme dilution of the groundwater entering the marina with nutrient loading that is lower than the present coastal waters. Water quality will be improved, thereby generating a positive impact on the nearshore marine environment. Further, under short storm wave conditions, the proposed marina construction causes a positive impact by reducing the wave height by 10 percent in the mooring area.~~

The anchialine ~~ponds~~ pools that are located north of the existing harbor are not likely to be impacted, as no development activities are proposed north of the existing harbor. It is highly unlikely that existing groundwater flows to the Kaloko-Honokōhau pond system to the north of the existing harbor will be impacted by the proposed marina to the south.

Seawater Air Conditioning (SWAC) is being considered as an alternative source for the development's cooling needs, in keeping with the sustainability goals of the overall Kona Kai Ola project. The design of the SWAC shall mitigate possible impacts through the prevention of the introduction of high nutrient deep seawater directly into the seawater lagoons, marina, or shallow nearshore coastal waters.

Proposed Mitigation Measures

Drainage, Flood Control, Water Quality and Soil Erosion: All construction activities will fully comply with public regulations. A construction waste management plan will be developed that seeks to reduce over 50 percent of the waste generated during construction. Material excavated during construction would, as much as possible, be used for areas that require fill.

Because of the highly porous geology, it is likely possible that surface generated sediments will enter groundwater in the advent of significant rainfall during grading. Because this groundwater could enter the new harbor area, the final harbor opening to the existing harbor would be opened only after all major site grading has occurred. The use of silt curtains will minimize the suspended sediment entering the ocean when the new harbor basin is opened to the existing harbor.

Marine Environment and Aquatic Ecosystems: As previously mentioned, further studies indicated that with the construction of the new harbor basin, the anchialine pools makai of the proposed basin may not necessarily increase in salinity to levels unhealthy for *Halocaridina rubra* and *Metabetaeus lohena* and other anchialine pool fauna. In addition, these studies determined that there are mechanisms to mitigate potential impacts. Mitigation measures to facilitate the long-term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. As a mitigation measure, bioretention, which is a Best Management Practice (BMP), is a highly appropriate application for the proposed development to prevent any nonpoint source pollution of groundwater. Another mitigation measure that may be included in the management plan is salinity adjustment of the anchialine pools to maintain healthy habitat for the anchialine ecosystem by surcharging man-made anchialine pools created adjacent to, or in the vicinity of, natural pools with low salinity well water. The change in the local groundwater flow pattern in the vicinity of the proposed marina will impact the anchialine ponds that are located between the proposed marina and the shoreline south of the harbor entrance. The salinity of the anchialine ponds will increase due to a reduction of brackish groundwater. Some ponds will be excavated to make the new harbor basin. These ponds are already degraded by nutrient enrichment, trash from visitors, and the introduction of minnows.

Of the 19 anchialine pools in the southern complex, three pools with a combined surface area of 20 m² would be eliminated due to harbor construction. Creation of new anchialine pools can help mitigate for the loss of these individual small pools. Regarding the remaining pools, further studies showed that while there were several signs of direct human use and disturbance, such as trash receptacles and toilet facilities, the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish, including topminnows and tilapia, and introduced plants, predominantly pickleweed and mangrove.

No realistic mechanisms are envisioned for re-injecting fresh water into these systems to maintain their ecological balance as an anchialine system. These ponds will be changed from a brackish water system to a marine system. Ponds in the area of the shoreline park and cultural park will be cleaned of vegetation and protected from other physical alteration. A buffer zone around these newly established marine ponds will be protected as well. Further recommended mitigation includes restoring other anchialine ponds off the project site, preferably in the Kaloko-Honokōhau National Historical Park land.

Similar to anchialine pools, no adverse or permanent environmental impacts are anticipated to coral reef ecosystems, although secondary impacts resulting from increased boater access to adjacent areas could occur. To monitor these impacts, permanent monitoring transects in coral reef habitats will be established near the harbor.

Acoustic impacts generated by construction activities related to blasting for the new marina may affect marine mammals and turtles. To mitigate these potential impacts, in-air and in-water exclusion zones will be established, as further discussed in Section 3.9.4. Observers will be deployed along the coastline to assure that marine mammals and basking or beached turtles are not in the exclusion zones during blasting activities.

The proposed marina will add 800 new slips to the existing facility, and it is likely possible that a portion of these new boats will engage in fishing activities. It is ~~recommended~~ proposed that facilities and programs to foster continued stewardship, fisheries science, and educational programs be implemented in the design of the new marina facilities. The proposed marine science center would provide a venue for implementing the educational and stewardship programs.

Archaeological and Cultural Resources: Cultural and archaeological resources will be protected as directed by the preservation plans approved by DLNR. In addition, the shoreline area contains most of these sites and will be protected as a cultural resource park. The management plan for this area will be developed through close consultation with ~~cultural~~ lineal descendants. For the area specifically within the legislative boundary of the Kaloko-Honokōhau National Historical Park ~~National Park~~ that is fronting the Kona Kai Ola project site, the developer will work cooperatively with the Kaloko-Honokōhau National Historical Park ~~National Park Service~~ to develop a management plan and interpretive plan for these cultural and archaeological resources.

Further mitigation includes the proposed preservation of the ahu (small rock cairns) near the makai end of the site and a short section of the old walking trail as a symbol of the trail system. Also, a cultural practitioner, who is knowledgeable of the site and can assist JDI ~~the project developer~~ to ensure proper cultural protocols are followed in the design of preservation measures; will be employed.

Kona Kai Ola will encourage and support the objectives of the Ala Kahakai National Historic Trail system, which is currently being developed to include historic coastal trails, and connecting mauka and makai trails, along with the addition of new trails to connect these historic trails. To encourage cultural practices, access to the shoreline will be open and access to cultural resources will be in a manner that encourages native Hawaiian and local resident ~~use~~ access and respect. Mauka viewsheds from the shoreline will be preserved and not obstructed.

Visual Impacts: Due to its location within the Queen Ka'ahumanu Highway view plane, the project has the potential to impact public views of the coastline in this area of North Kona. The proposed ~~Harbormaster Control Tower~~ harbormaster observation hale is a small one- or two-story structure set back approximately 500 feet from the harbor entry channel and will be visible from the ocean and the Kaloko-Honokōhau National Historical Park. To mitigate view impacts on the adjacent Kaloko-Honokōhau National Historical Park, design measures to minimize impacts will be employed. Further, it is proposed that part of the hale ground floor of the Harbormaster Control Tower ~~be~~ would be made available for park uses, such as a visitor center.

To protect view planes to and along the shoreline area, further mitigate visual impacts, the proposed project includes a 400-foot buffer zone along the shoreline will that will be preserved as open space. Improvements within this buffer zone will be limited to lateral shoreline public trails, mauka-makai access trails from the project site, and cultural or environmental-related improvements related to existing features within the buffer zone. No buildings or structures shall be built within the 400-foot shoreline setback area, with the possible exception of possible culturally-related structures that are directly related to native Hawaiian cultural resources in the buffer zone and that are requested by JDI's cultural advisors.

To control building mass near the shoreline, development sites directly adjacent to the shoreline setback area will be limited by design covenants to a lower unit density. Buildings immediately adjacent to the 400-foot shoreline setback are proposed at one and two stories height high to minimize building mass against the shoreline setback area. Major roadways, parking areas, and areas surrounding all major structures will be landscaped in accordance with a landscape master plan. In Alternative 1, the shoreline setback in the shoreline park would be increased to 600 feet in the southern area of the project site, and remain at 400 feet at the northern area of the project site.

Noise: It is not expected that construction-related project-generated noise will impact adjacent properties as they are mostly vacant or industrial. The only areas that may be affected are the Honokōhau Harbor users and the Fishing Club located south of Kealakehe Parkway. Commercial, hotel and time-share buildings completed in the initial phases may also be affected ~~from~~ by construction noise due to subsequent phases as they are in very close proximity to the construction site.

Construction blasting, if required for the new marina, could produce noise impacts. However, blasting at construction sites near populated areas is usually accomplished by using numerous small charges detonated with small time delays. Blast mats can also be used to assist in directing the explosive energy into the rock, controlling flying debris, and muffling the noise. With the appropriate blast design techniques, the noise from blasting can be controlled to minimize noise impacts. In cases where construction noise exceeds, or is expected to exceed, the State's "maximum permissible" property line noise levels, a permit must be obtained from the State DOH to allow the operation of vehicles, cranes, construction equipment, power tools, etc., which emit noise levels in excess of the "maximum permissible" levels.

Air quality: The project will have short and long-term air quality impacts. Mitigation measures during the construction phase will be employed based on an effective dust control plan. Further, all construction activities will comply with State Air Pollution Control regulations and the provisions of Section 11-60.1-33, HAR. All grading operations will be conducted in full compliance with dust and erosion control requirements of the County of Hawai'i's Grading Ordinance.

After construction of the project, implementation of air quality mitigation measures for long-term traffic impacts are not needed, as projected emissions are expected to remain within both state and national air quality standards.

Traffic: To mitigate traffic impacts, various signalization improvements and roadway improvements will be implemented. To connect Kona Kai Ola with the neighboring communities, Kona International Airport, and Kailua-Kona Village, the project proposes to sponsor a regularly scheduled shuttle service, so that people could utilize Kona Kai Ola without having to use a car for access. Further, the project includes the construction and realignment of Kealakehe Parkway makai of Queen Ka'ahumanu Highway and through the lands of Queen Lili'uokalani Trust connecting with Kuakini Highway in Kailua-Kona. Another measure to enhance road connectivity in the ahupua'a is the improvement of the intersection of Kealakehe Parkway and Queen Ka'ahumanu Highway. These improvements will serve the project as well as the regional community. Alternative 1 would decrease the number of trips generated in the AM peak period by 35 percent, from 1,511 trips in the proposed plan to 977 trips, and would decrease the PM peak period by 40 percent, from 3,277 trips in the proposed plan to 1,972 trips.

Infrastructure and Utilities: Project-related infrastructure will be sized in accordance with project requirements.

Consistent with Public Policies

Kona Kai Ola is generally consistent with environmental regulatory requirements contained within Chapter 343, HRS, and the Environmental Impact Statement Rules, Title 11, Chapter 200 of the Hawai'i Administrative Rules. The project is consistent with and implements objectives and policies of the Coastal Zone Management Program, Chapter 205A, HRS, the Hawai'i State Plan, Chapter 226, HRS, and the State DHHL Island Plan. Kona Kai Ola also is consistent with relevant objectives and policies of the Hawai'i County General Plan and regional plans. ~~At this writing, the County Council has approved a bill to amend the~~ The Land Use Pattern Allocation Guide (LUPAG) map for a portion most of the site is from Open to Urban Expansion, with some Open designation on the shoreline.

Kona Kai Ola is consistent with the Urban Expansion Area designation. The agreement between JDI and the State identifies hotel and time-share uses as possible development at Kona Kai Ola. The project is not a resort. A resort is a concept in which visitors are attracted to spend most, if not all, of their stay within the resort area through the design of amenities that fulfill the needs of a particular visitor market segment. This self-containment is achieved to varying degrees in resort development, depending on the natural, historic/cultural, and recreational resources within a resort site and the intended scale of the resort.

State and County laws recognize this distinction between a “resort” and a “hotel” or “time-share unit.” Section 514E-5, Hawai‘i Revised Statutes, authorizes time-share units to be located in a resort area or any other area in which a county may by ordinance allow a hotel unit. The Hawai‘i County Code correspondingly permits hotels and time-share units in non-resort zoning districts. The proposed project may include up to 700 hotel units and 1,803 time-share units, and depending on the eventual location of these project components, rezoning may be required for implementation. Also, pProject implementation requires rezoning to allow proposed uses.

Compliance with environmental laws and policies ~~are~~ is fundamental to Kona Kai Ola. JDI has made a corporate commitment to environmental sustainability in all its work and will incorporate the latest environmental design and technology to create an energy efficient, low environmental impact, sustainable development at Kona Kai Ola.

Summary of Unresolved Issues

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina would generate less environmental, social and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at the writing of this FEIS.

Seawater Air Conditioning (SWAC) is planned to utilize deep, cold ocean water for cooling or air conditioning, thereby significantly reducing energy consumption requirements. The specific design for the proposed SWAC facility has not been finalized. If injection wells are chosen for circulated-water disposal, the location of these will be dictated by the underlying aquifer and groundwater system. The design of the SWAC will be established as the project progresses. If SWAC is not implemented, then conventional air conditioning systems will be used.

The project will generate jobs, thereby possibly requiring workers to commute from existing distant housing areas, or to search for housing from the increasingly expensive West Hawai‘i housing market. Affordable housing requirements generated by Kona Kai Ola will need to be determined, which is done in the rezoning process.

Based on the current plan, it is anticipated that the development will need to secure water quantities estimated at 2.6 million gallons a day. Currently, Department of Water Supply (DWS) sources are not adequate to support the project needs. The developer is working with the County, DLNR and others on new sources, transmission and storage of water for the development.

During blasting operations for excavation of the marina, it may not be possible to clear sea turtles from the harbor and the coastal areas immediately adjacent to the project. While blasting techniques can be used that lower the in-water acoustic energy below that which may cause physical damage (Level A take), it is not likely that noise can be reduced to a level that will not cause significant response (Level B take) from the turtles resting on nearby beaches or swimming in adjacent waters. Means to resolve this problem are under discussion with NOAA.

Listing of Required Permits and Approvals

Federal

- U.S. Army Corps of Engineers Department of the Army Individual Permit (Section 404)s
- ~~U.S. Army Corps of Engineers Permit (Section 10)~~
- U.S. Coast Guard – Private Aids to Navigation

State of Hawai'i

Department of Health

- Office of Environmental Quality Control – Chapter 343 - Environmental Impact Statement
- Clean Water Branch – National Pollutant Discharge Elimination System Permit
- Clean Water Branch – Water Quality Certification (401)
- Clean Water Branch – Zone of Mixing
- Noise, Radiation, and Indoor Air Quality Branch – Community Noise Permit
- Safe Drinking Water Branch – Injection Well Permit and Source Water Use Approval
- Safe Drinking Water Branch – Operator Certification
- Safe Drinking Water Branch – Underground Injection Control Permit

Department of Land and Natural Resources

- Commission on Water Resource Management – Well Construction Permit, Pump Installation Permit, and Water Use Permit
- Office of Conservation and Coastal Lands – Conservation District Use Permit (SWAC pipe and ~~parkway~~ Kuakini Highway eExtension through Queen Lili'uokalani Trust property).

Department of Business, Economic Development and Tourism-Office of Planning

- Coastal Zone Management – CZM Consistency

County of Hawai'i

- ~~General Plan Amendment (in process)~~
- Rezoning
- Building Permit
- Grading/Grubbing Permit
- Special Management Area Permit (SMA)
- Subdivision Approval

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1 Introduction and Project Description

1.1 Overview

Jacoby Development, Inc. and Kona Marina Development Group, LLC, an affiliate of Jacoby Development, Inc., herein collectively referred to as JDI, have been selected by the State of Hawai'i to develop Kona Kai Ola at Kealakehe, Kona, Island of Hawai'i. The project includes a community-focused marina and commercial village that features visitor lodging, a marine science center, water features, and a cultural center. The project area encompasses 530 acres, of which 200 acres are owned by the State Department of Hawaiian Home Lands, herein referred to as DHHL, and 330 adjacent acres are owned by the State Department of Land and Natural Resources, herein referred to as DLNR.

In addition to the 530-acre project area, 22 acres owned by the Queen Lili'uokalani Trust are proposed for the extension of a proposed parkway that serves Kona Kai Ola and Kailua-Kona. The total subject area for this ~~Draft-Final~~ Environmental Impact Statement is therefore 552 acres. This project does not include lands in the Kaloko-Honokōhau National Historical Park or the Honokōhau Harbor except for the shared entrance channel.

This document contains the ~~Draft-Final~~ Environmental Impact Statement, or ~~DEIS~~-FEIS, in accordance with Chapter 343 of the Hawai'i Revised Statutes. Pursuant to EIS requirements, EIS changes based on responses to DEIS public comments are tracked throughout this FEIS. Added text is double underlined, and deleted text is indicated by ~~strike-through text~~.

The following summarizes project information:

Project Location	Kealakehe, North Kona, Island of Hawai'i
Judicial District	North Kona
Project Area Tax Map Key	7-4-008: 071 and 72 7-4-008: <u>0999</u> (proposed parkway through project site) 7-4-008: 003 (portion)
Project Site	Total 530 acres - 330 acres owned by DLNR (includes parkway property through site) - 200 acres owned by DHHL
Additional Study Area	22 acres for parkway extension south through lands owned by Queen Lili'uokalani Trust
Total EIS Study Area	552 acres
Existing Land Use	Mostly vacant, contiguous to the existing DLNR Honokōhau Harbor facility to the north.

Existing Land Use Designations

State Land Use Urban and Conservation
Hawai'i County General Plan Open and Urban Expansion
Hawai'i County Land Use Pattern Allocation Guide (LUPAG) Designation Urban (DHHL); Urban Expansion and Open (DLNR) (On November 29, 2006, the Hawai'i County Council approved re-designation of most of the DLNR land to Urban Expansion)
Hawai'i County Zoning Open
Special Management Area Completely in SMA Zone
DHHL Island Plan Commercial

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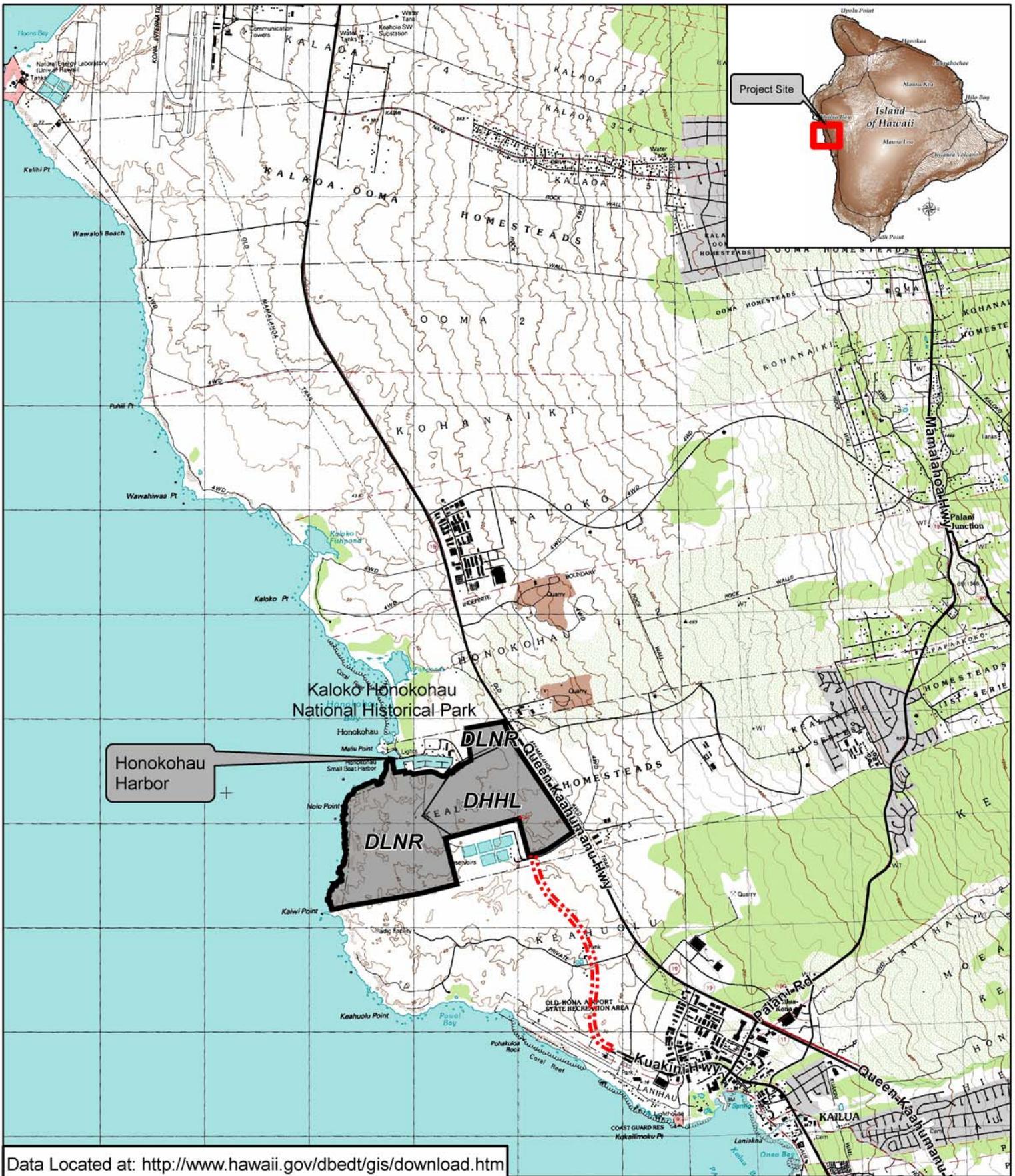
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1.2 Project Site

The 530-acre project site of the proposed Kona Kai Ola is located in Kealakehe, North Kona, on the island of Hawai'i as shown in Figure A. The site is owned by the State of Hawai'i, and includes Tax Map Key (TMK) parcels as illustrated in Figure B. Figure C contains ownership information, which is summarized as follows:

- DHHL owns about 200 acres identified as TMK 7-4-008:072;
- DLNR owns about 330 acres identified as TMKs 7-4-008: parcels 003 (por.), 071, and 0999 (proposed Kealakehe Parkway extension makai of Queen Ka'ahumanu Hwy).



Data Located at: <http://www.hawaii.gov/dbedt/gis/download.htm>

Figure A: Location Map

Legend

- Project Site
- Proposed Parkway



0 2,000 4,000 Feet

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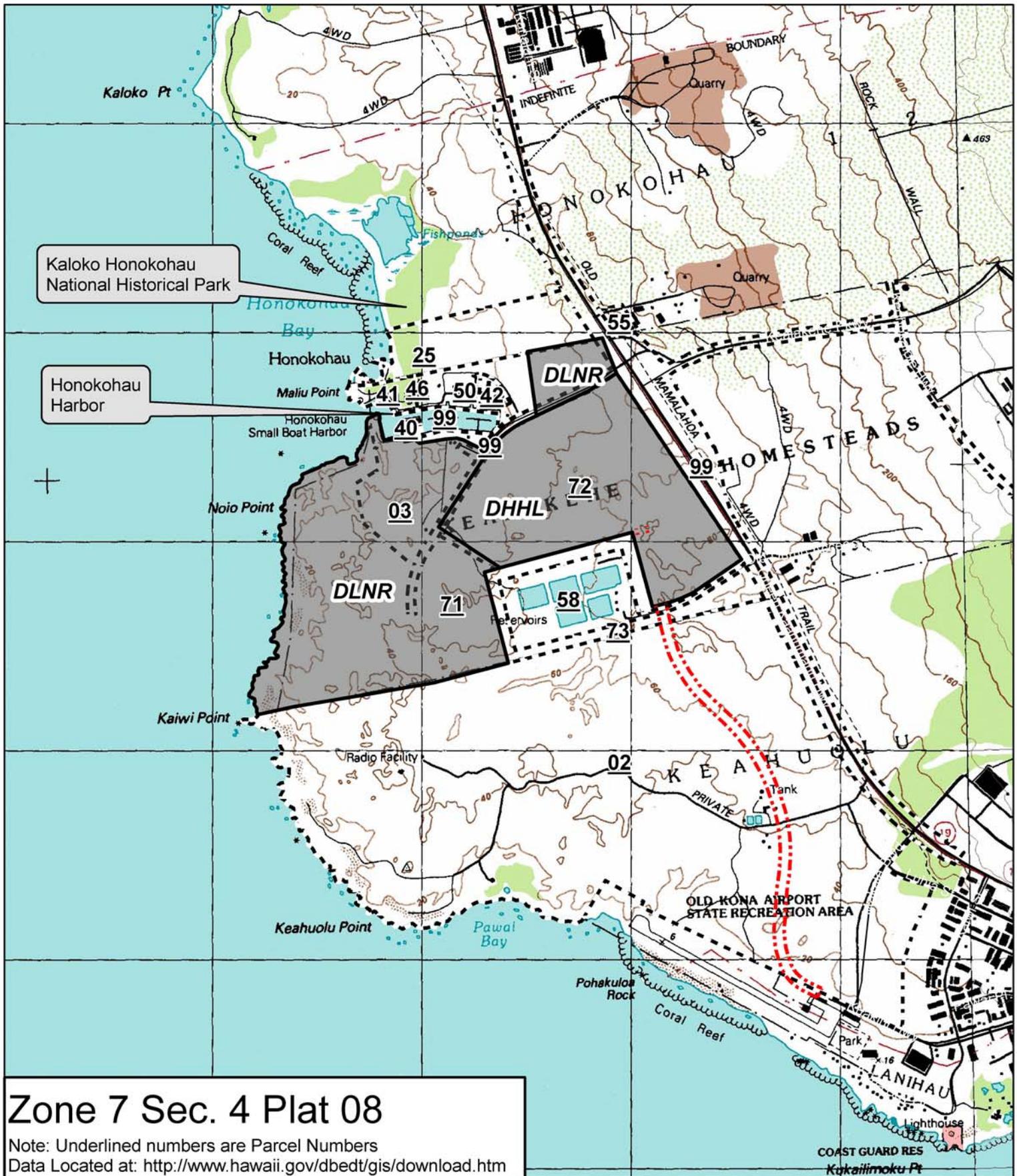


Figure B: Tax Map Key

Legend

-  Project Site
-  Parcels
-  Proposed Parkway

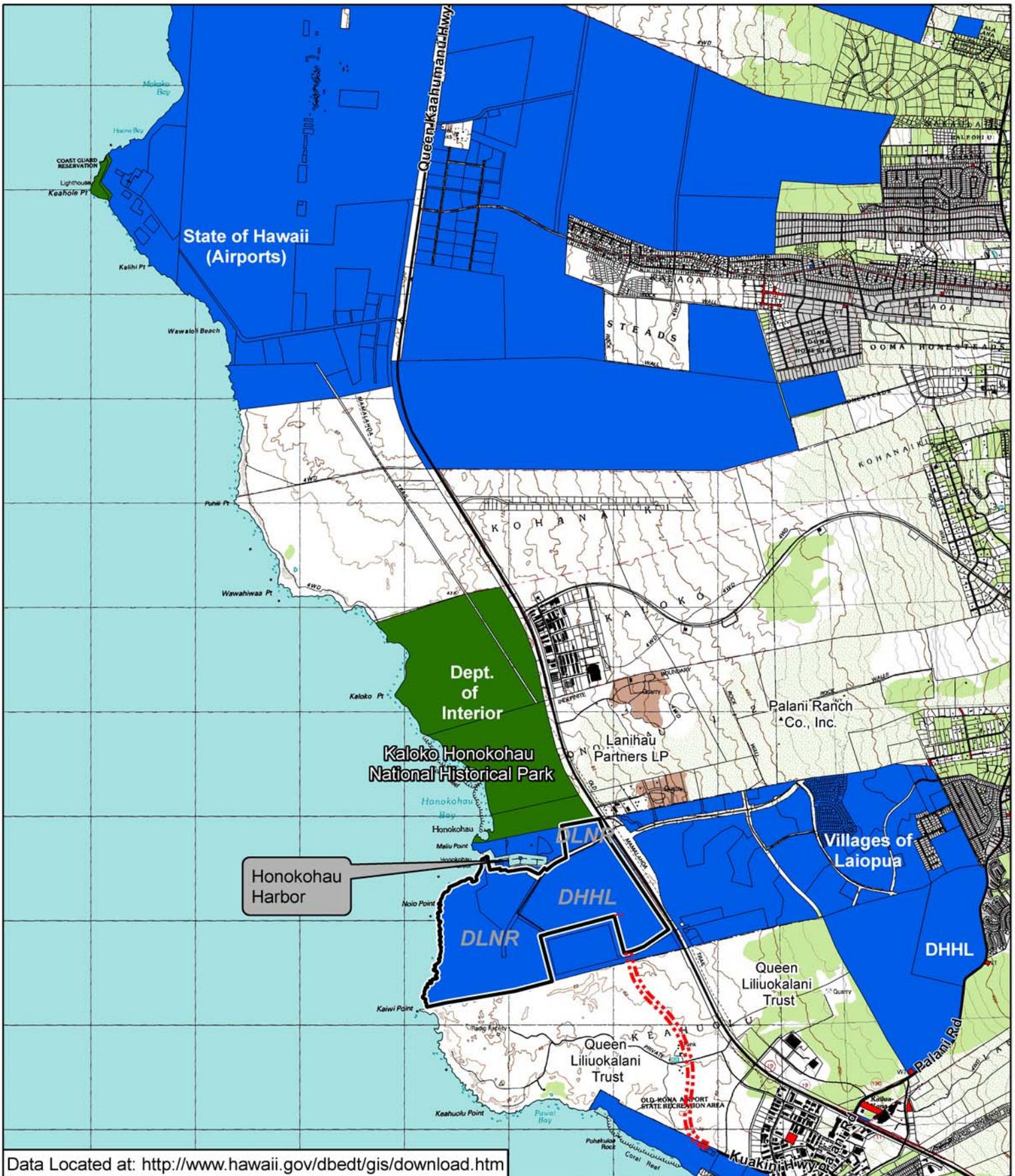


0 1,000 2,000 Feet



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Data Located at: <http://www.hawaii.gov/dbedt/gis/download.htm>

Figure C: Land Ownership Map

Legend

- | | |
|------------------|-----------------|
| Project Site | Hawaii County |
| Proposed Parkway | State of Hawaii |
| | USA |



0 2,000 4,000 Feet

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The ~~DEIS~~-FEIS study area also encompasses approximately 22 acres of land to be used for the proposed Kealakehe Parkway extension to Kuakini Highway south through Queen Lili'uokalani Trust lands.

The entire project site is bounded on the north by Kaloko-Honokōhau National Historical Park, and on the south by the Queen Lili'uokalani Trust parcel and the Kealakehe Wastewater Treatment Plant operated by Hawai'i County. The project site is bounded on the west by the Pacific Ocean shoreline, and on the east by Queen Ka'ahumanu Highway.

Currently, most of the project site is vacant. A gravel road with some DLNR-owned storage units and boating support equipment occupy a small portion of the DLNR parcel identified as TMK 7-4-008:003, surrounding the existing harbor. On the parcel to the south identified as TMK 7-4-008:071, a small public park and an unimproved parking area are located near the existing harbor entrance channel. The parking area is currently being used by adjacent boat owner slips, as well as those who hike to 'Alula, a small pocket beach located a short distance to the south, for sunbathing, snorkeling, and scuba diving. Limited shore fishing occurs in this area as well. The land and shoreline are difficult to access. 'Alula provides the only safe ocean access during calm seas. 'Alula beach is also used regularly by kupuna from the region, and hula halau for cleansing ceremonies (hiu wai).

The shoreline area of the project site contains the majority of the most prominent cultural/archaeological features. Makaopio (Hale-o-Lono) heiau was built in a brackish water pond on the north side of the beach area. Further south is the Hale o Kane structures. There are also anchialine ~~ponds~~spools in this immediate shoreline area. These anchialine pools are important cultural and natural resources that are used for cultural practices and educational purposes now. The shoreline south of this area is made up of rugged lava flow, perched beaches and small groupings of dry vegetation. The inland project site area consists of rugged lava flows with sparse dry vegetation.

1.3 Surrounding Uses

Surrounding uses include harbor-related commercial and recreational activities at the Honokōhau Harbor, and cultural and recreational activities related to the Kaloko-Honokōhau National Historical Park.

The Kaloko-Honokōhau National Historical Park was authorized by the U.S. Congress in 1978 to preserve and perpetuate traditional native Hawaiian activities and culture. The congressional advisory commission recommended that the area previously designated "Honokōhau Settlement National Historical Landmark" and adjacent waters to be preserved for the benefit of the Hawaiian people and the nation as part of the national park system.

The ~~e~~Congressionally ~~H~~Legislated Park boundary includes 7.5 acres of State lands on the northern side of Honokōhau Harbor and 15.5 acres of State lands to the south of the harbor entrance. While the ~~NPS~~ Kaloko-Honokōhau National Historical Park has a lease agreement with the State for the 7.5 acres, the 15.5 acres on the southern side of the harbor is not leased by ~~NPS~~ Kaloko-Honokōhau National Historical Park. These lands are included in the current Kona Kai Ola project area. For the area specifically within this legislative boundary fronting the Kona Kai Ola project site, the developer will work cooperatively with the National Park to develop a management plan and interpretive plan for these cultural and archaeological resources.

The town of Kailua-Kona lies to the south of the project site and south of the Queen Lili'uokalani Trust property.

The nearshore waters are primarily for transit of vessels entering or exiting the Honokōhau Harbor, swimming, snorkeling or scuba diving off 'Alula beach, scuba diving from boats moored or anchored at various locations within Honokōhau Bay, and fishing from boats in Honokōhau Bay and other shore locations. The area from Keāhole Point to the north to Kailua-Kona town to the south is typified by rich coral reefs and fish communities, and features several popular scuba-diving sites.

1.4 Purpose and Need for the Project

The State of Hawai'i has expressed a desire to create and expand income-generating uses on the subject lands, and provide expanded recreational ~~and~~ options for the surrounding community through the use of private investment.

Kona Kai Ola responds to these efforts, and the project is based on agreements with two State agencies. DHHL has a lease agreement with Kona Marina Development Group, LLC, an affiliate of Jacoby Development, Inc., for the development of its 200 acres. DLNR has a development agreement with JDI for its 330 acres. The background of these agreements is discussed in this section, and these agreements are collectively referred to as "agreements with the State" in this ~~DEIS~~FEIS.

1.4.1 DHHL

The 200-acre DHHL parcel was transferred to DHHL by the State of Hawai'i in February 2001 as part of a 1994 settlement with the State. The land has been identified by DHHL as the only major DHHL parcel with income-generating potential on the west side of the Island of Hawai'i and is designated for commercial development in the DHHL Hawai'i Island Plan of May 2002. Its strategic location relative to Queen Ka'ahumanu Highway and proximity to the Kona International Airport, Honokōhau Harbor, the town of Kailua-Kona, and municipal infrastructure systems, render the site a prime candidate for generating income that will support the mission of this public trust. (DHHL 2002)

In January 2004, this land was leased to Kona Marina Development Group, LLC, an affiliate of Jacoby Development, Inc., for a commercial, light industrial, retail/restaurant, hotel, time-share, and ~~resort~~-visitor recreation development. Although permanent residential development is not allowed under the lease agreement with the State, JDI is planning to construct employee housing on a nearby site that will be leased at below market rents. It is anticipated that project-generated revenue will help finance DHHL housing programs on other DHHL land, including the Villages at La'i 'Ōpua that requires expensive infrastructure for water, sewer and roads.

1.4.2 DLNR

DLNR acreage adjacent to the Honokōhau Harbor was identified as the site for a new marina basin to connect to the existing harbor. The project site is strategically located for commercial development and to generate income for the State of Hawai'i, while providing community and statewide economic and social benefits. Since it was determined that the cost of the harbor expansion was too high for the State to finance with public funds, DLNR solicited proposals from interested developers. In exchange for expanding the harbor, the developer would be granted a limited range of development options, subject to a long-term lease, for some of the remaining DLNR lands in the area.

In November 2005, the Board of Land and Natural Resources signed a development agreement with JDI. The development agreement provides that as an essential component of the Board's finding that the public interest demands the Kona Kai Ola project, JDI will develop and construct a new marina basin of not less than 45 acres and containing not less than 800 new boat slips.

Traffic in the area is already congested at peak times, and any additional development would require significant traffic improvements. JDI is therefore required by DHHL to complete a range of roadway improvements in the area. These transportation improvements include:

- A realignment of the Kealakehe Parkway and intersection with Queen Ka'ahumanu Highway;
- Construction of the Kealakehe Parkway extension to serve each of the development parcels of the property.

These improvements, along with certain other infrastructure improvements to be constructed as part of the project, constitute the "Core Infrastructure" as defined in agreements with the State.

If JDI meets certain conditions in its development agreement with the Board, including development and construction of the new marina and Core Infrastructure, JDI is permitted to develop a project with land uses including retail/restaurant, hotels and time-share units, light industrial/marina uses, open space, public access, and recreational water features. Although residential use is not permitted on the leased lands, JDI is planning to construct employee housing on a nearby site that will be leased at below market rents. The agreements also prohibit the transfer of fee simple ownership of State land. The commercial and time-share features will be based on long-term leases. Per the agreement, the project site will be leased from the State.

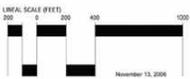
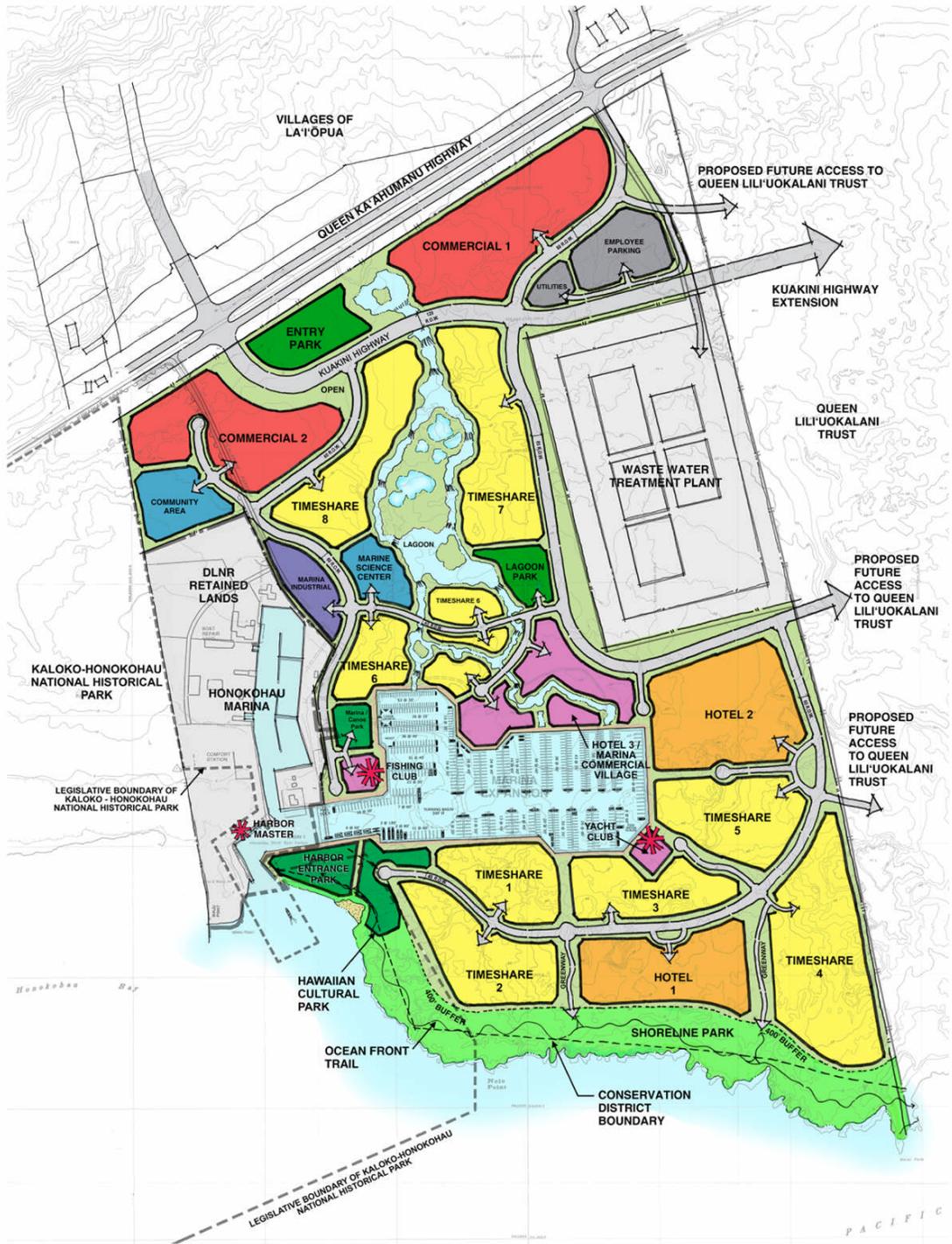
1.5 Proposed Project and Objectives

1.5.1 Development Program

The vision of Kona Kai Ola is an environmentally sustainable marina-focused development consisting of a mix of uses including visitor and resident-serving commercial enterprises, hotels and time-share units, marina services, open space and community-benefiting facilities including public infrastructure improvements in a pedestrian friendly setting surrounding the marina and seawater lagoons. The Kona Kai Ola Master Plan proposes a mixed-use and community-focused marina and commercial village as shown in Figure D. The project has a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons with a marine wildlife park and a marine science center. The Kona Kai Ola harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional project community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians.

-Project components include the following:

- *Marina:* The focal point of the proposed project is a new 45-acre marina. The new marina is anticipated to meet an increasing public demand for boat facilities on the west side of the Island of Hawai'i. The agreements stipulate that the new marina contain approximately 800 boat slips with a minimum basin size of 45 acres.
- *Ocean Recreation and Cultural Emphasis:* Kona Kai Ola has a strong ocean and cultural orientation and these themes will be reflected in several proposed ways. A marine science center is proposed along with public access, public water features, community gathering areas, a yacht club, a big game fishing club, a proposed canoe park, ~~and~~ a cultural park, and a cultural center that may have the Hawaiian voyaging canoe as its focus.
- *Open Space:* In keeping with the ocean and recreation orientation, the project will feature approximately 224 acres of developer-initiated green space, open space, public spaces and view corridors. The project will also feature a 400-foot development setback from the shoreline, as illustrated in the Open and Greenspace Plan Figure E.
- *Commercial:* Commercial areas primarily located on the DHHL parcel will be designed to primarily serve the local residential market. This may include large retailers and local residential services such as banking, office space, grocery stores and restaurants. The commercial development near the proposed marina on the DLNR portion of the site will be more focused on serving both the local residents and the visitor market with smaller shops and unique restaurants and boutiques.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure D: Preliminary Concept Plan

Legend

- | | |
|--|--|
| Timeshare | Marine Science Center / Community Area |
| Hotel | Utilities / Hotel Facilities |
| Commercial | Recreation / Open |
| Marina Retail | Shoreline Park |
| Marina Support / Commercial | |





Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure E: Green / Open Space Plan



- *Hotels:* Kona Kai Ola includes hotels that are expected to meet a wide range of demands, and thus optimize economic benefits. 700 hotel units in conjunction with a commercial village are proposed. The economic analysis completed as a part of this ~~DEIS~~-FEIS and included as Appendix ~~B-C~~ of this ~~DEIS~~-FEIS, analyzed various development scenarios to determine which levels will provide economic viability for the project.
- *Time-share Units:* Per requirements of the agreements, a vacation ownership or time-share ownership plan may be developed in one or more phases, 1,803 of these units are proposed. The agreements specifically prohibit the development of residences that are marketed or intended for use as primary or permanent residences.
- *Marina Support:* To support the marina and its activities, approximately eight acres are proposed for marina industrial uses such as boat repair, launching, storage, rental, sanding/paint station, and fueling.
- *Other Amenities:* Kona Kai Ola will feature lagoons and water features throughout the development.
- *Support:* Areas are reserved for facilities support, job training, employee parking and a seawater air conditioning facility.
- *Seawater Air Conditioning (SWAC) facility:* This system is designed to pump cool water from ocean depths through the development assisting air conditioning and then disposed of in injection wells to prevent nearshore impacts.

It is noted that the word "resort" is sometimes used in foundational documents, supporting studies, and the text of this document to connote certain transient accommodations that are typically found in resort developments. However, the project concept does not include the establishment of a resort per se, as it does not involve the establishment of an exclusive, self-contained resort facility that is designed to be a destination area in itself. The transient accommodations add to the mix of uses that provide the synergism for this unique project. Thus, the occasional "resort" reference in project descriptions in this document should be read to be interchangeable with the references to hotels and time-share units.

Table 1 summarizes land uses proposed in the Kona Kai Ola development program.

Table 1: Proposed Kona Kai Ola Development Program

Uses	Land Uses	Preliminary Units	Acreage
Marina	Various levels of boat accommodations	800 slips	45 acres
Hotels	Three hotels	700 units	66 acres
Time-share	Eight areas	1,803 units	145 acres
Commercial	Two areas	not applicable	51 acres
Marina Industrial	Marina support	not applicable	7 acres
Project Support and Utilities	Project support / employee parking Utilities	not applicable	13 acres
Water features	Lagoons Marine Park Brackishwater Pond	not applicable	19 acres
Community Uses	Marine Science Center Community Area Yacht Club Big Game Fishing Club	not applicable	24 acres
Parks	Shoreline Park (buffer = 400 feet) Cultural Park Harbor Entrance Park Marina / Canoe Park Lagoon Park Entry Park	not applicable	66 acres
Open space and roads	Open space areas Roadways	not applicable	93 acres
Total		2,503 Hotel/Time-shares units	530 acres

1.5.2 Project Sustainable Design

The U.S. General Services Administration defines sustainable design as a process that “seeks to reduce negative impacts on the environment, human health and comfort of building occupants, thereby improving building performance” (GSA 2006). Sustainable design is a process that requires integration and communication between all parties involved in the design and construction of a development. In a typical development, an owner works with an architect and site planner to design the development. Following a site’s design, engineers are hired to design the structure and systems of a building. Eventually a contractor is brought in to construct the development. In this version of development, the designers and contractors work in isolation. In contrast, sustainable design requires that team members work together to understand how all pieces to a development fit within the whole. This integration allows project members to offer unique solutions to common design and construction problems while also integrating environmental concerns into a project.

JDI has made a corporate commitment to environmental sustainability in all its work. In Kona Kai Ola, JDI intends to incorporate the latest environmental design and technology to create an energy efficient, low environmental impact, sustainable development at Kona Kai Ola. The vision for the project is to develop a project that has minimal impact on the environment by striving to significantly reduce water consumption, waste disposal, energy use and carbon dioxide emissions.

One key to measuring the sustainability of the project’s design and operation is to use the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. The LEED Green Building Rating System is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building developers and operators the tools they need to have an immediate and measurable impact on their buildings’ performance (LEED 2006). JDI has experience with the LEED certification process from its other projects both for individual buildings, and for large campus infrastructure as well. JDI intends to pursue, at a minimum, Silver LEED certification for its development of the Kona Kai Ola project.

At the project’s onset, JDI developed goals related to design, energy, water, waste and transportation, and the following sections present goals in each of those areas.

Sustainable design principles include the ability to:

- ~~minimize non-renewable energy consumption~~
- ~~optimize site potential~~
- ~~use environmentally preferable products~~
- ~~protect and conserve water~~
- ~~enhance indoor environmental quality~~
- ~~optimize operational and maintenance practices~~

1.5.3 Design Related Goals

- The development will maintain 40 percent of the total site area as open (including marina). Kona Kai Ola's original proposed site plans have set aside 40 percent of total site area as open space.
- The project site temperature will be reduced while maintaining an attractive environment for visitors and the community. By reducing the site temperature, the cooling requirements in buildings will be lessened and walking within the site will be more comfortable. A variety of different measures are being considered to reduce site temperature; these measures include site vegetation, incorporation of water features throughout the site, reduction of dark pavement, and shading of pathways.

1.5.4 Energy Related Goals

- The project will reduce building energy use by 50 percent, as compared to a building that does not incorporate energy efficient strategies (the comparison building is defined by using ASHRAE/IESNA Standard 90.1-2004). The project team has already begun analyzing the energy use in a typical time-share. Strategies to help reduce energy use include: incorporating significant wall and ceiling insulation, utilizing windows that allow daylight without allowing heat penetration, purchasing energy efficient lighting and appliances, designing the buildings to maximize natural ventilation, and using cold ocean water for air conditioning and cooling.
- The project will use renewable energy technologies on-site to provide the remaining 50 percent of overall building energy use. On Hawai'i Island, one of the most abundant resources is solar insolation. Given the year-round abundance of solar insolation, the use of solar thermal and photovoltaic technologies is feasible for the project. The development intends to integrate these technologies into each building's architectural features. Initial calculations show that the time-share segment can integrate enough solar technologies on each building's roof to completely offset time-share electricity demand.
- These measures will help to reduce the site's peak energy demand by 50 percent. By reducing the development's demand during the range of hours that most of the Hawai'i Island's citizens are using electricity, Kona Kai Ola can help HELCO reduce the probability of brownouts and blackouts. The reduction in peak energy demand can be achieved by using smart technologies that control energy use.

1.5.5 Water Related Goals

- The project will aggressively reduce use of potable water used in fixtures and appliances by 70 percent relative to a basecase building. The development will cut water use through the application of innovative water recycling techniques, the incorporation of water efficient fixtures and appliances, and the recycling of greywater for toilet flushing. The initial modeling of a time-share unit demonstrated that the use of water efficient fixtures and appliances and the recycling of greywater for toilet flushing already contribute to a 50 percent reduction in potable water demands.

- The project will reduce or eliminate the need for potable irrigation. The reduction or elimination of potable irrigation can be accomplished using a multi-prong strategy. First, the project will focus on incorporating native Hawaiian plants, including native dryland species, in its landscaping plan. The project will retain a significant amount of the black lava features that make the Kona Kai Ola site so distinctive. Employing native vegetation and maintaining lava features will reduce water demand. To fulfill the remaining water requirements, the development may use brackish water to irrigate vegetation that is not affected by salt levels. Furthermore, the use of rainwater cisterns to collect rainwater and distribute it, while also recycling greywater from showers, laundry, dishwashers, and hand sinks can lead to further reductions in water needed for irrigation. Irrigation water may also be provided by condensation on cold water pipes buried at the root zone of landscape plants, as has been shown to be successful at the Natural Energy Laboratory of Hawai'i.
- The project will improve water quality related to marina development by following the best available economically achievable practices identified by the U.S. Environmental Protection Agency for marina development and management. These measures include marina flushing, habitat assessment, shoreline stabilization, storm water runoff management, and a variety of other measures.

1.5.6 Waste Related Goals

- The project will divert over 50 percent of the waste generated during construction. The preparation of a site and the eventual construction of buildings and site infrastructure generate significant amounts of waste. By identifying construction and site materials that can be reused or recycled on or off-site, the Kona Kai Ola project will reduce construction waste by at least 50 percent. Prior to the beginning of construction activities, a construction waste management plan will be developed that will lead to a 50 percent reduction in construction waste. Polluted runoff will be treated using structural and non-structural Best Management Practices (BMPs) before the water is released to the marina.
- To further prevent polluted runoff, bioretention, which is a Best Management Practice (BMP), is a highly appropriate application for the proposed development. Storm water should be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table.
- The development will include the creation and maintenance of an extensive recycling program that will reduce waste generated on site by 90 percent.
- Project components will produce compost for use on and off site. The restaurant operations and time-share buildings will generate large amounts of compostable material from food preparation and consumption. Rather than dispose of this material, it can be composted and used as a natural fertilizer.

1.5.7 Transportation Related Goals

- Kona Kai Ola will reduce transportation related impacts through provision of mass transit options. The project will provide public transit service linking the airport and the new harbor village and Kailua Village. The development will also establish a transit system to transport people around the project site.
- Kona Kai Ola will be a walkable development. The development hopes to be easily navigable on-foot or on a bike. The plan will include numerous walking and biking trails linking site features. Additionally, reducing site temperatures will enhance the walkability of the site.
- Kona Kai Ola is being responsive to the community's desire to improve transportation infrastructure early in the project by committing to build the Kuakini Highway Extension in the first phase of the project.

Many of these strategies are discussed throughout this ~~DEIS~~ FEIS and many sustainable features are ~~recommended~~ proposed as mitigating measures for certain aspects of this project.

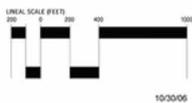
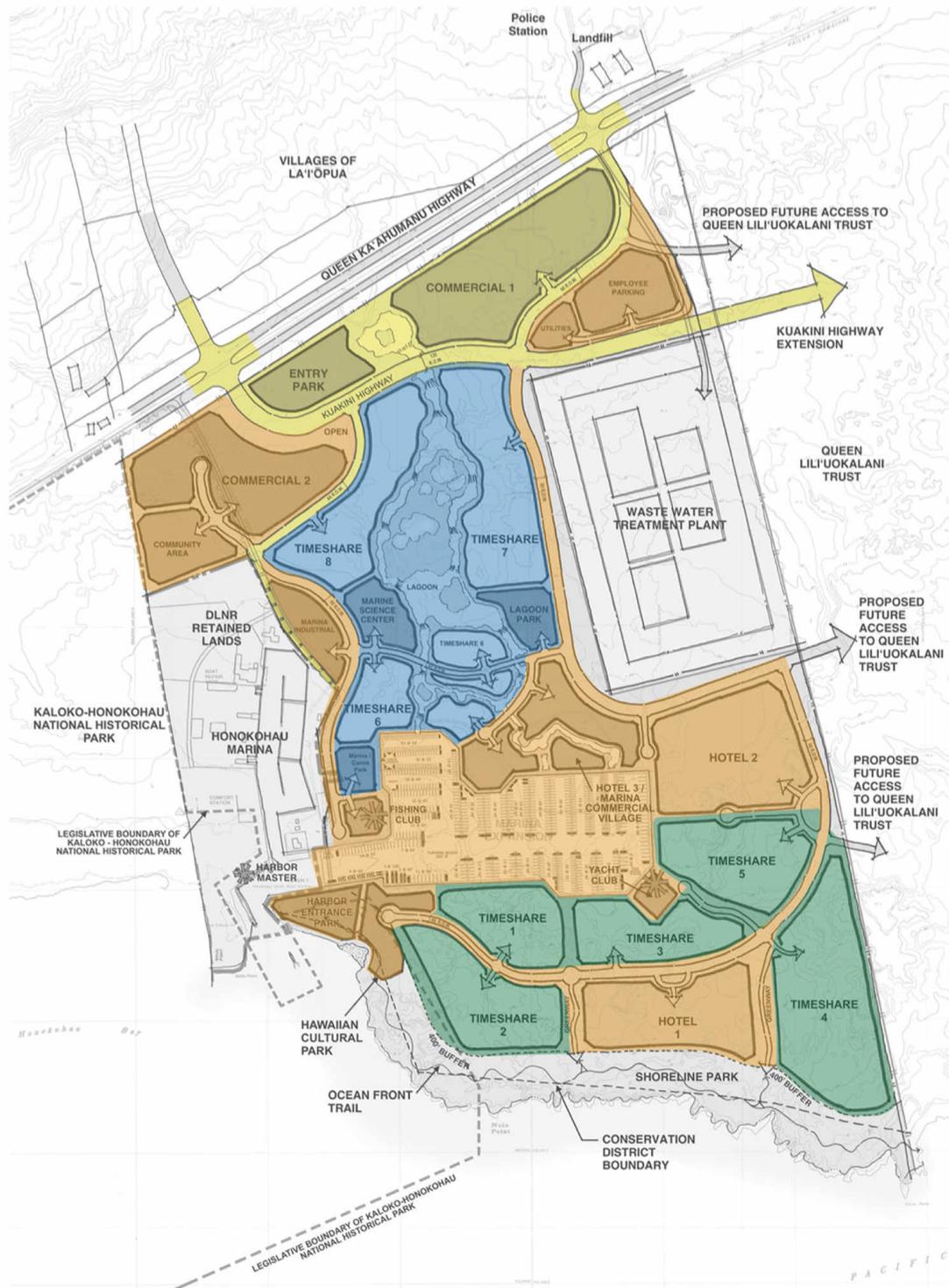
1.6 Phasing

Figure F presents the proposed Phasing Plan for land-based development. While the marina has a separate phasing sequence, the Phasing Plan depicts how the marina construction fits into the land-based construction sequence. It is anticipated that a 15-year build out will ensure market viability for each component of the master plan. Installation of the boat slips would be constructed as the market warrants over the 15-year build out of the project. At this time we are estimating the number of slips that would be constructed in each phase. If for some reason the market demand for boat slips in that phase differs from the anticipated projections, the allocation for that phase would be increased or decreased accordingly. Each phase is hereby discussed.

1.6.1 Phase 1

Phase 1 includes the development of Commercial Parcel No. 1, which is approximately 29 acres. This parcel fronts Queen Ka'ahumanu Highway and is at the intersection of Queen Ka'ahumanu Highway and Kealakehe WWTP Access Road. This prime parcel provides a natural location for retail activity and therefore would be developed immediately. A regional commercial center that will serve the residents of Kona is envisioned for this site.

Developing this commercial parcel in Phase 1 requires major traffic improvements, as access to the parcel is critical to its commercial success. JDI will not only provide access to the commercial parcel, but also address regional traffic issues like congestion and connectivity in Phase 1. The roadway system will be improved with turning movements and widening per recent plans by the State of Hawai'i Department of Transportation (HDOT). JDI plans to improve the intersection of the Queen Ka'ahumanu Highway and the Kealakehe WWTP Access Road. The Kealakehe WWTP Access Road is planned to be realigned and widened to an ~~80-foot-feet~~ 80-foot road right-of-way (ROW) that will serve the Commercial Parcel No. 1 and eventually intersect with the proposed Kuakini Highway Extension to the west.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure F: Phasing Map

Legend	COLOR	PHASE
		1
		2
		3
		4



JDI

JACOBY DEVELOPMENT, INC.

JDI also plans, ~~in accordance with DHHL lease agreement, to realign Kealakehe Parkway mauka of Queen Ka'ahumanu Highway to allow for a straighter path to the parkway's intersection with Queen Ka'ahumanu Highway. In addition, JDI plans to build a new Kealakehe Parkway/Queen Ka'ahumanu Highway intersection, and extend Kuakini Highway.~~

Beyond the roadway improvements mentioned above, JDI is planning to address congestion on the Queen Ka'ahumanu Highway and resolve regional connectivity issues by extending Kuakini Highway as a parallel route to Queen Ka'ahumanu Highway to the existing Kuakini Highway terminating at Makala Boulevard by Old Kona Airport State Park. This will alleviate traffic off the main highway. The highway extension over Queen Lili'uokalani Trust lands is subject to future negotiations and agreements with Queen Lili'uokalani Trust.

Utilities within the project boundary, such as water, sewer, power, telephone, and cable television within the Kuakini Highway Extension ROW, will also be developed in this phase.

Phase 1 is proposed to be built out in the first two years after approval from DLNR and DHHL, subject to negotiating a lease on the DLNR lands and negotiating an agreement with Queen Lili'uokalani Trust on the Kuakini Highway Extension. The improvements are situated on DHHL land, which allow it to be developed as soon as aforementioned conditions are met. Access to the existing Honokōhau Harbor and the existing Kealakehe WWTP will continue throughout Phase 1.

1.6.2 Phase 2

The excavation of the 45-acre marina basin will occur in Phase 2. This first increment of marina construction will exceed 50% of the overall estimated marina cost. Basic marina facilities included in this increment will be the marina utilities, the perimeter treatment/railing and portions of the promenade. Approximately 100 slips will be constructed in this increment.

Marina support facilities located on the north boundary of the project and adjacent to the existing Honokōhau Small Boat Harbor will be developed in Phase 2. This area is an extension of the existing harbor lands and may include uses such as additional boat maintenance and repair facilities to support the existing marina and new marina.

Three hotel parcels will be developed in Phase 2. Two of the three parcels are located along the basin's edge. The third parcel is located along the coastline mauka of the 400-foot shoreline setback. The Employee Parking Area and the Project Support Facilities site are also being developed in this phase.

Commercial Parcel No. 2, at the intersection of the proposed Kealakehe Parkway Extension and Queen Ka'ahumanu Highway, will also be developed in Phase 2. Further, several community uses are included in Phase 2. The nine acre Community Benefit Development parcel ~~makai-west~~ of the Commercial Parcel No. 2, the Yacht Club and ~~Big Game~~ Fishing Club are being developed in this phase. The harbor entrance park at the mouth of the existing marina will also receive improvements during Phase 2. The public access ways to the shoreline adjacent to Hotel Parcel No. 1 and its associated parking, trails, and restrooms will also be developed during this phase.

An 80-foot Right of Way road along the north boundary of the WWTP will be built in this phase, and will provide access to the three hotels that are being developed. Numerous ~~60-foot-feet~~ 60-foot ROW roadways are also planned in Phase 2.

The utilities that will service the project, such as water, sewer, power, telephone, and cable television within the roadway's ROW mentioned above, will also be developed in Phase 2.

Phase 2 is proposed to be built out in the two to five years after the project has been issued its permits and entitlements. Access to the existing Honokōhau Harbor and Kealakehe WWTP will continue through this phase on existing and transferring to the new roadways.

1.6.3 Phase 3

Phase 3 includes the second increment of the basic marina facilities. Marina construction for this increment will include further development of the promenade, marina restrooms and parking, expansion of the fuel dock, vessel pumpout station and approximately 400 additional slips.

The central water feature that spans from the new Kuakini Highway through the center of the project and flows into the marina basin will be built in Phase 3. This water feature will be the primary amenity for the uses in this portion of the project.

Three of the eight time-share parcels will be developed in Phase 3 thereby generating 675 units. Three community uses are also planned for Phase 3. The Marine Science Center will be built along the north edge of the water feature. The Lagoon Park with man-made swimming lagoons will be built on the south edge of the water feature. The last community feature in Phase 3 is the construction of the Canoe Launch and Marina Park at the north edge of the new basin.

A mid-level ~~40-foot-feet~~ 40-foot ROW roadway connecting the northern and southern side of the project will be constructed in this phase. This roadway will allow Kona residents and visitors to traverse across Kona Kai Ola without having to drive onto the Kuakini Highway ~~e~~Extension, thus reducing congestion on Kuakini and retaining local traffic on-site.

The utilities within the ~~40-foot-feet~~ 40-foot roadway's ROW servicing the uses in this phase, as well as the rest of the project, will be developed concurrently in Phase 3.

Phase 3 of the master development plan would be built over the nine-year period.

1.6.4 Phase 4

The fourth and final phase of the project to be built over the ~~15-15-~~15-year period is comprised of the remaining time-share parcels. Parcels one, two, three, four, and five will be completed in Phase 4.

The coastline roadway comprising of ~~60-foot-feet~~ 60-foot and ~~50-foot-feet~~ 50-foot ROW segments will be built in this final phase. The utilities within these roadways' ROW will be developed concurrently in this phase.

The remaining basic marina facilities include building the balance of approximately 300 slips and an additional vessel pumpout station.

1.7 Environmental Process

Of the nine land uses or administrative acts that trigger environmental review under HRS 343, the following are relevant to the proposed project:

- The project involves State lands;
- The project site includes lands in the Special Management Area shoreline area; and
- ~~The project requires an amendment to the Hawai'i County General Plan~~
- A portion of the project site is on the National Historic Register.

An Environmental Impact Statement Preparation Notice (EISPN) was published on July 8, 2006, and comment letters from agencies and citizens were received in July and August of 2006. Responses to the comment letters were mailed in the week of October 20, 2006. A copy of the comment letters and corresponding response letters are included in Appendix A.

A Draft Environmental Impact Statement was published on December 23, 2006. Ninety-two public comments were received within a 45-day comment period ending February 6, 2007, and comments that were postmarked after this date are also included in this FEIS. All comments letters and corresponding response letters are included in Appendix B of Volume 2 of this FEIS.

This ~~DEIS~~ FEIS was prepared pursuant to Chapter 343, Hawai'i Revised Statutes (HRS), and the Environmental Impact Statement Rules, Title 11, Chapter 200 of the Hawai'i Administrative Rules (HAR). This ~~DEIS~~ FEIS provides an overview of technical, environmental, social, cultural, and economic aspects of the project. It seeks public input at this stage to allow public and agency concerns to be addressed as part of the Final EIS. This ~~DEIS~~ FEIS identifies possible impacts from the Kona Kai Ola project and explores potential mitigation measures to avoid or reduce impacts. There has been significant public input from various stakeholders, governmental agencies and elected officials, to date. Public feedback will continue to be sought throughout this EIS process.

1.8 Proactive Communication Outreach Program

In community meetings and presentations of the proposed project, key issues that emerged include the need for improvements of the road infrastructure in the existing area, traffic concerns on Queen Ka'ahumanu Highway, the potential impact on the growth of Kona of the proposed number of visitor accommodation units (hotel and time-share), the environmental impact of the marina and the proposed number of slips, concerns about the County of Hawai'i's Kealakehe Waste-~~W~~water Treatment Plant, the need for community gathering places (parks and other areas to play and learn), adequate shoreline setbacks, and greater sensitivity to Hawaiian cultural values.

The community's concerns and priorities expressed at these meetings were provided to the Kona Kai Ola planning and design team. Through an iterative planning process, the master development plan was revised and studies were expanded to address the community's concerns. This planning process, which includes consultation with neighbors and community stakeholders, will help ensure a successful design of Kona Kai Ola.

Design and planning steps being taken to address these community concerns include:

- Design the overall project to incorporate sustainability with energy efficiency, environmental protection, and pedestrian-friendly designs to enhance community health;
- Plan to create a sustainable ahupua'a by developing a commercial mixed-use development around a new harbor in the makai region, and by developing affordable workforce housing in an area mauka of the project site in the same or adjacent ahupua'a, and connecting the ahupua'a with improved roadways, serviced by a regularly scheduled shuttle. This way, people can live close to where they work, play and learn, thereby lessening their dependence on automobiles;
- Design and plan for the Kealakehe Parkway eExtension to Kuakini Highway to be built in the first phase of the project as a major road connecting the harbor area to Kailua-Kona Village;
- Evaluate safety issues with the shared entrance channel that may limit the number of slips in the new harbor basin;
- Evaluate the market for boat slips that may suggest changes to the number of slips in the new harbor basin;
- Include a substantial shoreline park, with a 400-foot setback, providing increased public shoreline access to recreation areas and protection of culturally significant sites;
- Perpetuate the cultural history of this land through the inclusion of a cultural center as an integral part of the project;
- Include numerous community spaces in the plan including a canoe park, community gathering areas, and cultural center;
- Include a marine science education center, which will provide new opportunities for local schools to learn about the ocean and the maritime heritage of Hawai'i;
- Evaluate different options for upgrading the wastewater treatment plant to improve its performance and capacity;
- Evaluate and analyze potential environmental impacts, and suggested mitigation measures that will be included in a comprehensive Environmental Impact Statement.

In addition, JDI ~~will~~ is in the process of establishing the Kona Kai Ola Community Foundation as a 501(C)(3) non-profit corporation to promote community efforts such as community development, community health care, job training, educational and cultural programs and projects. The primary target service population includes North Kona, and Hawai'i Island residents with a focus on native Hawaiians. JDI ~~will contribute~~ has contributed \$100,000 as initial funding. An initial meeting of the organization's Board of Directors was held on June 16, 2007.

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation. As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.~~

~~The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.~~

~~In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.~~

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~▪Golf Course~~
- ~~▪Retail Commercial Facilities~~
- ~~▪Hotel Development Parcels~~
- ~~▪Marina Development Parcels~~
- ~~▪Community Benefit Development Parcels~~

JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

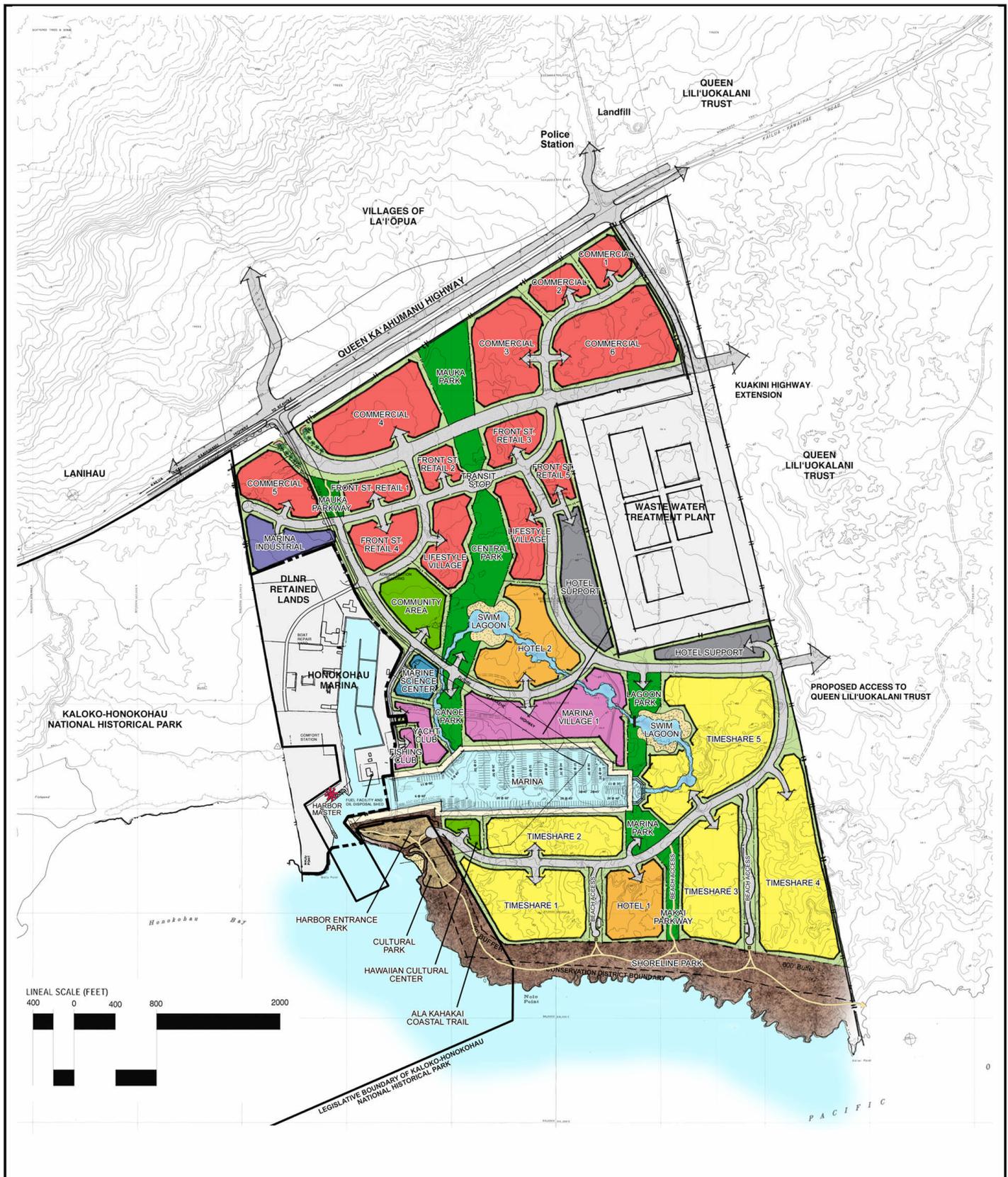
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

 TIME SHARE	 MARINA SUPPORT / COMMERCIAL	 UTILITIES
 HOTEL	 MARINE SCIENCE CENTER	 PARKS & GREEN SPACE
 RETAIL / COMMERCIAL	 COMMUNITY AREA / CULTURAL CENTER	 SHORELINE
 MARINA RETAIL	 SWIM LAGOON	 HARBOR ENTRANCE PARK / CULTURAL PARK
 MARINA		



Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800 slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.

2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as “proposed project”) is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona’s water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

~~Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.~~

~~Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest has been rejected at this time.~~

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of 20m² would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from \$557.6 million per year to circa \$814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some \$12.2 million per year under the Alternative 1 versus \$14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about \$37.5 million annually, up substantially from the \$11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from \$7.7 million annually for the County and \$36.5 million for the State, to \$4.9 million and \$23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

Recreational Resources:

In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosystems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2. However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the “Preferred Urban Growth” boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP’s adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The “Preferred Growth Plan” of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded “Harbor Complex,” a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned “Open”. Under Section 25-5-160 of the Hawai'i County Code, “The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)”.

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

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3 Assessment of Existing Natural Environment

3.1 Climate

This western area of the Island of Hawai'i is sunnier and significantly dryer than the eastern half of the island. The North Kona region has an average annual rainfall of approximately 15 to 20 inches. Most vegetation cannot flourish in the dry conditions and highly porous lava flows of the project area. Average daily temperatures range from a minimum of 61° F to a maximum of 90° F. Ocean waters offshore range from 72° F to 78° F with temperatures reaching between 80° F to 82° F between August and October. (NOAA 2006)

Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

The Kona Kai Ola development will optimize the benefits of the region's climate. The mild climate of Hawai'i allows the implementation of architectural features, positioning of structures and use of traditional local materials and features that result in reduced energy costs, improved aesthetics, and culturally-appropriate design.

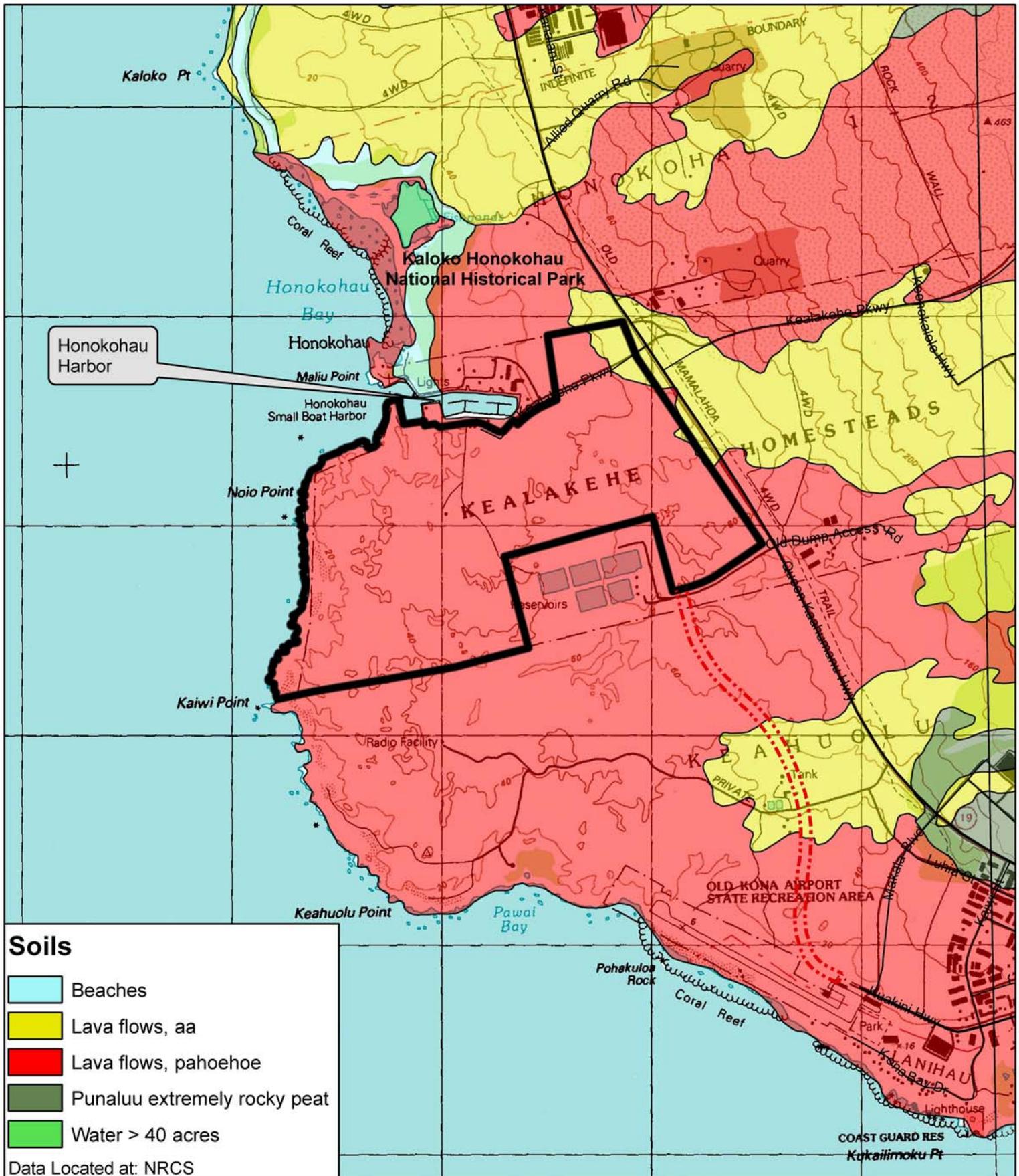
An environmental sustainability goal is to reduce site temperature while can be reduced while maintaining an attractive environment for visitors and the community through the use of site vegetation, the incorporation of water features throughout the site, the reduction of dark pavement, and the shading of pathways. Further, JDI will achieve LEED certification for energy efficiency for structures at the Kona Kai Ola development as discussed in Section 1.5.2. These measures would occur in the proposed project, as well as Alternatives 1 and 2.

3.2 Soils

The U.S. Department of Agriculture Soil Conservation Service, Soil Survey of the Island of Hawai'i, State of Hawai'i (1972) indicates that the majority of the soils found in the project area consist of Lava Flow - Pāhoehoe (rLW) as shown in Figure G1. There is no soil covering and the land is typically bare of vegetation. Lava Flow – A'a (rLV) soils are located along the eastern boundary of the site along Queen Ka'ahumanu Highway. This lava has practically no soil covering as well. All of the lavas on the site emanated from the southwest flanks and upper southwest rift zone of Hualālai. The State Department of Agriculture, Agricultural Lands of Importance to the State of Hawai'i (ALISH) system assesses lands through a rating system of agricultural suitability. The project site is not classified under the ALISH system.

Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

Because the lava on this site has practically no soil covering, no impacts are anticipated, and no mitigations are ~~recommended~~ proposed at this time for existing soils. Earth movement and alteration of terrain on the site, including importation of top soils, are discussed in Section 3.3.



Soils

- Beaches
- Lava flows, aa
- Lava flows, pahoehoe
- Punaluu extremely rocky peat
- Water > 40 acres

Data Located at: NRCS

Figure I: Soils Survey Map

Legend

- Project Site
- Proposed Parkway

0 1,000 2,000 Feet

3.3 Geography, Topography, and Geology

3.3.1 Geography and Topography

This project is located in the County-designated watersheds of Honokōhau and Wai‘aha as shown in Figure J-1H. The Honokōhau Watershed is relatively small and narrow extending from the active shield volcano, Hualālai, to the ocean. This watershed includes the Honokōhau Harbor and the Kaloko-Honokōhau National Historical Park.

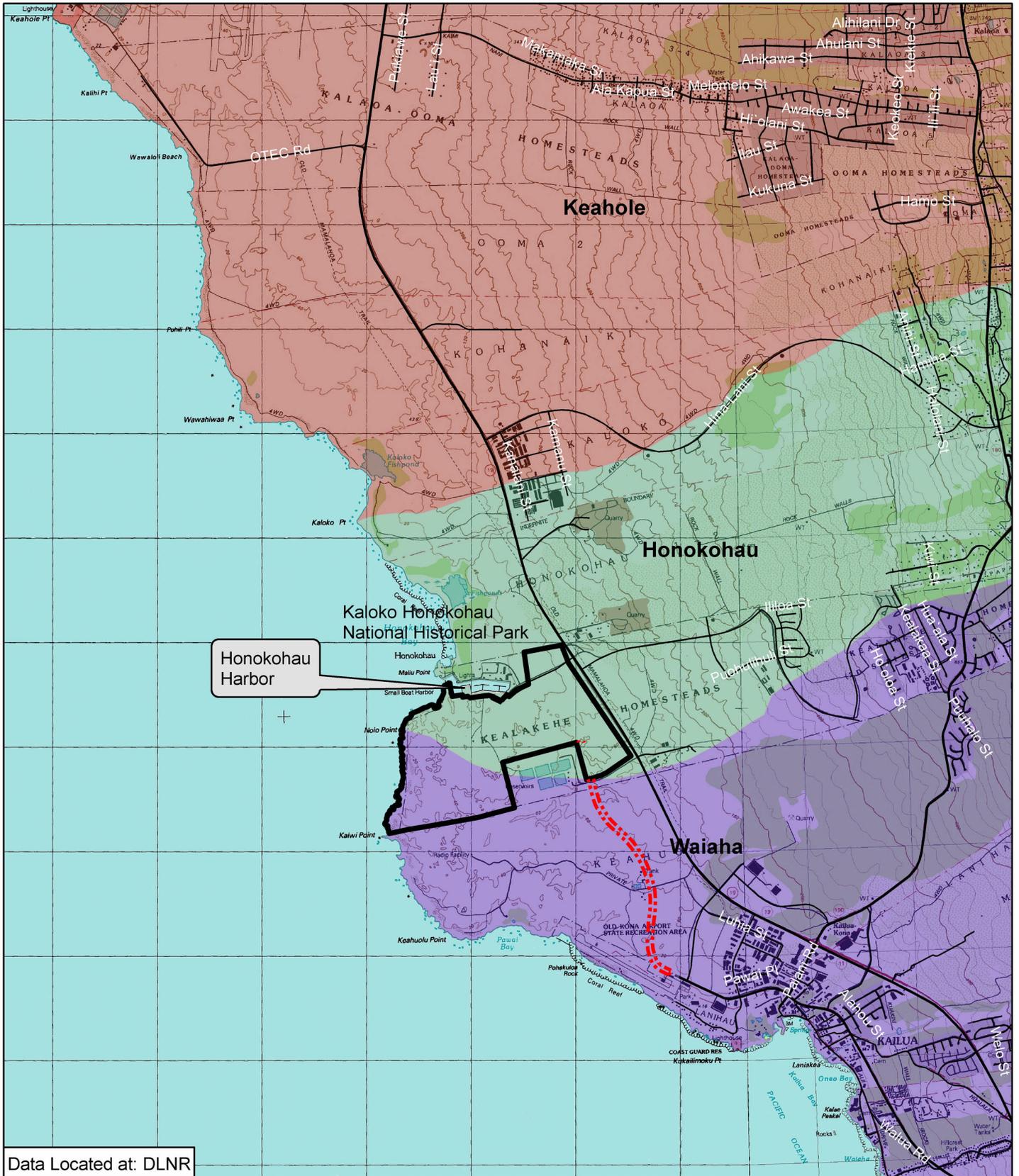
The geography of the project area is characteristic of the Kona coast. The steep upland mountain slope to the east gradually gives way to a flat coastal area consisting of volcanic lava flows and a rocky coastline. The shoreline is typically abrupt with a wave carved escarpment dropping to a shallow boulder system ocean floor. Beyond the wave eroded shoreline, the general slope of the volcano continues into the ocean depths. A succession of reef forming coral species inhabit the rock surface out to a depth where growth is limited by a lack of light. Due to the relative youth of the island, reef forming corals have not had sufficient time to develop into geologically significant reef structures.

The project shoreline, as with much of the shoreline area north of Kailua-Kona town up to Kawaihae Harbor consists of broad, flat, gently sloped land formed by pāhoehoe and a‘a lava flows. The average slope of the property from the highway to the shoreline is approximately three percent grade. The slope of the land near the Kona Kai Ola project is almost flat, dipping only 1.5 percent. However, further inland, the flank of Hualālai becomes much steeper. The average slope, above elevation, 400 feet above mean sea level (ft., msl), is seven percent.

The shoreline is abrupt and rocky with few beaches or accessible shore areas near the project site. The area is mostly unaltered except for the adjacent existing State Honokōhau Harbor facility and the grading that has occurred for Queen Ka‘ahumanu Highway and the construction of the Kealakehe Wastewater Treatment Plant. The existing harbor was excavated out of the lava rock. This has resulted in the water level and harbor being 6-10 feet below the surrounding contiguous land at the entrance to the harbor. The highly permeable geology and the low sloping topography result in unique drainage, hydrology, and groundwater issues. Figure J-2 illustrates the site topography.

3.3.2 Surface Geology

The lavas forming the area surrounding Kona Kai Ola and Honokōhau Harbor were erupted from the Hualālai Volcano. The lava flows are of basaltic composition and form pāhoehoe and a‘a lava flows within the flow units. Hualālai is an active shield volcano that dominates the landscape in and around the Kailua-Kona region. The most recent of the flows near the property flowed just south of the property about 1600 years ago (Moore and Clague, 1991), but Hualālai has erupted as recently as 1801. About 15 percent of the surface of Hualālai is covered by flows less than 750 years old and is placed within lava-flow hazard Zone 4 (Wright, 1992). All of the lavas referred to above emanated primarily from the southwest flanks and upper southwest rift zone.



Data Located at: DLNR

Figure J-1: Watershed Map

Legend

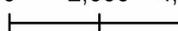
-  Project Site
-  Proposed Parkway

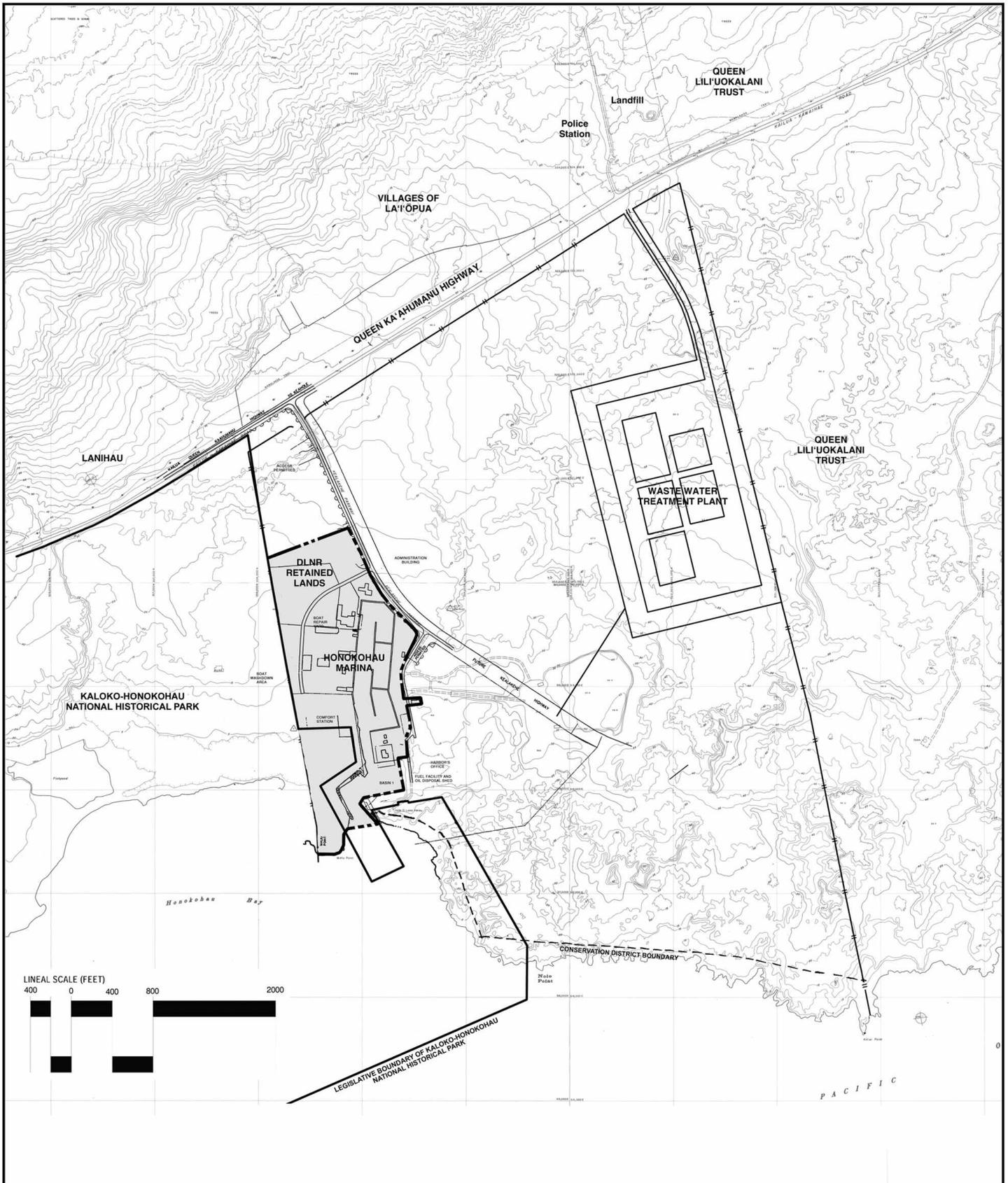
Watershed

-  Honokohau
-  Keahole
-  Waiaha



0 2,000 4,000 Feet



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure J-2: Topography Map



3.3.3 Subsurface Geology

The surface geology of the area has been well mapped. Only recently has the subsurface geology been studied in greater detail due to the numerous water wells that have been drilled over the last 15 years, offshore submarine mapping by the USGS, and recent geophysical studies associated with groundwater exploration. The USGS used side-scan sonar to map large and distinct submarine landslides, slumps, and debris fields west of the South and North Kona coast. The offshore bathymetry shows very abrupt changes in depth that suggest faulting and tectonic adjustments within Hualālai Volcano and Mauna Loa. The North Kona Slump, a landside older than 130,000 years, left a large escarpment that was covered over by more recent subaerial lava flows.

3.3.4 Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

The proposed project will impact the site due to excavation and grading. Most of the excavation will occur within the proposed marina basin. The average depth of the proposed marina would be approximately ten feet below sea level. Existing ground elevation around the proposed harbor area varies from 0 to 30 feet above mean sea level. Other areas of excavation will occur to “step” surrounding lands down to the marina, and to lower level areas planned for shore-side seawater lagoons.

Since the majority of the site is rock, excavation operation will likely be accomplished by a combination of blasting and physical excavation similar to methods used for the initial harbor construction. The excavated material could then be used for areas that require fill. The excavated material will need to be processed in such a manner to accommodate the development.

An updated topographic survey will be prepared by a Land Surveyor registered in the State of Hawai'i. This topographic survey map will provide a more accurate description of the topography and ground elevations that will be used for purposes of preparing construction grading plans.

The developer will implement a construction waste management plan that seeks to reduce over 50 percent of the waste generated during construction would be consistent with LEED criteria and the project's environmental sustainability goals. Further, reduction of the need to dispose excavated material would be accomplished through the beneficial re-use of the material for on-site fill and the creation of building materials, as concrete aggregate, landscaping, and stonework.

Because of the highly porous geology, it is ~~likely~~ possible that surface generated sediments will enter groundwater in the advent of significant rainfall during grading. Because this ground water could enter the new harbor area, the final harbor opening to the existing harbor will be opened only after all major site grading has occurred. The use of silt curtains will minimize the suspended sediment entering the ocean when the new harbor basin is opened to the existing harbor.

As a mitigation measure, bioretention, which is a Best Management Practice (BMP), is a feasible application for the proposed development. There is a probability that nutrients and other potential pollutants will runoff landscaping and impermeable surfaces such as roadways and parking lots during medium or high rainfall events. Some of these pollutants could enter the groundwater table and into anchialine pools and ultimately the ocean. As an alternative to directing runoff into the ground through drywells, storm water should be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table.

The level of these impacts would decrease with Alternative 1, which would require less excavation due to a smaller marina. Alternative 2, which contains an 800-slip marina, would require the same level of excavation as the proposed project.

3.4 Natural Drainage

Due to the low rainfall levels in the project area (15-20 inches average annual rainfall—(NOAA 2006)), and the lack of streams or other major drainage ways in the immediate area, it appears that there is not a significant amount of storm water currently flowing across the property. Further, no natural gulches, streams or defined drainage ways are located on the project site. Even in the event of heavy rainfall, which is more than two inches in one hour, (NOAA 2006), the porous nature of the ground is such that sheet flowing to the shore does not occur. The naturally occurring precipitation mostly infiltrates into the ground. Due to the high surface permeability and lack of a naturally developed drainage system, it appears that there is not a significant amount of storm runoff entering the ocean from the project site. Storm runoff will generally be retained in hummocky surface of the a'ua and pahoehoe flows and wither infiltrate into the ground or evaporate. The 2-year, 24-hour rainfall at the site is between 4.0 and 4.5 inches (NOAA-NWS Technical Paper No. 43). This intensity would produce overland flow but most of the rainfall would be stored in the irregular topography of the site.

Anticipated Impacts and Proposed Mitigation

The project site will be designed to comply with Department of Health rules on stormwater runoff. BMPs will be implemented so that the project site will retain runoff from a 2-year 24-hour storm. Low points will be created at roadway intersections to allow storm runoff to stay within the proposed roadways and not into developable parcels. Mitigation measures will include the provision of storm drains and drywells at strategic locations to intercept storm runoff from the roadways and lead it into the ground. Bioretention, a BMP which was discussed in Section 3.4, would be a feasible application for the proposed development.

Compliance with public regulations will further mitigate project impacts. According to Chapter 10 of Hawai'i County Code, all grading, grubbing, and stockpiling permits and operations shall conform to the erosion and sediment control standards and guidelines established by the Department of Public Works in conformity with Chapter 180C, Hawai'i Revised Statutes.

~~Further, a National Pollutant Discharge Elimination System (NPDES) permit will be required prior to the County's issuance of a grading permit.~~

Typical Low Impact Development standards call for retention of the 1-year 24-hour storm. The State of Hawai'i Department of Health has recently discussed requiring new development designs that would retain a 2-year 24-hour storm. For the following events on the project site, the precipitation amounts are as follows:

- 1-year 24-hour is 2-2.5 inches
- 2-year 24-hour is 4-4.5 inches
- 10-year 24-hour is 4.5-6 inches

(NOAA-NWS Technical Paper No. 43)

Alternatives 1 and 2 would generate similar levels of impacts on natural drainage and thus require similar mitigation measures.

3.5 Air Quality

An air quality study was prepared by B.D. Neal & Associates and is included in Appendix CD. The purpose of the study was to describe existing air quality in the project area and to assess short- and long-term, direct and indirect air quality impacts that could result from construction and use of the proposed facilities as planned.

3.5.1 Existing Condition

Current air quality in the project area is mostly affected by air pollutants from vehicular, industrial, natural, and/or agricultural sources. Volcanic emissions also periodically plague the project area. Air pollutant emissions from the Hawaiian volcanoes consist primarily of sulfur dioxide. Though Kilauea is more than 50 miles east of the project site, southwesterly winds carry emissions known as volcanic haze (vog) into the area.

The major industrial source of air pollution in the project vicinity is Hawai'i Electric Light Company's Keāhole Power Plant, which is located four miles to the north. Air pollution emissions from Keāhole Power Plant consist mostly of sulfur dioxide and oxides of nitrogen. Queen Ka'ahumanu Highway is the region's major arterial roadway. Emissions from vehicles are carried toward the project area by nighttime downslope winds, while afternoon onshore winds carry emissions away from the project.

During the most recent 5-year period for which data has been reported (2000-2004), the Department of Health operated an air quality monitoring site in the Kealakekua area for measuring sulfur dioxide. During the sulfur dioxide monitoring, measurements showed concentrations to be consistently low, representing about 10 percent of the state and national standard. No exceedances of the state/national 3-hour and 24-hour AAQS for sulfur dioxide were recorded.

3.5.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

The project will have short and long-term air quality impacts. Construction-related impacts include fugitive dust from vehicle movement and soil excavation, as well as exhaust emissions from on-site construction equipment. Additionally, there could also be indirect short-term impacts from slow-moving construction equipment traveling to and from the project site, from a temporary increase in local traffic caused by commuting construction workers, and from the disruption of normal traffic flow caused by lane closures of adjacent roadways. Alternative 1 would generate less air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin. Alternative 2 is expected to generate the same level of air quality impacts as the proposed project.

After construction is completed, motor vehicles coming to and from the proposed development will result in a long-term increase in air pollution emissions in the project area. To assess the impact of emissions from these vehicles, a computerized air quality modeling study was undertaken to estimate current ambient concentrations of carbon monoxide at intersections in the project vicinity and to predict future levels both with and without the proposed project. Predicted Worst-Case 1-hour concentrations for all scenarios were within both the national and state ambient air quality standards.

In the year 2020 without the proposed project, concentrations remained about the same or decreased compared to the existing case. In the year 2020 with the project, predicted concentrations increased at three locations compared to the “without” project scenario, but values remained within state and federal standards. Alternative 1 would generate less long-term air quality impacts than the proposed project due to a reduction of traffic by 35 and 40 percent during, respectively, AM and PM peak traffic times.

Based on standard planning estimates, the peak electrical demand of the project when fully developed is expected to reach about 70 MW. Assuming the average demand is approximately one-half the peak demand, the annual electrical demand of the project will reach approximately 300 million kilowatt-hours.

Electrical power for the project will most probably be provided mainly by oil-fired generating facilities, but some of the project power may also be derived from geothermal energy, wind power or other sources. To meet the electrical power needs of the proposed project, power generating facilities will likely be required to burn more fuel and, hence, more air pollution will be emitted at these facilities. The following table provides estimates of indirect air pollution emissions that would result from the project electrical demand assuming all power is provided by burning more fuel oil at local power plants.

Table 2-a. Estimated Indirect Air Pollution Emissions From Kona Kai Ola Project Electrical Demand

<u>Air Pollutant</u>	<u>Emission Rate (tons/year)</u>
<u>Particulate</u>	<u>86</u>
<u>Sulfur Dioxide</u>	<u>780</u>

<u>Carbon Monoxide</u>	<u>70</u>
<u>Volatile Organics</u>	<u>8</u>
<u>Nitrogen Oxides</u>	<u>340</u>

Based on U.S. EPA emission factors for utility boilers. Assumes peak electrical demand of 70 MW and that the average electrical demand is one-half the peak demand, resulting in 300 million kw-hrs per year of electrical power use. Estimated emission rates assume low-sulfur oil used to generate power.

These values can be compared to the islandwide emission estimates for 1993 (the latest estimates available) contained in the following table. The estimated indirect emissions from project electrical demand amount to about 8 percent or less of the present air pollution emissions occurring on Hawai'i Island assuming all project power is derived from oil.

Table 2-b. Air Pollution Emissions Inventory For Island Of Hawai'i, 1993

<u>Air Pollutant</u>	<u>Point Sources (tons/year)</u>	<u>Area Sources (tons/year)</u>	<u>Total (tons/year)</u>
<u>Particulate</u>	<u>30,311</u>	<u>9,157</u>	<u>39,468</u>
<u>Sulfur Oxides</u>	<u>9,345</u>	<u>nil</u>	<u>9,345</u>
<u>Nitrogen Oxides</u>	<u>4,054</u>	<u>8,858</u>	<u>12,912</u>
<u>Carbon Monoxide</u>	<u>3,357</u>	<u>23,934</u>	<u>27,291</u>
<u>Hydrocarbons</u>	<u>1,477</u>	<u>203</u>	<u>1,680</u>

Source: Final Report, "Review, Revise and Update of the Hawaii Emissions Inventory Systems for the State of Hawaii", prepared for Hawaii Department of Health by J.L. Shoemaker & Associates, Inc., 1996

Mitigation measures during the construction phase will be employed based on an effective dust control plan. Further, all construction activities will comply with State Air Pollution Control regulations and the provisions of Section 11-60.1-33, HAR. All grading operations will be conducted in full compliance with dust and erosion control requirements of the County of Hawai'i's Grading Ordinance. The Hawai'i Administrative Rules require that there is no visible fugitive dust at the property line, and mitigation measures will be implemented to ensure compliance with these rules. While some degradation of air quality during construction may occur, adequate dust control measures will help to localize and shorten the duration of impact.

Additional measures to mitigate increased vehicular emissions due to disruption of traffic by construction and/or commuting construction workers will include moving equipment and personnel to the site during off-peak hours.

After construction of the project, implementation of air quality mitigation measures for long-term traffic impacts are not needed, as projected emissions are expected to remain within both state and national air quality standards.

Nevertheless, in keeping with Kona Kai Ola's environmental sustainability goals, the project will help to reduce impacts on air quality by reducing dependence on motor vehicles, as discussed in Section 4.7.7.

3.6 Natural Hazards

3.6.1 Earthquakes

In Hawai'i, the Uniform Building Code provisions contain six seismic zones, ranging from 0 (no chance of severe ground shaking) to 4 (10 percent chance of severe shaking) in a 50-year interval. The most recent earthquake occurred on October 15, 2006 with a magnitude of 6.7, earthquake and aftershocks, with epicenters off the northwest coast of the Island of Hawai'i.

Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

New construction on the project site could be impacted by seismic activity resulting in destruction and possible injury or loss of life. In general, however, the risk of earthquakes should impose no specific major constraint on the project as the entire West Hawai'i region is subject to varying degrees of hazards.

Primary mitigation to address the impacts of seismic activity is in conformance with provisions of the Uniform Building Code appropriate to the Zone 4 Seismic Probability Rating and any other local, State or Federal requirements.

3.6.2 Flood

As shown in Figure KI, the current flood zone designation for the area is Zone X, with the exception of a small area near the coast which is Zone AE and VE. Zone X designation is areas determined to be outside of the 500-year flood plain. Zone AE designation has the base flood determined. Zone VE designation is coastal flood with velocity hazard (wave action); base flood elevations determined. Flood elevations within the AE and VE flood zone designation are 8 and 9 feet above mean sea level. This flood zone designation extends inland from the coast approximately 400 feet.

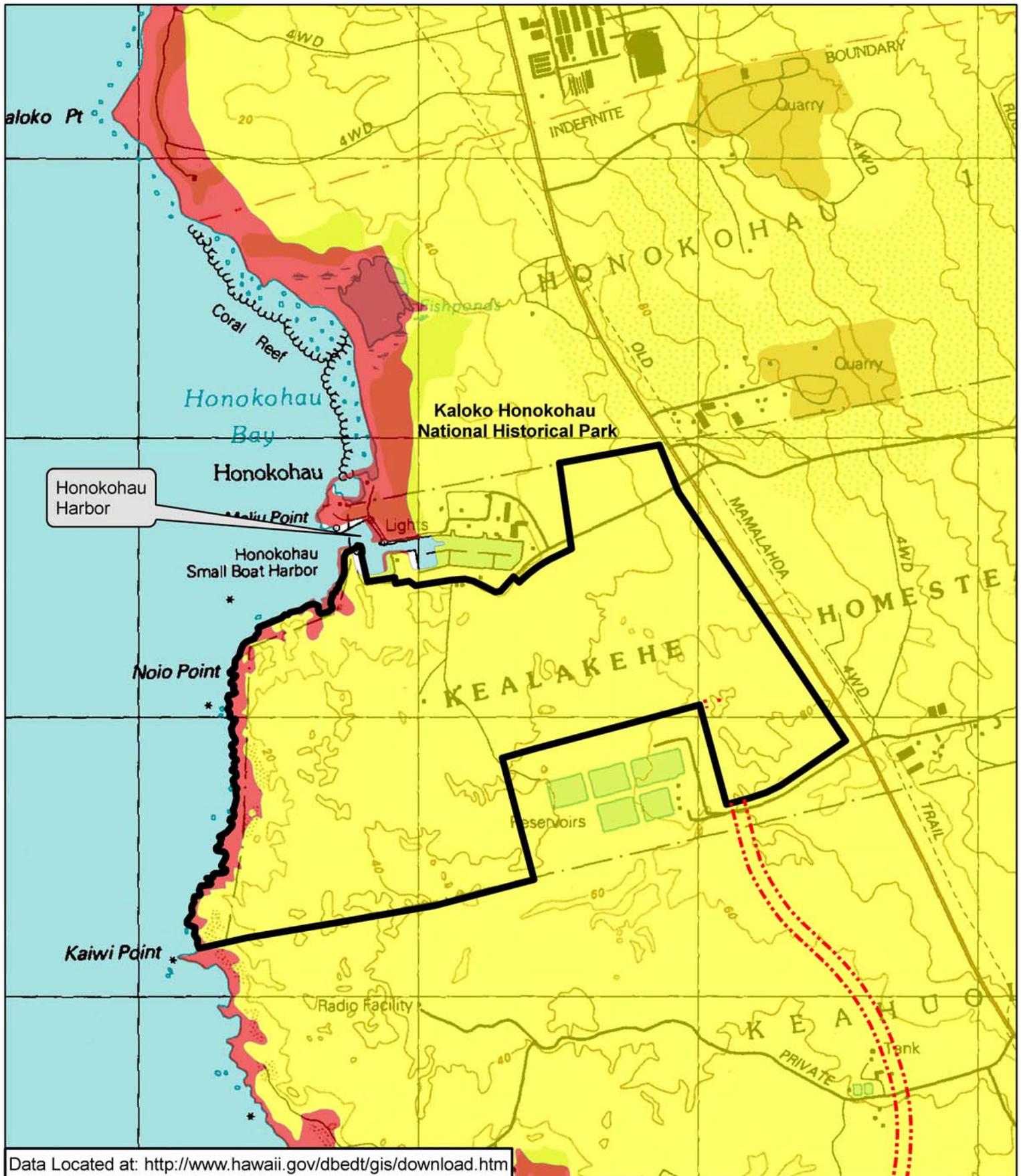
Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

Base flood elevations and flood area designations will most likely change if the marina is expanded as proposed. Further, buildings, primarily along the perimeter of the enlarged marina, along the entrance to the marina and along the shoreline, could be negatively impacted by flooding.

Mitigation measures to address flooding impacts include siting the proposed coastline developments out of the current Zone AE and VE flood zones. Further, finished pad elevations will be kept above base flood elevations per the Flood Insurance Rate Map.

Average grades of the proposed coastline developments are well above the current base flood elevations of 8 and 9 feet. Grades for specific development areas should fall in the following ranges:

- Time-share 2 - 20 feet to 30 feet
- Time-share 4 - 35 feet to 45 feet
- Hotel - 20 feet to 50 feet



Data Located at: <http://www.hawaii.gov/dbedt/gis/download.htm>

Figure K: Flood Hazard Map

Legend

-  Project Site
-  Proposed Parkway

Flood Zone

-  A
-  X



0 750 1,500 Feet




3.6.3 Tsunamis and Hurricanes

Approximately half of the project site is located within a tsunami inundation zone as shown in Figure LJ. Structures currently proposed in the tsunami evacuation zone include time-shares, the expanded marina, roadways, infrastructure, and various accessory commercial uses.

Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

Most of the area subject to tsunami is within the planned 400-ft shoreline setback. This area could also be subject to high surf, hurricane-force winds, and coastal flooding due to its location along the shoreline. Expansion of the harbor may exacerbate these threats.

Tsunamis and hurricanes can affect on-site users and structures. First, public safety is of paramount concern, and an effective evacuation plan needs to be prepared and implemented. As noted on the *County of Hawai'i Tsunami Evacuation Map*, the Honokōhau Harbor area would be evacuated to Kealakehe High School mauka of the project site up Kealakehe Parkway. The Kailua-Kona Police Station would serve as the emergency response agency. The police station is located mauka of the project site on Queen Ka'ahumanu Highway. The intersection of Queen Ka'ahumanu Highway and the current Honokōhau Harbor Road is one of fourteen intersections designated for manned roadblocks.

Second, structural damage can result. The damage of tsunami and hurricane events can be minimized through conformance with County requirements and design standards prescribed by Chapter 27 of the *Hawai'i County Code* relating to flood control and requirements for construction in a tsunami zone.

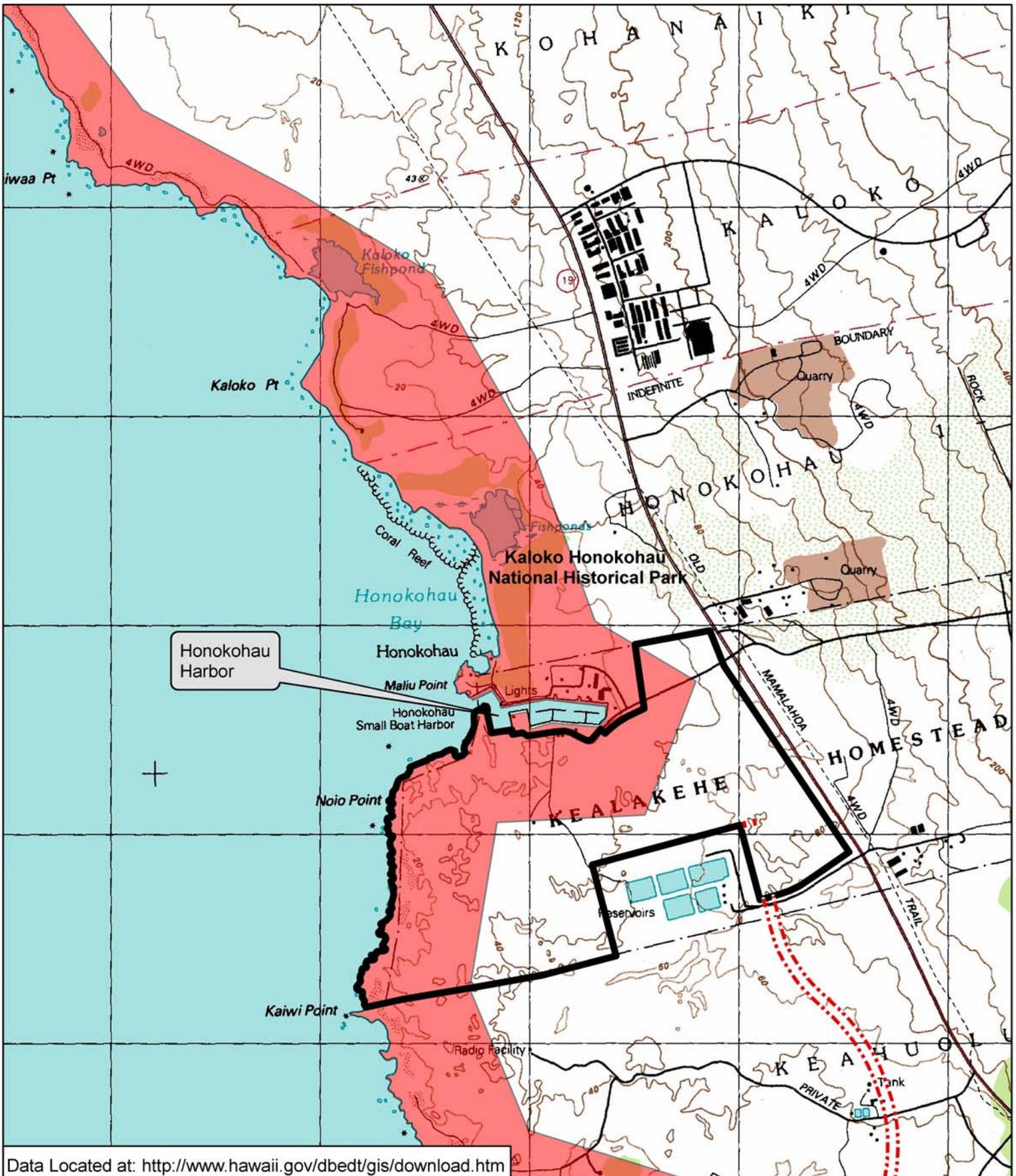


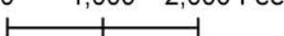
Figure L: Tsunami Hazard Map

Legend

-  Project Site
-  Proposed Parkway
-  Tsunami Inundation Area



0 1,000 2,000 Feet



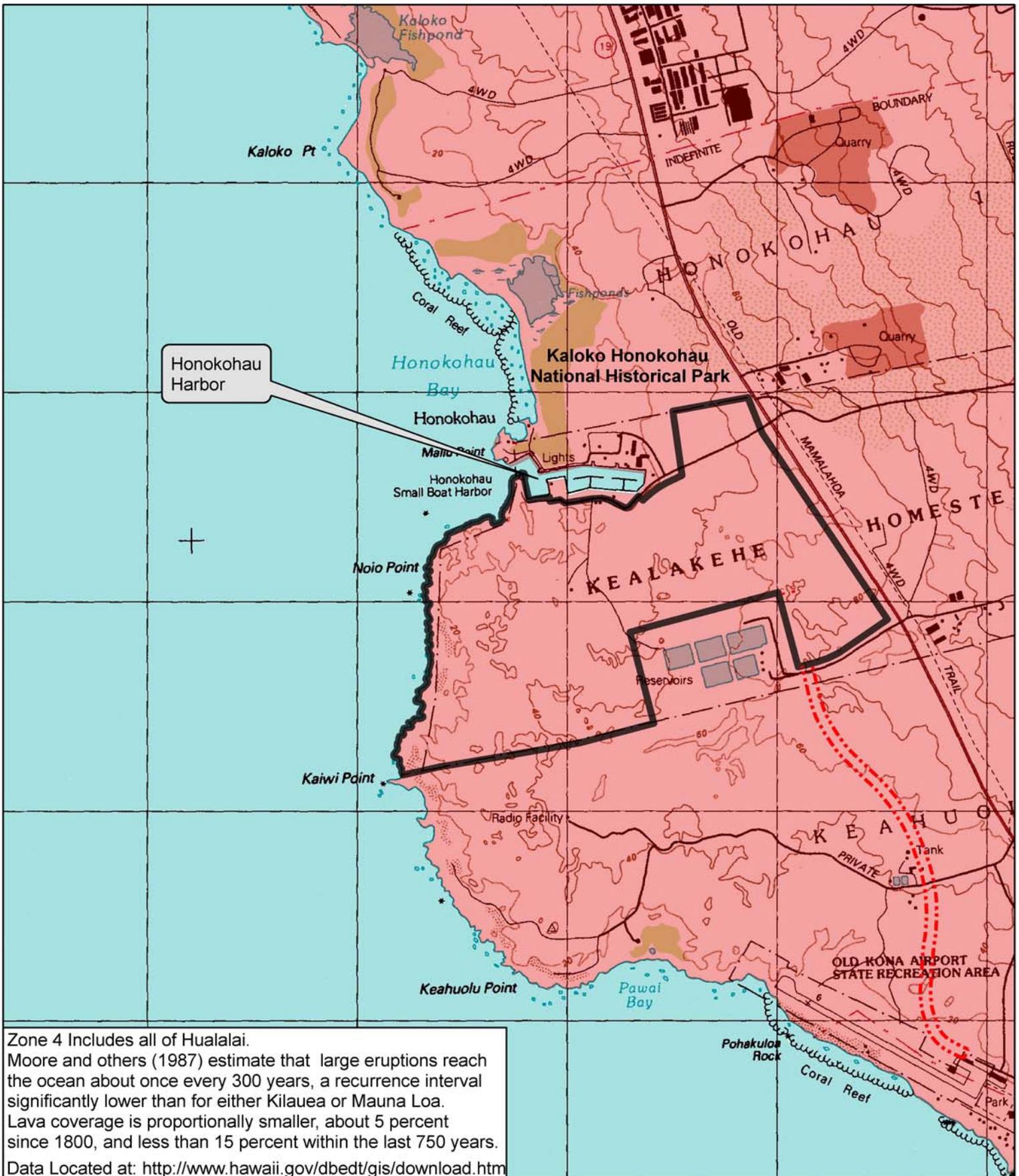

3.6.4 Lava Flows

Recent geological mapping estimates the age of the pāhoehoe lava flow surrounding the Honokōhau area at 5,000 to 10,000 years ago. This flow in turn is overlain by two pāhoehoe and a'a flow units that have been dated at approximately 3,000-4,000 years old, respectively. Just south of the Honokōhau Harbor is a more recent pāhoehoe and a'a lava flow unit dated at approximately 1,500 years old. The last eruption from Hualālai was in 1801 from the southwest rift zone at Ka-ū-pūlehu.

This project site is located in Volcano Hazard Zone 4, where only a small percentage of the area has been covered with lava in the past 10,000 years. Large eruptions of lava reach the ocean on average about every 300 years. The percentage of Hualālai that has been covered by lava in the last 750 years is less than 15 percent. The last eruption from Hualālai was in 1801 from the southwest rift zone at Ka-ū-pūlehu (Stearns and Macdonald, 1946). The project could be subject to damage from lava flows from Mauna Loa, if such flows were to occur, as shown in Figure MK.

Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

While unlikely, the threat of a volcanic flow to this site poses a minimal threat. Mitigation measures include the preparation, notification and evacuation of on-site users and working with Hawai'i County, State and Federal emergency response agencies.



Zone 4 Includes all of Hualalai.
 Moore and others (1987) estimate that large eruptions reach the ocean about once every 300 years, a recurrence interval significantly lower than for either Kilauea or Mauna Loa. Lava coverage is proportionally smaller, about 5 percent since 1800, and less than 15 percent within the last 750 years.
 Data Located at: <http://www.hawaii.gov/dbedt/gis/download.htm>

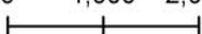
Figure M: Volcanic Hazard Map

Legend

-  Project Site
-  Proposed Parkway



0 1,000 2,000 Feet




3.6.5 Brush Fires

In Hawai'i, wildfires occur on all six major islands: Kaua'i, O'ahu, Moloka'i, Lāna'i, Maui, and Hawai'i Island. Unlike the continental United States, Hawai'i's ecosystem, like that of other Pacific islands, is not adaptive to wildfire. Humans are the number one cause of wildfires in the state of Hawai'i and the number of wildfires is increasing (PDC 2006).

Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

This project will be required to be designed and built to comply with all building and fire code requirements. These requirements will be met through the building permit process and through consultation with the Hawai'i County Fire Department.

3.7 Terrestrial Environment

3.7.1 Flora

Robert Hobdy, Environmental Consultant, conducted a comprehensive botanical survey of the proposed Kona Kai Ola development site. The purpose of the survey was to document existing plant species, document the status and abundance of each species, determine the presence of any native flora, particularly any that are Federally-listed as Threatened or Endangered, and to determine if the project area contains any special habitats which, if lost or altered, might result in a significant negative impact on the flora in this part of the island. His report is contained in Appendix ~~DE~~.

3.7.1.1 Existing Conditions

The property is situated on a lava plain and vegetation is sparse. Near the northern part of the site, vegetation was slightly denser but the majority of the native plants were found along the coastline in the area of upcast sand and coral deposited on the lava.

A total of 42 plant species were observed during the survey. Most of the species that dominate the area are non-native. The project site consists mainly of hardy dryland grasses and shrubs, with very few scattered trees. The most abundant species is fountain grass (*Pennisetum setaceum*). Also common are 'uhaloa (*Waltheria indica*), natal redtop (*Melinis repens*), koa haole (*Leucaena leucocephala*), mai'a pilo (*Capparis sandwichiana*) and kolū (*klu* - English) (*Acacia farnesiana*).

Three species are endemic to Hawai'i, including hinahina (*Heliotropium anomalum* var. *agrentum*), pā'ū-o-Hi'iaka (*Jacquemontia ovalifolia* subsp. *sandwicensis*) and mai'a pilo (*Capparis sandwichiana*).

Additionally, nine species are indigenous to Hawai'i as well as other Pacific islands, as follows:

- mau'u 'aki'aki (*Fimbristylis cymosa*);
- 'ākulikuli (*Sesuvium portulacastrum*);
- koali 'awahia (*Ipomoea indica*);
- pōhuehue (*Ipomoea pes-caprae*);

- naupaka kahakai (*Scaevola taccada*);
- 'ilima (*Sida fallax*);
- alena (*Boerhavia repens* L.)
- alahe'e (*Psydrax odorata*);
- 'uhaloa (*Waltheria indica*).

Three species are Polynesian introductions, brought here during the course of their migrations and include niu (*Cocos mucifera*), milo (*Thespesia populnea*), and noni (*Morinda citrifolia*).

The remaining twenty seven species are non-native plants. There were no endangered or threatened plants found on the property and as stated, most of the area consisted of grasses with few native species. The 22-acre Kuakini Highway eExtension area has identical flora habitat.

3.7.1.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

The coastal strip itself is never more than 400 feet wide and consists of upcast sand and coral which overlays a jagged and scenic lava landscape between the Honokōhau Harbor, past Noio Point, to the property boundary at Kaiwi Point. Nine native species grow in the area, including the silvery hinahina, which is used for making lei.

It is not expected that flora located west of the proposed harbor will be significantly impacted by possible changes in groundwater conditions due to harbor construction. This area averages 13 inches of rain a year, much of which percolates down to the water table. Also the native coastal plants that grow in the sand and coral areas cast up onto the lava shelf by west swell surf are not likely to be affected at all. Further, the native plants growing on the coastal strip are all widespread enough that the creation of the coastal buffer strip should provide them adequate consideration and protection.

To mitigate project impacts, a 400-foot strip extending back from the shoreline will be protected, as there are native species that dominate the area. It is ~~recommended~~ proposed that this area be left intact, as it would be difficult to develop and it is occasionally inundated with powerful surf. For the remainder of the property, there is little of botanical concern, and the proposed changes should have little significant negative impacts on the botanical resources in this part of Kona.

3.7.2 Fauna

Rana Productions, Ltd. conducted an avian and terrestrial mammalian species survey of the project site. The purpose of the survey was to determine if any avian or mammalian species currently listed as endangered, threatened, or proposed for listing under either the ~~f~~Federal or the State of Hawai'i's endangered species programs are on, or within the immediate vicinity of the proposed development site. This report is contained in Appendix ~~E~~E.

3.7.2.1 Existing Conditions

Three mammalian species were observed and detected during the survey. Feral dogs (*Canis f. familiaris*), Indian mongoose (*Herpestes a. auropunctatus*), and cats (*Felis catus*) were encountered around the site. Signs of scat from these animals were also found throughout the site. These mammals are alien to the islands. Hawai'i's only endemic mammalian species, the endangered Hawaiian hoary bat was not detected during the survey.

The findings of the mammalian survey are consistent with at least one other faunal survey conducted on a portion of the subject property in 2001, as well as with other surveys conducted within the lowland, fountain grass dominated areas in North Kona. The Hawaiian hoary bat was not detected during the survey. However, it has been seen to over-fly the site, including the Kealakehe Waste-Water Treatment Plant and the Honokōhau Harbor on a seasonal basis. The site is unable to sustain the bat and lacks necessary components for roosting and feeding.

Although no rodents were detected during the survey, it is likely possible that four rodent species utilize various resources found within the project site. These include roof rats (*Rattus r. rattus*), Norway rats (*Rattus norvegicus*), European house mice (*Mus domesticus*), and possibly Polynesian rats (*Rattus exulans hawaiiensis*). Without conducting a trapping program, it is difficult to assess the population densities of these often hard-to-see alien mammals.

A total of 183 individual birds of 18 different species, representing 13 separate families, were recorded during station counts. An additional two species, including the Black-necked Stilt (*Himantopus mexicanus knudseni*) and Ruddy Turnstone (*Arenaria interpres*), were recorded as incidental observations while transiting the study area between count stations. The subspecies of the Black-stilt is endemic to Hawai'i and is an endangered species.

While most of the species are alien to the Hawaiian Islands, the Black-crowned Night-Heron (*Nycticorax hoactli*) is an indigenous resident breeding species. Indigenous migratory species include Pacific Golden-Plover (*Pluvialis fulva*), Wandering Tattler (*Heteroscelus incanus*), and Ruddy Turnstone (*Arenaria interpres*).

The Zebra Dove (*Geopelia striata*) and the House Finch (*Carpodacus mexicanus frontalis*) accounted for about 46 percent of the total number of birds. The Zebra Dove was also the most common species recorded during the survey.

The diversity and density of avian species were extremely low, as expected given the dry and harsh conditions of the project site. The findings were consistent to earlier surveys conducted on the property in 2001 as well as other surveys conducted within the lowland, fountain grass dominated areas in North Kona. Due to the conditions of the project site, it is unable to sustain the nesting of native avian species. The 22-acre area that would be developed as the Kuakini Highway eExtension has similar habitats and similar fauna characteristics.

The habitat currently found within the project site does not provide the resources necessary for the sustenance or nesting of endemic listed avian species. This is not so of the Kealakehe WWTP located along the southern boundary of the property. Since the facility opening in March of 1994, the ponds within this facility have concentrated the majority of waterbirds along the Kona coast. Currently the bulk of the island's populations of two endemic endangered waterbirds, Black-necked Stilt (*Himantopus mexicanus knudseni*), and Hawaiian Coot (*Fulica alai*) utilize resources within this facility. The Kealakehe WWTP also hosts many of the more than 80 species of migratory and extralimital avian species which have been recorded from Hawai'i and which have been recorded from coastal areas in North Kona.

The Kealakehe Waste Water Treatment Plant, however, has been a viable nesting area for waterbirds along the Kona coast. Although not detected during this survey, it is possible that small numbers of the endangered endemic Hawaiian Petrel (*Pterodroma sandwichensis*), and the threatened Newell's Shearwater (*Puffinus auricularis newelli*) fly over the project area between the months of May and November.

3.7.2.2 Anticipated Impacts and Recommended Proposed Mitigations

~~The developed area of the project does not appear to be valuable habitat used by native birds or mammals. Therefore, it is not expected that the development of the proposed Kona Kai Ola property will have significant impacts on native avian or mammalian resources present within the North Kona District.~~

The proposed brackish water pond area will provide additional habitat for shorebirds and some visiting seabirds. The creation of 19 acres of lagoons may result in impacts to two listed endemic waterbird species, including Black-necked Stilt (*Himantopus mexicanus knudseni*), and Hawaiian Coot (*Fulica alai*). It may also result in impacts to some migratory shorebird and waterfowl species protected under the Migratory Bird Treaty Act (MBTA). The U.S. Fish and Wildlife Service (USFWS) will be consulted under the Endangered Species Act, as well as the DLNR under HRS Section 195D.

The developer will consult with Kaloko- Honokōhau National Historical Park, DOFAW and USFWS to develop a plan to establish a managed ecosystem and mitigate any potential impacts to listed species resulting from development of this property. A Natural Resources Management Plan that covers all listed species likely to be impacted will be prepared in consultation with the wildlife regulatory agencies following the development of a more detailed development plan.

~~Exterior light associated with development typically does have~~ has the a-potential to impact on Hawaiian Petrels and Newell's Shearwaters as they ~~could~~ can be disoriented and downed by ~~because of~~ exterior lighting associated with the various businesses and marina operations.

~~Recommended~~ Proposed measures to ~~mitigate~~ minimize project-related impacts include the use of shielded external lighting to minimize the disorientation of the nocturnally flying ~~nocturnal~~ Hawaiian Petrels and Newell's Shearwaters. Also, shielding would be needed to comply with Hawai'i County Code § 14-50 et seq. which requires the shielding of exterior lights so as to lower the ambient glare caused by unshielded lighting to the astronomical observatories located on Mauna Kea.

~~To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackish water pond area suitable for avian fauna, including stilts, coots and ducks. This is a positive impact and water features will constitute a managed ecosystem that will protect these species.~~

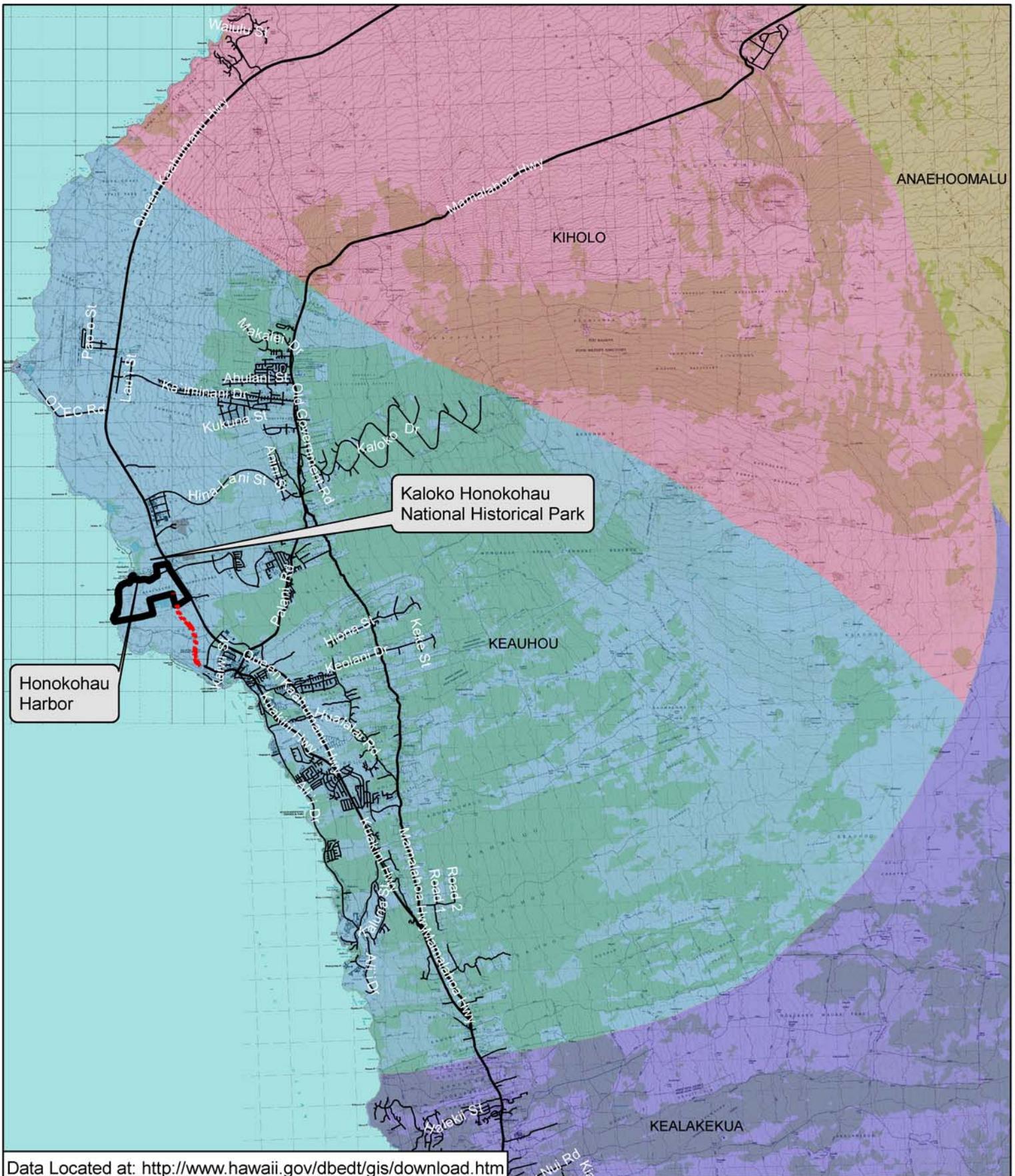
3.8 Water Resources

3.8.1 Groundwater

In the State Water Resource Protection Plan, aquifers of the Island of Hawai'i have been classified based on a coding system that identifies and describes these aquifers. This classification is made up of Aquifer Sectors and Aquifer Systems. Aquifers are composed of Sectors further broken down into Systems as shown in Figure NL. The aquifer, which underlies the entire project area, is identified as follows:

- Aquifer Sector: Hualālai (Identified as #809 with a total estimated sustainable yield of 56 mgd)
- Aquifer System: Keauhou (Identified as #80901 with an estimated sustainable yield of 38 mgd)

This aquifer system is 167 square miles extending from Kainaliu in the south to Hualālai's southwest rift zone in the north. Basal groundwater in aquifer systems of Hualālai consist of volcanic geological formations known to extend at least four miles inland to Māmalahoa Highway. High-level groundwater ~~is~~ has been encountered between 1,600 and ~~1,800~~ 2,000 feet above mean sea level in recently drilled wells.



Data Located at: <http://www.hawaii.gov/dbedt/gis/download.htm>

Figure N: Aquifer Map

Legend

- | | | | | | |
|--|------------------|---|------------|---|--------|
|  | Project Site |  | ANAEOOMALU |  | KIHOLO |
|  | Proposed Parkway |  | KEALAKEKUA |  | WAIMEA |
| | |  | KEAUHOU | | |



0 6,000 12,000 Feet

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A groundwater hydrology study by Waimea Water Services (WWS) with water chemistry analytical assistance from AECOS Laboratory of Hawai'i, LLC has been completed as part of this ~~DEIS~~FEIS and is contained in Appendix G-1. The objective of the study was to determine baseline groundwater conditions, the effect of ocean tides on groundwater flow, and to predict potential impacts from the proposed development. Locations of the monitoring wells used for the study are shown in Figure OM.

Water quality data and flow information determined from this study were used to model water quality impacts in the existing harbor, the proposed marina and the nearshore environment. The Groundwater Hydrology Study is contained in Appendix FG-1.

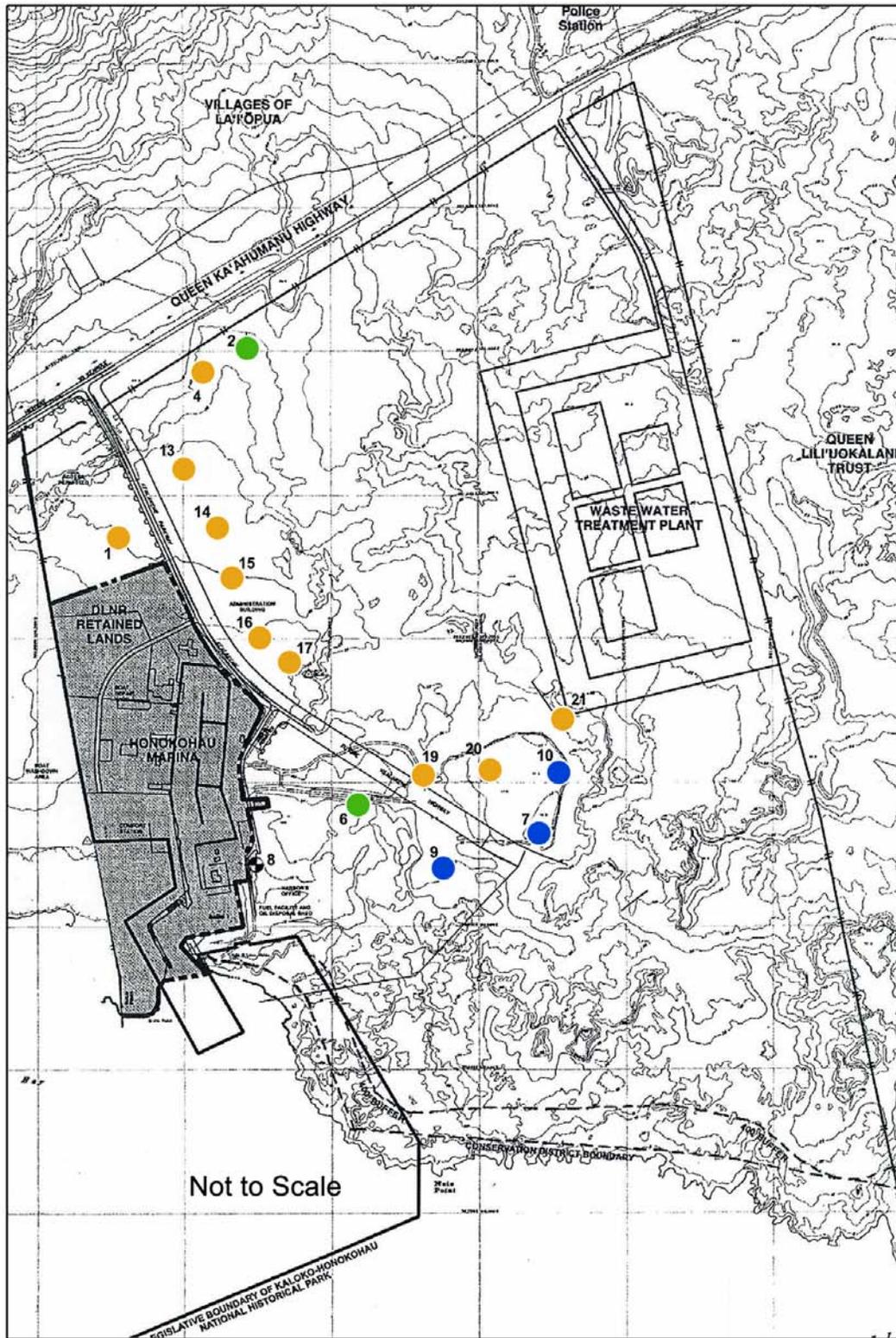
3.8.1.1 Existing Conditions

~~Groundwater resources of the area have been examined in at least four previous studies in the last decade.~~ There are several potential sources of groundwater contamination up-slope of the project site including:

- Kealakehe Waste-~~W~~water Treatment Plant – aeration ponds;
- Kealakehe Waste-~~W~~water Treatment Plant – disposal sump (~ 01.8 mgd treated effluent);
- Kailua-Kona Landfill, unlined, closed but reported to be burning underground;
- Kona Light-Industrial district, potential source of numerous small quantities of pollutants; Rock Quarry operations.

At 1.8 mgd of R-2 effluent, the Kealakehe WWTP disposal sump appears to be the single largest point source of nutrients in this area.

Groundwater at the project site occurs as a thin basal brackish water lens. A salinity profile at the O'oma Test Well, about 3 miles north of the site, shows the midpoint (50% of seawater salinity) at elevation -33 feet MSL (Waimea Water Services, 1996). The ocean tide is important when measuring local water levels. Water wells in Kaloko-Honokōhau National Historical Park fluctuate 0.5 to 1.5 feet daily (Oki et. al, 1999). The sensitivity of wells to tidal variations indicates that the hydraulic conductivity (K) is very high. Also, the high tidal variation will result in variable groundwater flow directions.



Source: MACTEC Engineering & Consulting, Inc.

Figure O: Boring Locations

Legend

- Deep Well Monitoring Location
- Boring Locations within Planned Marina
- General Subsurface Boring Locations



0 2,000 4,000 Feet



Results of several previous studies on the quality and flow of groundwater indicate that the shallow basal lens is highly permeable and is affected by the ocean tides. The tidal variation at the shoreline results in variable groundwater flow direction (Bauer 2003).

Numerical modeling of the groundwater flow system in the area quantified the overall recharge and discharge of groundwater throughout the shoreline, but did not have sufficient details for the Honokōhau area (Oki, USGS 1999).

The ~~National Park Service~~ Kaloko-Honokōhau National Historical Park conducted water quality monitoring in shallow wells within the park to identify potential impacts of pollutants from light industrial activities mauka of the park to the ponds within the Kaloko-Honokōhau National Historical Park. Pollutants at very low concentrations were measured in this study.

3.8.1.2 Groundwater Flow and Quality Salinity

Previous studies estimated the fresh groundwater discharge through the site to vary from 1.35 to 3 million gallons per day (mgd). The present studies by WWS indicate that ~~the groundwater discharge occurs within a 20-foot thick layer just below the water table and discharges 3 to 4 mgd of fresh water discharges~~ per shoreline mile. The top 10-foot layer of brackish groundwater under the site has a salinity ranging from 8 to 12 parts per thousand (ppt). A salinity of 16 ppt (50 percent seawater) is reached at a depth of about 20 feet and salinity of 34 ppt (97 percent seawater) is found at a depth of 80 feet.

Groundwater in the project area is brackish with chloride concentrations ranging from 2 ppt to 6 ppt. Salinity closer to the ocean varied from 4.5 ppt to 12 ppt. At the basal springs and the pond area salinity varied from 9 ppt to 34 ppt (Oki et al).

Nutrient and priority pollutant water chemistry was measured in the project area at six locations: Well 2, Well 6, Quarry well, National Park Service Well, the Harbor Spring, and the Kealakehe WWTP effluent. Complete results are shown in the Appendix F

The water quality sampling program found that groundwater mauka of the WWTP showed total nitrogen concentrations of 1.20 mg/l. Although the concentration of total nitrogen in the effluent from WWTP was as high as 5.09 mg/l., groundwater makai of the WWTP showed relatively low concentration of total nitrogen at 0.59 mg/l, and high concentrations of phosphorus.

In addition, trace amounts (1-10 µg/L) of chromium, copper, nickel, selenium, and zinc were also detected in the groundwater. A semi-volatile organic compound, phenol, was also detected in groundwater at concentrations ranging from 4 to 10 µg/l.

Appendix G-1 contains the results of the groundwater hydrology study conducted for this project. The groundwater flow gradient ("steepness" or slope of the water table) in the Honokōhau region is relatively flat. The average groundwater gradient in the area is about 1 ft/mile. The gradient is one of the factors that influences the velocity of groundwater flow. At high tide the ocean may rise several feet above the average groundwater elevation causing the groundwater gradient to decline to near 0 or negative slope, causing groundwater flow to stop or even reverse and flow inland (Waimea Water Services, 1996). A water level survey conducted by Waimea Water Services indicates that groundwater elevations fluctuate with the tide and that the existing Honokōhau Harbor acts as a drainage point for local groundwater.

Tidal influence reaches far inland. The Kaloko Irrigation well which is 12,500 feet inland was estimated to have a tidal efficiency of 30 percent (Bauer 2003). This is interpreted to mean that the regional hydraulic conductivity, or permeability, is extremely high. Hydraulic conductivity is a measurement of how well water can flow through the rock. Hydraulic conductivity is commonly expressed in units of distance/time (ft/day). These units do not imply velocity or speed of groundwater flow. Estimates of hydraulic conductivity at the site vary from about 6,000 to 40,000 feet per day. This can be contrasted with conductivity estimates from O'ahu and Maui of about 1,500 feet per day.

The high regional hydraulic conductivity influences the regional groundwater flow in several ways. The ocean tides have an influence further inland than most areas in Hawai'i. This means that the energy from ocean tides, or tidal signal, can directly influence the aquifer further inland than most places in Hawai'i. The saltwater-freshwater mixing zone is probably thicker because of the extended tidal influence. This thicker mixing zone means that the vertical freshwater zone of the local aquifer is relatively thin. Also, the inland tidal signal may induce cold seawater to flow under the mauka freshwater aquifer. Tidal variations also create variable groundwater flow directions. At high tide, deep marine groundwater flows inland to the east, and at low tide shallow brackish groundwater flows west into the harbor and ocean.

Groundwater salinity at the surface of wells in and near the study area varies from about 4 ppt to nearly 9 ppt (Appendix G-1). Salinity in the O'oma testhole increases from 9 ppt to 25 ppt and salinity in wells 2 and 2A increase from 4 ppt at the surface to 16 ppt (~50 percent seawater) at approximately 85 feet below sea level. At the basal springs and the pond area, salinity varied from 9 ppt to 34 ppt (Oki et al, 1999). Salinity is an important factor influencing the total volume of groundwater flow to the ocean through the harbor. A 3 mgd flow of pure fresh water (0 ppt) if mixed with an equal volume of seawater (35 ppt) will result in a 6 mgd brackish (17.5 ppt) groundwater flow. A 4 mgd freshwater flow diluted to 22 ppt with sea water would result in a theoretical groundwater flow of about 8 mgd, and a flow of 21 mgd if diluted to 30 ppt (Appendix G-2).

Temperatures in wells near the ocean are relatively low. A vertical traverse (log) of the O'oma Testhole shows temperatures of 63 degrees Fahrenheit at about 100 feet below sea level. Temperatures in Wells 2 and 2A show similar low temperatures at depth. These low temperatures are probably caused by a close connection to deep cold seawater. Similar temperatures are not reached in the open ocean until at a much greater depth. This is consistent with underground salt water rising as it mixes with the brackish groundwater layer (Appendix G-2). The tidally-driven local flow pattern appears to transport subterranean cold water from the deep ocean.

Regional water levels have not changed significantly since periodic monitoring began in the early 1990s. For example, water levels at the O'oma Testhole have remained constant at about 1.6 feet above mean sea level (Bauer 2003). Water levels at the inland Kalaoa Irrigation well have actually risen by about 0.5 feet since monitoring began in 1993.

3.8.1.3 Groundwater Nutrients and Pollutants

A previous study on Kaloko-Honokōhau National Historical Park property (Oki, NPS, 1999) detected phenol, a semi-volatile organic compound commonly used in the production of a wide variety of products including aspirin, weedkiller and synthetic resins, at low concentrations (4-10 µg/L) in shallow wells. A subsequent sample obtained from the park well and other surrounding wells (Appendix G-4) failed to find detectable levels of this chemical in the groundwater.

AECOS obtained samples from wells on the western site (Well 6), eastern site (Well 2), from the harbor spring, the Kaloko-Honokōhau National Historical Park well adjacent to the site, the Quarry well above the site at an elevation of about 130 feet, and from the effluent of the Kealakehe Wastewater Treatment Facility inflow trench at an elevation of about 90 feet above sea level. All samples were monitored for contaminants by EPA methods 602 (Aromatics), 608 (Chlorinated Pesticides), 625 (BNA Extractables), and 8151A (Phenoxy Acid Herbicides). All results were below detectable levels.

The water quality sampling program found that groundwater east of the Kealakehe WWTP effluent inflow trench showed total nitrogen concentrations of 1.20 mg/l. Although the concentration of total nitrogen in the effluent from Kealakehe WWTP was as high as 5.09 mg/l., groundwater west of the Kealakehe WWTP effluent inflow trench in Well 6 showed a relatively low concentration of total nitrogen at 0.59 mg/l.

Similarly, total phosphorus in the Quarry well above the Kealakehe WWTP effluent inflow trench was low at 0.12 mg/l, very high in the Kealakehe WWTP effluent (3.70 mg/l) and low again (0.62 mg/l) in Well 6 northwest of the Kealakehe WWTP effluent inflow trench. There were high concentrations of total phosphorus in Well 2 (2.71 mg/l) in the east portion of the project site and an absence of similar high levels of phosphorous up-slope at Well 6. One might assume that, if the source of high phosphorous in Well 2 was the Kealakehe WWTP effluent inflow trench, these high levels would also be present in Well 6. A high level of phosphorous in Well 6 was not found, however, in the water quality sampling study.

The above nutrient data is consistent with water quality data collected in anchialine pools and nearshore waters during the water quality, marine biological baseline studies conducted by Oceanic Institute, as presented in Appendix H-1.

Oceanit re-sampled the two on-site wells (2 and 6), the Quarry well east of the site, and an additional control well (O'oma) located just north of both the project site and the Kaloko-Honokōhau National Historical Park well at an elevation of about 80 feet. These samples were all obtained during low tide to assure maximum concentration of groundwater constituents and were analyzed at a separate laboratory using different analyses techniques including EPA 8270C (semi-volatile), 8081 (pesticides), and EPA 8260 (volatile). Results of the analyses showed all chemicals below detectable levels with the exception of the detection of a low concentration of Bis (2-Ethylhexyl) Phthalate (a component of PVC pipes and glo-sticks among other uses) in the Quarry well at 14 µg/L, just above the detection level.

3.8.1.33.8.1.4 Anticipated Impacts and Recommended-Proposed Mitigation

The excavation for the construction of the proposed marina will impact the existing pattern of groundwater flow at the Kona Kai Ola site by intercepting-modifying freshwater flows south of the harbor. Groundwater currently flowing toward the ocean south of the existing harbor will might flow into the proposed marina and then to the ocean through the harbor entrance. Because the proposed marina is to the south and does not extend as far inland as the existing harbor, any impacts to groundwater flow will likely be limited to lands south of the existing harbor. Because the ground formation is so permeable and the local hydraulic gradient is controlled primarily by ocean tides, any impact to groundwater flow from the proposed harbor is likely to be localized.

No impacts to the groundwater flow in the rest of the project site are anticipated from the proposed development. Secondary impacts to land and aquatic resources, from the change in the localized groundwater flow pattern in the project area, are addressed in section 3.9.3.2.

3.8.2 Surface Water

There are no significant natural freshwater streams or ponds other than brackish anchialine ~~ponds~~ pools on and around the project location. These anchialine pools are located in areas where the land is low enough to expose the brackish water layer, and are important surface water features with natural and cultural significance. The anchialine ~~ponds~~ pools are discussed further in Section 3.9.32.

Precipitation from moist higher elevations percolates rapidly due to high permeability of the natural ground surface. No natural gulches or waterways for surface run off have been formed. The site receives an annual average of only 13 inches of rainfall a year. A one-year 24-hour storm delivers only 2 to 2.5 ~~3~~ inches of rainfall (Giambelluca, et. al. 1986~~1962~~, rainfall-Frequency Atlas of the Hawaiian Islands).

Anticipated Impacts and Recommended-Proposed Mitigation

The site will have varying degrees of impermeable surfaces depending on the final design and materials used. The increase of impermeable surfaces and roofs of buildings will change the runoff/seepage pattern and probably cause an increase in the runoff volume.

According to proposed design guidelines, primarily only areas immediately adjacent to buildings and other built features will be planted or irrigated. Irrigation water for these small planted areas will be provided primarily from recycled water, brackish well water, buried cold water pipes, and condensate from air conditioning systems. Landscaping that is developed will potentially add both water from irrigation and dissolved nutrients, either from localized fertilizer application or from the use of recycled wastewater. Pesticide use is likely to be a general part of landscape maintenance with the potential for runoff pollution.

The increase of runoff volume and possible leaching of fertilizers from landscaped areas can cause impacts to receiving waters. Measures to mitigate project impacts will include conformance with related public regulations. All drainage systems are required to be engineered to satisfy all County requirements through Hawai'i County Department of Public Works (DPW) review. In excess of these requirements, each parcel will be required through the Design Guidelines to provide complete retention of the 1-year 24-hour rainfall runoff. The areas that increase the runoff volume will be paired with adjacent landscaped features, such as planted the landscaped areas and those immediately adjacent to buildings and other roof-drainage facilities to will provide retention and seepage. Natural volcanic rock surface in other areas will be retained wherever possible.

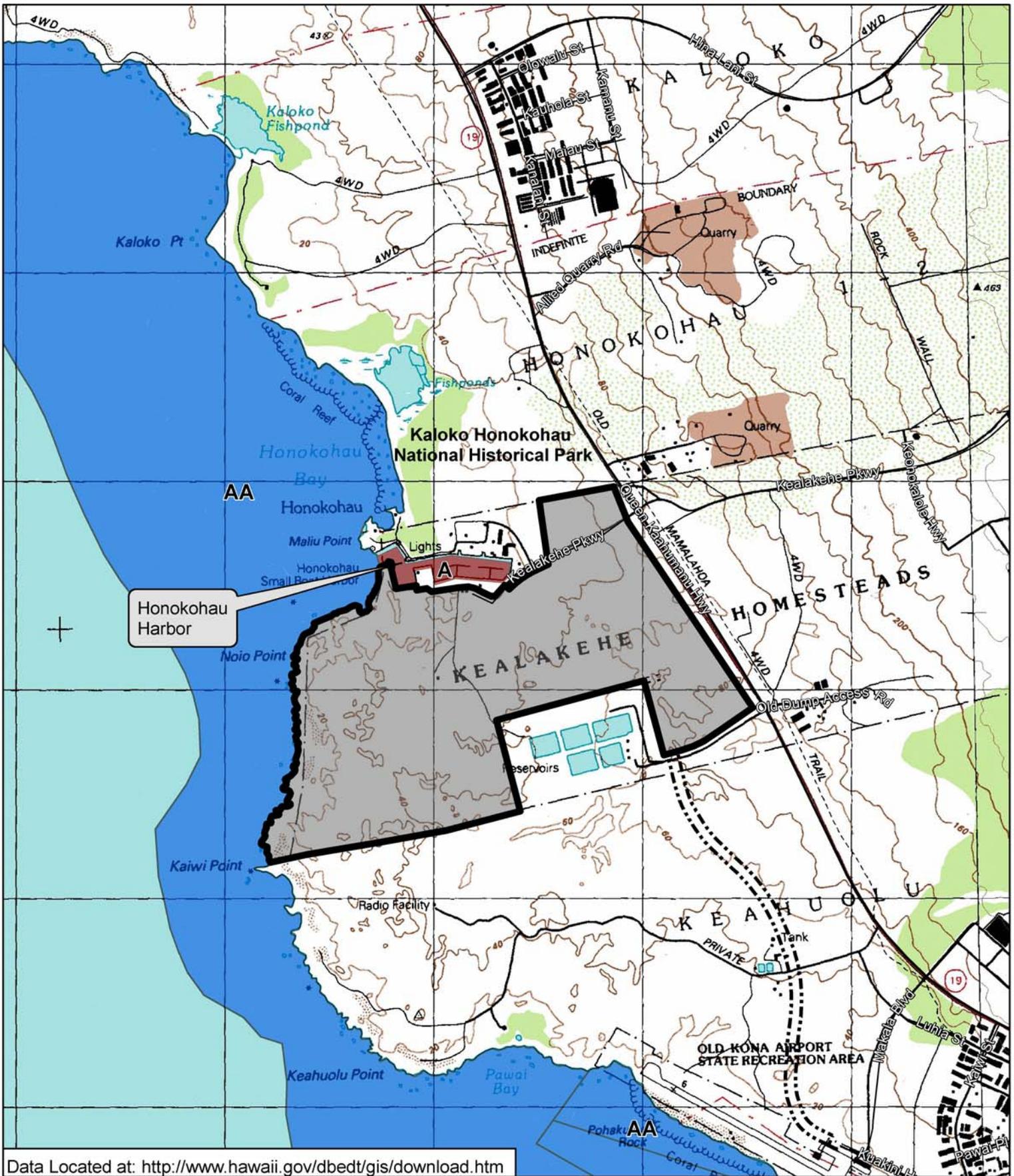
The use of chemical fertilizers will be limited or preferably not used at all for the landscaping features. Use of organic fertilizers like composted vegetation would mitigate nutrient concentration in runoff and seepage water. Where-ever possible, irrigation will use recovered or recycled water and should be applied as sub-surface drip irrigation to minimize evaporation and runoff.

The use of hardy, native xeriscape plantings that need lower amounts of water and fertilizers are ~~recommended~~ proposed to be used for landscaping features. Further, drywells will be constructed in appropriate locations with rain run off directed to these by a drainage system.

Mitigation of runoff impacts will be further specified in design plans and will be determined during the permitting process when final designs are developed. JDI will stipulate low impact development techniques as part of the general design guidelines. The Best Management Practices (BMPs) will be very site specific and must be incorporated with the building and landscape design. BMPs will be incorporated to minimize runoff volume and peak flow, minimize the quantity of pollutants in runoff or flows to groundwater, and maximize re-use of storm water for natural irrigation.

3.9 Marine Environment and Aquatic Ecosystems

Marine waters inside the Honokōhau Harbor are classified “Class A” by the State of Hawai'i Department of Health as shown in Figure ~~PN~~. It is the objective of Class A waters that their use for recreational purposes and aesthetic enjoyment be protected. Waters outside of the existing marina are classified “AA” by the State of Hawai'i Department of Health. It is the objective of ~~e~~Class AA waters that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused sources or actions. To the extent practicable, the wilderness character of these areas shall be protected.



Data Located at: <http://www.hawaii.gov/dbedt/gis/download.htm>

Figure P: Water Quality Classifications Map

Legend

	Project Site		A
	Proposed Parkway		AA
			Unclassified

Water Classifications



0 1,000 2,000 Feet



JDI

JACOBY DEVELOPMENT, INC.

3.9.1 Nearshore Environment and Coastal Waters

3.9.1.1 Existing Conditions

Along the Kona Coast the nature of the benthic community is largely a function of depth and wave action. Because the island is relatively young, fringing reef structures have not yet developed and there has been no significant terra-forming through riverine processes. Coral reefs therefore develop over raw volcanic base in accordance with light availability (primarily a function of depth), wave and current action, substrate condition, and ecological interspecific competition factors.

The USGS (2007) has recently completed a benthic habitat survey of the waters off shore of the Kaloko-Honokōhau National Historical Park and fronting the Honokōhau Harbor. This study has identified 21 separate benthic habitat classes, the distribution of which is primarily controlled by the character of the submerged volcanic flows. Twelve habitat zones are identified which are controlled primarily by water depth, benthic slope, and substrate structure. The dominant structure is a large shallow bench between the shoreline and extending up to 700 meters off shore where it ends in a shallow escarpment. Coral cover is highly variable over the entire submerged park area, but some of the highest coverage is located to the north and south of the harbor channel entrance. This study identifies an area at a depth of about 10-15 meters (~40 feet) off the harbor mouth with lower than expected coral cover.

Prior to the release of the USGS study a separate effort was undertaken by Oceanic Institute to characterize the marine environment within and off shore of the Honokōhau Harbor. Coral and fish communities within Honokōhau Bay and off the Kona Kai Ola site are generally typical of West Hawai'i reefs, with little evidence of anthropogenic impacts. Quantitative transects conducted at locations north, south, and fronting the harbor concluded that Species composition of corals was typical for Kona reefs, with Lobe coral (*Porites lobata*) and Rose-Coral (*Pocillopora meandrina*) abundant in the shallow and mid-reef zones and Finger Coral (*Porites compressa*) more abundant in deeper zones. Highest coral abundance was observed at locations immediately to the north and south of the Honokōhau Harbor entrance channel. Coral cover at locations in the Kaloko-Honokōhau National Historical Park to the north and on the other side of the point to the south of the harbor of these were not statistically significantly different; however, reefs to the north of Honokōhau Harbor in general showed higher coral cover than reefs to the south. This higher density is possible primarily because the southern reefs are more exposed to strong surf and associated damage and scour. Coral and fish communities within Honokōhau Bay and off the Kona Kai Ola site are generally typical of West Hawai'i reefs, with little evidence of anthropogenic impacts.

Water quality conditions within Honokōhau Harbor, adjacent anchialine ponds and coastal waters of Honokōhau Bay are modified by the effects of groundwater influx. Oceanic Institute in conjunction with AECOS Laboratory of Hawaii, LLC completed water quality testing and marine biological baseline monitoring surveys as a part of this Environmental Impact Statement. These surveys were conducted to determine the existing water quality, aquatic resources and habitats within and adjacent to Honokōhau Harbor, the proposed Kona Kai Ola site, and at sites potentially impacted by the proposed development.

It is known and documented that freshwater intrusion into the current marina and near shore areas causes many water quality parameters to deviate from typical nearshore waters that are unaffected by large amounts of groundwater. Specific criteria established by the State Department of Health for conducting baseline water quality surveys along the Kona Coast of the Island of Hawai'i and guidelines established by the West Hawai'i Coastal Monitoring Task Force were followed in water sampling and analysis procedures (WHCMTF 1992).

Water quality testing efforts were coordinated with Waimea Water Services and Oceanic Institute to select proper sites for groundwater/springs. Water samples were collected from all significant anchialine ~~ponds~~ pools located within the project boundaries, on either side of the harbor entrance channel. ~~Pollutant~~ Water quality testing was limited to ~~ones that are reasonable to be suspected on or near the site.~~ nutrients and physical parameters known to be primary factors in pond and nearshore ecosystems function. Testing parameters were discussed with the National Historical Park Service and other stakeholder agencies. The report on Marine Water Quality and Marine Biological Baseline Studies and Impact Analysis is included in Appendix GH-1.

Coastal waters of the site are seen as a continuous and interconnected system from the shallow low salinity groundwater flowing through the harbor, anchialine ~~ponds~~ pools, and emerging into the ocean through the harbor mouth and sub-surface springs. The less dense brackish water with its load of land-derived nutrients enters the nearshore water and spreads out as a surface layer. The degree of mixing and impacts to nearshore marine resources is determined by coastal currents, wind waves, and ocean swells.

~~Currently 3 to 4 mgd of brackish water with salinities of about 5 ppt flow through the existing harbor into the ocean. The proposed development includes marine features mauka of the proposed marina. The marine features will be supplied with up to 75 mgd of clean salt water from 100 to 300 foot depth for marine wildlife exhibits. This water will be discharged into the proposed marina and will flow back eventually into the ocean. The salinity of the discharge water from the marina will be about 34 ppt and the average discharge volume will be 79 mgd.~~

Brackish groundwater discharge input into Honokōhau Harbor was calibrated for the hydrodynamic model using salinity profiles (OI Consultants, 1991 and Glenn, 2006) and the Harbor flushing time (OI Consultants, 1991). This calibration and analysis is described in Appendix U. The calibration period was selected to coincide with the flushing study conducted in 1991. Both OI Consultants (1991) and Glenn (2006) showed salinity profiles that did not go below about 25 ppt at the back of the harbor and the contours are well defined and mainly confined within the top 2-3 feet of the harbor. This indicates that the brackish groundwater entering the system is likely to be in the range of 20 ppt (indicated by the maintained stratification or low mixing and mid-20 ppt contours near the wall). Ziemann (2006) noted in his observations that it appeared that a single source of brackish groundwater at the back of the Harbor was predominantly responsible for inputs. Therefore, the model discharge condition was placed in the cells along the back wall of the harbor. The quantity and salinity of the inflow as well as the dispersion coefficient were varied until the salinity contours appeared to match with reported values and the flushing time was close to 12 hours as reported in OI Consultants. It was found that the most reasonable value was 30 mgd at 22 ppt. This is close to the value reported by Gallagher (1980) of 27 mgd of brackish water entering Honokōhau Harbor.

A detailed analysis of the change in flow velocities through the harbor entrance is described within the 3D model shown in Appendix U. It was found that tidally averaged velocities through the harbor entrance may increase by 3-4 cm/s post-expansion. This is due to the increased tidal prism, the addition of the exhibit water, and the increased flow of brackish groundwater into the system.

3.9.1.2 Methodologies and Studies

Three studies were conducted to evaluate project impacts on nearshore and coastal waters. Oceanit completed a Zone of Mixing study that was presented in the DEIS and is contained in Appendix HI. This study was tasked with determining the mixing and dispersion of flows emerging from the harbor into the adjacent shallow nearshore waters. To accomplish this, data from previous studies were reviewed and field research was conducted to measure stratification and currents adjacent to the harbor entrance and out into the ocean. A “Zone of Mixing” area was determined outside of which there is no discernable influence to water quality from the existing harbor effluent. This information was used to assess impact from modifications to groundwater inflow from marina expansion, and the seawater effluent flow from the marine water features.

~~The model analysis for mixing and water flow through the existing harbor and the proposed marina included existing water exchange between harbor and ocean and the future water exchange resulting from the expanded marina area and the discharge from the marine water features. The model results include three dimensional water flow patterns as well as water quality distribution details.~~

A Wave Penetration Study was prepared by Moffat and Nichol to determine wave characteristics within the existing harbor and the proposed expansion basin. This study was presented in the DEIS and is contained in Appendix J.

In response to DEIS comments, a Harbor Water Quality Modeling Study was prepared by Moffat and Nichol and is presented in Appendix U of this FEIS.

3.9.1.3 Zone of Mixing Anticipated Impacts and Recommended Mitigation

~~Oceanit completed a Zone of Mixing study that is contained in Appendix H. This study was tasked with determining the mixing and dispersion of flows emerging from the harbor into the adjacent shallow nearshore waters. To accomplish this, data from previous studies were reviewed and field research was conducted to measure stratification and currents adjacent to the harbor entrance and out into the ocean. A “Zone of Mixing” area was determined outside of which there is no discernable influence to water quality from the existing harbor effluent. This information was used to assess impact from modifications to groundwater inflow from marina expansion, and the seawater effluent flow from the marine water features.~~

The model analysis for mixing and water flow through the existing harbor and the proposed marina included existing water exchange between harbor and ocean and the future water exchange resulting from the expanded marina area and the discharge from the marine water features. The model results include three-dimensional water flow patterns as well as water quality distribution details.

The three-dimensional model was extended outside of the harbor entrance in order to examine relative changes from baseline conditions. Due to the lack of available data regarding specific brackish discharge events along the coastline, the model is not calibrated outside of the harbor entrance, and any changes predicted in this region are only referred to in terms of relative changes (in relation to model predicted existing conditions). This analysis is shown in Appendix I. It was found that the significance of the additional brackish groundwater inflow into Kona Kai Ola Marina also has an effect on the surrounding surface waters of Honokōhau Bay. The concentrations of nutrients in low flow scenarios are less than existing conditions due to the lack of additional nutrients to the system. However, with higher brackish inflow, the relative growth of algae is more contained while nutrient concentrations relatively increase. Relative nitrogen concentrations in the bottom layers can be maintained in scenarios without additional exhibit flow included, however with the additional saline flow, there is more of a nitrogen load in the bottom layers.

Anticipated Impacts and Mitigation Measures

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water for the water features will be pumped from 100 to 300 foot depth. The total amount of water supplied to the water features will be 75 million gallons per day. The rate of pumping is designed to achieve an approximate 4 hour residence time within the ponds (pers. comm. Cloward H2O, 2007) and to prevent build up of pollutants from users and marine animals. The water for the water features will be pumped from 100 to 300 foot depth. The total amount of water supplied to the water features will be 75 million gallons per day. The rate of pumping is designed to achieve rapid turnover of water within the ponds and to prevent build up of pollutants from marine animals and users. Currently, the nutrient concentrations at the existing marina entrance are very high (1,200ug/l of total dissolved nitrogen (TDN) and 83 ug/l of total dissolved phosphorus (TDP)). The intake water for the features has low levels of nutrients (185 ug/l TDN and 5.6 ug of TDP).

The anticipated impacts and mitigation measures discussed below assume construction of an 800-slip harbor. One possible mitigation measure would be to reduce the size of the harbor expansion. Any modification of the final design size of the marina would require modification of contract language with the DLNR. In that Alternative 1 would include a smaller marina and smaller seawater lagoons, the latter of which would represent a 74 percent decrease from 19 acres in the proposed project to five acres in Alternative 1, there would be a proportionate reduction in seawater discharging into the new harbor.

The intake water for the features has low levels of nutrients (185 µg/l TDN and 5.6 µg of TDP). This amount will be modified by the generation of nutrients by marine animals. This quantity was modeled via calculations performed by ClowardH2O (pers. comm., 2007). Through modeling, this level of nutrient input was found to have an effect on both ammonia and nitrate concentrations outside of the harbor. However, the modeled input did not contribute significantly to eutrophication potential due to the limiting nature of phosphorous within the system. These processes and sensitivity tests are described at length in Appendix U.

Although the total amount of nutrients that will be generated per day will increase from the nutrient output of marine animals and users, the concentration of the nutrients will be lower due to the large amount of water available for mixing within the basin. The overall impact will be a reduction of nutrient concentration in the outflowing water.

The boats used in the marina will be small, and spills could occur from boats or while fuelling. These amounts in a majority of cases will be relatively small. The entrance to the marina is relatively narrow and in case of a fuel spill, the traffic will be stopped and a containment boom will be installed to contain the spill within the basin.

Adequate numbers of containment booms, absorption units and oil removal facilities will be at the fueling station and also provided to an identified emergency response station. Personnel will be trained to respond in case of a spill. In addition, the local fire station, police and civil defense and other agencies will be informed in case of a larger spill.

The proposed new marina would significantly increase the size of the water body, but would utilize the existing marina entrance for access to the ocean. This will increase the tidal prism in addition to the extra anticipated inflows to the new marina. It would be expected to intercept additional groundwater, adding these flows to the existing harbor outflow in addition to being the outfall location for the exhibit flows. Model results presented in Appendix U show that the increase in depth-averaged velocities through the harbor entrance can be as great as 4 cm/s under typical conditions.

The proposed marina basin will therefore not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance. There will be an expanded zone of mixing between the brackish effluent and the surrounding ocean waters due to the concentration of flows at the harbor mouth. The addition of effluent water from the marine water features will result in an additional increase outflow across the marina entrance from 30 mgd to an expected value of greater than 135 mgd after development of the marine water features. ~~to the south will intercept additional groundwater, adding these flows to the existing harbor outflow. The proposed marina will therefore not result in any significant increase in groundwater flow to the coastline, but rather a concentration of the existing flows to the harbor entrance. There will be an expanded zone of mixing between the brackish effluent and the surrounding ocean waters due to the concentration of flows at the harbor mouth. The addition of effluent water from the marine water features will result in an additional increase outflow across the marina entrance from 4 mgd at present to 79 mgd after development of the marine water features. The effluent from the marine water features will contain low amounts of nutrients because of the high flow through. The large amount of water will dilute any pollutants that enter the harbor basin from groundwater or surface water. This will improve the water quality and will be a positive impact on the nearshore environment.~~

Despite its proximity to the WWTP, sewers do not service the existing adjacent State harbor or surrounding private structures. All sewage from existing facilities is treated in on-site septic systems with resulting effluent flowing to groundwater that almost certainly flows directly to the existing harbor. Under post-development conditions all of these flows would be connected to the Kona Kai Ola sewage system resulting in a positive impact by eliminating this existing pollutant load into the harbor. Sewage from facilities at the existing marina will be connected to the Kona Kai Ola sewage system. Sumps, connection lines and pumping facilities will be constructed to move the sewage from the present septic tank systems directly to the larger collection system. The work needed for this conversion will be included in the sewage infrastructure design and construction.

~~Hydrogeological studies have concluded that the expansion of the marina does not increase the groundwater flux through the harbor mouth into the ocean significantly. The groundwater from the brackish aquifer already converges to the existing harbor and does not show flow across the planned marina basin area into the ocean.~~

~~It is estimated that the average groundwater discharge is 3 to 4 million gallons per day (mgd). The salinity of the water that discharges from the brackish aquifer is about 12 percent of seawater or about 4.3 parts per thousand (ppt). In addition, 52,000 gallons per minute of surface seawater (36 ppt) will be pumped from the nearshore area for use in the marine lagoon features. This amounts to approximately 75 mgd. This water eventually is discharged into the harbor basin and into the ocean. This water is not expected to reach the existing marina basin because the proposed basin connects to the existing one very close to the common entrance. Therefore the impacts to the existing marina environment from the additional discharge are expected to be negligible.~~

At present, the salinity of the water column remains entirely saline in the bottom layers with more brackish influences near the surface (about 30 ppt). Model results displayed in detail within Appendix U show that salinity differences near the harbor entrance are completely confined to the surface layers and are at maximum about 0.5 ppt less than the current conditions of about 30 ppt (surface). Salinity at the marina entrance, at 10 foot depth is not affected by the brackish water discharge. The benthic flora and fauna close to the marina entrance and at less than 10 feet water depth face variations of salinity from 34.5 ppt to 36.0 ppt.

~~At present the depth averaged salinity of the water exiting the existing basin is about 33.5 ppt close to the marina entrance. The brackish water stays at the surface and shows its influence for distance of about 2,000 feet. Salinity at the marina entrance, at 10 foot depth is not affected by the brackish water discharge. The benthic flora and fauna close to the marina entrance and at less than 10 feet water depth face variations of salinity from 34.5 ppt to 36.0 ppt.~~

~~A straight forward mass balance calculation shows the following changes to the existing flow and salinity. The average outflow from the harbor will increase from 4 mgd to 79 mgd. The salinity of the water will change from an average of 33.5 ppt to about 34.4 ppt. The water will still be less dense, and the depth of impact will be limited to the surface 3 to 4 feet. The benthic flora and fauna will face a smaller variation in salinity that will discourage opportunistic biota dominance and lead to a healthier and more diverse benthic community. This is a positive impact on the benthic environment. The increase in the outflow will cause a very slight increase in water velocities, but this is well below the existing velocity variations in the entrance channel vicinity.~~

Construction of a new marina basin will have ~~short-short~~ term negative impacts on coastal marine resources. Direct construction impacts are likely to be small. Marina construction will be accomplished with a berm separating the construction area from adjacent marine waters, minimizing the discharge of sediment from excavation and dredging. Excess sediment remaining in excavated marina will be removed before the land bridge is removed in order to minimize any temporary sediment plume. When the final land bridge is removed, a temporary sediment plume is anticipated. Silt curtains will be used to ~~minimize the~~ prevent suspended sediment entering ocean waters.

Although the runoff at the site is small due to the dry climate and the high porosity of the land, during high rainfall, some runoff might reach the harbor basin as overland sheet flow. The new marina will serve as a collection point for materials utilized or generated at the development site, either through direct runoff or by interception of groundwater flow. There is the potential that fertilizers, pesticides, petroleum products, road wastes, etc, could be discharged from the mouth of Honokōhau Harbor into the coastal marine environment. Structural Best Management Practices (BMPs) will be designed and installed to remove as much of pollutants as possible from the run off during such unusual conditions.

Small boat harbors have been found to be consistent sources of certain types of pollutants to the surrounding environment. These pollutants in general include:

- Heavy metals (zinc, copper, tin, lead) associated with bottom paint or sanding of painted surfaces during maintenance activities;
- Petroleum product release from fueling operations, and bilge discharges exacerbated by the large number of boats and range of operator skills;
- Trash and debris from boat operations and surrounding harbor activities;
- Sewage from intentional or accidental releases from on-board waste systems;
- Biological waste from fish cleaning;
- Waste streams from land-side boat washing and maintenance activities;

Most of the impacts can be minimized through the use of Best Management Practices (BMPs), which are a combination of activities, education and devices that help prevent or reduce water pollution. A “Clean Marina Program” similar to the International Blue Flag Marina Program or the Clean Marinas California Program will be implemented at the new marina and include key elements such as promoting and enforcing:

- Boater education signage, literature and programs
- Emergency and spill response plans
- Safe fuel, hazardous material, sewage and bilge water handling practices
- Use of sewage marina pump out, waste and oil recycling facilities
- Environmentally sensitive boat maintenance and cleaning practices
- Environmentally sensitive hull cleaning practices
- Good housekeeping practices on boats and docks
- Use of fish cleaning stations / receptacles and fish waste composting

- Enforcement of harbor rules and regulations

3.9.1.4 Wave Impacts to the Existing Honokōhau Harbor

The wave climate within the existing Honokōhau Harbor and the proposed marina was analyzed using a numerical model that is further discussed in Appendix JI. A wave measurement study was conducted to determine the wave response of the existing harbor to outside wave climate. A directional wave gage at a depth of sixty feet directly in front of the existing harbor entrance and a non directional wave gage inside the existing harbor basin were installed to measure wave climates simultaneously. The results of the wave measurements were provided for wave transformation model calibration.

Results of the wave climate analysis with and without the expansion were used to predict wave agitation impacts to the existing harbor. The model was operated for waves with a 9-second period and swells of 13-second period as the dominating waves for the offshore area.

Anticipated Impacts and Proposed Mitigation

Wave climate in the existing harbor from the proposed marina construction depended on the period of the incoming waves. There was a slight decrease in the wave height in the existing basin for outside waves of a 9-second period. For longer period swells, there was no significant change in the wave height in the basin.

For waves with a 9-second period, the wave height at the inner end of the outer basin attenuated to 40 percent of the incident wave. There was no additional wave attenuation due to the presence of the proposed marina. Within the existing harbor inner basin, the wave height attenuated to about 20 percent of the incident wave. The wave height in the inner harbor decreased by about 10 percent with the construction of the proposed marina.

For longer period swells, the wave height in the outer basin remained at 50 percent attenuation. In the inner basin, the wave height reduced to about 20 to 30 percent of the incident wave. There was no significant change in the wave height in the inner basin from marina construction.

The analysis shows that under short storm wave conditions, the proposed marina construction causes a positive impact by reducing the wave height by 10 percent in the existing marina. However, under swell conditions there is no change in wave agitation in the mooring area of the existing harbor with the proposed marina. Overall, the impact of construction of the proposed marina basin is positive since the existing harbor will experience less wave agitation. This may be due to the fact that the amount of wave energy entering through the harbor entrance remains the same, while additional water area and frictional surfaces (both sides and bottom) provide for greater wave dissipation after the expansion. No mitigation is ~~recommended~~ proposed due to the project's positive effect.

3.9.1.5 Harbor Water Quality

A three dimensional hydrodynamic and water quality model of Honokōhau Harbor and its surrounding waters was developed using the Delft3D modeling suite and is described in detail in Appendix U. The model was driven at its offshore boundaries by tidal predictions, and calibrated to reproduce available measurements of water levels, currents, salinity and temperature.

Model results suggested that the brackish groundwater inflow to Honokōhau Harbor was approximately 30 million gallons per day (mgd), with an average salinity of 22 parts per thousand (ppt), in order to reproduce the salinity profiles observed from a number of available data sets. In addition, this flow rate is in very good agreement to the published values of brackish groundwater inflow to Honokōhau Harbor. The model also showed that under these conditions, Honokōhau Harbor maintained a flushing time of approximately 12 hours, which is consistent with available studies and data. The flushing within the harbor was found to be primarily due to the density currents that result from the salinity gradient within the Harbor created by the brackish groundwater inflow. This finding also corroborated with study findings that this flushing mechanism results in water exchange in the harbor on the order of seven times faster than if it were flushed via tidal action alone.

A water quality model was developed to replicate typical conditions experienced in Honokōhau Harbor and its environs. Water quality parameters were calibrated and validated using two available datasets. It was found that the water quality within Honokōhau Harbor is primarily maintained due to the high rate of circulation. The nutrient loads entering the harbor through the brackish groundwater inflow are high, and without high flushing, water quality within the Harbor would not be able to be maintained.

Anticipated Impacts and Mitigation Measures

The water quality model was applied to predict the post-project conditions after the addition of the Kona Kai Ola Marina. Per the Conceptual Master Plan, the marina consists of a 45 acre marina basin with 800 boat slips. Brackish groundwater inflows into the new marina basin were bracketed between 0 mgd and 60 mgd. The two simulated extremes represent scenarios where no additional brackish groundwater will be intercepted by the new marina, which is not consistent with the observed conditions, and when brackish groundwater inflow into the new marina is twice the amount that will be still flowing into the existing marina, respectively.

The model results demonstrated, relative to the increased area, that water quality within the proposed 45-acre marina basin system could not be maintained. Inflow of brackish groundwater to the new marina was found to be fundamental to the flushing and water quality of the proposed system. However, even for the largest simulated inflow of 60 additional mgd entering the new marina, water quality was still degraded post-expansion. This is primarily due to the fact that the proposed marina basin has five times the volume of the existing harbor. In addition, the geometry of the system led to internal circulation between the existing harbor and new marina basin. The 45-acre new marina basin only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd.

Alternatives to the aforementioned system that could maintain the flushing and water quality, as observed under existing conditions, were investigated. It was found that the reduction of the volume of the new marina basin by 45 percent significantly improved the flushing and water quality. Broad range sensitivity tests were also performed to determine the effect that various parameters had on the proposed system. For example, addition of nitrogen and phosphorous loads were tested to determine the limitation of the system.

The conditions with the project constructed were found to be phosphorous limited. Several simulations were performed including and excluding the inflow from the marine exhibits which provides an additional nitrogen load and also varying the location of this inflow. It was found that the inflow from the marine exhibits can have a beneficial effect on flushing, especially when positioned within the existing harbor basin. However, its effect is significantly less than the effect due to the brackish groundwater inflow. When the exhibit inflow is excluded or positioned at the east end of the new marina, its effect is small in terms of flushing due to its high salinity. From a water quality perspective, since the loads from the exhibit inflow consist primarily of nitrogen, it does not cause increased algae growth. However, this exhibit inflow does raise the concentrations of ammonia and nitrate in the system.

Simulation results indicate that under the conditions when the post-expansion system receives an additional brackish inflow into the new 25-acre marina on the order of 30 mgd or more, water quality within the harbor system and in the surrounding waters remained similar to existing conditions. These conditions are expected to occur based on the findings reported by Waimea Water Services (2007), which states that the proposed marina would exhibit the same or similar flushing action as the existing marina.

An additional mitigation measure proposed by Waimea Water Services (2007), if sufficient inflow is not intercepted, consists of drilling holes in the bottom of the new marina to enhance this inflow and facilitate flushing within the proposed system.

3.9.33.9.2 Anchialine Ponds Pools

Two studies on anchialine pools were conducted in this EIS process. The anchialine ponds pools water quality studies and biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute and isbiota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute in October 2006 and are included as Appendix GH-1. That survey included pools located both north and south of Honokōhau Harbor. In response to DEIS comments and to further study the pools south of entrance channel of Honokōhau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. The report is contained in Appendix H-2.

3.9.3.13.9.2.1 Existing Conditions

Anchialine ponds pools exist in inland lava depressions near the ocean. Two anchialine pond pool complexes are located immediately to the north and south of the Honokōhau Harbor entrance channel. The complex to the north is located wholly within the designated boundaries of the Kaloko-Honokōhau National Historical Park as shown in Figure QQ. Many of the ponds pools in the southern complex are within the park administrative boundary as well. Ponds Pools in the northern complex show little evidence of anthropogenic impacts. Many contain typical vegetation and crustacean species in high abundance.

Figure R locates anchialine pools near the harbor entrance and ponds Ponds in the southern complex are depicted in Figure S.

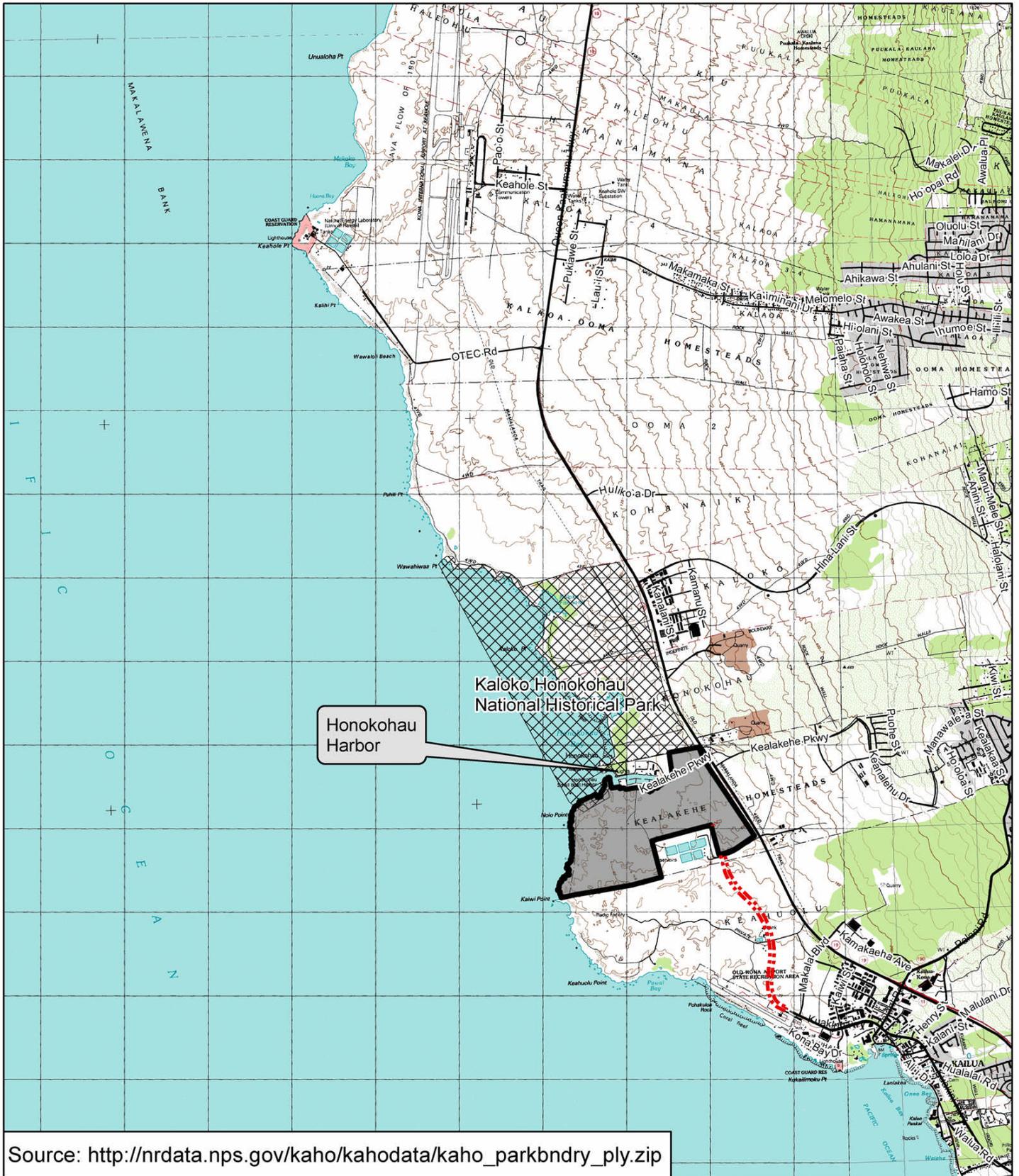


Figure Q: National Historical Park Service Legislative Boundary Map

Legend

-  Project Site
-  Proposed Parkway
-  National Park Boundary



0 2,500 5,000 Feet






Source: Oceanic Institute

Figure R: Anchialine Pool Locations



0 2,000 4,000 Feet





Source: Aquatic Resources Management And Design

**Figure S: Anchialine Pool Locations
in Southern Complex**



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The 2006 study identified 22 pools in the southern complex. The 2007 study found that three of the 22 pools are part of an estuary complex with direct connection to the ocean. While there were several signs of direct human use and disturbance, such as trash receptacles and toilet facilities, the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish, including topminnows and tilapia, and introduced plants, predominantly pickleweed and mangrove. are moderately to heavily impacted, with many containing exotic fish that exclude the anchialine crustaceans. The ponds also show evidence of human impact, including discarded bottles, cans, wrappers, diapers, toilet paper, etc. Water quality conditions within the ponds generally reflect the conditions of the underlying groundwater.

Figure P locates anchialine ponds near the harbor entrance. The study conducted as a part of this EIS show that the anchialine ponds south of the harbor entrance are moderately to heavily impacted by human activities and introduced fish populations. The study found that the nitrogen phosphorus concentrations in these ponds are significantly higher compared to the ponds north of the harbor entrance. The sources of these additional nutrients are not known. Continuous influx of nutrients will eventually degrade the water quality to levels that could alter the pond ecology.

Biota surveys in the two pond systems clearly indicate that counts of typical pond denizens show a remarkable difference between the northern and southern ponds pools. In the northern ponds pools the number of *Halocaridina rubra* ranged from a low of 20–25 to too numerous to count. The biota rich pond bottoms appeared red due to the *Halocaridina rubra* numbers. The only other species visible was the predatory shrimp *Metabetaeus lohena*. In contrast, only four out of the 22 ponds pools examined in the southern pond complex showed a decreased presence of *Halocaridina rubra* (6 to 200) individuals in the pond, and three ponds pools contained *Metabetaeus lohena*. Eight of the ponds pools contained numbers of introduced minnows which is an apparent predator of *Halocaridina rubra* and *Metabetaeus lohena*.

The 2007 study found three of the pools identified in the 2006 study were part of an estuary complex with direct connection to the ocean, and that the southern complex contained 19 anchialine pools. The study further found that a majority of the southern pools are degraded biologically and physically, primarily due to the effects of introduced fish and plant species. Six pools are currently devoid of alien fish, but they face a high level of threat due to the proximity of pools that have these species. Of the 19 anchialine pools, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Of the 19 anchialine pools, three pools with a combined surface area of 20m² would be eliminated due to the harbor construction.

The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 ppt. and that the anchialine biology would then perish. There is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and final determination of anchialine salinity following the harbor construction. The assessment that all anchialine pools will be barren with the construction of the harbor may be premature. *Halocaridina rubra* (opae ula) are routinely drawn from high salinity wells at 30-32 ppt.

Within the 19 pools, native and non-native fauna included 14 species comprised of 5 fish, 2 mollusca, and 6 crustacea. Algae within the pools primarily consisted of a mixed assemblage of diatoms and cyanobacteria, with several pools dominated by matted filamentous *Cladophora*, sp. The darker cave/overhang pools and high tide pools had epilithic *Hildenbrandia* sp. covering the rock substrate. Riparian vegetation was dominated by introduced species consisting of Pickleweed (*Batis maritima*), Mangrove (*Rhizophora mangle*), and Christmasberry (*Shinus terebenthifolius*). Only two species of native plants Akulikuli (*Sesuvium portulacastrum*) and Makaloa (*Cyperus laevigatus*) existed near the pools and comprised only few small patches and a single tuft (respectively).

Most of the hypogean anchialine shrimp have adapted to the presence of minnows by foraging in the pools at night. During daylight hours, only the adult shrimp appear to coexist at low population levels with the smaller *P. reticulata*, but the larger *G. affinis* and *Oreochromis* prevent the daytime appearance of hypogean shrimp due to predation.

The average salinity in Kealakehe pools is relatively high at 13.5 ppt compared to most other pools along the West Hawai'i coastline, having an average of approximately 7 ppt. This high salinity appears to be characteristic of this region, and is similar to the average of most pools within the adjacent ahupua'a of Honokōhau and Kaloko. The levels of nitrate-nitrogen levels are relatively high compared to other undeveloped areas, but fall in the range of some developed landscapes. Other water quality parameters, including pH and temperature, fall into normal ranges for anchialine pools.

This relatively high salinity is the likely reason aquatic insects were not found in any pools at Kealakehe. Though the rare damselfly *Megalagrion xanthomelas* has been observed and collected from Kaloko, a statewide assessment of its range has not found it to occur in water with salinity greater than 3ppt. However, there has been an unsubstantiated occurrence of the nymph in a pool of up to 8ppt (Polhemus, 1995).

Another species of concern is the hypogean decapod shrimp *Metabetaeus lohena*. These shrimp are sometimes predatory on *H. rubra* but are more often opportunistic omnivores similar to *H. rubra*. Predusk and nocturnal sampling at high tide is clearly the optimal method to determine habitat range and population densities for this species. These shrimp were found in 13 of the 19 pools, 7 of which had *M. lohena* only at night. The occurrences of *H. rubra* were found in 16 of 19 sampled pools, 8 of which had 'Ōpae'ula observed only at night. Consequently, despite having numerous degraded anchialine resources at Kealakehe, there are opportunities for many of the pools to be restored and enhanced to a level where large populations of anchialine shrimp and other native species may return to inhabit the pools as they likely have in the past.

As mentioned earlier, the southern ponds also had elevated concentrations of nutrients indicating water quality degradation. These factors indicate that if no restoration or maintenance activities are instituted to reserve these ponds, these ecosystems will degrade beyond recovery.

3.9.3.23.9.2.2 Anticipated Impacts and Recommended-Proposed Mitigations

The anchialine ~~ponds~~ pools that are located north of the existing harbor are not likely to be impacted because no development activities are proposed north of the existing harbor. It is highly unlikely that existing groundwater flows to the Kaloko-Honokōhau pond system to the north of the existing harbor will be impacted by the proposed marina to the south.

Of the 19 pools in the southern complex, three would be eliminated due to harbor construction. Regarding the remaining pools, the DEIS noted that tThe change in the local groundwater flow pattern in the vicinity of the proposed marina will ~~would~~ impact the anchialine ~~ponds~~ pools that are located between the proposed marina and the shoreline south of the harbor entrance. The 2006 study (Appendix H-1) noted that tThe salinity of the anchialine ~~ponds~~ pools will ~~would~~ increase due to reduction of brackish groundwater, and that ~~—~~ Some ponds will be excavated to make the new harbor basin. Those ~~ponds~~ pools that are not excavated will revert to full salinity, causing the loss of their habitat, and associated aquatic flora and fauna. However, current investigations indicate that these ponds are already enriched by nutrients and the density of associated aquatic fauna is very low. In addition, trash from visitors, and introduction of minnows has already degraded the pond ecology. Even without the potential impacts from the proposed marina construction, the pond ecology might change irreversibly from the nutrient input, human indifference and expansion of non native fauna species.

Further studies conducted in response to DEIS comments (Appendix H-2, and Appendix G-3) indicate that the remaining pools may not increase in salinity to levels unhealthy for *H. rubra* and *M. lohena* and other anchialine pool fauna. In addition, these studies determined that there are realistic mechanisms employed elsewhere that would mitigate changes due to groundwater changes. Waimea Water Services found that harbor construction would cut off some of the fresher ground-water flow. However, predicting the extent of change in flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore.

Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented. The mitigation plan will be based on the following objectives:

Objective 1 To preserve, maintain, and foster the long-term health and native ecological integrity of anchialine pools at Kealakehe.

Objective 2 To protect and promote cultural practices and traditions surrounding anchialine resources at Kealakehe.

Objective 3 To provide education, interpretation, and interactive opportunities for the community to learn about and appreciate the anchialine resources.

Objective 4 To acquire a pond manager to implement the program, conduct monitoring, research, and reporting, and provide education to the community about anchialine and estuarine resources.

Mitigation measures to facilitate the long-term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on the environment can be measured. The framework for the mitigation plan will include three measures intended to meet these objectives, including bioretention, salinity adjustment and possible new pools.

As a mitigation measure, bioretention, which is a Best Management Practice (BMP) is a feasible application for the proposed development. There is a probability that nutrients and other potential pollutants will runoff landscaping and impermeable surfaces such as roadways and parking lots during medium or high rainfall events. Some of these pollutants could enter the groundwater table and into anchialine pools and ultimately the ocean. As an alternative to directing runoff into the ground through drywells, storm water should be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table.

Bioretention is a Best Management Practice (BMP) that would be a highly appropriate application for the proposed development. Further, BMPs utilized in series may incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, raises the level and reliability of pollutant removal. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

Another mitigation measure that may be included in the management plan is salinity adjustment. In the 2006 assessment regarding the impact to the southern pools from the proposed construction of the harbor, it was stated that this construction would cause the salinity in the anchialine pools to become equivalent to the ocean at 35ppt. It was then concluded that the anchialine biology would perish.

However, there is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and a final determination of anchialine salinity following the harbor construction. The dynamics of groundwater movement through a porous lava medium both seaward and laterally along the coastline is an inexact science. This is compounded by the variations in water density, including stratification of salinity within the proposed harbor and capillary movement of low-density surface water through the substrata.

The assessment that all anchialine pools will be barren with the construction of the harbor may therefore be premature. *H. rubra* are routinely drawn from high salinity wells at 30 – 32 ppt and survive in this salinity for years. Further, high populations *H. rubra* and *M. lohena* have thrived and reproduced in pool salinities of 27ppt. If the pools do become full strength seawater at 35ppt, there exists uncertainty on the long-term effects to anchialine organisms, since there are no long-term studies or examples of native anchialine ecosystems at 35ppt. Native anchialine pool vegetation also has relatively high salinity tolerance.

If the salinity were expected to rise to 35 ppt, possible mitigation in the management plan will include methods to surcharge man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water. If sufficient volume is used, it is theoretically possible to lower salinity in adjacent natural anchialine pools. This surcharge method has been successfully used to raise salinity in anchialine pools and cause the salinity rise in adjacent pools of at least up to 10 meters away. Surcharging with low salinity should work as well or better since the lower density water will essentially float atop the higher salinity water at the surface layer, and move throughout the complex of natural pools. Surcharging may also be a viable mitigation to dilute and more rapidly disperse any pollutants that may be detected in the pools.

Another mitigation measure includes the creation of new anchialine pools. There is significant opportunity to create new anchialine pools and greatly expand the native habitat and resource. It has been demonstrated at several projects in West Hawai'i that anchialine pools can be created and will be colonized with a full compliment of anchialine species endemic to the area.

Anchialine pools are considered focal points of higher productivity relative to the subterranean groundwater habitat around them. Their productivity promotes an increase in population levels of anchialine species within the pools themselves and throughout the subterranean habitat surrounding them.

No realistic mechanisms are envisioned for re-injecting fresh water into these systems to maintain their ecological balance as an anchialine system. These ponds will be changed from a brackish water system to a marine system. But, those ponds in the area of the shoreline park and cultural park will be cleaned of vegetation and protected from other physical alteration. A buffer zone around these newly established marine ponds will be protected as well.

The anchialine pond shrimp (*Metabetaeus lohena*) and the orangeback damsel fly (*Megalagrion xanthomelas*) are listed as candidate endangered species in the Federal Register and were both recorded in surveys of these anchialine ponds done in 2004 by US Geological Survey Biological Resources Division and the NPS Inventory and Monitoring Program. Low numbers of *Metabetaeus lohena* were encountered in three of the 22 ponds surveyed in the southern pond complex. *Megalagrion xanthomelas* was not encountered in any of the southern pond complex ponds during the recent study. The low density of *Metabetaeus lohena* and the observed absence of *Megalagrion xanthomelas* may be due to the impacts from high nutrient input and general degradation of the ponds.

An attempt should be made to move as much of the existing population of *Metabetaeus lohena* from these anchialine ponds before they become too saline, to possible newly excavated ponds that may be developed off-site. These shrimp should not be introduced into existing populated ponds to avoid any potential pathogenic impacts to the healthy ponds.

Public education on the unique ecology of the anchialine ponds and the need for preserving their ecology will reduce future human impacts in other healthy ponds.

Further recommended mitigation includes restoration to degraded anchialine ponds off the project site, preferably those located at the adjacent Kaloko Honokōhau National Historical Park.

3.9.43.9.3 Marine Fishing Impacts

3.9.4.13.9.3.1 Existing Conditions

Presently, of the 270 berths at Honokōhau Harbor, 120 are registered with commercial licenses. The two two-lane boat ramps service an additional average of 20 to 30 boats per day, although this number can exceed 100 boats per day during tournaments. Of the 120 commercial moored boats, 60 engage in charter fishing, about 12 as commercial fishing boats, with the balance conducting dive tours, sight-seeing, para-sailing, or acting as shuttles for large cruise ships. Discounting fishing by divers, this brings the total number of boats moored in Honokōhau Harbor involved in commercial fishing activities to about 72 vessels ~~or about 60 percent of the commercial fleet.~~

In fisheries the catch is related, but not necessarily proportional, to the fishing effort. As fishing effort increases, so does the fishing pressure on existing stocks. Even in a healthy fishery, every fish caught by a fisherman is one less fish that is available to be caught by all other fishermen. As a fishery expands, the first impact seen by the fishermen is generally a lower catch per unit effort (CPUE) and a general decrease in both the average weight of fish caught and in the number of fish caught in the largest size categories. When the total catch begins to approach the sustainable yield, both CPUE and the sizes of all the fish caught can decline over very short periods of time. When this happens and if fishing pressure continues, the fishery may “crash” and may require a long period of time to recover.

Examination of the fishing statistics shows that bottom fish landings have historically been low and inconsistent. Currently, only a small fraction of boats in the area target bottom fish. As this portion of the fishery appears to be limited by a lack of shallow fishing grounds, it is not likely that an increase in the moored fishing fleet will cause any significant impact to this segment of the fishery.

~~Data compiled by commercial boat booking agency CharterDesk shows a relatively constant total catch of all billfish species varying from about 2000 to almost 4000 fish caught per year. Data indicate a “successful” billfish catch rate of about 1 in every 2 trips. Currently, there are about 60 registered commercial charter vessels in the harbor and about 50 charter vessels using the two two-lane boat ramps.~~

About half of the total fish caught are Kona’s prized Blue Marlin. Analyses of annual data from existing Honokōhau Harbor showed that the average weight of blue marlin decreased from about 265 pounds in the early 1980s to about 200 pounds in the late 1990s. During this same period of time the success rate for catching blue marlin dropped from about 1 blue marlin every three trips, to about 1 blue marlin every 4 trips. As of 2005, the catch rate has dropped to about 1 blue marlin in every 10 ten trips. This catch is only a small percentage of the total marlin catch by commercial long liner fishing boats in Hawaiian waters. Similar trends are seen for other large billfish and tuna.

3.9.4.23.9.3.2 Anticipated Impacts and Recommended Mitigation

The proposed marina will add 800 new slips to the existing facility. It is reasonable to assume that a portion of these new boats will engage in fishing activities. A study on the potential impact of these additional fishing boats on the marine fisheries is contained in Appendix RQ.

Alternative 1 includes a 400 slip marina, so there would be a proportionate reduction in fishing pressure.

While it is ~~likely possible~~ likely possible that an increase in the number of fishing boats would decrease CPUE, the overall impact on the health of the fishery from the proposed expansion of the marina is less clear. Even at a constant CPUE, the increase in the fish catch from charter boats will be a very small percentage of the total billfish and tuna catch over these Pacific-wide fisheries. The Kona fleet catches more blue marlin than any other trolling fleet in Hawai'i, but in 2000 it only accounted for about 127,500 pounds of the 423,000 pounds caught by all anglers throughout the state and the additional 700,000 pounds landed by commercial long line fishermen in the state (Data from WestPac Year 2000 Recreational Fishing Summary). It is not likely that the fishing pressure from the expanded charter fleet will have an adverse impact on the Pacific-wide fishery.

Impacts on Marlin and Tuna / Pelagic Fishery

The impact on the marlin and tuna fisheries from increased harbor capacity will be a function of the number of new boats in the harbor targeting these fisheries and the ability of these new boats to attract paying customers. Both marlin and large tuna fisheries have been shown to be in general decline according to private, state, and national fisheries statistics. There are several hypothesized causes for these declines relating primarily to international fisheries. The ability of the State to manage these pelagic marine fish stocks is limited by the national and international fishing policies.

Fisheries management typically attempts to reduce fishing pressure by limiting access to the fishery either through licensing, gear (boat) restrictions, catch limits, season or area limits. Limiting the number of boat slips available would not by itself provide effective control over fisheries pressure because these pressures are market driven, as well as for recreational and subsistence purposes, and there are other methods, such as boat launch ramps, to access the fishery.

Impacts on Coral Reef From Extractive Fisheries

It is possible that a large number of boat slips in the expanded harbor will be occupied by resident-owned motor boats for personal use. Private boats in Hawai'i are used for a variety of activities that have historically proven difficult to regulate. These may include extractive activities such as bottom fishing, trolling, spear fishing, tropical fish and invertebrate collecting, as well as non-extractive activities including sport diving, skiing, paragliding, racing, or shoreline transportation. Each of these activities has individual existing impacts upon marine resources and these impacts are expected to increase with the new harbor unless appropriate management is initiated.

There is a general perception that the increased access to nearshore resources will result in a decline in these fish stocks similar to that seen historically on O'ahu. This perception is not without merit and deserves serious attention from resource managers. However, the increased access to the shoreline has already occurred, and will continue as the coastline is developed regardless of harbor development. As most fisheries are market driven, as well as for recreational and subsistence purposes, there will be increased pressure on these resources in the future regardless of harbor development. Fisheries managers need to take a serious look at management strategies for the future. Attempting to preserve fisheries resources only by limiting the size of the harbor is not likely to have any positive long-term effect on the nearshore living marine resources because there are increasingly other avenues to access the shorelines.

SCUBA

An increase in the number of boat slips is likely to cause an increase in both the number and size of commercial moored vessels offering dive tours as well as private boats used for diving. Although all of the dive sites in Kona are relatively near shore, the lack of shoreline access and ease of entry by boat makes boat diving the preferred option. As more of the Kona coast becomes developed however, this shoreline limitation to dive sites is likely to decrease. Attempting to limit dive pressure on the reef by limiting the number of available slips is not by itself an effective long-range management tool. As the number of divers on the reef increases, the pressure on the reef from anchor damage, extractive fisheries, and unintentional diver induced coral damage will likely increase. The increased pressure on dive sites from SCUBA divers must be met with commensurate changes in management to limit adverse impacts.

3.9.3.3 Proposed Mitigation

An increase in the harbor size offers the opportunity to consolidate, focus, and fund management and enforcement activities at one centralized location. The pressure on fish and invertebrate stocks, as well as upon populations of marine mammals and turtles can be expected to increase as the Kona population increases, regardless of whether the harbor is improved. The following changes could be made by DLNR, paid for at least in part by the additional revenues to DLNR from the Kona Kai Ola project. These changes are in the management authority of the DLNR Division of Aquatic Resources and the DLNR Division of Boating and Ocean Recreation.

- Increase in the number of fisheries enforcement and management personnel in Kona at one centralized harbor location
- Allocation of slip and office space for fisheries personnel and equipment
- Increased numbers of submerged mooring buoys (presently approaching 100) at all dive sites,
- Increased education materials for recreational divers and fishermen
- Initiate restrictions on the quantity and size of boats in each commercial sector
- For inshore species, initiate catch restrictions in line with Division of Aquatic Resources guidelines that prioritize recreational fishing above commercial fishing, and subsistence fishing above recreational fishing.

The increased level of fisheries knowledge has spawned an atmosphere of stewardship in the general charter-boat fishing community. With catch and release programs returning upwards of 40 percent of the Kona catch back to the ocean there is an obvious awareness that the value of catching the fish is often far greater than the value of selling it. It is ~~recommended~~ proposed that facilities and programs to foster continued stewardship, fisheries science, tracking of all fish catch, and educational programs be implemented in the design of the new marina facilities.

The proposed marina, marina support facilities, public marina promenade, fishing club, and marine science center will provide a venue for implementing the following efforts:

- Efforts to promote tag and release will be fostered through public education and the implementation of more "Catch and Release – Only" tournaments.
- Promote management through catch limits to possibly include slot weight catch limits, ~~ie.i.e.~~ must tag & release animals between 250–950 pounds
- Promote various other stewardship measures relating to fisheries conservation.

3.9.5.3.9.4 **Marine Mammals and Sea Turtles**

In addition to water quality, which is discussed in Section 3.9.1.3, other environmental impacts that may affect marine mammals and sea turtles include noise and vessel collisions. The following sections describe existing conditions, potential impacts and suggested mitigations to prevent negative impacts to marine mammals and sea turtles from noise and vessel collisions.

3.9.5.13.9.4.1 **Existing Conditions Affected Environment**

A number of marine mammal and turtle species are found in Hawaiian waters near the Kona Kai Ola project site. Detailed information on the abundance, behavior, threats to the species, hearing ability and vocalization data is provided for all species in Appendix S. Data on the most prevalent endangered species and species of particular interest are summarized here.

Humpback Whales: The population of humpback whales (*Megaptera novaeangliae*) around Hawai'i was estimated to be between 4,500-6,500 in 2000. Whales migrate between subpolar Alaska and Hawai'i each year (Mobley et al 2001). The population growth rate between 1993 and 2000 is estimated to be seven percent indicating that the population is recovering from its dramatic reduction due to commercial whaling. It is worth noting that this is considered a high rate of increase for a mammalian species.

The highest densities of animals are found within the 100 fathom isobath. and seek refuge in shallow waters close to shore. Most humpbacks off Hawai'i are found north of Honokōhau in the waters of the Hawaiian Islands Humpback Whale National Marine Sanctuary. Nevertheless, they are commonly seen off Honokōhau in winter months. Humpbacks are not deep diving animals. Whales in Hawai'i typically dive to less than 100 feet, although occasional deeper dives are possible (Hamilton et al. 1997)The whales breed and give birth while in Hawai'i during the winter months, and migrate north to feed each spring.

~~Humpback whales found in Hawai'i's waters are part of a global population of Humpback whales that was reduced by over 250,000 individuals, or 90 percent, due to hunting (Johnson et al 1984). In 1966, the International Whaling Commission instituted a moratorium on all hunting of whales globally, and populations have begun to rebound. The North Pacific population of humpback whales, with a population of approximately 15,000 prior to hunting, is recovering from an estimated low of 1,000 individuals (Rice 1978, Johnson et al 1984). Humpback whales are also protected under the Federal Endangered Species Act. It is estimated that Hawai'i's population of Humpback whales is growing by 7% annually (Mobley et al 2001).~~

Congress designated the Hawaiian Islands Humpback Whale National Marine Sanctuary (HINMS) on November 4, 1992, and was followed by the Governor of Hawai'i's formal approval in 1997. The Sanctuary's purpose includes protecting humpback whales and their habitat within the Sanctuary, educating the public about the relationship of humpback whales to the Hawaiian Islands marine environment, managing the human uses of the Sanctuary, and providing for the identification of marine resources and ecosystems of national significance for possible inclusion in the Sanctuary. The sanctuary is approximately four nautical miles north of Honokōhau Harbor.

~~While waters surrounding the main Hawaiian islands constitute one of the world's most important North Pacific humpback whale habitats (Calambokidis et al. 1997), the Sanctuary actually encompasses five noncontiguous marine protected areas across the Main Hawaiian Islands, totaling 1370 square miles. Almost half of this area surrounds the islands of Maui, Lāna'i and Moloka'i. Smaller areas are designated on the North shore of Kaua'i, North and Southeast shores of O'ahu, and Hawai'i's Kona Coast. On Hawai'i's Kona Coast, the Sanctuary encompasses the entire northwest facing coast, consisting of submerged lands and waters seaward of the shoreline to the 100 fathom (183 meter) isobath from 'Upolu Point southward to Keāhole Point, which is approximately four nautical miles north of Honokōhau Harbor.~~

Whales have very sensitive hearing, so any loud underwater sound has ~~may have~~ the potential to disturb these animals. ~~Vessel collisions are also a concern with whales.~~ Playback experiments have estimated that humpback whales will respond to biologically meaningful sound at levels as low as 102 dB re 1 μPa, a level that is similar to background ambient noise (Frankel et al. 1995). Increases in vessel numbers will lead to an increase in noise from operating boats. However, even at its greatest predicted increase, the median sound level from active boats is not expected to raise sound levels to an intensity that would be considered an impact (Level B take) to marine mammal population (See Appendices T-2 and T-3). Humpback whale song ranges from 20 Hz to over 10,000 Hz, with most acoustic energy typically concentrated in the 100-1000 Hz range. This vocal production and the anatomy of their inner ear indicate that these animals are most sensitive to low-frequency sound (Ketten 1992).

Numerous studies have shown that human activity can affect humpback whale behavior, including vessel activity (Bauer 1986; Norris 1994; Corkeron 1995; McCauley et al. 1996; Scheidat et al. 2004), oceanographic research (Frankel and Clark 2000; Frankel and Clark 2002), and sonar (Miller et al. 2000; Fristrup et al. 2003). If the humpback whale population continues to expand at its present rate (8%/year) it can be expected that greater numbers of whales will extend into waters off the Kona Coast. This is likely to increase the demand for whale watching vessels from the new harbor and this increase will have a negative impact on the whale population expansion. The increase in both the number of vessels and number of whales increases the chance for collisions.

Vessel collisions are also a major concern. The majority of whale strikes occurred where whales and boats are most common, such as in ~~and boats watching are common as in~~ shallow waters between Lāna'i and Maui. In a recent study, ~~three of~~ ~~conducted by NMFS on 22 27~~ recorded whale-vessel collisions ~~strikes~~ in the main Hawaiian Islands, ~~only two were recorded~~ ~~occurred~~ off the Kona coast. (Lammers et al. 2003). That study also found that 14 of the 22 collisions were reported between 1995 and 2003. This observed increase may result from more awareness of the issue, or from the greater number of both whales and vessels in Hawaiian waters. In Hawai'i, data from 1972 to 1996 reveal at least six entanglements of humpback whales in commercial fishing equipment (Mazzuca et al. 1998). These data also indicate an increasing trend of entanglement since 1992 and a three-fold increase in death and entanglement occurrences related to human activity in 1996.

It is highly unlikely that humpback whales will approach to within the Level A or Level B impact "take" zones created by the explosive blasts of harbor construction. However, the sounds generated by these explosions will be within the frequency hearing range of humpback whales and could potentially be heard by whales between Kona and Maui. Modeling predicts that the maximum sound level two miles offshore the site is less than 150 dB re 1 μ Pa, which is less than the threshold for Level B impacts. As the explosions are planned to occur daily for up to 9 months, the cumulative impact of this noise must be considered if construction is anticipated when whales are expected in the area (December 15 – March 30). ~~In one instance, a fishing boat was pulling in a catch and was lifted by a whale. In the other instance, a whale was struck by a dive boat heading towards its diving spot.~~

Dolphins: A number of dolphin species are found in the waters near Honokōhau Harbor. Detailed information on all of these can be found in Appendix S. Spinner dolphins (*Stenella longirostris*) are regularly seen in shallow water and in close proximity to the project site. Spinner dolphins (*Stenella longirostris*), often inhabit waters within Honokōhau Bay and at times intentionally congregate near the harbor channel to take advantage by bow riding outgoing vessels. "Spinners" common name stems from their habit of leaping clear of the water and ~~twirling in the air.~~ They are the smallest dolphins typically seen in Hawai'i, with a mature size of 6 feet in length and 160 pounds.

Spinners school in pods of a few animals to 100- 180 or more, with pod sizes of 1-20 being most common (Östman-Lind et al. 2004). They and show community behavior when feeding in on mesopelagic fish, squid and shrimp in deep water at night, and rest in nearshore shallow waters during the day (Norris and Dohl 1980; Benoit-Bird et al. 2001). when they come near shore to play and rest. On the Island of Hawai'i, Kealakekua Bay is one location of almost daily spinner visits, but they frequent many other bays along the coast and regularly rest in Honokōhau Bay. There are seven primary resting areas along the Kona coast of Hawai'i, including Honokōhau Bay, where spinners are regularly seen near the harbor entrance (Östman-Lind et al. 2004). There is some evidence that the spinner dolphins may be resident to the area (Östman-Lind et al. 2004), making them more susceptible to repeated disturbance.

The hearing ability of spinner dolphins has not been measured. However, hearing of the related striped dolphin (*Stenella coeruleoalba*) was measured between 500 Hz and 160 kHz, with maximum sensitivity at 64 kHz (Kastelein et al. 2003). The hearing response of this single dolphin was less sensitive below 32 kHz than other dolphins. As all marine mammals have very sensitive hearing, any loud underwater sounds have the potential to disturb dolphins as well. Given the sporting habit of spinners and other dolphins of bow riding ships and small boat wakes, they are apparently not overtly impacted by vessel traffic noises.

Despite their limited sensitivity to low frequency sound, spinner dolphins have been shown to be impacted by human activity. Examples include interruption of resting activity and increases in the number of higher energy behaviors (Luna-Valiente and Bazúa-Durán 2006). Numerous studies describe changes in distribution (Haviland-Howell et al. in press) and short-term behavioral changes of dolphins in response to vessel traffic (Bejder et al. 1999; Scarpaci et al. 2000; Gregory and Rowden 2001; Nowacek et al. 2001; Van Parijs and Corkeron 2001; Ritter 2002; Lusseau 2003; Ng and Leung 2003). However, it has been established that for at least one population of bottlenose dolphins, these repeated short-term effects translate into long-term detrimental effects on the affected population (Bejder et al. 2006a; Bejder et al. 2006b).

In Hawai'i, some entanglements of spinner dolphins have been observed (Nitta and Henderson 1993; Rickards et al. 2001) but no estimate of annual human-caused mortality and serious injury is available. A habitat issue of increasing concern is the potential effect of swim-with-dolphin programs and other tourism activities focused on spinner dolphins around the main Hawaiian Islands (Östman-Lind et al. 2004).

Hawaiian Monk Seals: Endangered Hawaiian Monk Seals (*Monachus schauinslandi*, Hawaiian Name: 'Ilio holo I ka uaua) are on the endangered species list. They are rare, but not unknown along the Kona Coast. Fortunately, monk seals are air breathing and spend the majority of their time above water where they are easily observed. If a monk seal is reported observed in the area, Kona Kai Ola would work with relevant agencies to protect the seal. Most monk seals are found in the Northwest Hawaiian Islands, but recent aerial surveys estimated that there are 52 seals in the main Hawaiian Islands (Baker and Johanos 2004). There have been 13 sightings between 2003 and 2006 in the vicinity of Kaloko-Honokōhau National Historical Park (NOAA protected species division data) indicating regular, albeit low-level use of these areas by monk seals. One Two birth on the Island of Hawai'i has been reported (Baker and Johanos 2004).

The best population estimates for Hawaiian monk seals (as of 2003) was 1,244 (Carretta et al. 2004). However the population is currently showing a decline that has been continuing since the 1950s (Antonelis et al. 2006).

Underwater hearing in the Hawaiian monk seal has been measured between 300 Hz to 40 kHz. Their most sensitive hearing is at 12 to 28 kHz, which is a narrower range compared to other phocids. Above 30 kHz, their hearing sensitivity drops markedly (Thomas et al. 1990).

Monk seals are very intolerant of human activity and are easily disturbed. When the U.S. military inhabited Sand Island and the Midway Islands and Kure Atoll, the monk seals disappeared until after the military left. Monk seals prefer to be solitary animals (Reeves et al., 2002).

Sea Turtles: Five species of sea turtles are known to frequent Hawaiian waters, with Hawaiian green sea turtles (*Chelonia mydas*) by far the most abundant at 97% of the total numbers, hawksbill turtles (*Eretmochelys imbricata*, 1.7% of total), olive ridley turtles (*Lepidochelys olivacea*, 0.8%), and occasional sightings of leatherback (*Dermochelys coriacea*) and loggerhead sea turtles (*Caretta caretta*, Chaloupka, et al, 2006, from stranding reports). Green sea turtles are the most plentiful large marine herbivore in the world and have experienced a very successful population recovery in Hawaiian waters since 1974 when harvest was outlawed in Hawai'i, and 1978 when they became protected under the Endangered Species Act (Balazs, et al. 2004). Both green sea turtles and hawksbills are known to breed and nest on beaches within the main Hawaiian Islands, and have a 25-30 year generation time with a life span of 60-70 years (Balazs et al 2004). Total population numbers of green sea turtles in the Hawaiian archipelago have not been estimated, but the population has at least tripled since the 1970s and may now be approaching the carrying capacity of the islands (Chaloupka, et al. 2006).

Bartol et al. (1999) measured the hearing of juvenile loggerhead sea turtles using auditory evoked potentials to low-frequency tone bursts found the range of hearing to be from at least 250 to 750 Hz. The frequency range that was presented to the turtles was from 250 Hz to 1000 Hz (Bartol et al. 1999).

Most recently, Bartol and Ketten (2006) used auditory evoked potentials to determine the hearing capabilities of subadult green sea turtles and juvenile Kemp's ridleys. Subadult Hawaiian green sea turtles detected frequencies between 100 and 500 Hz, with their most sensitive hearing between 200 and 400 Hz. However, two juvenile green turtles tested in Maryland had a slightly expanded range of hearing when compared to the subadult greens tested in Hawai'i. These juveniles responded to sounds ranging from 100 to 800 Hz, with their most sensitive hearing range from 600 to 700 Hz. The two juvenile Kemp's ridleys had a more restricted range (100 to 500 Hz) with their most sensitive hearing falling between 100 and 200 Hz (Bartol and Ketten 2006).

Adult Green turtles are primarily herbivorous often seen on reefs as deep as 100+ feet but much more common in shallower waters. Foraging behavior of green turtles is well documented and in Hawai'i is typically characterized by numerous short dives (4 to 8 min) in shallow water (typically less than 3 m) with short surface intervals (less than 5 sec) (Rice et al. 1999). Resting periods are characterized by longer dives (over 20 min) in deeper water (4 to 40 m) with surface intervals averaging 2.8 min (Rice et al. 1999). The amount of time that turtles spend foraging versus resting is still largely unknown. Green turtles in Hawai'i frequently use small caves and crevices in the sides of reefs as resting areas, and spend significant amounts of time on the tops of reefs (Balazs et al. 1987). Green turtles are known to be resident in Kiholo Bay, Hawai'i (Balazs et al. 2000), and presumably other areas as well, potentially increasing their susceptibility to vessel collision and/or repeated disturbance. Two turtle "cleaning stations" have been reported near the mouth of Honokōhau Harbor. During periods of calm water green sea turtles are often seen over very shallow reef flats where the choicest of algae are to be found. While some turtles may "rest" upon the surface, it is much more common to find them in small caves or wedged between coral heads where they are less subject to shark attacks. Green sea turtles may occasionally be seen far at sea (they nest in French Frigate Shoals in the NW Hawaiian Islands), but they are much more prevalent over the shallow shoreline areas where they forage for food.

Vessel collisions and potential noise impacts are a concern with regard to turtles. In a study of 3,861 turtle strandings in the main Hawaiian Islands from 1982 – 2003 (Chaloupka, et al. 2006), boat strikes accounted for only about 2.7 percent of the cases and were almost always fatal (95 percent). Entanglement in gill nets accounted for about six percent of strandings and also had a high rate of mortality (75 percent). Hook and line entanglement (seven percent of strandings) was much less likely to result in the death of the turtle (52 percent mortality). At least 20 green sea turtles have stranded in Honokōhau Harbor or along the boundaries of Kaloko- Honokōhau National Historical Park. Of all 3,861 strandings recorded in the Main Hawaiian Islands since 1982 only three occurred within 10 miles north or south of Honokōhau Harbor (Balazs, personal communication from NMFS database).

Recent increases in longline fisheries may be a serious source of mortality. Greens comprised 14% of the annual observed take of all species of turtles by the Hawai'i-based longline fishery between 1990 to 1994 (NMFS 1998a). Over the period of 1994 to 1999, it was estimated that an annual average of 40 green sea turtles were caught by the Hawai'i-based longline fishery (McCracken 2000).

Recent proliferation of a tumorous disease known as fibropapillomatosis (Herbst 1994) may reverse improvements in the status of the Hawaiian stock (NMFS 1998a), although recent modeling suggests that population levels continue to increase despite the disease (Chaloupka and Balazs 2005). The disease is characterized by grayish tumors of various sizes, particularly in the axial regions of the flippers and around the eyes. This debilitating condition can be fatal and neither a cause nor a cure has been identified.

Hawksbill turtles (*Eretmochelys imbricate*) are observed less often than green sea turtles near Honokōhau. About 20-30 female hawksbills nest annually in the Main Hawaiian Islands (NMFS 1998b). In 20 years of netting and hand-capturing turtles at numerous nearshore sites in Hawai'i, only eight hawksbills (all immatures) have been encountered at capture sites including Kiholo Bay and Ka'u (Hawai'i), Palo'ou (Moloka'i) and Makaha (O'ahu) (NMFS 1998b). It was only recently discovered that hawksbills appear to be specialist sponge carnivores (Meylan 1988). Previously they had been classified as opportunistic feeders on a wide variety of marine invertebrates and algae.

Increasing human populations and the concurrent destruction of habitat are also a major concern for the Pacific hawksbill populations (NMFS 1998b). Hawksbill turtles appear to be rarely caught in pelagic fisheries (McCracken, 2000). However, incidental catches of hawksbill turtles in Hawai'i do occur, primarily in nearshore gillnets (NMFS 1998b). The primary threats to hawksbills in Hawai'i are increased human presence, beach erosion and nest predation (e.g., by mongooses) (NMFS 1998b).

3.9.5.23.9.4.2 Anticipated Impacts and Recommended-Proposed Mitigation

A complete analysis of the in-air and in-water potential acoustic impacts from the construction of the Kona Kai Ola small boat harbor was completed by Marine Acoustics, Inc.(MAI) and is included in this document as Appendix T-3. In conducting this analysis, the best available scientific, environmental, geologic, and meteorological data were obtained and used to calculate the acoustic transmission loss (TL) and subsequently to predict the received levels (RLs) at the five receiver sites. State of the art acoustic propagation models were employed in this analysis to determine in-air and in-water TL. MAI used the Acoustic Integration Model[®] (AIM[®]) to assess the impact of the predicted acoustic sound field on the species of marine mammals that could conceivably occur near the Kona Kai Ola project site.

The conclusion of that report determined that the criteria for Level A impacts to marine mammals for either in-air or in-water conditions at the receiver sites were never exceeded for the model source and receiver locations for non-blasting activities. However, these thresholds could be exceeded by the explosive blasting used to create the new harbor. For both in-air or in-water acoustic propagation, this only occurred when an animal was within about 200 meters (656 ft) of the explosion. This condition could only occur when the explosive source was at locations farthest north in the new harbor and closest to the existing harbor. This condition mandates that a safety range out to at least 200 meters (656 ft) of the source be shown to be clear of all marine mammals and sea turtle prior to each blast to preclude potential Level A takes.

The MAI report indicated that the in-air RLs for the explosive sources would exceed the assumed 100 dBA threshold for Level B harassment of pinnipeds (seals) for ranges out to about 0.4 nm (i.e., 800 yds [731 m]). This threshold is nominally for pinnipeds, but it should be extended to surface resting marine mammals and basking or beached sea turtles. Therefore, an in-air safety buffer of at least 731m from any explosive source is proposed, that should be maintained and found clear of marine mammals and basking or beached sea turtles prior to any blasts. It should be noted that although a receiver site was not modeled specifically in the existing harbor, that area is often within the range of this safety buffer and that extra care should be taken to ensure that no marine mammals or sea turtle are in the existing harbor prior to any blast. Analysis of the most restrictive Level B in-water explosive threshold shows that it is only exceeded when an animal is closer than 300 m (984 ft) from the explosive source.

Although the possibility exists for Level B impacts to marine mammals, based purely on the sound fields produced by the explosive blasts, analysis of the marine mammal distribution and movement as predicted by the AIM model, indicates that this is very unlikely situation. Therefore, it is expected that there will be much less than 0.5 Level B takes, with or without mitigation. But the mitigation safety buffer must still be enforced to preclude the unlikely possibility of marine mammals or sea turtle being near the explosive sources when they are used.

It should be recognized that several mitigation measures are already built into the proposed project. For example, the proposed practice to maintain a rock "dam" separating the construction site from the existing harbor reduces acoustic energy propagating to area potentially containing marine mammals or sea turtles. Also, this dam precludes animals from entering the construction area. This dam or land-bridge will be in place for all drilling and dredging activities, except for the removal of the land bridge itself.

Several other possible methods of mitigation are available to the Kona Kai Ola project, and feasibility, practicality, and benefit will be discussed with the National Marine Fisheries Service (NMFS) during consultation, and may be implemented subsequent to that consultation. The first possible mitigation technique is to acoustically monitor the potentially impacted areas during construction to: a) assess the accuracy of the modeling and b) to interact proactively with construction personnel to ensure that the identified threshold levels are not exceeded. Although the best available science and data was used to model the acoustics of the area, numerous conservative assumptions needed to be built into the modeling. By monitoring the actual levels received, in-situ corrections/updates to modeled parameters could potentially reduce the built-in conservativeness and reduce the potentially impacted areas. For example, the modeling assumes that all of the small voids in the bedrock are water-filled and therefore impart minimum attenuation on the acoustic signal as it propagates through. If even a small percentage of the voids are gas-filled, this attenuation would increase greatly and the impacted area would be reduced.

Another possible mitigation technique would be to augment the land-based visual observer, who it is assumed would verify that the area was clear the animals, with boat-based observers. This would increase the effectiveness of recognizing the presence of marine mammals and sea turtles in the potentially affected areas.

Additionally, interactions with the construction teams to alter the blasting methods modeled could potentially mitigate and reduce acoustic impacts to marine animals. A blasting expert will be consulted to develop a discontinuous non-linear blasting plan that will optimize cancellation of the explosion pressure wave into the marine environment. Examples of possible changes include: reducing charge size, reducing the depth drilled and blasted during any blast, reducing the number of blast holes or the volume of each blast, etc. The combination of these techniques with acoustic monitoring could potentially allow a large portion of the northern third of the harbor to be excavated with little or no potential impact to marine animals.

Interactions with NMFS during the consultation period will be used to examine these or any other techniques which may be identified. Also, the project is requesting help in identifying any possible method known to NMFS to establish and maintain turtle exclusion areas, especially in the existing harbor, without harassing the turtles. It may become apparent during those consultations that even with the identified buffer zones and mitigation techniques that an Incidental Harassment Authorization (IHA) is required, especially for the northern third of the proposed harbor.

Marine Acoustics, Inc. also completed a study of the expected ambient noise levels in Honokōhau Bay as a result of the increased vessel traffic from the expanded harbor. This report is included in this document as Appendix T-2. That report concluded that the average maximum daytime ambient noise levels would be expected to increase about 9.7 dB across the frequency spectrum from 100 Hz – 2 kHz, with the quadrupling of the vessels using the expanded harbor (i.e., the proposed action). Although significant, this increase would occur primarily during daylight hours, and the predicted median ambient noise would still be below 100 dB for all frequencies. The other significant factor is that there will be a quadrupling of the number of localized (i.e., small) individual sound fields in the area. These sound fields surround the individual boat that are contributing to the overall ambient noise. Noise levels in excess of 120 dB extend out to about 550 m (1804 ft) from these boats, with even high levels at closer ranges. Short of actual collisions with animals, Level A impacts are unlikely for noise levels typically generated by small boats. The Level B threshold nominally extends to approximately ten meters around each boat (depending on equipment such as size of motor, conditions of propeller and other equipment). Therefore potential Level B impacts to marine mammals and sea turtles would only occur within this range. Therefore, the chance for potential Level B impacts is small.

Completion of the harbor expansion project will increase the vessel traffic crossing the Hawaiian Islands Humpback Whale National Marine Sanctuary, the southern boundary of which is approximately four nautical miles north of Honokōhau Harbor. At a time when the whale population is growing, an increase of vessel traffic may increase the likelihood of vessel-whale collisions. Related to vessel traffic, an increase in whale watching activities is also likely. Vessels participating in these activities directly seek out higher whale population densities, increasing the likelihood of collisions, but also having the potential for disrupting whale behaviors such as resting, courting, mating or birthing.

As noted earlier, however, of the ~~27-22~~ recorded whale strikes in the main Hawaiian Islands, only ~~two~~ three were recorded off the Kona coast. Sanctuary managers may need to implement additional regulations for private and/or commercial activities directly involving whale encounters. Mariner education programs, already in place as part of Sanctuary operations, will help to mitigate possible impacts due to increased boaters, and the proposed marine science center will complement Sanctuary educational programs.

~~Impacts to turtles may occur during construction of the marina. Since most of the marina will be excavated in a land-locked condition, turtles will not be subject to any potential harm from excavation. Experience during construction of the Ko Olina lagoons, and the expansion of the Barber's Point Harbor on O'ahu indicate that turtles abandoned their offshore (30-100 ft depth) resting habitats and concentrated in very near shore waters adjacent to the harbor and, at times, even within the active construction areas as soon as blasting and excavation began. Although no turtle injuries or mortalities were reported during either of those harbor construction activities, this should serve as a cautionary example for future coastal construction activities.~~

An increased level of impacts to turtles from increased boating and fishing activities may occur. ~~The level of impact documented by National Marine Fisheries Service is limited to only three turtle mortalities confirmed, since 1982, from a total of 3,861 strandings throughout the Main Hawaiian Islands. Of the 3,861 turtle strandings recorded from the Main Hawaiian Islands since 1982, 75% were mortalities, and of these about 4% (~est. 116, from Figure 3 of Chaloupka, et.al.) were from boat strikes and 3 of these occurred within 10 miles of Honokōhau Harbor. Data from NPS staff at the adjacent Kaloko-Honokōhau National Historical Park show a total of 20 strandings within the parking (19) and harbor (1) between 2000 and 2006 with one attributed to boat strike and 6 to fishing gear entanglement. Eleven additional gear entanglements and one additional boat strike were also recorded but not listed as strandings. Human caused impacts from fishing and boat strikes are anticipated to increase as turtle populations continue to increase and boating /fishing activities increase with the expanding harbor.~~

~~It would appear that anthropomorphic impact to turtles from boat strikes and fishing activities is very low along the Kona Coast adjacent to the existing harbor. It is likely that this is due in part to the relatively steep ocean bottom that limits the habitat of the turtles to the very nearshore areas away from the areas of heavy boat traffic. Recognition by the general public that sea turtles are protected also puts a heavy social pressure on fishermen who may inadvertently catch a sea turtle, and is likely a factor in the recovery of this species. Although no adverse impacts to turtles have been documented within the existing harbor, the close proximity of boats and turtles in this environment is cause for concern.~~

~~During land-based construction of the marina, no mitigation is necessary as previous experience has shown that turtles are not adversely impacted by these activities. Once the land bridge is open, however, it is highly likely that turtles will be attracted into the new harbor and be subject to potential harm from in-water construction of piers or other facilities. During this period of time and until the harbor is operational, it is recommended that a mesh barrier will be ~~is~~ erected across the new harbor channel to exclude turtles from the inner basin. The mesh size needs to be selected in consultation with ~~regulatory~~ NMFS agencies to make sure it does not entangle turtles.~~

As the new harbor area will ~~likely~~possibly attract turtles to the basin (similar to the existing harbor) and an increase in boat traffic is expected in the harbor channel there will be an increased possibility of turtle strikes within the channel and new harbor area. To minimize this possibility it is ~~recommended~~proposed that educational signs be erected around the harbor describing the turtles and warning boaters to be cautious while traversing harbor channels. The slow no-wake lane in the entrance channel should also be strictly enforced and the State should consider extending the slow no-wake zone further out to the first green buoy.

~~As all marine mammals have very sensitive hearing, any loud underwater sounds have the potential to disturb these creatures. Potential underwater acoustics may impact marine mammals and sea turtles during construction activities, such as blasting and pile driving. Appendix Q contains a study of underwater noise impacts during the construction and operation of the proposed project.~~

~~To mitigate impacts related to noise generated by construction activities, such as blasting and pile driving, a program to monitor sound levels and the presence of marine mammals and sea turtles will be implemented. Construction activities will be adjusted if whales, monk seals, dolphins or sea turtles are in the vicinity. Further, keeping the land bridge closed to the ocean until all major pile driving and blasting are completed will further avoid adverse impacts.~~

~~Increased boat traffic will result in increased low intensity sounds in the harbor area and along transit routes. The ecological role played by anthropomorphic sound in the marine environment has recently received heightened awareness. Evidence from declassified Department of Defense ocean recordings off of San Diego show that background sound levels off shore of the harbor have increased approximately ten-fold in 30 years. Much of this increase in sound level has been ascribed to large ship traffic. While intense sound levels can adversely impact marine mammals and potentially other species, this level of sound pressure has not been shown to be produced by the small boats envisioned to occupy the new marina.~~

~~Adverse impacts of lower intensity noise, such as from small boat engines, have been very difficult to quantify. No definitive information is available to determine the level of impact produced by increase in small boat generated noise on fish, marine mammals and sea turtles. Given the sporting habit of spinners and other dolphins of bow-riding ships and small boat wakes, they are apparently not overtly impacted by vessel traffic noises.~~

~~However, boat generated noises can be reduced by slowing boats to “slow no wake” in the main traffic lane of the entrance channel. The State could also consider extending the “slow no wake” lane out to the first green buoy. Appropriate signage to enforce these requirements is recommended.~~

3.9.63.9.5 Ciguatera

Ciguatera fish poisoning can occur in tropical fisheries around the world and is endemic in Hawai'i. The toxin is generated by a microscopic marine dinoflagellate, *Gambierdiscus toxicus*, often found growing on the surfaces of red or brown algae. Herbivorous fish eat the algae and the toxin accumulates in the flesh. The toxin bio-accumulates up the food chain so that high level reef predators, such as jacks (Ulua, *Caranx sp.*) or barracuda (kaku, *Syphraena barracuda*) may contain elevated concentrations of toxin that are potentially disease causing when consumed by humans. Because the toxin also accumulates in humans (primarily in fat tissues), the dosage required to elicit symptoms may also vary significantly between individuals. Occasions have been documented where multiple individuals eat similar portions of a toxic fish, but only one or a few of the individuals get sick with the others being completely asymptomatic.

Symptoms vary between individuals, but are generally flu-like including nausea, weakness, aches and pains, and on occasion temperature reversal where cold items feel hot and hot items feel cold to the touch. Symptoms typically last for days to weeks, may persist for up to a year, and are rarely fatal.

The causative dinoflagellate can almost always be found in tropical marine environments in low numbers. Disease outbreaks have been correlated with environmental changes that may cause perturbations in the population balance of algae over a section of reef or coastline. Outbreaks of ciguatera have been documented following large scale coastal construction projects (including harbor construction) and hurricanes (Banner, 1976, Randall 1958 and Raymond 1994). Such perturbations may lead to an imbalance causing certain populations of algae to bloom, but do not necessarily lead to outbreaks of ciguatera. If dinoflagellate populations bloom, then there is increased probability that toxins will accumulate in fish populations and begin to cause disease in fish consumers.

Anticipated Impacts and Mitigation Measures

The potential for a bloom of the ciguatera causing dinoflagellate associated with coastal construction is always a concern in tropical waters. Although there does appear to be a correlation between coastal construction activities and blooms of the causative dinoflagellate, the correlation is far from conclusionary and the ecological mechanisms leading to bloom conditions are not clear. Because the mechanism is not understood it can not be controlled. Therefore the only mitigation possible is to conduct monitoring and make appropriate public health announcements should a bloom occur. Monitoring for the causative dinoflagellate should be conducted for a minimum of two years: 1 year prior to construction (to create a known baseline) and 1 year after population levels have fallen to pre-construction levels.

~~To protect public safety it is important that the population of ciguatera causing dinoflagellates is monitored before construction to provide a baseline and then monthly for up to one year following construction until pre-construction population levels are achieved. If dinoflagellate population levels bloom, then it may be necessary to also monitor local food fish species and post warnings if potentially toxic levels of ciguatera poison are detected.~~

3.9.73.9.6 SWAC Facility

Air conditioning for the Kona Kai Ola development may be provided by a system utilizing deep, cold ocean water for cooling or Seawater Air Conditioning (SWAC). SWAC would significantly reduce energy consumption requirements, and is being considered in keeping with the sustainability goals of the overall Kona Kai Ola project. If SWAC is not implemented, then conventional air conditioning systems will be used.

Oceanit completed a Cooling Water Intake Analysis as part of the proposed SWAC facility at Kona Kai Ola. Since the intake pipe will draw water from the ocean, its features and impacts were analyzed. Comparisons were also made with the Natural Energy Laboratory of Hawai'i Authority (NELHA) located north of Kona Kai Ola at Keāhole Point. The Cooling Water Intake Analysis is contained in Appendix KJ.

Under the current concept plan, the SWAC system would draw 10 to 20 million gallons per day of deep ocean water for use in the air conditioning system. Water sufficiently cold for this purpose is available relatively close to the shoreline at approximately 3,000 feet of water depth at 11,000 feet off shore. The depth of 3,000 feet for the cooling water intake was used to maximize the temperature difference and minimize pumping costs. At a higher cold water temperature, the volume of water increases significantly. This requires larger intake pipes, pumps, heat exchangers, and disposal facilities with higher operational cost. Final selection of the depth and temperature will be determined in the design of the system.

A description of the proposed SWAC facility for Kona Kai Ola includes:

- A 36 inch pipe would draw ocean water of an ideal temperature (40-42° F) from the ocean and to the SWAC facility.
- Water would then circulate through the cooling system at 44°-45° F.
- 20,000 gallons per minute (gpm) would constitute peak flow.
- Average flow would be around 7,500 gpm.
- After 16-18 "nodes" circulate cooling water through the Kona Kai Ola development, the water would be discharged through a pipe into a proposed injection well system.
- While the total square footage served by SWAC is not confirmed, it is anticipated that it will service most of the development and/or approximately 6 million sq. ft.

As part of any SWAC proposal, a Conservation District Use Permit (CDUP) would need to be approved through the DLNR's Office of Conservation and Coastal Lands (OCCL). The application for this permit requires 30 percent design completion of the actual system.

Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

In initial plans, the flow was to be directed to the mauka end of the lagoon water feature, where it would flow through the lagoons, to the new marina and finally out the existing harbor channel. The SWAC discharge, being equally saline but cooler than coastal waters, would be more dense and flow along the bottom delivering its high nutrient load directly to the benthic substrate and coral reefs.

In this scenario, a possible environmental impact would have resulted in which the existing extensive coral reef areas in the vicinity of the harbor mouth would have been exposed to high nutrient water, with resultant overgrowth by macroalgae and loss of coral reefs and habitat. In addition, the discharge of nutrient-rich seawater into the shallow, well-lit lagoon would have created ideal culture conditions for uncontrolled macroalgal growth. Attached macroalgae, would rapidly grow to uncontrollable densities.

The water taken from approximately 3,000 foot depth (depth of 40° F isotherm) will contain about 500 $\mu\text{g/l}$ nitrate-nitrogen. The result would be a discharge of approximately 54 kg/day (120 pound/day, 43 tons/year) of nitrate-nitrogen, the most readily-usable form of nitrogen fertilizer, to the coastal marine environment. This plan would have introduced unacceptably high levels of nutrients to the nearshore water.

The initial plan has therefore been revised and the effluent water will be either directed to deep wells or to facilities where secondary use of this resource will occur. Since deep ocean water is high in nutrients, cold and low in pathogens, it is ideal for mariculture. Use of this resource for mariculture before discharging into the environment will reduce the negative impacts and provide an economic return for Kona Kai Ola. It is therefore ~~recommended~~ proposed that secondary uses be explored, including aquaculture, water bottling, or other uses with the resultant effluent again being re-entered to a deep underground dispersion well.

The design of the SWAC shall mitigate possible impacts through the prevention of the introduction of high nutrient deep seawater directly into the seawater lagoons, marina, or shallow nearshore coastal waters.

At a 3,000 foot depth, only deep dwelling marine fauna could possibly be impacted by pipe suction. To mitigate possible impacts, the ocean end of the intake pipe shall be fitted with a diffuser to dissipate the suction force of water into the pipe to prevent any fouling by rays or other fauna. The diffuser will be designed at 3,000 foot depth and a diffuser or other acceptable inlet structure will be designed to prevent accidental impacts to marine fauna.

4 Assessment of Existing Human Environment

4.1 Cultural Resources

Under Act 50, the Hawai'i Legislature finds that native Hawaiian culture plays a vital role in preserving and advancing the unique quality of life in Hawai'i. Articles IX and XII of the state constitution, other state laws, and the courts of the State impose on government agencies a duty to promote and protect cultural beliefs, practices, and resources of native Hawaiians as well as other ethnic groups. One of the purposes of the Act is to require that environmental impact statements include the disclosure of the effects of a proposed action on the cultural practices of the community and State.

Two Cultural Impact Assessments, or CIAs, are referenced for this project area. The studies encompass the Kealakehe ahupua'a and surrounding area, and are not parcel-specific. Combining these studies in the analysis provides a comprehensive view of the cultural significance of the project site. The CIAs are contained in ~~Appendices~~ KL-1 and L-2.

Dr. Taupouri Tangarō completed the most recent CIA for the project site and surrounding area. A previous CIA was completed for the area by Pualani Kanaka'ole Kanahale in 2001 as part of a previous development plan for the DHHL parcel. The DEIS for the DHHL project was not published, and the project did not proceed. Concurrence has been granted by DHHL to discuss and include the 2001 CIA in this ~~DEIS~~FEIS.

Both studies involved a review of maps, archival documents, historical materials, pre-historical literature in chant and narrative form, walking and diving the area in search of cultural sites, and a review of water quality, flora, and fauna, and oral history.

Prior to the initiation of his CIA, Dr. Tangarō met on the site with cultural practitioner Māhealani Pai, and Hawaiian research specialist Ku'uilei Kanahale to conduct a paeaea, which is a ceremony that "introduces who we are to the living systems of Kealakehe, Keahuolū and their contiguous ahupua'a, as well as to the mountain tops of Mauna Kea, Mauna Loa, Hualālai, inclusive of Ka Moana Nui A Kanaloa, the ocean".

4.1.1 Background

The Kealakehe ahupua'a is one of twenty-three ancient ahupua'a within the 'okana of Kekahawai'ole. It is bounded by Honokōhauiki ahupua'a to the north and Keahuolū ahupua'a to the south. Kealekehe ahupua'a extends mauka to the Honua'ula Forest. The ahupua'a from Kalaoa (Keāhole Point) to Kealakehe were known as "Kekaha-wai-'ole-o-na-Kona" or the hot, dry, waterless shores of Kona. Despite the reputation of this land, the natives of Kekaha-wai-'ole had great knowledge of their land's cycles and its productive abilities. Here were springs and brackish water ponds inland from the shore and the ocean was abundant. They planted in the mauka, or upland, forest where there was sufficient rain for their crops. When the rainy season passed, they camped at the shore, grew sweet potato, and fished. (Kanahale 2001)

The translation of Kealakehe is interpreted in two ways: 1) Kealakehe, with the emphasis on the last syllable, translates as "the pathway of graves"; 2) Kealake'e, with an 'okina replacing the "h," is the more popular definition, which means "winding path." There is no definition for Kealakehe as it is spelled today, however, according to the Hawaiian language dictionary, the last two syllables, "kehe," is considered a spelling variation of "ke'e" and vice versa. (Kanahele 2001)

4.1.2 Assessment

There are elements of the physical landscape within the vicinity of the project site of cultural significance.

- **Maliu Point.** Maliu Point separates Kealakehe and Honokōhauiki. Two generations ago Maliu referred to a rock located at the point; the point itself was known as Pu'uoina, a name that has since disappeared. The little bay on the south end of Maliu housed a shark hole and was known as Hale Manu. A structure at Maliu was known as Hale Mono (north side of Honokōhau Harbor entrance) and may have been a female heiau, although little is known about the site.
- **'Alula Bay.** South of Honokōhau Harbor is a white sand beach known in chants and stories as 'Alula. In Emerson's map of 1888, 'Alula was a canoe and small boat landing. According to some interviewees, the original name for the beach was 'Aulaula, which describes the broad current of the bay. 'Alula is susceptible to an inundation of northwest swells, which travel far inland. There is an 'ōpelu koa or 'ōpelu fishing ground in the bay. Kupuna and hula halau from the neighboring region also use 'Alula beach regularly for the cultural practices of a cleansing ceremony called "hiu wai."
- **Freshwater Pond.** One of the references cites the freshwater pond mauka of 'Alula as the 'Aiopio pond. The term "freshwater" refers to water that is drinkable. Modern terminology refers to these ponds as "brackish" because they are mixed with small amounts of seawater.

However, the 'Aiopio fishpond as we know it today is located in Honokōhauiki. Most kama'āina of Kona do not recollect the name for that particular pond mauka of 'Alula. The 'Aiopio pond is a known habitat for 'ōpae'ula, or red shrimp, used as bait for 'ōpelu. All of the anchialine ~~ponds~~ pools of the Kona coast had an abundant amount of 'ōpae'ula readily available for 'ōpelu fishing. 'Ōpae'ula ponds have deteriorated as 'ōpae'ula loses its popularity with 'ōpelu fisherman. As it has become more of a chore to clean the ponds, contemporary fishermen prefer to use bread. The fishermen at south Kona still use 'ōpae'ula and pumpkin. The pond mauka of 'Alula has exotic fish, including topminnows, which means that the 'ōpae'ula population has been minimized tremendously.

- **Makaopio (Hale o Lono).** Makaopio (Hale o Lono) is one of the most important man-made cultural structures in Kealekehe as a reminder of the cycles of creation and procreation involving humans, ocean and land, and flora and fauna. Makaopio (Hale o Lono) heiau was built in a brackish water pond on the northern shore of 'Alula Bay. Makaopio (Hale o Lono) was built to evoke the god Lono during makahiki season for abundant rain, greenery, and enough fresh water to last through the next heavy rain season. ~~Makaopio (Hale o Lono) is one of the most important man-made cultural structures in Kealekehe as a reminder of the cycles of creation and procreation involving humans, ocean and land, and flora and fauna.~~ Although it is protected from the high surf by a low outcrop of rocks, because of age and neglect, the heiau has lost some of its major setting stones and the possibility of repairing the damage is unlikely.
- **Hale o Kane.** A heiau on the bluff south of 'Alula. Kane is the major deity of Hawaiian wholeness and health. Kanahale (2001) notes that no one she talked to could provide the name or the function of these structures.
- **Ka Lae of Kaiwi.** Kaiwi is the point on the boundary of Kealakehe and Keahuolū. According to fishermen of the area:

Kaiwi Point houses a mamamo ko'a. Kaiwi has an intriguing story connected with Ka Miki. In this ka'ao, Kaiwi is a shark and Kalualapuila is the Kahuna of Kealakehe. Kaiwi and Kaluapuila are the same entity. Eventually the grandmother of Ka Miki, Kauluhenuihikolo, discovers this dual identity when the shark becomes a man-eater and plans to destroy him. Kaiwi -Kalualapuila are both destroyed when the grandmother teaches her grandchildren to call up the fires of Pele to rid the land of this man eating shark. Hi'ikanoholae, known today as Ka Lae Keahuolū, was the boundary direction for the lava flow. The protocol for lava is that a course of flow is given and Hi'ikanoholae is the southern limit for the flow. The flow did exactly what it was asked to do with Kaiwi and the characteristic of a Hi'ikaikaiealei and Hi'ikaikaiealemoe flow is seen at Kaiwi Point.

- **Trail System.** The project site has remnants of a trail system that indicates the passing through of pedestrians from one major site to another. The maps show evidence of the trail coming from Lanihau and heading towards the ponds of Honokōhauiki. Trails were the bloodline from one kūlanakauhale (village) to the next, and usually revealed the rest stops, popular villages, water locations, fanning mounds, etc. The trail remnants at the project site, however, do not reveal any of these types of sites. It is noted that the Ala Kahakai National Historic Trail is a system that is currently being developed. This system comprises any historic coastal trail, or connecting mauka and makai trails, along with the addition of new trails to connect these historic trails. As discussed in Section 4.2.1.2, the archaeological survey detected no evidence of historic trails that may be included in Ala Kahakai National Historic Trail system, although this is not unexpected, given the stretches of sand and bare pahoehoe lava that are easily traversed on foot and marked by shoreline.
- **Ahu.** The largest cultural structures found on the site are the ahu (small rock cairns). An ahu was constructed to mark a boundary, bring attention to a location, to place offerings to an occupational deity, to collect water, or to place articles to be kept for a later return. An intact ahu is located towards the ~~makaivest~~ boundary of the site. Other ahu sites were not as well preserved and were at different stages of deterioration.

- **Kealakahē, Burials.** During site visits, an empty open vault which had familiar burial patterns was located. However, the ahu at this site did not correlate with burial practices. For specific burial site descriptions, see Section 4.2.
- **Hualālai Ka Heke Ao Na Kona.** Mauna Kea, Mauna Loa, and Hualālai are the three prominent volcanic mountains of Hawai'i Island, and because of their contribution to the water cycles and aquifers, they have entered indelibly into the fabric of Hawaiian consciousness, especially where the land is dry and parched. Mt. Hualālai is a prominent feature of North and South Kona and is a phrase famed in song and chant. The word heke also means the “triangular sails on canoes,” associating the function of a canoe sail to that of the mountain which captures and directs moisture to the slopes of the Kona districts.

4.1.2.1 Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

In interviews, one of the greatest areas of cultural concern was potential impacts to water quality as related to fishing grounds and ponds. It was noted that population growth and urbanization in general generate similar impacts. Further studies conducted in response to DEIS comments (Appendix H-2 and Appendix G-3) indicate that the remaining ponds may not change to high salinity levels unhealthy to anchialine fauna, like the native shrimp. In addition, these studies describe realistic mechanisms employed elsewhere that would likely mitigate change due to groundwater salinity changes. These mitigation measures are further discussed in Section 3.9.2.

The need to revive mauka – makai trails was expressed, as well as the need to protect cultural and archaeological sites. The Ala Kahakai National Historic Trail is a system that is currently being developed to include any historic coastal trail, or connecting mauka and makai trails, along with the addition of new trails to connect these historic trails. The mission of the National Historic Trail is to preserve in place ancient and historic trails and routes. While most of the remnant trails are partial segments of a possible historic network, there are no intact substantial segments. The project seeks to add new trails to connect any remnants from historic trails to provide a coastal trail system along the shoreline park and around the marina basins. This trail system is consistent with the goals and objectives of the Ala Kahakai National Historic Trail, and would be appropriate to be included in that system. The project will seek to improve public access, preserve, and where appropriate, enhance cultural and historical features in the area.

A concern expressed in the 2001 interviews was the operation and impacts from the Waste ~~W~~ater Treatment Plant, south of the project site, and the perception that it may leak. Many expressed concerns that continued development along the coast will affect the quality and quantity of fish along the coast. Further discussion of water quality impacts is discussed in Section 3.9.

~~It is recommended that~~ The cultural and archaeological resources will be protected as directed by the preservation plans approved by DLNR; recommendations are presented in Section 4.2.2. In addition, the shoreline area ~~contains~~ containing most of these sites will be protected as a cultural park. The Kona Kai Ola project will seek to perpetuate Hawaiian culture through continued practice of cultural and traditional activities. The management plan for this area ~~should~~ will be developed through close consultation with cultural descendants. For the area specifically within the legislative boundary of the National Historical Park that is fronting the Kona Kai Ola project site, the developer will work cooperatively with the National Historical Park to develop a management plan and interpretive plan for these cultural and archaeological resources.

Further mitigation includes the proposed preservation of the ahu (small rock cairns) near the makai end of the site and a short section of the old walking trail as a symbol of the trail system. Also, a cultural practitioner, who is knowledgeable of the site and can assist the project developer to ensure proper cultural protocols are followed in the design, will be employed.

To encourage cultural practices, access to the shoreline will be open and access to cultural resources will be in a manner that encourages native Hawaiian and local resident use. Mauka viewsheds from the shoreline will be preserved and not obstructed.

4.2 Archaeological Resources

The project area was studied in two archaeological studies, both of which were conducted by Haun & Associates. A 2001 DHHL parcel inventory survey was completed as part of a previous DEIS for a project that was never completed. The 2001 study was submitted to the State Historic Preservation Division for review at the time, and is therefore public record (Haun 2001). The other study was commissioned as part of this Kona Kai Ola project and was completed in August of 2006. This most recent study involved completion of an archaeological inventory survey for the DLNR properties of Kona Kai Ola and the full extension of the proposed parkway south through the Queen Lili'uokalani Trust property. The studies are presented in Appendices M-1 and M-2.

The goal of the inventory surveys was to identify archaeological resources within the proposed project site. In accordance with DLNR-SHPD rules for inventory surveys, the studies included:

- Background review and research of existing archaeological and historic documentary literature relating to the project area and its immediate vicinity;
- High intensity, 100 percent pedestrian survey coverage of the project area;
- Detailed recording of all potentially significant sites;
- Limited subsurface testing (manual excavation) at selected sites to determine function;
- Analysis of background research and field data; and preparation of a Final Report.

These reports are contained in Appendix L.

4.2.1 Existing Conditions

The project area is located within the ahupua'a of Kealakehe and Keahuolū. These ahupua'a are situated at the southern end of the lava-covered land north of Kailua-Kona called Kekaha, which "describes a dry, sun-baked land". In 1823, observations of Reverends Thurston and Bishop described houses along the coast. The houses were built on lava, and sweet potatoes, watermelon, and tobacco were grown in small gardens within the lava.

During the Great Mahele, Kealakehe was retained as government land and Keahuolū was awarded to the mother of King Kalakaua and Queen Lili'uokalani, Chiefess of Ka'awaloa, Ane Keohokalole. The rights of native tenants were preserved by the Kuleana Act. The majority of the tenant claimed land parcels were conveyed to the claimants between 1819 and 1846. The awarded parcels in Kealakehe are all situated inland between approximately 900 ft and 1,900 ft elevation. None of the awarded parcels in Keahuolū appear on modern tax maps, but most were probably situated inland.

Various types of feature types were identified in the project area, as follows:

- **Pāhoehoe Excavations** are features that consist of excavated holes within either the surface of a pāhoehoe lava flow or at the base of pāhoehoe ridges, outcrops, and knolls. Stone removed from the excavations are sometimes piled adjacent to the holes. Some of these features are interpreted as quarry sites used to obtain raw materials for the manufacture of stone tools. Other features resulted from excavations to extract seabird nestlings for food.
- **Stone Alignments** are comprised of low enclosures constructed of one, occasionally two, courses of flat pāhoehoe slabs, or a combination of flat slabs and subangular basalt cobbles and small boulders. These structures are all built on bare pāhoehoe lava with no soil or cultural remains present. The function of these features is undetermined.
- **Cairns (ahu)** are features constructed of stacked subangular basalt cobbles and small boulders, pāhoehoe slabs, or a combination of the two materials. These features are typically well-built and are interpreted as markers.
- **Mounds** are features built of piled subangular basalt cobbles and small boulders, pāhoehoe slabs, or a combination of the two. These features are informally constructed and evidenced no associated cultural remains. Other mounds are either collapsed cairns features or of indeterminate function.
- **Petroglyphs** are images that have been pecked into lava surfaces. The petroglyphs within the project area all consist of small anthropomorphic figures.
- **Enclosures** are features built of stacked and/or piled subangular basalt cobbles, small boulders, or pāhoehoe slabs. The enclosures within the project area are either oval in shape or U-shaped, and are interpreted as temporary habitation structures based on their formal type and lack of substantial construction (faced walls, paving, etc.).
- **Overhangs and Caves** are features located on the sides of outcrops. The features within this category within the project area evidenced internal modification and are interpreted as temporary habitations.

- **Platforms** can consist of a well-built rectangular structure made of stacked and piled pāhoehoe slabs and subangular basalt cobbles and small boulders. Some on the project site are interpreted as a ceremonial structure, probably a small shrine, based on results of the subsurface testing and the presence of branch coral.
- **Trail** sections were identified within the project area, extending across lava flow. Most consist of steppingstone trails of pāhoehoe slabs and small cobbles. Most segments are small and do not interconnect with other larger trail systems.

Sites identified during the surveys were assessed for significance based on the criteria outlined in the Rules Governing Procedures for Historic Preservation Review (DLNR 1998: Chap 275). According to these rules, a site must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and shall meet one or more of the following criteria:

- *Criterion "a"*: Be associated with events that have made an important contribution to the broad patterns of our history;
- *Criterion "b"*: Be associated with the lives of persons important in our past;
- *Criterion "c"*: Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; or possess high artistic value;
- *Criterion "d"*: Have yielded, or is likely to yield, important information for research on prehistory or history; and
- *Criterion "e"*: Have an important traditional cultural value to the native Hawaiian people or to another ethnic group of the state, associations with traditional cultural practices once carried out, or still carried out, at the property, or due to associations with traditional beliefs, events or oral accounts - these associations being important to the group's history and cultural identity.

4.2.1.1 DHHL Site Findings

This inventory survey identified 56 sites with 121 features. Portions of two trails (Sites 7704 and 13194) identified during previous surveys, have been destroyed since the sites were initially recorded. The sites include 41 single feature sites and 15 complexes of features. The identified features consisted of:

- | | |
|---------------------------|----------------|
| ▪ 55 Pāhoehoe excavations | ▪ 2 enclosures |
| ▪ 31 stone alignments | ▪ 1 cave |
| ▪ 16 cairns | ▪ 1 overhang |
| ▪ 8 mounds | ▪ 1 platform |
| ▪ 5 petroglyphs | ▪ 1 trail |

An important finding of the survey was the identification of numerous pāhoehoe excavations and stone alignments. The excavations identified during the study were all interpreted to be quarries for obtaining either scoriaceous lava (7 features) or fine-grained basalt for basalt tool manufacture (48 features).

Based on the review criteria, 58 sites (includes the two destroyed trail sites) are assessed as significant under Criterion “d” – “have yielded information important for understanding prehistoric and early historic land use in the project area”.

In addition, the following sites are additionally assessed as significant under Criterion “e” because the sites consist of petroglyphs and a possible shrine:

- 23010 – petroglyph,
- 23011 – petroglyph,
- 23038 – possible shrine,
- 23042 – petroglyph

4.2.1.2 DLNR and Parkway Corridor Site Findings

A total of 126 sites with 432 features have been documented within the project area. The sites consist of 23 sites that were identified during previous archaeological studies within the area, and 104 that were newly identified during the current project. One of the previously documented sites could not be relocated. The 432 features consist of:

- 170 Pāhoehoe excavations;
- 80 cairns;
- 34 alignments;
- 26 overhangs;
- 23 lava blisters;
- 22 enclosures;
- 14 terraces;
- 10 platforms;
- 10 trails;
- 8 walls;
- 7 pavements;
- 5 midden scatters;
- 4 mounds;
- 4 sand areas;
- 3 filled cracks;
- 3 lava tubes;
- 2 C-shapes;
- 2 petroglyphs;
- 2 walled terraces;
- 1 artifact scatter;
- 1 flat slab;
- 1 L-shape;
- 1 metal tower and upright

Nearly all of the permanent habitations are located within 200 meters of the shoreline below 25 foot elevation. Permanent habitation features are primarily clustered along the coast in two areas. One cluster consisting of four sites is situated on the southern coast of Kealakehe just north of the boundary with Keahuolū. The cluster includes one feature interpreted as a possible heiau.

The other cluster is situated on the northern coast surrounding the small beach at 'Alula and cluster of brackish water pools. The cluster includes seven dwelling foundations at three sites. The cluster includes a possible canoe shed and Makaopio Heiau. The remaining coastal permanent habitation sites are scattered along the coast between these two clusters.

Human burials have been identified in three locations within the project area with three additional probable burial features also identified. The burial features consist of three platforms, a lava tube, and two filled cracks.

Trail segments were identified in ten locations during the survey. Site 1898 Features C and F consist of wide walls that extend across ponds inland of Feature A (heiau). Both of these identified trail segments and heiau are located within the proposed "cultural park" of the Kona Kai Ola project, are slated for preservation and will not be disturbed. The most significant (in length) trail segment is 7704 which is 428 feet long marked by 26 aligned cairns. This trail segment is located on the ~~maka-i-west~~ boundary of the wastewater treatment plant and extends in a north-south direction, ~~but appears to be a partially constructed spur of another trail that was abandoned and not utilized.~~

While the shoreline was undoubtedly used to travel along the coast, there was no evidence of a trail during surveys conducted for this project. The lack of trail evidence is not unexpected, given the stretches of sand and bare pahoehoe lava that are easily traversed on foot and marked by the shoreline. Despite the lack of major historic trail segments on the shoreline, a new coastal trail system could be created and made part of the Ala Kahakai National Historic Trail system.

Evidence of the Emerson Trail (Site 21588) was not found in the course of the study. The area was surveyed three times during fieldwork and surveyors specifically looked for worn surfaces, petroglyphs and cairns and, at the time, the vegetation was not that thick. Areas of bare pahoehoe lava were clearly visible and all were checked.

Anchialine pools were included in the archaeological survey but only human modifications to the pools were given feature designations. While it is likely that all were used, if there is no physical evidence of use, then a site/feature designation was not made. The archaeology study documents seven architectural features at Sites 1898 and 1899 that modify natural pools; these pools are not assigned features designations.

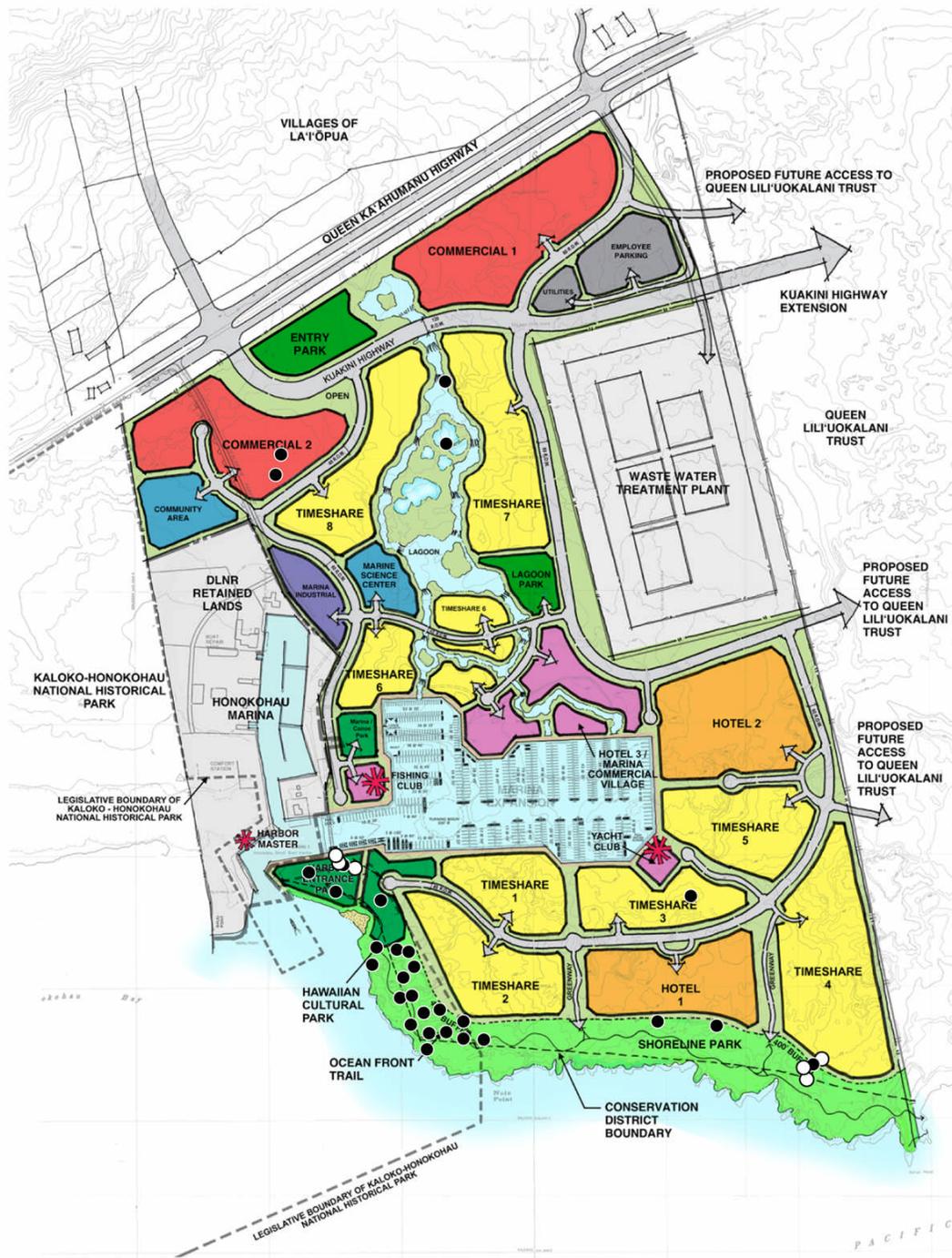
Based on the review criteria, all 126 sites are assessed as significant as Criterion "d". The sites have yielded information important for understanding prehistoric to historic land use in the project area. Three sites are also assessed under significant under Criterion "c" as good site type examples.

Four sites that include ceremonial features have associations with traditional Hawaiian beliefs important to Hawaiian history and cultural identity and are additionally assessed under Criterion “e”. In addition, five sites are assessed as culturally significant because probable pre-contact burials are present.

4.2.2 Anticipated Impacts and ~~Recommended~~Proposed Mitigations

Implementation of the proposed project will impact on-site archaeological resources in varying degrees. The following outlines ~~recommended~~proposed mitigation measures, and Figure TQ, which has been revised for accuracy since the DEIS publication, depicts resources recommended for preservation. The basis for determining which sites would be further studied and preserved is the criteria outlined in the Rules Governing Procedures for Historic Preservation Review (DLNR 1998: Chapter 275). The criteria provide a management tool that addresses levels of significance and future action. Hence, while archaeological features have cultural value, not all archaeological sites meet Criterion e, which is previously discussed. The archaeological study identified eleven sites as culturally significant based on the presence of burials or ritual architecture.

- The mapping, written descriptions, photography, and test excavations at fifty-four sites adequately documents them and no further work or preservation is ~~recommended~~proposed.
- Forty-seven sites are ~~recommended~~proposed for mitigation through data recovery. The plans for data recovery ~~would~~will be detailed in a Data Recovery Plan prepared for DLNR-SHPD review and approval.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure T: Revised Archaeological Resources Location Map

Legend

- | | | |
|---|---|--|
| Timeshare | Marine Science Center / Community Area | Archaeological Sites Recommended for Preservation |
| Hotel | Utilities / Hotel Facilities | Inaccurately Depicted in DEIS and Are Not Included as Recommended for Preservation |
| Commercial | Recreation / Open | |
| Marina Retail | Shoreline Park | |
| Marina Support / Commercial | | |



Not to Scale



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- Twenty-nine sites are ~~recommended~~ proposed for preservation in accordance with a Site Preservation Plan prepared for DLNR-SHPD review and approval. Of the 29, 25 are located on lands owned by DLNR and four are on DHHL lands. These preservation sites include thirteen sites within the legislative boundary of Kaloko-Honokōhau National Historical Park that the developer intends to preserve.
- The specific plans for preservation and maintenance of the burial features at five sites would be detailed in a Burial Treatment Plan prepared for DLNR-SHPD and the Hawai'i Island Burial Council (HIBC) review and approval.

The levels of impact and mitigation measures related to the proposed project are similar in Alternatives 1 and 2.

4.3 Visual Resources

4.3.1 Existing Conditions

The *Hawai'i County General Plan* characterizes the scenic beauty of various areas and identifies sites and vistas of natural beauty. Although the subject property is not specifically listed as an example of natural beauty within the Kona districts, the view plane extending mauka and makai from Queen Ka'ahumanu Highway is identified as such a site. The large geographical area within this view plane includes the project site.

- *Palm Tree Corridor:* There is a palm tree-lined road corridor extending makai from Queen Ka'ahumanu Highway leading to Honokōhau Harbor. The corridor is flanked by mature palm trees, some fronted by memorial plaques. While this lane is not formally acknowledged by the County, nor protected under County or State statutes, it is acknowledged here as it is a unique feature of interest.
- *Proposed Harbormaster Facility:* The Kona Kai Ola project will utilize the existing Honokōhau Harbor entrance channel. DOBOR officials have expressed the importance of a harbormaster location with a clear view of the ocean entrance for boater safety reasons. At present the appropriate location is considered to be north of and across from the interior channel from the existing fuel dock. This would provide a much better view than the fuel dock side of the channel due to the visual obstruction associated with the existing park on the south side of the ocean entrance. This location was selected as the optimum position for controlling boat movement from both basins and through the existing ocean channel from a health and safety standard.
- *Mauka views:* Mauka views from the shore area, the proposed cultural park area and from the ocean are important from both a cultural and community quality of life perspective. As more of the West Hawai'i coast become developed, the expansive views formerly so common, are jeopardized. Mount Hualālai, framed in the background by Mauna Loa and Mauna Kea, is a prominent feature of North and South Kona and is a landmark along Queen Ka'ahumanu Highway.

4.3.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

Due to its location within the Queen Ka'ahumanu Highway view plane, the project has the potential to impact public views of the coastline in this area of North Kona. In addition to the General Plan, the *West Hawai'i Coastal View Study* of 1990 notes that "urbanization and public improvements may ...offer the greatest opportunity to protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources."

Depending on the development plan for the commercial parcel, the palm trees along the existing entrance road to the harbor may need to be removed. However, portions of a proposed roadway may be able to incorporate some of the existing palm trees.

The proposed Harbormaster Control Tower is proposed to be a small two-story structure set back approximately 500 feet from the harbor entry channel and located in a small second floor area. Hence, this facility will be visible from the ocean and the Kaloko-Honokōhau National Historical Park. Marina designers and DOBOR have determined that the harbormaster facility needs to be at the proposed location and at the proposed height to ensure the safety of marina traffic into and around the existing Honokōhau Harbor and the new marina. To mitigate view impacts on the adjacent Kaloko-Honokōhau National Historical Park, design measures to minimize impacts will be employed. Further, it is proposed that the ground floor of the ~~Harbormaster Control Tower~~ harbormaster observation hale be made available for park uses, such as a visitor center. Alternatively, the harbor master observation hale may only be a single story building.

To mitigate visual impacts, a 400-foot buffer zone along the shoreline will be preserved as open space. Improvements within this buffer zone will be limited to lateral shoreline public trails, mauka-makai access trails from the project site, and cultural or environmental-related improvements relating to existing features within the buffer zone. No buildings or structures shall be proposed within the 400-foot shoreline setback area, with the possible exception of culturally-related structures.

To control building mass near the shoreline, development sites directly adjacent to the shoreline area are limited by design covenants to a lower unit density. Buildings immediately adjacent to the shoreline setback are proposed at one and two stories height to minimize building mass against the shoreline setback area.

Buildings located further inland will increase to a maximum of four stories, in keeping with the "coconut tree height" general limit. The quantity of landscaped or re-naturalized open space should be emphasized near the setback area by design covenants.

The northern edge of the large commercial parcel contiguous to the water feature by Queen Ka'ahumanu Highway will be limited by design covenants to one-story structures. Structures on the remaining area of the parcel will be limited to the equivalent of three stories in height. The larger building mass at the southern portion of the parcel will provide a screen for the existing earth berm around the waste-water treatment plant from the Highway.

Major roadways, parking areas, and areas surrounding all major structures will be landscaped in accordance with a landscape master plan.

A visual impact study was conducted to illustrate various views of the Kona Kai Ola development. In the computer simulated views, no existing buildings are shown on the existing harbor area.

Five views are illustrated and in this FEIS and are described as follows:

▪ Figure U-1: View from the Villages of La'i 'Ōpua.

This gives an overall mauka to makai view of the entire project from the Villages of La'i 'Ōpua. The existing wastewater treatment plant and the lands belonging to Queen Lili'uokalani Trust are to the left. The National Historical Park and existing entry channel to Honokōhau small boat harbor are to the right. Queen Ka'ahumanu Highway is in the foreground with the ocean in the background.

The existing view of the site from this vantage point is of a barren lava field devoid of vegetation that gently slopes to the ocean. The large pools of the existing wastewater treatment plant dominate this desolate landscape. This computerized view of the proposed project depicts how Kona Kai Ola intends to transform this desolate lava field into a vibrant mixed use community. This view also shows how the project will retain 40% of the land area in open space with lagoons, community areas and a vast shoreline park.

The project's proposed roadway system can be clearly seen. The Kuakini Highway Extension Right of Way is depicted in the foreground. A new access road that will serve the existing marina is on the lower right. On the left is a collector road that borders the wastewater treatment plant and provides access to the uses along the coastline. A road also connects these two roads through the core of the project. Finally, there is a road that will service the uses along the coastline and provide access to the park at the harbor's entrance.

The water feature through the central core of the project is clearly visible. This central feature provides an amenity to the mauka parcels as it meanders through the project to the proposed marina to help with water circulation.

The buildings within the project are no more than three to four stories tall or no higher than a coconut tree.

▪ Figure U-2: View of the main entrance into the project.

The existing wastewater treatment plant and the lands belonging to Queen Lili'uokalani Trust are to the left. The National Historical Park and existing entry channel to Honokōhau small boat harbor are to the right. Queen Ka'ahumanu Highway and main entrance to the project are in the foreground.

The existing view from this vantage point is of the existing intersection of Queen Ka'ahumanu Highway and the access road to Honokōhau Harbor. Barren lava fields extend out from the road to the north and south. The road is lined with coconut trees. The access road leads to the existing Honokōhau Harbor to the east.

This view shows the proposed main entrance into the project at the intersection of the Queen Ka'ahumanu Highway and the proposed Kuakini Highway Extension. The Kuakini Highway Extension veers to the left upon entering the project and extends all the way to Kailua-Kona. This proposed roadway will provide a parallel route to Queen Ka'ahumanu Highway, alleviate traffic in the region, and provide an important alternate route into Kailua-Kona.

This view also shows the inviting main entry to the project, which is accomplished by the retention of a large open space area and using setbacks along the Kuakini Highway Extension. The coconut trees along the existing access road to the harbor, will be carefully relocated to a site within the project and provided with necessary care and irrigation. The open area along the highway is a planned natural park with a brackish water pond, designed as a habitat for migratory birds that currently visit the area. A view corridor connecting this park through the core of the project to the proposed marina was designed to create mauka and makai views through the interior of the project.

▪ Figure U-3: View from North Side of Honokōhau Harbor Entrance Channel

This gives a view looking from the north side of the entrance channel near the makai entry to the Kaloko Honokōhau National Historical Park. The image only shows the new construction that will be added to the existing fuel dock and various State buildings that already located in this area near the fuel dock lease area. The small harbormaster observation hale is shown in the foreground. This is shown as a small two story structure, but it could alternatively be only a single story.

To the right on the makai side, the shoreline cultural park can be seen, along with a proposed cultural center located adjacent to the cultural park. Also shown is a conceptual design for an outdoor hula performance area. The trail is shown for illustrative purposes only and would be designed to blend in with the natural lava landscape. The anchialine pools and historic sites are not shown, but will be protected in the shoreline cultural park. The buildings close to the shoreline park are limited to one and two story buildings, while the buildings closer to the marina are shown at a height of four stories at the highest. The new harbor basin, shown at 800 slips, is surrounded by a public promenade, with a mix of commercial, hotel, time-share uses, as well as public parks for launching one and two-man outrigger canoes. The vessels currently in the outer basin of the existing harbor would be moved into the new harbor facility, leaving the whole area of the outer basin for transiting to and from the new harbor to the ocean.



**Figure U-1: View from Villages
of La'i 'Ōpua**





**Figure U-2: View of Main Entrance
Into the Project**



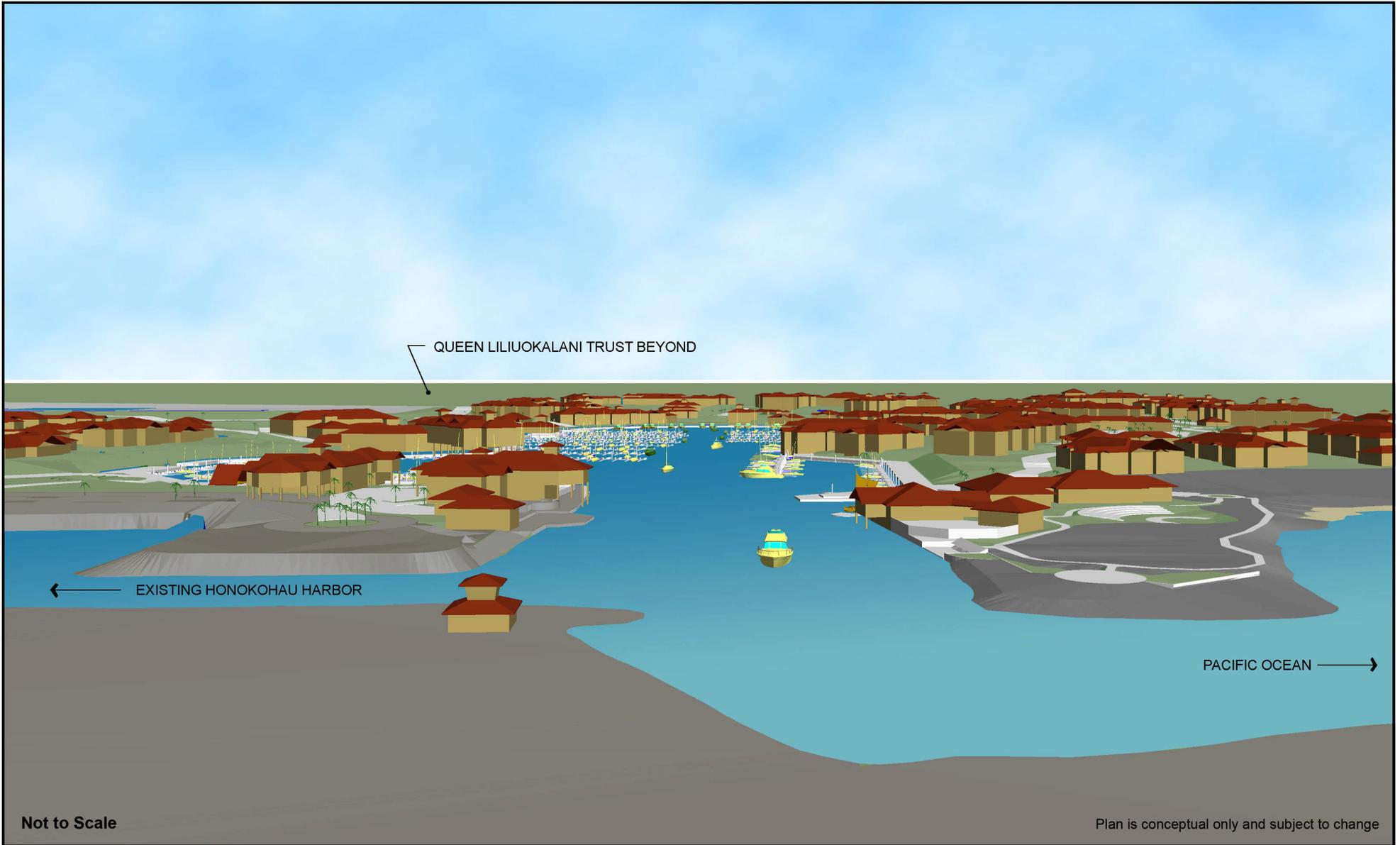


Figure U-3: View from North Side of Honokōhau Harbor Entrance Channel



▪ Figure U-4: Close-up view from ocean of the coastline and makai parcels

The view from the coastline shows a lava field that gently slopes up towards the Highway. As part of the development proposal, Kona Kai Ola's goal is to provide public shoreline access and connections to the coastal trail system. Greenways will be provided between the makai development parcels to preserve and complement the existing natural landscape. Within these wide areas will be vehicular access for public parking, passive recreation facilities such as barbecue and picnic facilities, and comfort stations to service users and hikers on the coastal trail system, which is being designed to be made part of the Ala Kahakai National Historic Trail system. They will also serve as view channels to the ocean from mauka areas of the Project. Mauka views from the shoreline are important view planes that are being maintained as part of this development.

▪ Figure U-5: View of the project from the ocean

This gives an overall view of the entire project. The existing landscape is a barren lava field having the existing wastewater treatment plant and existing harbor and support buildings as the only developed areas. The National Historical Park and existing entry channel to Honokōhau Small Boat Harbor are to the left, with Alula Beach on the coast.

The site gently slopes down from the highway to the ocean. The dark gray area at the coastline indicates a 400' shoreline setback, which will be left undeveloped with the exception of a coastal trail system. From the coastal trail, two lateral greenbelts provide public access to the shoreline and coastal trail system. Originating in Kailua-Kona, the coastal trail system will continue towards the Kaloko-Honokōhau National Historical Park, past the project site and cove beach, and terminate at the proposed Cultural Museum and park, with anchialine ponds and a heiau. As part of the marina development, water taxis will shuttle pedestrians across the marina, from the makai to the mauka. Pedestrian-friendly paths are integrated throughout the project to connect the development parcels with the commercial areas and the marina promenade. The existing wastewater treatment plant is seen in the background and will be buffered by a landscaped berm.

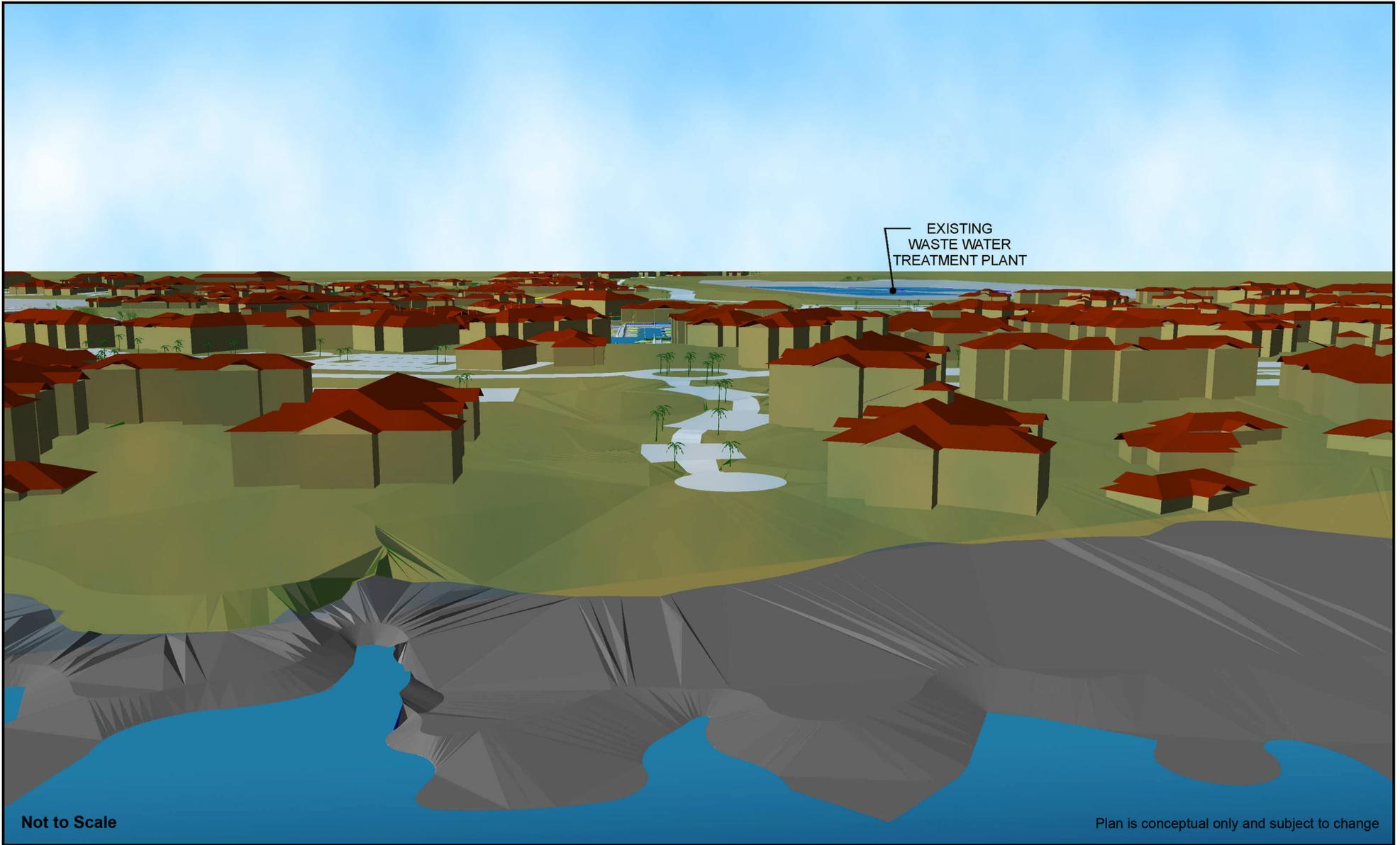
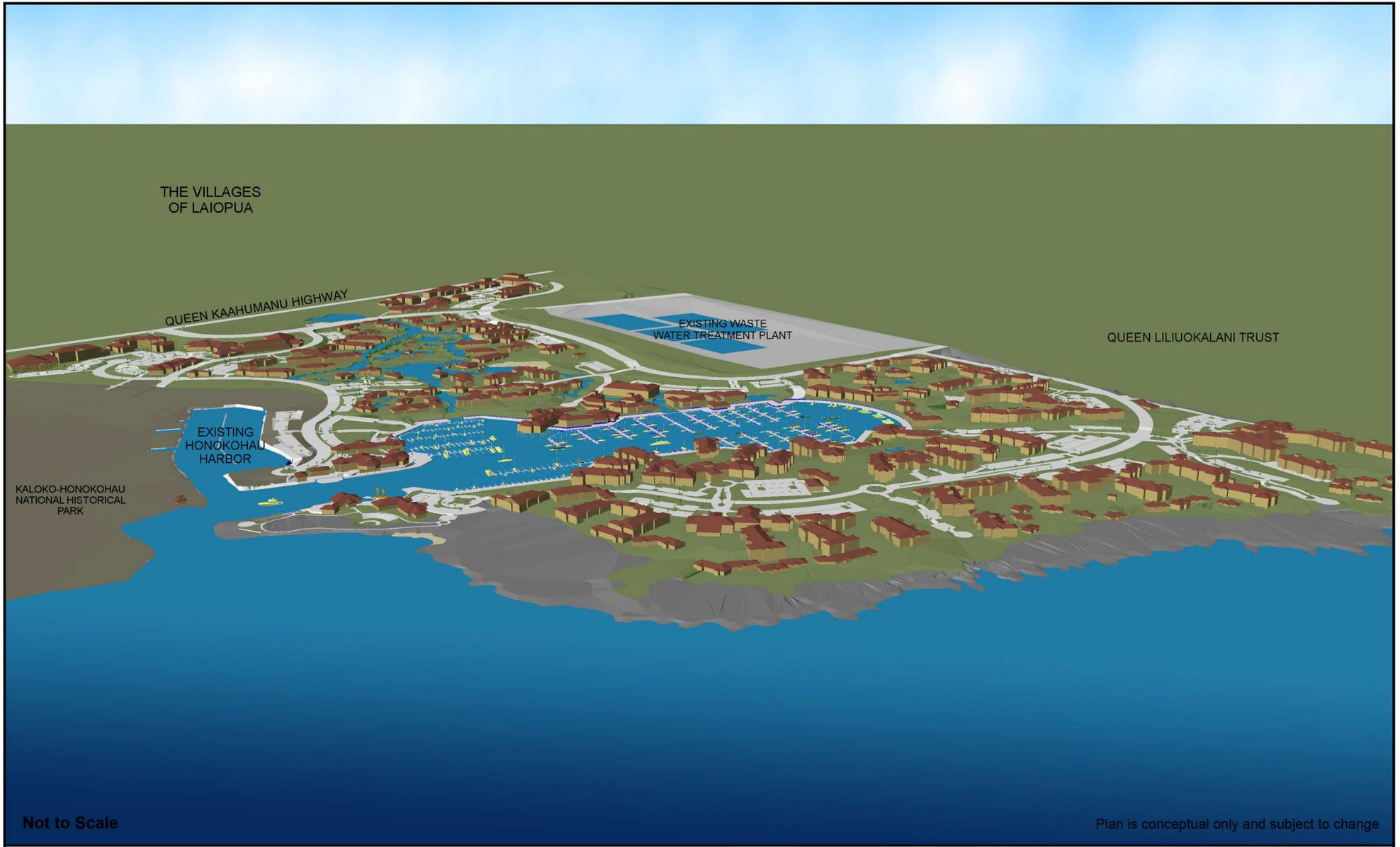


Figure U-4: Close-Up View from Ocean of the Coastline and Makai Parcels





**Figure U-5: View of the Project
from the Ocean**



4.4 Noise

D.L. Adams Associates conducted a noise assessment for Kona Kai Ola; it is contained in Appendix NM. The purpose of the assessment was to measure existing noise levels, predict future noise levels due to the project, evaluate the noise impacts anticipated from the project and recommend mitigation.

4.4.1 Existing Conditions and Methodology

Long-term and short-term noise measurements were obtained at various locations around the project site. Long-term measurements were recorded for 24 hours and the short-term measurement was recorded for about 30 minutes.

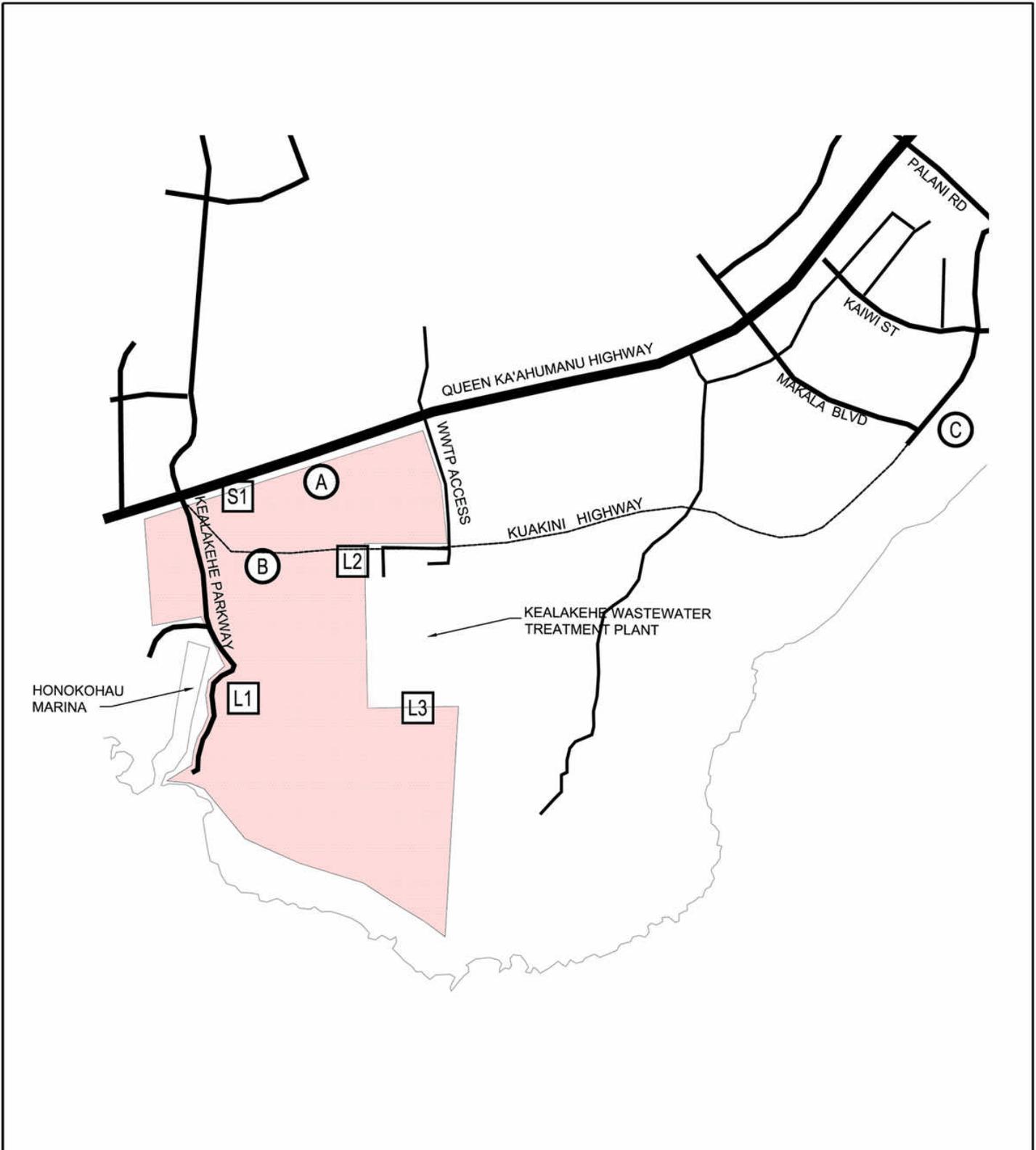
Long-term measurements showed that hourly noise levels generally ranged from 37 dBA to 56 dBA. The average calculated day-night level near the Honokōhau Harbor was 55 dBA. The average calculated levels at two locations near the Kealakehe Waste-Water Treatment Plant were 55 dBA and 58 dBA. Noise sources at the different locations included intermittent vehicular traffic on Kealakehe Parkway, wind, industrial and marina activities, occasional aircraft flyovers, and the waste-water treatment plant blower noise.

A vehicular traffic noise analysis was completed for the existing conditions, year 2020 with the project, and year 2020 without the project, using Federal standards. Three locations were used and short and long-term noise measurements were calculated. Figure VR depicts the traffic analysis testing locations.

- At location A, along Queen Ka'ahumanu Highway, noise levels were calculated to be within the FHWA/DOT maximum noise limit of 72 dBA during peak traffic hours, at 74 feet from the roadway. Noise levels are expected to increase by less than 1 dB without the project and increase by 1 to 2 dB with the project. A 3 dB change is not considered significant.
- At location B, along the proposed Kealakehe Parkway extension, at least 40 feet from the roadway, noise levels are expected to equal the maximum noise limit of 67 dBA. Future traffic projections show that traffic noise levels are expected to increase by 3 to 5 dB with construction of the Kona Kai Ola project.
- At location C, along Kuakini Highway, noise predictions with and without the project are expected to be below the maximum noise limit of 67 dBA. The projected increase is less than 2 dB which is not a significant noise increase.

4.4.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

It is not expected that project-generated noise will impact adjacent properties as they are mostly vacant or industrial. The only areas that may be affected are the Honokōhau Harbor users and the Fishing Club located south of Kealakehe Parkway. Commercial, hotel and time-share buildings completed in the initial phases may also be affected from construction noise due to subsequent phases as they are in very close proximity to the construction site.



Source: D.L. Adams Associates, Ltd.

Plan is conceptual only and subject to change

Figure V: Noise Measurement Locations

- L1 Long Term Noise Measurement Location
- S1 Short Term Noise Measurement Locations
- A Noise Prediction Locations
- Project Location



Not to Scale



Noise impacts on the Kaloko-Honokōhau National Historical Park may result from construction activities over the duration of the 15-year construction period. However, only a small portion of the construction activities will occur in proximity to the park's property line. Additionally, construction activities must comply with requirements set forth in the State Department of Health noise permit.

On a long-term basis, noise impacts on the Kaloko-Honokōhau National Historical Park may result from the existing Honokōhau Boat Harbor and adjacent industrial uses. Industrial and mechanical activities must comply with the State Department of Health Maximum Permissible Noise limits at the property line. Noise from the new marina may be audible but the project will comply with noise regulations to ensure that noise will remain within permissible levels.

As there is a large portion of the development that has no overnight accommodations, and would contain commercial and light industrial use, noise from these uses could significantly impact the proposed noise sensitive hotel and time-share areas. Expected mechanical equipment may include air handling equipment, condensing units and other similar uses.

Aircraft noise due to the Kona International Airport may be audible, although flights over the site are infrequent and the project site is outside of the Ldn 55 airport noise contour. At the Kealakehe Wastewater Treatment Plant, noise levels are compliant with the DOH and EPA noise limits, however, noise and tonal quality from the blowers could be found objectionable.

~~At the Honokōhau Harbor, intermittent industrial noises may be audible to the adjacent Kona Kai Ola time share community. Mechanical noise from these areas must meet the State noise rules, which stipulate maximum permissible noise limits at the property line.~~

Regarding noise generated by boats, regulations on boat noise is not currently enforced in the State of Hawai'i. Many states have approved a version of the SAE (Society of Automotive Engineers) J1970 or J2005 Standard which places restrictions on the operation of motorboats that exceed certain noise levels.

One restriction states that motorboats should not be operated in such a manner as to exceed 90 dBA when subject to a stationary sound level test (i.e., measured 1.5 meters away from the idling boat). These noise levels were applied to the existing background levels measured at the Kona Kai Ola project site. Assuming that boats entering and exiting the Honokōhau Marina are in compliance with this regulation in that they emit 90 dBA or less in idle, boat noise for noise receivers more than 150 meters (492 feet) from the channel is equivalent to or less than daytime background noise levels.

Noise receivers within 150 meters from the channel will be subject to noise levels in excess of daytime background noise levels. However, boat noise can be defined as a single noise event that is measured over the time interval between the initial and final times for which the sound level of the single event exceeds the background noise level. The noise generated by these single boat noise events takes place currently at the marina and is not expected to increase in the future.

The frequency of single boat noise events is expected to increase proportionally to the increase in boat traffic due to the proposed project. Although the noise generated by a single boat event remains the same, more of these events will occur within a given time period. It is expected that noise levels within 150 meters of the marina and the channel to increase by up to 5 dB. In that a change of 3 dB is generally considered barely perceptible to the human ear, and an increase of 5 to 6 dB will be noticeable, but is not a significant noise impact.

While the level and duration of noise impacts due to boat traffic is the same with Alternative 2, Alternative 1 would generate impacts of less duration in that the number of slips is half that of the proposed project.

Construction blasting, if required for the new marina, could produce noise impacts. However, blasting at construction sites near populated areas is usually accomplished by using numerous small charges detonated with small time delays. Blast mats can also be used to assist in directing the explosive energy into the rock, controlling flying debris, and muffling the noise. With the appropriate blast design techniques, the noise from blasting can be controlled to minimize noise impacts. In addition, if the noise from blasting occurs in brief intervals, i.e., less than 10 percent of any 20 minute period, it is excluded from the State DOH noise limits.

In cases where construction noise exceeds, or is expected to exceed, the State's "maximum permissible" property line noise levels, a permit must be obtained from the State DOH to allow the operation of vehicles, cranes, construction equipment, power tools, etc., which emit noise levels in excess of the "maximum permissible" levels.

Mitigation of noise impacts from stationary mechanical equipment will occur resulting from compliance with the State DOH Community Noise Control rules. In addition noisy equipment will be located away from neighbors and the residential units, as much as practical. Enclosed mechanical rooms may be required for some equipment.

Siting of onsite structures will also help to mitigate noise impacts. Commercial buildings that border Queen Ka'ahumanu Highway will be constructed at least 75 feet from the edge of pavement so as not to exceed FHWA's maximum exterior L_{eq} noise limit of 72 dBA. Time-share buildings that border Kealakehe Parkway should be constructed at least 50 feet from the edge of the pavement so as not to exceed the FHWA's maximum exterior L_{eq} noise limit of 67 dBA.

Although noise levels at the perimeter of the wastewater treatment plant are compliant with DOH and EPA limits, further noise mitigation is ~~recommended~~ proposed to attenuate the high frequency buzz emitted by the blowers at the Kealakehe Waste-Water Treatment Plant. Effective noise mitigation may include the following:

- Completing a rock berm along the northern property line will provide approximately 5-10 dB noise reduction as well as a visual barrier around the site.
- Consideration should be given to replacing aging equipment at the WWTP, such as the blowers, with quieter equipment. Mechanical equipment could be enclosed and sound absorptive material installed on the interior of the enclosure. Other typical noise mitigation for stationary equipment includes mufflers, silencers, and acoustical louvers.

During marina construction, blast mats should be used to assist in directing the explosive energy into the rock, controlling flying debris, and muffling the noise. Use of appropriate blast design techniques is required. Issues relating to underwater noise are addressed in Section 3.9.4.25.

4.5 Social Environment

Social impact assessments identify and disclose information of use to decision makers and citizens, as they evaluate the implications of proposed development. Because the social realm is extensive and not precisely defined, assessments typically contain substantial attention to community issues and perceptions, in addition to analyses of selected issues. The social impact assessment, herein referred to as SIA, for this project is contained in Appendix NO.

4.5.1 Existing and Anticipated Future Socio-economic Environment

4.5.1.1 Population

The Study Area of the SIA is West Hawai'i, which includes North and South Kona, as well as South Kohala. Between 1990 and 2000, West Hawai'i's population increased from 43,373 to 56,301 persons, signifying a 30 percent increase. During this period, the de facto population increased by 33 percent, from 54,841 persons in 1990 to 72,673 persons in 2000. (The Hallstrom Group, 2006)

The region's population growth correlates with the growth in the visitor industry that has been occurring along West Hawai'i's coast since the 1960s. The increase of accommodations that house the steady stream of visitors supports a healthy employment base, which, in turn, attracts many people to relocate to West Hawai'i for job and entrepreneurial opportunities.

Much of the population increase is attributed to in-migration. Census data indicate the percentage of West Hawai'i residents born outside the state of Hawai'i rose from 39.5 percent in 1980 to 48.9 percent in 2000. Comparable percentages for the rest of the county were 25.9 percent in 1980 and 31.0 percent in 2000. Thus, in-migration has clearly been funneled into West Hawai'i in general and North Kona in particular, more than into the rest of the county.

The forecast resident population for 2020 in West Hawai'i is 100,357 persons, which represents an increase of 78 percent increase between 2000 and 2020. The forecast de facto population in West Hawai'i is 126,345 persons, which is approximately a 74 percent increase ~~from~~ from 2000 to 2020. (The Hallstrom Group, 2006)

Anticipated Impacts

It is projected that the proposed hotel and time-share units will begin generating on-site de facto population in Year 4 of development. At full build-out and stabilization in Year 15, the project is estimated to generate a de facto guest / time-share owner population of 5,321 persons (The Hallstrom Group, 2006). This on-site population would account for four percent of the forecast 2020 de facto population for West Hawai'i. The perceived impacts related to project population impacts are discussed in Section 4.5.4.2.

4.5.1.2 Economic Forces

Economic conditions are major forces that influence the social environment. West Hawai'i is now, and is projected to continue as, the Big Island's economic engine. During the 1960s, West Hawai'i developed as a tourist destination as well as a commercial center. The first luxury hotel, the ~~Kona Village~~ Mauna Kea Beach Hotel, was built on the West Hawai'i coast in 1964. In 1968, the Honokōhau Harbor was created to help address the needs of boaters and tourists. The construction of the 272-slip harbor helped stimulate development of a light industrial and commercial area in the adjoining area of Kailua-Kona.

In 1975, the coastal Queen Ka'ahumanu Highway was completed. This became Kona's main industrial route, and it made Honokōhau and nearby hotels easily accessible from the Kona International Airport. The construction of the highway precipitated a boom period financed largely with Japanese capital that lasted until the early 1990s, when an economic downturn in Japan helped contribute to a statewide slowdown.

Since 1990, average daily visitor census for Kona and the Big Island generally increased through 1998, dipped for a few years thereafter, but has surged strongly since 2001, when Hawai'i became increasingly recognized as a safe tropical destination for Americans afraid of traveling abroad. In 2005, Hawai'i Island welcomed a record 1,487,747 visitors, who spent more than \$1.5 billion.

The Big Island's economic growth over the past decade or so has taken place almost entirely in West Hawai'i. Sixty-one percent of the island's job growth occurred in West Hawai'i. Most of the island's private-sector businesses and jobs are now located there, and the clear trend is for further development – based primarily on tourism and recreational real estate. Though many current residents still wish to defend the historic rural character of the area, the outlines of a future city are apparent for the area around Kailua, including Honokōhau.

The most recent hotel development in West Hawai'i was Hualalai, which opened in 1997. ~~Despite the growth in visitors, no significant new hotel development (other than renovations) has occurred in West Hawai'i since 1990.~~ West Hawai'i hotel occupancies have lagged those of other islands. Time-share has represented a significant portion of the growth in overall visitor units (as compared to hotel units alone) in recent years.

It is projected that the economy will continue to be driven primarily by growth in the visitor industry and associated recreational real estate. Tourism forecasts prepared by the Hawai'i State Dept. of Business, Economic Development, and Tourism (DBEDT) are for the Big Island as a whole, not West Hawai'i alone. Visitor units are projected to increase from 11,351 units in 2005 to 14,890 in 2030.

The DBEDT forecasts anticipate an approximate 40 percent increase in employment over a thirty-year period, from the island-wide job count of 65,000 in 2000 to 92,000 in 2030. Based on trends over the past decades, it may be assumed that most of these additional jobs will be located in West Hawai'i, though housing issues make it less certain that the additional workers will live there.

4.5.2 Housing

4.5.2.1 Existing Conditions

Hawai'i has longstanding issues regarding housing. These include the lowest homeowner rate, relatively small houses, high housing costs, crowding and a high percentage of workers per household. It is generally accepted that Neighbor Island resort areas such as West Hawai'i have even more acute housing issues. The 2000 Census shows that medians in North Kona (\$233,900), South Kohala (\$206,000), and South Kona (\$213,100) were all substantially higher than the island wide median (\$153,700).

For renters, as of 2000, reported rents were generally higher in West Hawai'i than the rest of the county, but so were wages – West Hawai'i renters at that time actually paid a slightly lower percentage of household income for rent than elsewhere in the county.

Large post-2000 increases in housing costs can be attributed to (1) housing prices catching up with real income increases; (2) a nationwide housing boom, especially in second homes, which is now abating; and (3) a surge in local real estate investment, from both local and off-shore purchasers. Both resort-residential and "pure residential" markets have now started to cool, but prices remain higher than the island wide median.

4.5.2.2 Affordable Housing Requirement

Under Hawai'i County Ordinance Chapter 11, Section 4 Affordable Housing Requirements, ~~resort and~~ hotel uses generating more than 100 employees on a full-time equivalent basis must earn one affordable housing credit for every four full-time equivalent jobs created. Kona Kai Ola developers are interested in pursuing housing opportunities for workforce housing in the lands mauka of the project site in the same or adjacent ahupua'a. The number of employees that would form the basis for the affordable housing requirement is ~~undetermined~~ discussed in Section 4.6.5 ~~at the time of this writing~~. JDI will comply with all affordable housing requirements of applicable Hawai'i County ordinances.

4.5.3 Construction-Related Impacts and ~~Recommended~~ Proposed Mitigation

The effects of construction related activities will depend greatly on how much other construction is occurring in the same area, and whether the economic cycle requires the in-migration of workers. Possible impacts include:

- Disruption of existing harbor activities (from blasting and dredging of expansion area, new infrastructure, and new buildings): ~~Recommended~~ Proposed mitigation includes compliance with public regulations and requirements governing construction and the development of communication and mitigation plans to deal with such issues.
- Actual or anticipated effects of blasting on nearby activities outside the project: In addition to proximate uses such as the ~~National Historic Park~~ National Historical Park and nearby business centers, schools and residential areas located even farther mauka are likely to be anxious about blasting.

- Temporary housing and social issues associated with imported workers: If construction occurs when the economic cycle – which has now been "up" for an uncharacteristically long time – goes back to a "down" phase, the project's construction labor pool may well come from Big Island laborers already present. If not, there may be a need to import workers, build temporary quarters, and cope with some of the usual social side effects of transient workers during their off-hours.

4.5.4 Community Issues and Perceived Social Impacts

Social impacts involve values and perceptions, and many concerns cannot be objectively determined with certainty in that cause-effect relationships are not always easy to determine. An important part of social impact assessment involved interviewing knowledgeable community leaders and observers from a wide spectrum of beliefs and interests. The bulk of the report consists of an examination of issues raised by 53 West Hawai'i community stakeholders and subsequent possible mitigation actions. One set of interviewees consisted of marine and shoreline users in particular. The other consisted of general community stakeholders from business, civic, government, environmental, Native Hawaiian, and social agency perspectives.

4.5.4.1 Issues Related to Marine and Shoreline Environment

Harbor: Most interviewees felt the current Honokōhau marina facilities have deteriorated and that there is a significant need for additional slips. There was also approval for "green" engineering proposals related to pumping cold deep-seawater for air conditioning and circulation in the harbor. There were also resident concerns and questions about marina expansion. Impacts on offshore fishing stocks and boating safety due to feared congestion of the entrance channel were addressed in other EIS studies.

An important issue was related about affordability of new slips for the local West Hawai'i boating community, whether there will be a rich-poor division between the retained DLNR harbor area and the new marina area.

Shoreline: There is a great demand in the general community for more shoreline parks, and some felt that any large project such as Kona Kai Ola should be required to develop a major public facility, such as a grassed-over West Hawai'i version of O'ahu's Ala Moana Beach Park. On the other hand, many of those more familiar with the naturally rocky character of the shoreline, as well as existing Native Hawaiian archaeological features, were pleased with the developer's current plans to preserve the area in its present form, provide trails, and establish a 400-foot setback area. Some, however, wanted an even greater setback, and even those concerned about protecting the area also wanted to be sure that public access is assured. Most seemed to want restroom facilities and a parking area for shoreline users. Possible mitigation measures discussed were to support high priority community infrastructure needs, including more shoreline parks.

4.5.4.2 Issues Related to Project Scale and "Growth-Generating" Nature

The greatest community concern about the proposal was the sheer scale of proposed time-share and hotel development, and associated strains on infrastructure, including housing needs, from visitors and in-migrant workers.

The SIA noted a deep strain of public distrust that either government or developers can or will succeed in resolving growth-related "infrastructure overwhelm." People appeared so traumatized by the existing area-wide traffic situation that they often did not seem to register either (1) current government efforts to build new road capacity, or (2) the developer's commitment to extend Kealakehe Parkway to Kuakini Highway and Kailua-Kona through its own property and the adjacent parcel owned by the Queen Lili'uokalani Trust.

Similarly, most interviewees reacted to the proposed scale in relation to the current extreme West Hawai'i labor shortage; only a few noted the current construction boom is tapering off and that harbor expansion could arguably help maintain the construction industry.

A number of interviewees expressed dismay that DLNR has prohibited any owner-occupied housing uses on the property. They felt that such uses would be "growth-absorbing" rather than "growth-generating," and they urged reconsideration of this policy.

The SIA notes that some people raising this issue were concerned about maintaining West Hawai'i's historical rural character, and it is inherently difficult for any large project to meet that group's concerns. However, many others were more concerned about correcting infrastructure deficits and better planning of future growth.

Issues related to population growth are not unique to Kona Kai Ola. In 2002 and 2005, the Hawai'i Tourism Authority (HTA) included small "West Hawai'i" samples in its statewide "Survey of Resident Sentiments on Tourism in Hawai'i." Critical issues included cost of housing and traffic, followed by population growing too fast. The survey also found that almost everything – with the exception of availability of jobs – was more likely to be considered a "big problem" in 2005 than in 2002. The West Hawai'i results were similar to those from most other parts of the state.

The survey also found an erosion from 2002 to 2005 in West Hawai'i resident support for tourism growth, belief in the overall benefits of tourism, although a majority still did feel tourism had brought more benefits than problems, and particularly in the need for more tourism jobs. Based on even earlier statewide survey results, the 2005 HTA report noted that resident support for expanded tourism employment is cyclical – it shrinks when tourism is strong (as at present) and then expands again when tourism has down times.

In addition to the results shown in these two exhibits, the 2005 survey included a number of other questions. Several dealing with local government performance indicated a frustration with infrastructure overload from recent growth:

- 66% of West Hawai'i residents said government had done a "poor job" of building new infrastructure to keep up with growth in resident and visitor population.
- 45% gave government "poor" marks (vs. just 32% "good," and the rest unsure) for planning and controlling tourism-related growth.
- 40% said "poor" (vs. 20% "good") for balancing the economic benefits from tourism against the need to control problems caused by tourism.

Thus, it appears that much of the negative sentiment toward tourism growth may be rooted in the current perception of infrastructure overload.

Possible mitigation includes the up-front construction of the Kealakehe Parkway – Kuakini Highway connector to Kailua, as well as fulfilling all affordable housing requirements and developing provisional plans for housing construction workers if they need to be imported. Job training programs in conjunction with project implementation will also help to mitigate potential social impacts. ~~Further, JDI will establish~~ Further, JDI established the Kona Kai Ola Community Foundation to support community efforts such as community development, community health care, job training, educational and cultural programs and projects ~~and will contribute~~ contributed \$100,000 as initial funding.

4.5.4.3 Project Compatibility with Existing and Emerging Community

Short-Term Compatibility with Neighboring Uses: The most immediate compatibility concern is with the Kaloko-Honokōhau National Historical Park north of the project. The park primarily borders the existing DLNR harbor; only a relatively small part of the Kona Kai Ola project (in its northeast corner) would share a roughly 1,000-foot boundary with the park. Park officials have expressed a number of concerns about the project, including environmental impacts and that the project includes some land on the south side of the harbor entrance which Congress included in the Park's "legislative boundary" but which the State has never actually transferred.

There is a general sense that the Park's intended experience for both visitors and Native Hawaiian cultural practitioners assumes a certain solitude. This concern is not just related to Kona Kai Ola but also various other projects that will surround the Park with urban activities. Kaloko-Honokōhau National Historical Park is situated in the middle of the major urban growth corridor of Kailua-Kona, as identified in the Kona Community Development Plan. Compatibility of this urban growth adjacent to the park can be achieved through careful planning to prevent negative impacts on water quality, air quality, noise levels, and light levels at night, and other areas of concern to the Kaloko-Honokōhau National Historical Park. In addition, areas within the legislative boundary of the National Historical Park that are located on part of the project site, can be managed in a compatible manner through a cooperative arrangement with the National Historical Park to ensure proper consultation and coordination for any management measures taken with the cultural sites and anchialine pools located along the shoreline. The 400-foot setback along the shoreline protects these National Historical Park resources in a cultural park that has a priority purpose of protection of these important cultural resources of structures and anchialine pools. A related concern is that staff resources could be overwhelmed with higher than expected visitation rates.

Possible mitigation to address compatibility concerns includes working closely with Kaloko-Honokōhau National Historical Park NPS regarding the Harbor Master Tower on the harbor master observation hale, as well as regarding the management of, anchialine ponds, pools and cultural sites in the shoreline cultural park area. In addition, buffer areas/zones along the boundary of the project site with the Kaloko-Honokōhau National Historical Park will need to be developed to protect the ambience of the park. Further, education programs for Kona Kai Ola visitors about park resources, fragility, and cultural protocols will promote compatibility.

The proposed Kona Kai Ola structures are designed to blend with the natural terrain, use site appropriate xeriscape landscaping and utilize earth tone colors and natural materials, to the degree possible. The proposed harbormaster facility's close proximity to the National Historical Park boundary requires special consideration to ensure that the visitor visual experience from the Park is not compromised. While there are no actual visual guideline requirements for the preservation of views from the Park, Kona Kai Ola has been, and will continue to work with the National Historical Park Service to ensure that visual experience is preserved to the degree possible while ensuring safety of the harbor entrance.

Another short-term question is whether Kona Kai Ola will support or compete with the Kailua Village visitor area. Some interviewees assumed there will be synergy; others assumed competition. The actual outcome cannot be easily predicted, because it depends not only on what Kona Kai Ola does, but also upon success of the current new Kailua Village Business Improvement District or other efforts that reshape Kailua over the next few years.

The proposed shuttle and water taxi services, as well as the Kealakehe Parkway connector to Kuakini Highway in Kailua, will help to foster a good relationship between on-site businesses and Kailua Village.

Long-Term Relationship with the Future Character of Kona: Interviewees were divided on whether to accept an urban future for Kona. If one believes, however, that Kona is evolving into a city extending from Keauhou to Keāhole, then the Kona Kai Ola project – along with Kailua Village and the intervening, yet-unplanned Queen Lili'uokalani Trust "Urban Expansion Area" – will comprise the coastal core of that city. Thus, what happens or does not happen at the project site will be very critical for the long-term character of urban Kona.

An assessment of long-term compatibility with the Kona region is as follows:

- *Marine Orientation:* The Kailua area has been traditionally connected to boating and deep-sea fishing. That sort of active interaction with the ocean – not simply using it as a scenic backdrop, as many resort areas do – makes Kona Kai Ola very compatible with the history of West Hawai'i. The enlarged marina can open the doors for expanded marine support industries and connections with ocean research occurring elsewhere in the region. It can build upon a relatively unique aspect of Kona's identity, separating it from the slower-paced resort and second-home enclaves north of the airport. It potentially revitalizes and reinforces the area's "sense of place."
- *Opportunity for Native Hawaiian Identity Through Regional Planning:* A possible future for Kona Kai Ola and West Hawai'i, even with a thriving maritime orientation, is that it will increasingly feel like a colony of Southern California.

However, some interviewees noted the project is located within a "triangle" of properties with important Native Hawaiian linkages: the National Historical Park to the north, the yet-little-developed Queen Lili'uokalani Trust lands to the south, and DHHL's expanding Villages of La'i 'Ōpua to the east (mauka) and in the same ahupua'a. They noted that Kona Kai Ola development plans already include tentative linkages such as the connector road through Queen Lili'uokalani Trust lands and possible shuttles for workers living mauka of the site. Several suggested that government and landowners immediately north of Kailua work together on regional plans, both to address infrastructure questions and also to ensure incorporation of Hawaiian cultural values.

- *Resident and Visitor Social Integration ("Mixed Use")*: If leisure activity continues to drive the growth of West Hawai'i, one critical aspect of its future character will be the extent to which there is de facto segregation of visitors and residents. There is unease about the growing prevalence of gated communities. If the Kona Kai Ola project, in the heart of the possible future city, feels unwelcoming to residents and a place for affluent yachters and other visitors alone, there may seem little hope for successful integration elsewhere. The Kona Kai Ola developers explicitly aim for a "Mixed Use" development that brings residents and visitors together. Success in achieving that goal is critical, and so our final discussion below summarizes likely factors in achieving such success.

4.5.4.4 Likely Drivers of "Mixed Use Success"

Interviewees were asked about various project components intended to draw residents into the project because 1) of the social importance of the envisioned resident-visitor interaction, and 2) it is a social experiment of sort for the Big Island. Key factors are likely to be, in order:

- Assurance of meeting the needs of existing recreational boaters.
- Provision of marina amenities, such as a fishing club and yacht club, public promenade around marina, canoe park, and walking and cycling trails to connect with the marine science center and seawater lagoons.
- Provision of shoreline and ocean recreational facilities.
- Provision of community facilities in the seven acre parcel designated as a "Community Area."
- Provision of public parking at the marina and shoreline.
- Provision of a cultural park and related facilities to perpetuate the Hawaiian cultural heritage of the site.

4.6 Economic Environment

A market study was prepared to quantify the demand in West Hawai'i for the various uses proposed in the proposed project, determine if there is market support for the uses proposed in Kona Kai Ola, and estimate the market absorption for the primary components. The market study conclusions were the basis for the economic impact analysis, which was then translated into a public costs / benefits assessment. The market study, economic impact analysis and public costs / benefits assessment are contained in Appendix C-1B.

4.6.1 Tourism in Hawai'i and Hawai'i Island

On an overall basis, statewide and regional tourism trends are supportive of the proposed subject development.

Tourism in Hawai'i has recovered strongly since the September 11th, 2001 terrorist attacks, which interrupted a gradual and extended upcycle that peaked during the prior year. Demonstrating the strength of the island visitor industry, the market quickly rebounded and continued to grow through 2005, with total arrivals up seven percent from the prior year, reaching an all-time high of 7.38 million. Records were also achieved in regards to total visitor days (67.1 million) and total visitor expenditures (\$12.75 billion). As more people are spending more days and more money in Hawai'i, the tourism industry must be considered strong.

The neighbor islands have been the biggest recipients of the recovery and upward trends, all showing growth during the past four years, with the Big Island experiencing substantial gains during the last three. Hawai'i County arrivals were up 16.7 percent in 2005 to a record 1.49 million persons, and are up another 6.5 percent for 2006 based on data through September.

There were a record 9.8 million visitor days spent in the County last year, up 16.6 percent from 2004, and visitor expenditures were also at all time highs totaling \$1.9 billion. These figures are expected to be achieved or surpassed again this year.

It is estimated that upwards of 93 percent of Big Island tourism is directed to West Hawai'i, a figure anticipated to continue climbing as further visitor interest drives resort development in the study area, while other locales further age or remain minor destinations.

Kona and Kohala hotels have experienced full-recovery since 9/11, with major gains in 2005 moving them to all-time marks. Occupancy averages for Kona and Kohala hotels are at 75 and 72 percent, respectively, just off from last year's level. Profit margins for first class and luxury hotels in West Hawai'i are also up across the board over the past four years, several points above statewide average growth.

The West Hawai'i Economic Market Sector, which stretches along the leeward coast of the Big Island from the North Kohala through South Kona Districts, has evolved significantly over the last two to three decades, creating a vibrant, urbanized, freestanding economy that will continue to generate increasing demand for a wide range of land use types over the long-term.

The majority of private capital invested in Hawai'i County of late have been focused towards West Hawai'i's coastal destination resort communities, resident housing construction in the existing towns, and in the industrial/commercial districts of Kailua-Kona (particularly its northerly reaches). Much of the continuing expansion of urban Kailua-Kona will occur in the corridor between Kailua-Kona and the Kona International Airport, from the shoreline to the mauka forests.

The lower elevations, encompassing the Kona Kai Ola property, will continue its transformation into the central mixed-use core of West Hawai'i containing a vast array of uses including ~~resort~~ visitor accommodations, industrial/commercial, civic/public, and residential, along with large park/conservation areas along the ocean. The upland elevations will continue to be primarily residential.

While there has been fall-off from the record levels achieved by some market sectors last year, 2006 will still be among the best ever for West Hawai'i, and continue the general overall upcycle which began late last decade.

The economic, demographic and real estate trends are highly favorable in the primary study area over the coming two decades; the period during which the subject community would be developed.

4.6.2 Market Appropriateness

4.6.2.1 Suitability of Project Site for Proposed Uses

The master plan of the proposed development is appropriate for the region in which it is located, competitive with other leading projects in the state, and sufficiently comprehensive to provide a destination experience. It is representative of the highest and best use for the holding.

From a market perspective, the subject site is a good to superior property for undertaking a major ~~resort~~ mixed use community. The property enjoys a favorable location within an expanding community requiring a variety of vacant urban lands to meet a wide spectrum of local resident and (particularly) tourist demands.

The project site has superior mixed-use development potentials given its size, physical and market characteristics, and is among the most appropriate sites in the region for such uses; significantly being the only holding with marina expansion and National Historical Park support potentials. It has an extensive ocean frontage and is adjacent to the major marina facility in West Hawai'i, which will provide the focal theme of the project.

Further, the property is highly proximate to the Kaloko-Honokōhau National Historical Park, and within four miles of the Kona International Airport and central Kailua-Kona. It has access to available infrastructure systems and the region's primary thoroughfare; and, strong visibility, frontage/exposure, and intercept/recognition characteristics.

4.6.2.2 Project Components

The market study found that the greater Kailua-Kona region demonstrates significant demand for new, upscale tourist-oriented uses. There is a necessity for "fresh" lodging, shopping and thematic destinations if the area is to remain competitive with other statewide locales. No new hotel inventory has been built in decades, there has been just a single major time-share project (off-water) in recent years, and little has been done to exploit the marketing potentials of the world-renown Kona fishery. Available tourist-oriented commercial space in Kailua-Kona is near full occupancy, with the general and resident sectors also presently strong, and the subject marina-front village will be an intense, unique destination facility on the Big Island attracting tourists and locals.

The time-share (or interval ownership) sector has been the fastest growing segment of the transient lodging market in recent years, with several hundred new (or converted) units being added annually statewide. Time-share units have higher occupancies than hotels. Users enjoy longer stays, and feel more a part of the community than other travelers, and have spending levels approaching/at typical visitor levels. There is substantial unmet demand for new product in Kona, and it is estimated that the time-share units proposed for Kona Kai Ola would be absorbed in about 15 years if a variety of price and competitive unit types were made available.

It has been a decade since the last major new hotel was constructed in West Hawai'i, and since that time visitor arrivals are up by nearly 50 percent and total visitor nights by almost 30 percent. There are few vacant sites remaining on the leeward coastline, and scarcer still that would support a modern, upscale project capable of achieving room rates competitive with the Kohala hotels. It is estimated that the 700 Kona Kai Ola hotel rooms would require six to ten years to be absorbed, with build-out expected in about seven years from completion of the community's infrastructure.

The marina front commercial village of Kona Kai Ola will be a unique destination facility sure to attract large numbers of regional visitors and residents, and undoubtedly become a major thematic attraction similar to Whaler's Village at Kā'anapali. The demand for the development opportunity will be substantial, as will the interest in finished space. It is anticipated that the village will be one of the initial constructions in the development, and that it will be fully leased-up within 12 to 18 months of completion.

The resident and de facto populations of West Hawai'i are forecast to increase up to 50 percent over the next two decades, creating a demand for an additional two million square feet of leaseable floor space and 230 gross acres of development lands. While there are significant vacant holdings in the greater Kailua-Kona area, the subject highway-front lands will possess several competitive advantages which will enable them to achieve absorption in a reasonable term. It is estimated that 50 acres of highway-fronting commercial sites (supporting some 400,000-plus square feet) will be absorbed within nine years from project infrastructure completion. The "guests/interval owners" of the Kona Kai Ola community alone will create an on-site demand for some 150,000 square feet of floor space.

The demand for marina berthing in West Hawai'i is acute, and has been for more than a generation. The near-shore waters are considered among the best for sport fishing in the world, and offer excellent recreational, scenic and cruising opportunities. The waiting list for slips at the Honokōhau Harbor abutting the subject lands currently stands at 146 persons (effectively at its maximum limit), which equates to a roughly 15 to 20 year wait, at minimum. Another 150 to 300-plus persons would in a brief period lease slips were they made available in the area.

Apart from some limited expansion potentials at Kawaihae Harbor, some 25 miles north and on the outlying edge of the primary market sphere, there are no plans being forwarded to meet the expressed berthing needs of West Hawai'i.

The success of the Ko Olina Marina (O'ahu) demonstrates the ability of a modern, comprehensive, market-priced facility to attract large numbers of boaters. It is forecasted that the 800 slips within the Kona Kai Ola marina will be absorbed in approximately 12 years from initial offering. The adjacent eight acres of marina-supporting industrial lands will also be built-out and the finished space/sites absorbed within the same period (and likely sooner, say, within three to six years). (Hallstrom Study 2006)

4.6.3 Project Economic Impacts

4.6.3.1 Build-out and Absorption

The build-out and absorption of the Kona Kai Ola master plan will require approximately 15 years from groundbreaking, with about three years for infrastructure emplacement, an additional nine years before the final time-share project is completed, and another three years to achieve final sell-out and community stabilization.

Most components will be built-out and absorbed in shorter periods, as discussed in the previous section. The total direct capital investment into the property will be some \$2.2 billion, along with hundreds of millions of dollars in additional "soft" and contingency costs. Local contractors and suppliers will reap an estimated \$219.8 million and \$84.4 million in profits from the development, respectively.

4.6.3.2 Employment and Wages

Some 67,848 "worker years" will be created during the initial 18 years of community development and operation, with total wages of \$2.26 billion. Nearly 8,730 of the worker years will be associated with on-site construction; another 43,643 in on-site hotel, time-share, retail, marina-related, and common element positions; and to contribute an equivalent of 16,835 off-site jobs.

After build-out, the project will have 3,842~~1~~ permanent on-site jobs and contribute to another 1,267 off-site, with total annual wages of \$151.3 million in current dollars.

4.6.3.3 Visitor Spending

The project will begin being populated by interval owners/guests and hotel guests in Year 4 of development. Growing from a daily average of 547 persons that year to a stabilized total of 5,321 persons when build-out and stabilization are reached by Year 18, they will spend an estimated \$2.9 billion during the absorption period, and an annual average of \$311.2 million thereafter. There will be no permanent residents or school-aged children permanently residing at Kona Kai Ola.

4.6.3.4 Sales and Revenues

At stabilization, the operating businesses at Kona Kai Ola will generate an estimated \$557.6 million in annual gross sales; of which roughly 30 percent will come from the ~~resort~~ visitor population and 70 percent from other tourists and residents in the region.

The three hotels, housing 700 total rooms in boutique first-class to comprehensive luxury facilities, will have an estimated minimum \$115.6 million in annual revenues. The supporting businesses in the eight time-share projects are forecast to produce \$65.7 million in total yearly income, and the 500,000 square feet of retail commercial space in the community (including the Marina Village) would have annual sales of \$425.0 million.

The expanded 800 slip marina basin and associated eight-acre industrial area will produce a stabilized gross income of \$18.9 million per year, and the other minor operating components in the development (the proposed clubs, marine center and seawater lagoons) another \$17 million in sales.

The "base economic impact" of the subject to West Hawai'i and elsewhere on the island will grow from \$46.7 million in Year 1 to a stabilized level of \$858.8 million annually; totaling \$7.5 billion during the initial 18 years of construction and absorption. The "overall" economic impact created by the flow of monies through the Hawai'i market will be at least double these amounts.

4.6.4 Public Costs / Benefits Resulting from Project Development

The analysis of the project's overall cost to the state and Hawai'i County governmental services resulting from the subject development was based on both actual and per capita perspective.

From an actual public service cost, Kona Kai Ola will represent only a fraction of the county and state efforts and overall urban/resort lands in use. Given the vast number of housing units, ~~resorts~~ visitor accommodations, businesses, and agricultural lands on the island, it is difficult to assert that the subject development and users will create the need for meaningful expansion of existing public services. Nevertheless, the need for additional services is a cumulative effect. Each project, each resident, tourist and, to a lesser degree, business adds a little bit to the community base until increased "need thresholds" are reached.

As an alternative to actual cost estimates, which are often disparate as they inherently cannot provide for unexpected and/or atypical items, it is most common to project public costs on a per capita allocation based on the population of a given project. Government services are holistic in nature, providing a foundation throughout a community, regardless of actual, specific impact on any given land holding. A subject component may not have a need for off-site parks or schools, but they are essential to the patrons and workers and create the climate in which the business operates. Similarly, government administration, capital projects and public welfare items may have no direct relation to a particular project, but provide the economic underpinnings that enhance general overall economic success.

The total annual "actual" cost to Hawai'i County on a stabilized basis at build-out and full use of the subject development is estimated at less than \$1.5 million per year. The State of Hawai'i direct costs are estimated at circa \$500,000 annually by Year 18 of the projection model.

Using a per capita allocation basis, the total costs to Hawai'i County will escalate from \$788,744 annually in Year 4 of the project, to a stabilized level of \$7.7 million per year upon full absorption. The State of Hawai'i costs will run from \$3.75 million in the first year of occupancy to \$36.5 million yearly at stabilization.

The four primary taxes generated by the development and operation of Kona Kai Ola, and the amounts they are forecast to produce are as follows:

- Real Property Tax to Hawai'i County -- Associated real property taxes will increase from \$1.2 million in the first year to a stabilized annual level of \$19.7 million (using current assessment rates). The total real property taxes collected during the 18 year absorption period will be \$233.6 million.
- Income Tax to the State of Hawai'i -- Driven by the wages of the construction and operational employees in the community, and profits from subject businesses, the subject development will produce income tax payments estimated to grow from \$2.0 million in Year 1 to above \$10 million in high-construction years, before stabilizing at \$8.8 million over the long-term.

During the model time-frame, the total income tax collected is projected at \$146.7 million.

- General Excise Tax to the State of Hawai'i -- These tax receipts will flow from the construction contracts, expenditures in the region by subject workers (on and off-site), the gross sales of operating business, and the off-site purchases of Kona Kai Ola guests. The amount collected is forecast to be at \$6.4 million in the first year of development, reaching upwards \$33 million during major building years, and stabilizing at \$32 million annually after build-out. The state will garner an estimated \$446.9 million in excise taxes during the model period.
- Transient Accommodation Tax -- 18.6 percent of the project-generated transient accommodation tax will go to Hawai'i County and 55.2 percent will go to the State of Hawai'i. Hotel room guests and time-share unit users will have to pay a tax of 7.25 percent on their effective daily lodging rate. For hotel guests the Average Daily Rate being charged is the basis for the tax; for time-shares it is the estimated nightly market rate for a resort-visitor unit of that type.
- This tax collection will begin in Year 4 of the development as the occupancy of the subject inventory commences, and will move upwards from \$1.7 million annually initially, to an estimated stabilized amount of \$12.98 million per year. During the projection period, the total receipts produced by this tax is forecast at \$122 million.

In correlating the public costs with the tax benefits, the result is meaningfully positive in every year for both the State and Hawai'i County, with estimated total positive cash flows of \$333.5 million for the State and \$187.4 million for the County during the 18 year development/absorption period.

The projected County net benefits on a stabilized annual basis are projected at \$14.5 million. For the State, the stabilized benefit will be at \$11.4 million per year.

4.6.5 Workforce Housing Impacts

In response to DEIS comments, a study of possible workforce requirements and related secondary impacts was conducted by The Hallstrom Group; this study is presented in Appendix C-2. This study was based on a four-step study process that included 1) quantification of population and employment projections, 2) analysis of West Hawai'i employment demand and supply, 3) characterization of the subject workforce, and 4) quantification of subject workforce housing impacts.

The population and job count on the Hawai'i Island are forecast to increase by approximately 70 percent during the 24 year projection period that ends in 2030. On average, at least 60 percent of the population growth will be a result of net in-migration to the County.

Although trends will be slowing relative to recent decades, a significant portion of the population and business expansion will be directed towards West Hawai'i. In the next two decades, the population and job count in West Hawai'i will increase by about 80 percent, reaching 128,200 residents and 87,400 employment positions by 2030. The available approved or entitled, proposed and announced new projects and their associated forecast job creation supply will not be sufficient to meet estimated employment demand over time. Further, with the approaching build-out of the major West Hawai'i resorts and residential-orientation of the newer resort communities, few opportunities will exist for expansion in the historically-vital tourism economic sector.

As discussed in Section 4.6.3.2, implementation of the Kona Kai Ola master plan will create a total of 3,842 on-site full time equivalent employment positions in the operating businesses of the development. The project is estimated to be operational around 2012, following completion of infrastructure and Phase I construction, and will continue until the community reaches build-out and stabilization in 2026.

Approximately 45 percent of the jobs will be entry level positions with an average annual wage of \$20,000 in current dollars. Another 40 percent will be mid-level jobs with average yearly pay of \$32,000, and, 15 percent will be management/high-skill positions with wages averaging \$50,000.

Approximately 2,147 of the jobs in the subject project will be filled by persons who have in-migrated to the Big Island. However, only a nominal portion would be specifically relocated to West Hawai'i as a result of the development.

The total net housing load created by Kona Kai Ola in-migrant workers will be 1,074 units. This in-migration will generate a need for a range of 625 to 859 affordable housing units, as follows:

- As discussed in Section 4.5.2.2, under Hawai'i County Ordinance Chapter 11, Section 4 Affordable Housing Requirements, hotel uses generating more than 100 employees on a full-time equivalent basis must earn one affordable housing credit for every four full-time equivalent jobs created. Application of the "1 to 4" ratio to all of the transient units proposed for Kona Kai Ola (hotel and time-share) results in a workforce housing requirement of 625 units.

- Another method of calculating the need for affordable worker housing units is to estimate that approximately 80 percent of the total in-migrant worker need housing that meet affordable housing pricing guidelines. This results in a high end range of 859 units.

Based on affordable housing pricing guidelines, affordable housing units will have an estimated sales price of \$216,000 to \$292,000.

As agreements between the State and JDI prohibit residential development at Kona Kai Ola, workforce housing would need to be located off-site. Probable and desirable locations for workforce housings were based on availability, efficiencies and surveys conducted of area workers. Possible locations in support of Kona Kai Ola included the mid-elevation lands of the Keahole to Kailua-Kona Corridor, between the Queen Ka'ahumanu fronting commercial/industrial developments and Mamalahoa Highway; and in the Waikoloa Village expansion areas.

The most suitable location for workforce housing units is the Villages at La'i'Ōpua community, a DHHL project, or within the Hawai'i Housing Finance and Development Corporation affordable housing development planned for Keahuolū. These are two State-owned undertakings directly across the highway in the same ahupua'a. Locating workforce affordable housing units in these communities would substantially lessen the traffic impacts associated with a community subject workforce. Alternatively, the State lands adjacent to Waikoloa Village would be appropriate.

JDI will comply with all affordable housing requirements of applicable Hawai'i County ordinances.

4.6.6 Market and Economic Impacts Associated with Alternative 1

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County coffers. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The additional commercial sites in the near-highway lands will also be in demand as the area continues its evolution into the northerly gateway of the Kona urban center. The increased retail acreage will further capitalize on the available frontage-related opportunities by generating greater cumulative attraction for the development and enabling increased product diversity supporting a wider spectrum of businesses.

Absorption of the visitor-oriented inventory would be proportionately shorter with fewer hotel and time-share sites and units to be marketed, and fewer marina slips to be filled. The absorption time-frame for the larger commercial component will be longer, while the amount of marina-support and other leasable acreage is the same as in the proposed project and will require a similar absorption period.

Table 3 compares the primary marketable components of the proposed project and Alternative 1 and their estimated absorptions:

Table 3: Primary Marketable Components Comparison Between the Proposed Project and Alternative 1

	<u>Component</u>	<u>Proposed Project</u>	<u>Alternative 1</u>
<u>Hotel</u>	<u>Room Count</u>	<u>700</u>	<u>400</u>
	<u>Estimated Absorption (years)</u>	<u>7</u>	<u>4</u>
<u>Time-share</u>	<u>Unit Count</u>	<u>1,800</u>	<u>1,100</u>
	<u>Estimated Absorption (years)</u>	<u>15</u>	<u>10</u>
<u>Marina</u>	<u>Slip Count</u>	<u>800</u>	<u>400</u>
	<u>Estimated Absorption (years)</u>	<u>9</u>	<u>2</u>
<u>Commercial</u>	<u>Total Acreage</u>	<u>51 acres</u>	<u>143 acres</u>
	<u>Estimated Absorption (years)</u>	<u>8</u>	<u>14</u>

The public costs/benefits associated with Kona Kai Ola will change under Alternative 1 relative to the proposed project, with tax collections generally increasing and per capita costs decreasing.

Owing to the major increases in commercial space, State of Hawai'i income taxes generated by the community on a stabilized basis will increase by 10 to 15 percent annually under Alternative 1 and gross excise taxes by 25 to 35 percent, while transient accommodations taxes fall by approximately 30 percent. Overall, annualized state receipts would increase from \$47.9 million under the proposed project to about \$60.5 million per year in the alternate design.

Because the overall length of absorption is dictated by the time required to absorb the longest selling product-type, there is anticipated to be no significant change in the total project timeframe; the proposed project will require approximately 15 years following infrastructure and Phase I completion, and Alternative 1 circa 14 years. In the proposed project, the 1,800 time-share units set the upper absorption length (15 years); while under Alternative 1 it is in the increased commercial space which will take the longest to absorb (14 years).

There may be some minor time savings in the initial building stage (infrastructure and Phase I), from three years under the proposed project to approximately 2.5 years under Alternative 1 due to the smaller marina basin. The total project build-out will decline from 18 years in the proposed project to about 16.5 years for the alternative.

In Alternative 1, County of Hawai'i real property tax assessments and collections will decrease by 10 to 20 percent, from \$2.2 billion in assessments and \$19.8 million in annual collections under the proposed project to \$1.8 billion and \$16.2 million, respectively. This is due to Alternative 1 having fewer hotel rooms and time-share units but larger commercial development.

Regarding economic impacts, Alternative 1 will result in lesser new capital investment into West Hawai'i in comparison to the proposed project, dropping from \$2.26 billion to \$1.78 billion over the infrastructure build-out period. Profits flowing to local contractors and suppliers would also decline by the same proportion (down 21.2 percent).

Employment in the construction industries would decrease from 8,730 "worker years" during development in the proposed project to about 6,975 worker years in Alternative 1. Stabilized operational job counts would remain about the same in the marina industrial and minor community components under both plans, but hotel employment would fall from 910 full-time equivalent positions to about 525, time-share jobs from 1,260 to 770 and marina demands by about 10 positions.

Employment in the commercial components will nearly double from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the alternative.

Overall, the stabilized employment count at Kona Kai Ola would move slightly upward from the 3,842 FTE on-site and 1,267 off-site positions under the proposed project to some 4,267 on-site and 1,408 off-site permanent jobs under Alternative 1, which represents a gain of approximately 11 percent. Gross employee wages would be slightly lower during the build-out phase in Alternative 1 as there will be fewer construction jobs, but increase from some \$151.3 million per year on a stabilized basis after build-out in the proposed project to about \$167.9 million annually under the alternative.

The effective de facto population of on-site guests at build-out will decline by 37 percent under the Alternative 1 from an average of 5,321 persons daily to 3,363 persons. Their annual expenditures into the local economy will similarly decrease from \$311.2 million annually to \$196.1 million.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from \$557.6 million per year to circa \$814.3 million annually. The total base economic impact resulting from development and operation will similarly increase by between 35 and 45 percent from the proposed project.

Due to the lower de facto population at build-out the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from \$7.7 million annually for the County and \$36.5 million for the State, to \$4.9 million and \$23 million per year, respectively.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some \$12.2 million per year under the Alternative 1 versus \$14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about \$37.5 million annually, up substantially from the \$11.4 million in the proposed project.

4.7 Vehicular Traffic

A traffic impact analysis study has been prepared by Parsons Brinckerhoff, Inc. and is contained in Appendix PØ. The purpose of this study was to determine the ability of an enhanced roadway network to accommodate the proposed Kona Kai Ola development, along with other projected development in the area.

4.7.1 Existing Roadway Network

Primary components of the existing roadway network are as follows:

- *Queen Ka‘ahumanu Highway:* Queen Ka‘ahumanu Highway is a two-lane, undivided major roadway that provides north-south mobility along the Kona coast. Running parallel to the coastline between Kawaihae and Kailua-Kona, Queen Ka‘ahumanu Highway connects to the Kona International Airport, resort areas, and industrial developments along the coast. South of Makala Boulevard, emphasis of the highway changes slightly to allow for more access to the town, sacrificing mobility. In the vicinity of Honokōhau Harbor and Kealakehe Parkway, Queen Ka‘ahumanu Highway provides single through lanes with striped medians and protected left turns. While left turns from Queen Ka‘ahumanu Highway are protected, major street left turns at certain intersections are also permitted during the through phase. There are no bicycle lanes on the highway; however, there is sufficient room in the shoulders to accommodate cyclists.
- *Kealakehe Parkway:* Kealakehe Parkway is a two-lane, undivided neighborhood roadway which provides access from Queen Ka‘ahumanu Highway to the mauka portions of the Kealakehe community including the Villages of La‘i ‘Ōpua. The roadway runs mauka-makai, from Keanalehu Drive, crossing Queen Ka‘ahumanu Highway, and then terminating at the Honokōhau Harbor. The makai extension of Kealakehe Parkway will be the primary roadway within the project, connecting to smaller, local roadways.
- *Kuakini Highway:* Similar to Queen Ka‘ahumanu Highway, the Kuakini Highway is also a two-lane, undivided major roadway. Kuakini Highway runs parallel to Queen Ka‘ahumanu Highway, eventually merging in south Kailua-Kona town. The highway originates at Makala Boulevard, travels south through Kailua-Kona, merges with Queen Ka‘ahumanu Highway and terminates at Māmalahoa Highway in the Honalo area.
- *Makala Boulevard:* Makala Boulevard is a short, mauka-makai roadway which provides access to the Makalapua Shopping Center on the mauka side of Queen Ka‘ahumanu Highway, as well as the industrial area and old Kona Airport runway on the makai side. The roadway also connects Kuakini Highway and Queen Ka‘ahumanu Highway.

4.7.2 Current Traffic Issues

Currently, Queen Ka‘ahumanu Highway experiences significant congestion in the development area during the day. The State of Hawai‘i Department of Transportation (HDOT) is currently widening Queen Ka‘ahumanu Highway from two to four lanes between Kealakehe Parkway and Henry Street in Kailua-Kona. The second phase of this widening project will widen Queen Ka‘ahumanu Highway between Kealakehe Parkway and the Kona International Airport access road. This widening project is key to addressing the existing congestion on Queen Ka‘ahumanu Highway and to providing capacity for future growth in the Kona region.

Part of the reason for the existing congestion on Queen Ka‘ahumanu Highway is the lack of parallel roadways that could provide paths for north/south circulation within the Keāhole - Kailua-Kona region. As a result, the existing Queen Ka‘ahumanu Highway must serve regional, sub-regional, and local traffic. Related to the need for parallel north-south roadways is the need for mauka-makai roadways. These mauka-makai roadways would provide the ability for traffic to circulate between the regional, sub-regional, and local north-south roadways, allowing better use of the north-south roadways.

4.7.3 Existing Transit

Currently, the Island of Hawai'i is serviced by the Hele-On bus system. The area north of Kailua-Kona is served by four routes, including Kona - Hilo, North Kohala - Kailua-Kona, Intra-Kona and Ocean View/Kailua-Kona.

Both the Kona-Hilo route and the North Kohala-Kailua-Kona route occur once a day per direction per route. Both routes use Māmalahoa Highway/Palani Road north of Kailua-Kona. The Intra-Kona route runs five buses in each direction throughout the day starting in the early morning and ending in the evening.

The Ocean View-Kailua-Kona route connects the Ocean View community with the Kona International Airport, making the trip once a day per direction. This route remains on Queen Ka'ahumanu Highway throughout its route, passing by the Honokōhau Harbor twice a day.

4.7.4 Existing Traffic Conditions

The study area intersections were analyzed using accepted methods for signalized intersections in the *2000 Highway Capacity Manual (HCM)*. Operating conditions at an intersection are expressed as Level of Service (LOS) A through F, with LOS A representing free-flow conditions and LOS F representing over-capacity conditions.

- A – Little or No Delay
- B – Short Traffic Delays
- C – Average Traffic Delays
- D – Long Traffic Delays
- E – Very Long Traffic Delays
- F – Demand volume exceeds capacity, resulting in extreme delays with queuing that may cause severe congestion and affect other movements at the intersection.

4.7.4.1 Kealakehe Parkway and Queen Ka'ahumanu Highway

Due to the sheer volume of traffic on Queen Ka'ahumanu Highway, the intersection with Kealakehe Parkway operates at a 220-second cycle during morning and evening peak periods. This is a logical way to process as much through-traffic on Queen Ka'ahumanu Highway as possible. However, as a result, minor street approaches suffer because vehicles back up and wait through the long cycle length. Data collected on April 20, 2006, showed that the AM peak was found to be 7:45 AM to 8:45 AM, which coincides with the AM school peak. The PM peak hour was found to be 2:00 PM to 3:00 PM; but from about 1:30 PM to 4:30 PM, the wait in the southbound direction was persistent.

Both the mauka-bound and makai-bound Kealakehe left/through approaches were found to operate at AM and PM peak periods at LOS F. Overall, the Kealakehe intersection, including all movements, operates with an intersection LOS of C.

4.7.4.2 Makala Boulevard and Queen Ka‘ahumanu Highway

As with the Kealakehe intersection, mauka and makai-bound Makala left movements result in significant traffic delays. The mauka-bound Makala left turn operates at LOS E during the AM peak while the makai-bound left operates at LOS D during the AM and PM peak. Overall the Makala intersection, including all movements, operates with an intersection LOS of C to D.

4.7.5 Projections for Analysis

The year 2020 was used as a base year for future development both with and without the Kona Kai Ola project. This base year was chosen to coincide with the horizon year of the current *Island of Hawai'i Long Range Land Transportation Plan*. Many of these improvements have been identified in the General Plan Interim Amendments: Planning Director's Proposed Changes to General Plan Document.

- Extension of Kealakehe Parkway makai of Queen Ka‘ahumanu Highway connecting to Kuakini Highway
- Construction of Keohokalole Highway mauka and parallel to Queen Ka‘ahumanu Highway
- Construction of the Kealakehe Parkway extension east to Māmalahoa Highway.

For transit, the plan describes improving frequency of service with existing bus routes.

4.7.6 Proposed Year 2020 without Kona Kai Ola Project

Based on a 2.5-percent annual growth factor, analysis shows that there will be some traffic relief on Queen Ka‘ahumanu Highway with the projects assumed to be implemented. Overall, without the Kona Kai Ola project in year 2020, Queen Ka‘ahumanu Highway's LOS is estimated to be about the same as current levels at the Kealakehe intersection and a better LOS at the Makala intersection due to additional roadway improvements and extensions. Minor streets are also projected to operate at satisfactory levels. The construction of the Kealakehe Parkway through the Kona Kai Ola project site and connecting with Kuakini Highway is anticipated to be completed by the Year 2020.

4.7.7 Anticipated Project Impacts and ~~Recommended~~ Proposed Mitigation

With the Kona Kai Ola project assumed to be completed in 2020 and with the proposed implementation of roadways discussed earlier, future traffic volumes have been estimated with the anticipation of added trips from the development. The various components included in Kona Kai Ola will affect traffic levels.

With the project in place, it is estimated that about 1,500 trips will be generated during the AM peak period and about 3,400 trips will be generated during the PM peak period. With the project, traffic volume is estimated to be higher at all of the major intersections compared to traffic without the project. However the timing of the construction of road improvements will be changed with approval of the Kona Kai Ola project. With development of Kona Kai Ola, the Kuakini Highway eExtension road is anticipated to be built within the first two years (Phase 1). This is anticipated to be a more accelerated schedule than would occur without the Kona Kai Ola project.

Overall, the Kona Kai Ola project will impact the nearby road network. Estimated LOS appears to be the same or worse than at levels without the project. There are also increased delays anticipated at all intersections during the AM and PM peak periods compared to delays expected without the project.

Overall, the Queen Ka'ahumanu Highway corridor is expected to operate at an acceptable LOS during both the AM and PM peak periods with the Kona Kai Ola project in place. This is assumed that the proposed roadway improvements will be implemented to accommodate the additional volume. Though many of the proposed improvements have not begun, they will be necessary to handle the increased traffic flow as the Kona Kai Ola and La'i 'Ōpua developments begin. JDI is therefore required by DHHL to complete a range of roadway improvements in the area.

With the improvements in place, intersections and roadways within the study area are projected to operate at an acceptable level. Though many of the turns into and out of the development and nearby communities are rated at LOS C or below, the Queen Ka'ahumanu Highway widening, Keohokalole Highway construction, and Kealakehe extension will help the roadway system operate at an acceptable level.

Based on the intersection operations, the following mitigation measures are ~~recommended~~ proposed to be implemented in conjunction with the proposed Kona Kai Ola development:

- Signalize the Makala Boulevard/Kuakini Highway.
- At the Kealakehe Parkway/Queen Ka'ahumanu Highway intersection, reconfigure the intersection to double left turn lanes, double through lanes turn, and an exclusive right turn lane at all approaches.
- At the Police Station Access Road/Queen Ka'ahumanu Highway intersection, reconfigure the mauka-bound approach to exclusive left through turn, and right turn lanes.
- Strongly promote the use of public transit for hotel/time-share employees. Consider the possibility of employees using an off-site parking lot and bussing in.
- To connect Kona Kai Ola with the neighboring communities, Kona International Airport, and Kailua-Kona Village, the project proposes to sponsor a regularly scheduled shuttle service, so that people could utilize Kona Kai Ola without having to use a car for access.
- Construct and realign Kealakehe Parkway makai of Queen Ka'ahumanu Highway and through the lands of Queen Lili'uokalani Trust connecting with Kuakini Highway in Kailua-Kona in the first phase of the project.
- Improve the Kealakehe Parkway / Queen Ka'ahumanu intersection in its current location.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would generate less vehicular traffic than the proposed project. Alternative 1 would decrease the number of trips generated in the AM peak period 35 percent, from 1,511 trips in the proposed plan to 977 trips, and would decrease the PM peak period by 40 percent, from 3,277 trips in the proposed plan to 1,972 trips.

4.8 Marina Traffic Study

A boat traffic study was completed as part of the Moffatt & Nichol design of the marina expansion and is contained in Appendix Q-1P.

4.8.1 Existing Conditions

Honokōhau Harbor's initial construction commenced in 1969 and included the ocean entrance access channel and outer berthing basin. The inner basin was added in 1976. The entire marina basin was excavated from lava rock. The marina is operated by DLNR under its Division of Boating and Ocean Recreation. Basic features include:

- Honokōhau Harbor has existing 272 wet slips, including 120 slips supporting commercial operations such as sport fishing.
- Navigation access to the ocean is via an approximately 120-foot wide entrance channel.
- The harbor slips are at full occupancy.
- The harbor also has two 2-lane launch ramps with auto parking and trailer parking spaces.
- The outer basin has a fuel dock.
- The primary use of the marina is for recreational boating and related activities including sailing, sport fishing, snorkeling and SCUBA diving, and paddling.
- The proposed project will add marina slips that will access the ocean via the existing marina entrance channel.

The boat traffic study evaluated the impacts of adding a new marina basin with up to 800 boat slips on navigation of recreational boat traffic within the Honokōhau Harbor and the entrance channel. The general approach for the analysis involved quantifying existing boat conditions, conducting interviews with key harbor users and administrative personnel, a review of small craft harbor design guidelines and the quantification of impacts through the use of a boat traffic simulation model. For the Kona Kai Ola project, the boat traffic simulation model called SAMBT (Simulation and Animation Model of Boat Traffic) was used. This model was specifically developed to analyze recreational boat traffic in small craft harbors.

The existing marina has access to the ocean via a 120-foot wide entrance channel. As part of this boat study traffic survey, boat traffic counts through the channel were taken on “typical” and holiday weekdays and weekends between the end of May and July 2006. Currently the marina entrance exhibits relatively mild traffic conditions (LOS C or milder). During peak sport fishing activity, the entrance channel traffic spikes at LOS E during the peak afternoon return period. The traffic flow just barely reaches LOS E at 64 percent of channel carrying capacity. Given the fact that this peak traffic flow can be a common occurrence during tournaments and the sport fishing fleet is generally respectful, this traffic condition is considered tolerable and does not pose a serious congestion issue as could be expected for LOS E traffic conditions. (The LOS – Levels of Service definitions are consistent with those used in Section 4.7.).

An important issue related to the entrance channel is the impact of queuing on traffic congestion and boater safety. Boater interviews indicated that there was no real cause for concern for boats queuing offshore to return to the harbor, since there is plenty of maneuvering area and boaters will be willing to wait their turn. The area of concern was queuing to leave the harbor within the outer marina basin. This area is already congested due to the fuel dock and transient dock area.

Interview Findings

Boat traffic congestion is a subjective topic. The degree of congestion and its impact on the harbor depends on the vessel operator skill and tolerance, vessel type, frequency of congested conditions and impacts of the vessel operator’s use of the waterway. Interviews with both harbor administrators and long time users provide critical information regarding workings of the harbor including traffic patterns, coordination of multiple uses, and any existing problems related to boat traffic congestion. They also provide valuable insight regarding planning for the future marina expansion.

Various individuals and stakeholders were interviewed regarding existing harbor conditions. The general consensus is that the harbor entrance does not become too congested. The channel is highly utilized during peak sport fishing activities, but operates in an orderly fashion. Boats generally transit the entrance channel in two “lanes;” one for outbound and one for inbound traffic. There is insufficient width for two boats to travel abreast if there is opposing vessel traffic in the vicinity.

The amount of trailer boat activity is limited by available parking; tournaments can have up to 150 trailer boats. Significant congestion can occur in the vicinity of the fuel dock resulting from vessel queuing to use the fuel dock or load/unload passengers at the adjacent transient docks. These problems are exacerbated during wave surge conditions in the outer basin.

4.8.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

The new marina will result in an ~~approximately three-fold~~ increase in boat traffic and related marine activities, including fishing, scuba diving, dolphin and manta ray watching, snorkeling, dinner cruises and similar uses. Honokōhau Bay is currently the most heavily used area along the Kona coast for diving and water-related activities, due to the presence of Honokōhau Harbor, the largest and most heavily used recreational and commercial harbor along the Kona coast.

Adding 800 slips in the new marina may cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period.

Following are a comparison of existing LOS conditions and 800-slip anticipated LOS conditions.

- Existing Only – Average Existing Conditions - LOS C
- Existing Only – Peak Existing Conditions - LOS E
- With 800 Slip Project, Average Existing Conditions - LOS E
- With 800 Slip Project, Peak Existing Conditions - LOS E
- With 800 Slip Project, (Holiday) Average Existing - LOS E
- With 800 Slip Project, (Holiday) Peak Existing - LOS F

Concerns have been raised regarding the ability of the existing marina entrance to accommodate 800 additional slips. To address the sensitivity of boat traffic to size of the marina expansion, analyses were also conducted for an alternate reduced-size 600 slip marina expansion. The possible reduction of the marina from 800 to 600 slips results in a reduced traffic flow of 6 percent-11 percent for average and peak conditions. As seen below, the 600 slip marina slightly avoids the LOS F condition under peak holiday conditions.

- With 600 Slip Project, Average Existing Conditions - LOS D
- With 600 Slip Project, Peak Existing Conditions - LOS E
- With 600 Slip Project, (Holiday) Average Existing - LOS E
- With 600 Slip Project, (Holiday) Peak Existing - LOS E

In response to DEIS comments, the sensitivity of boat traffic to size of marina expansion was analyzed for Alternative 1, which features a 400-slip marina. The reduction of the marina from 800 to 400 slips results in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent during peak existing conditions. The LOS improves from E to D during average existing traffic condition, although remains at E during peak conditions

Presently, the Honokōhau Harbor entrance channel has no major traffic congestion problems. The entrance channel can exhibit short periods of high traffic volume during active sport fishing tournament season. The length of the constricted entrance channel is relatively short, thereby reducing congestion impacts. However, the outer berthing basin does become congested resulting from fuel dock and transient dock activities. The development of the new 800 slip private marina would cause a significant increase of boater activity in the harbor entrance and possible severe congestion during peak use periods. Mitigation measures could include traffic control, such as staggering of sport fish tournament traffic, implementation of a permanent manned traffic control tower or harbor patrol, or limiting vessel size.

Other possible mitigation measures include widening the entrance channel or reducing the number of slips to 600. Widening the entrance channel by approximately 50 feet could reduce projected traffic congestion in half. However, the permitting, length of time, and high cost of widening the entrance channel, have made this option not viable. A potential downside to this would be increased wave penetration into the harbor. Reducing the added recreational slip count to 600 may result in an average traffic flow reduction of 6 percent to 11 percent, and avoids the capacity exceedence during peak usage conditions. Regarding reduction of boat slips, the development agreement with DLNR presently requires that JDI develop and construct a new marina basin containing not less than 800 new boat slips.

In response to vessel traffic analysis and DEIS comments, a 400-slip marina design is presented in Alternative 1. This reduction to 400 slips also reduces the problems of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

There was a general consensus among those interviewed that the sport fish charter fleet should not expand due to limited demand and existing significant competition. The allowance of up to 50 percent of the slips in the existing harbor to support commercial operations was cited as partial cause for the excess supply. There was also broad consensus that a harbormaster building for effective observations on entrance channel activities would be a critical element of the proposed marina expansion. Further it was asked that critical consideration be given to a boat evacuation plan in the event of a tsunami.

Regarding moorings, day mooring buoys are currently installed for the State of Hawai'i DLNR Division of Boating and Ocean Recreation through ~~in~~ a cooperative arrangement with the dive charter industry, the Malama Kai Foundation, and the State of Hawai'i. In the coastal reach from Keāhole Point to Keahuolū day mooring buoys are near capacity for the dive operators currently operating out of Honokōhau Harbor. During times when heavy surf closes out sections of the coastline, boats from Keauhou Bay will add to the demand, often resulting in either an aborted dive trip or boats anchoring rather than utilizing the day mooring. Increased levels of diving activities as the result of the new marina will overload the existing moorings.

To minimize the impacts of increased entrance channel traffic, it is ~~recommended~~ proposed that an educational program and appropriate signage concerning boating to educate new and existing boater on rules-of-the-road and entrance channel protocol be developed. This information will include safe navigation during high wave conditions, use of proper judgment when scheduled to leave the harbor during high wave conditions, and proper seamanship if caught offshore during high wave conditions.

Further, effective signage is to be installed cautioning boaters to be aware of both traffic and ocean conditions before leaving the harbor. Additionally, some form of traffic control including staggering of sport fishing tournament traffic, implementation of a permanent manned traffic control tower or harbor patrol, and limiting vessel size should be implemented in the event that excessive traffic congestion becomes an issue.

Consideration should be given by DLNR to extend the "Slow No-Wake" zone out to the first green buoy as vessels enter and leave the harbor's entrance channel. Further, the installation of fifteen additional day-use mooring buoys at sites selected by appropriate regulatory agencies for vessels to use would help prevent anchor damage to coral reefs.

4.9 Trails, Bike Paths and Pedestrian Access

Public access to and through the project site must be maintained from a cultural, recreational and Conservation District perspective. In keeping with the sustainable theme of the development and to ensure and enhance public access to the site, Kona Kai Ola proposes to create a network of trails and pedestrian access points both mauka-makai and laterally along the shore. Bike paths will be included as part of the transportation network. The layout for the entire development at Kona Kai Ola will be designed at a density and scale which encourages walking, biking and transit usage.

Where appropriate, public trails will connect culturally and historically significant features on the project site by improving public access via trails. Per discussions with both Na Ala Hele Trails and Access Program and the Office of Conservation and Coastal Lands, a trail network will be established to and within the 400-foot setback area along the shoreline. Also known as King's Highway or the Māmalahoa Trail, the King's Trail is a rugged lava road built between 1836 and 1855 and extended around most of the island. There is a one-mile section of the trail inside the Kaloko-Honokōhau National Historical Park. No evidence of this specific trail on the Kona Kai Ola project site was disclosed in the archaeological or cultural studies.

Kona Kai Ola will support the development of the Ala Kahakai National Historic Trail (NHT), which was established in 2000 for the preservation, protection and interpretation of traditional Native Hawaiian culture and natural resources. The Ala Kahakai NHT is a 175-mile corridor that extends along the shoreline from Kohala to Puna. Mission goals include

- to provide opportunities to restore, interpret and perpetuate the culture of native Hawaiian;
- to commemorate historic events that occurred along the trail corridor;
- to enhance and preserve the numerous archaeological sites and other cultural resources associated with the trail;
- to contribute to the sustainability of natural resources accessed by the trail;
- to enable public access to the trail through agreements and certification of trail sections within the designated corridor;

The project site is located in the South Kohala / North Kona Management Zone (Ala Kahakai National Historic Trail Planning Team, 2004).

Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

Both the cultural studies and archaeological assessments for this project describe various historic trail sections throughout the site. Most of the remnant trails are partial segments of a possible historic network, but there are no substantial segments intact. These trails will be preserved and enhanced as tThe project will seek to improve public access, preserve and where appropriate, enhance cultural and historical features in the area and emphasize non-vehicle transportation around the project area.

Kona Kai Ola will be designed as a pedestrian friendly mixed-use commercial village that will have a bike path, trail system and sidewalk system to encourage walking and cycling. To support the Ala Kahakai NHT system, The project will connect pedestrian trails that connect to the project site from neighboring lands as a way to help create a trail system that could be part of the ~~Ala Kahakai National Historic Trail~~ system, as well as to implement a bike path, trail system and sidewalk system to encourage these activities.

4.10 Public Services and Infrastructure Facilities

4.10.1 Police Protection Services

The project site is in Beat 633 of the Hawai'i County Police Department. This beat is covered by the Kealakehe Police Substation, which is located on Queen Ka'ahumanu Highway, adjacent to the project site. Twenty-four hour police protection is provided to both North and South Kona with approximately 50 police officers.

Anticipated Impacts and ~~Recommended-Proposed~~ Mitigations

The proposed project will impact police protection services due to increased activity and people at the project site. The project will include venues for recreation and gathering, lodging, shopping and other features that imply community gathering and interaction. These impacts are not significant, however.

Mitigation measures to address such impacts are in two categories. On-site security measures, including security personnel and programs, can help to deter crime. The design of public spaces can also help to deter crime by avoiding isolated areas, using effective lighting and enhancing visibility.

4.10.2 Fire Protection Services

The project site is served by the Kailua-Kona Fire Station, which is located approximately three miles south of the project site, at the intersection of Palani Road and Queen Ka'ahumanu Highway. The station has a single pumper fire truck, life-saving boat, and an ambulance.

A staff of 18 firefighters and emergency personnel provides 24-hour service. Response time to the project site is five minutes.

Anticipated Impacts and ~~Recommended-Proposed~~ Mitigation

The proposed project will impact fire protection services due to the increase of urban uses and on-site population. Mitigation measures to lessen impacts on fire protection services can be achieved through conformance with public regulations related to structures and water fireflow requirements. Specifically, the project will comply with all requirements set forth in the Uniform Fire Code Section 10.207 that refers to fire apparatus access roads, and Section 10.301 (c) that pertains to providing water supply capable of supplying required fire flow.

4.10.3 Medical Services

The project site is served by the State-operated Kona Community Hospital, which is located approximately 14 miles south of the project site in Kealahou. Kona Community Hospital is a 94-bed full service hospital located in Kealahou, and is the primary health care facility serving West Hawai'i. The facility includes 33 Medical Surgical acute care beds; 34 Skilled Nursing/Long-Term Care beds; seven Obstetrics beds; eleven behavioral health unit beds; and, a nine intensive care unit beds.

Patient services include: (HHSC, April 2006)

- 24-hour Emergency Room
- Inpatient & Outpatient Surgery
- Long-Term Care / Skilled Nursing
- Acute Inpatient Care (Obstetrics/Gynecology, Medical/Surgical, Intensive Care, Behavioral Health, Skilled Nursing/Long-Term Care)
- Outpatient Nursing Services (Chemotherapy)
- Rehabilitation Services (PT, OT, Respiratory Therapy, Speech Therapy)
- Pharmacy
- Laboratory and Pathology Services
- Imaging Center (MRI, 16-slice CT Scan, Ultrasound, Echocardiogram, Nuclear Medicine)
- Cardiology
- Radiation Therapy (April 2005)
- Physician Specialties (General Surgery, Internal Medicine, Cardiology, Medical Oncology, Radiation Oncology, Pediatrics, OB/GYN, Urology, ENT, Ophthalmology, Plastic Surgery)

In 2005, utilization at Kona Community Hospital is summarized as follows:

- 4,069 admissions:
- 447 births
- 1,029 inpatient Surgeries
- 1,522 outpatient Surgeries
- 16,015 emergency visits

The hospital was constructed in 1975, and has undergone numerous renovations. A new Intensive Care Unit and expanded operating room area was added in 1990. In 1998-99, the obstetric unit was remodeled, emergency department renovated, and supply and admissions areas expanded.

Limited emergency care services are also available at the privately owned and operated Hualālai Urgent Care facility in Kailua-Kona, approximately 4 miles south of the project site.

State officials recently announced that land was being set aside in Kealakehe mauka of the project site for a Kona Medical Center.

Anticipated Impacts and ~~Recommended-Proposed~~ Mitigations

Kona Kai Ola may impact medical facilities because of the increase in de facto population due to additional visitors, and a likely increase of resident population due to employment-related in-migration. Although residential use is not a permitted use on the leased lands, JDI is planning to construct worker housing on a nearby site that will be leased at below market rents. The extent of in-migration due to employment is undetermined at this time.

The anticipated population growth for the region has stimulated plans for the development of future medical facilities. Potential impacts on existing medical facilities will be mitigated by the addition of new facilities. In the Villages of La'i 'Ōpua located immediately mauka of Kona Kai Ola, a site is designated for Hospital use, and allocations have been made utility needs.

4.10.4 Public Educational Facilities

The Kealakehe Intermediate School located in Kailua-Kona educates students in grades six through eight and had a fall enrollment of 1,052 during the 2004-2005 school year. Kealakehe High School is located near to the intermediate school, and serves grades 9 through 12. The high school's fall enrollment during the 2004-2005 school year was 1,450.

Anticipated Impacts and ~~Recommended-Proposed~~ Mitigations

Since there are no permanent residences permitted at the site, there will be no direct impact on area schools. Although residential use is not a permitted use on the leased lands, JDI is planning to construct worker housing on a nearby site that will be leased at below market rents. A separate analysis of impacts on public education facilities will need to be done for the workforce housing that is to be part of this project, and built off-site and potentially mauka of the project site. No mitigations are ~~recommended-proposed~~ at this time.

4.10.5 Drainage and Storm Water Facilities

The development of Kona Kai Ola may increase drainage flows, quantities, velocities, erosion and sediment run-off. This ~~DEIS-FEIS~~ takes into consideration storm runoff generated from the proposed streets. Each individual development parcel will address its own storm runoff as required. The storm drainage facilities designed for the site will take advantage of the porosity of the existing rocky landscape and the minimal slope, through the use of grading and dry wells, per County requirements. Storm run-off that discharges into the drywell system will tend to migrate towards the manmade lagoons. The lagoons will therefore be lined to prevent influence of such storm runoff. The Hawai'i County Public Works Department generally requires that on-site storm drainage facilities be sized to exceed pre-development drainage quantities, and be designed to result in quantities of storm water leaving the site, not exceeding those quantities entering the site.

Unlike the DLNR property, roadways within the DHHL property cannot be dedicated to the County of Hawai'i in fee. To obtain a license agreement for maintenance with the County, the entire storm water system will be designed to conform to the Hawai'i County Public Works Storm Drainage Standards.

Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

The proposed project will increase the proportion of impervious surfaces on the subject property through paving and reconfigure the topography, thereby adding to total runoff. This will necessitate the development of an appropriate drainage system to handle the increased and altered drainage patterns. Roadways in the new developed configuration will be dedicated to the County of Hawai'i, so the storm drainage system will be required to conform to the Department of Public Works Storm Drainage Standards.

Due to the rocky and porous nature of the soils, the County allows the use of drywells. Drywells typically vary in depth from 10 to 30 feet depending upon the permeability of the underlying soil or rock. Drywells will typically consist of a catch basin type design, with an opening at the curb and gutter. The depth of the catch basin structure will vary depending upon the depth of the rock. During the design of the drywell system, the percolation rates at proposed drywell locations will be determined.

~~Recommended~~ Proposed mitigation measures are as follows:

- The proposed development is located makai of the Underground Injection Well (UIC) line. Since drywells are considered injection wells, the developer is required to secure a UIC Well Permit, from the Department of Health (DOH), Safe Drinking Water Branch.
- Groundwater migration in the area is a concern especially with the construction of natural lagoons within the proposed development. Therefore, the recommendations from a hydrogeologist should be sought to assist with the design of the drywell system.
- All construction activities will comply with the County's grading permit requirements and the State's fugitive dust regulations.
- A National Pollutant Discharge Elimination System (NPDES) permit will be obtained before construction begins and the project will comply with all NPDES permit requirements including implementation and monitoring of all DOH-approved Best Management Practices.

Bioretention is a Best Management Practice (BMP) that would be a highly appropriate application for the proposed development. Further, BMPs utilized in series may incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, raises the level and reliability of pollutant removal. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

Specific design plans will be determined during the permitting process when final designs are developed. It is the intent of JDI to stipulate low impact development techniques as part of the general design guidelines. The Best Management Practices (BMPs) will be very site specific and must be incorporated with the building and landscape design. BMPs will be incorporated to minimize runoff volume and peak flow, minimize the quantity of pollutants in runoff or flows to groundwater, and maximize re-use of storm water for natural irrigation. Specific BMPs will be reviewed as part of the application for the National Pollutant Discharge Elimination System (NPDES) permit which will be required prior to the County's issuance of a grading permit.

Alternative 1 would result in the lowering of the density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces and the creation of more open space. However, roadway areas have increased by about 30 percent. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings.

4.10.6 Waste-Water Facilities

A *North Kona Sewer Master Plan* is being developed for the County of Hawai'i Department of Environmental Management (DEM) to address future sewer improvements necessary to serve projected development in the North Kona region of the Island of Hawai'i. This sewer master plan would then be used to develop an Implementation Study to support the establishment of an "Improvement District" for North Kona by the County Council (NKSMP 2006). Kona Kai Ola is being designed to be consistent with the North Kona Sewer Master Plan and will participate in any subsequent improvement district.

The proposed development is located within the service area of the Kealakehe WWTP. The Kealakehe WWTP is a County owned and operated wastewater treatment plant which has been in operation since March 1993. The WWTP currently receives about 1.8 million gallons of wastewater per day and treats it to R-2 reuse level. The Kealakehe WWTP has a design capacity of 5.3 million gallons per day (mgd) when operating all five of its lagoons. This capacity is considered the 20-year design which was initiated in year 2000. A sixth lagoon was included in the original design but was never constructed. The space for the sixth lagoon remains vacant and undeveloped. Activating the sixth lagoon increases plant capacity to 7.8 mgd. (CP&E 2006)

Wastewater is delivered to the WWTP through an existing 30-inch gravity sewer and 24-inch force main. The 30-inch sewer delivers wastewater from the mauka properties across Queen Ka'ahumanu Highway, while the 24-inch force main transports wastewater from the Kailua-Kona area. Wastewater is discharged into aerated lagoons. The effluent pump station receives the treated wastewater from the lagoons, treats it with chlorine, and pumps it into a temporary sump located across Queen Ka'ahumanu Highway for overland disposal.

Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

The project design peak flow is estimated at a total of 5.7 mgd. Given the current flow of 1.8 mgd to Kealakehe WWTP, the total flow to the plant would reach 7.5 mgd. Currently, the Kealakehe WWTP has a design capacity of 5.3 mgd, and capacity would increase to 7.8 mgd with the activation of a sixth lagoon that remains vacant and undeveloped. Accommodation of the proposed project would require activation of the sixth lagoon.

The sewer system will be comprised of a network of gravity sewers, force mains and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Gravity sewer lines are oversized to provide 15 percent excess capacity at the given slope. With the exception of one sewer line, the gravity lines will all discharge into one of the four pump stations. Over 95 percent of the wastewater generated onsite will be handled by the major pumping stations. The pumps selected for these facilities will be designed to meet peak flow requirements based on the current development proposed at the site. All pump stations will be equipped with a standby pump that will be equal to the largest pumping unit.

The following are ~~recommended~~ proposed to mitigate project impacts:

- The usage of recycled/R1 water would decrease the demand on the domestic water resources and provide an alternate source of irrigation water for many developers. The demand for recycled water was expressed by numerous stakeholders in the project area including the developers of Kona Kai Ola, as part of the research for the *North Kona Sewer Master Plan* (Forum 2002). It is ~~recommended~~ proposed that the infrastructure for the use of recycled R1 water, be incorporated into the sewerage plan.
- The project will need to work with Hawai'i County to upgrade the Kealakehe Waste WWater Treatment Plant so that it operates efficiently and that it treats the effluent sufficiently to produce R-1 reclaimed water suitable for re-use.
- It is anticipated that the Kona Kai Ola project non-potable water facilities, including any R1 irrigation facilities, will ultimately connect to the County's proposed effluent reuse system.

Alternative 1 includes a reduction of hotel and time-share units of 36 percent. Other uses, such as commercial, marina industrial, project support/utilities, and community uses increased by 219 percent. Wastewater flow estimates are population-based using an average flow rate of 80 gallons per capita per day. Preliminary estimates based on unit counts and acreages of other uses resulted in a net decrease in population of about ten percent. Therefore, wastewater flow generation would decrease proportionately in Alternative 1.

Project-related impacts will be discussed with the County of Hawai'i in the development of the North Kona Sewer Master Plan and specific plans for the Kealakehe WWTP. The developer will make its fair share contribution to the improvements at the Kealakehe WWTP.

4.10.7 Solid Waste Facilities

Solid waste generated in West Hawai'i is disposed of at the Pu'uuanahulu West Hawai'i Landfill, a 300-acre facility located approximately fifteen miles north at Waikoloa on the mauka side of Queen Ka'ahumanu Highway. The total amount of solid waste that is managed by the County system was approximately 160,000 tons in the Year 2000. Approximately 45 percent, or 70,000 tons, was deposited in South Hilo Landfill, and approximately 55 percent, or 90,000 tons, was deposited in Pu'uuanahulu Landfill. Recyclers in the County of Hawai'i diverted approximately 13 percent of its waste during FY 1998/1999 compared to a rate of 19 percent for the state and 28 percent nationally. (ISWMP 2002)

Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

Construction-related solid wastes will be generated over a relatively short time period and will consist primarily of vegetation, rocks, and other debris resulting from the clearing and grading of the area as well as the construction of buildings. The operation of the project will also generate solid waste associated with the use and maintenance of the time-share units, hotel units and commercial/marina facilities. As of 2002, Pu'uuanahulu Landfill has more than 12,000,000 cubic yards of permitted air space, which should be enough to accommodate the current waste stream from west Hawai'i for approximately 40 years. This facility is expected to be able to serve the County's needs into the future. However, diversion of waste by recycling and the use of waste reduction technologies would reduce the disposed waste stream and extend the life of the landfill. (ISWMP 2002)

~~Recommended mitigation~~ Project mitigation measures will include:

- Reuse the excavated material on site as much as possible.
- The contractor will be required to remove all debris from the project site, and properly dispose of it at the Pu'uuanahulu Landfill in conformance with County regulations.
- Seek to divert over 50 percent of the waste generated during construction by the preparation and implementation of a construction waste management plan consistent with LEED criteria.
- Create and maintain an extensive recycling program that will reduce waste generated on site by 90 percent.
- Produce compost from the restaurant and time-share buildings for use on and off site for use as natural fertilizer.

4.10.8 Potable Water Facilities

The Hawai'i County Department of Water Supply (DWS) provides and maintains various public water systems on the Island of Hawai'i. Prior to development of wells mauka of the old Māmalahoa Highway, the main source of potable water was the Kahalu'u Shaft Wells. Water was pumped from the Kahalu'u Shaft Wells to storage tanks to the north to provide service. As development progressed, DWS recognized that the development of wells mauka of the old Māmalahoa Highway was imminent. Presently, DWS has wells in operation within the Kealakehe sector.

- Honokōhau Well (State Well No. 4158-02)
- Keahuolū (QLT #I) Well (State Well No. 4057-01)

There are other planned water improvements to the DWS system in the area. DHHL and the Hawai'i Housing Finance and Development Corporation (HHFDC) anticipate development of four wells mauka of the old Māmalahoa Highway to support their projects. These wells include:

- Kealakehe Well (State No. 4057-04)
- North Keōpū Well (State Well No. not available)
- South Keōpū Well #3 (State Well No. 3957-02)
- Keōpū Well (State Well No. 3957-03)

Water system improvements, including wells, reservoirs and mains, for private development are usually dedicated to the County DWS after they are in operation. As part of the process, private developers secure a Water Agreement with DWS to define the allowable water credits and Facilities Charge for the development.

Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

The Kona Kai Ola Master Development Plan was used as a base to determine estimated water demands required for the project. Water demand is summarized as follows:

- Average Daily Demand = 1,765,750 gallons per day (gpd)
- Maximum Daily Demand = 2,648,625 gpd
- Peak Hour Demand = 8,828,750 gpd

Presently, DWS sources are not adequate to support the project. Source development is a primary requirement. Initial coordination with DLNR has identified two possible sources that may possibly be used for the project. DLNR anticipates a sustainable yield of each well to be approximately 1.5 million gallons per day.

- Keōpū Well #2 (State Well No. 3957-02)
- Keōpū Well #4 (State Well No. 3857-02)

The proposed water system will also include transmission and storage facilities. Initial communications with Queen Lili'uokalani Trust indicates an interest in partnering with Kona Kai Ola and allowing the needed transmission main corridor/easement through their property. However, the Queen Lili'uokalani Trust has not yet identified a development proposal on their property to the south. Water transmission corridors may alternately be coordinated with the State Department of Transportation as part of their highway improvements. While discussions continue with the Queen Lili'uokalani Trust, the storage tank that will serve the project will be located either on TMK 7-4-08:56 or 7-4-20:22. The proposed water system improvements and proposed operation criteria are based on Chapter 5, Hawai'i County Department of Water Supply Potable Water System Design Standards.

It is ~~recommended~~ proposed that the following mitigating measures be used:

- Reduce use of potable water used in fixtures and appliances by 80 percent relative to a basecase building. The development should incorporate innovative water recycling techniques, the incorporation of water efficient fixtures and appliances, and the recycling of graywater for toilet flushing.
- Reduce or eliminate the need for potable irrigation by incorporating Hawaiian or other appropriate dryland plants in the Kona Kai Ola landscaping plan, retention of the black lava features abundant on the site, use of brackish water to irrigate vegetation that is not affected by salt levels and the use of rainwater cisterns and the recycling of graywater from showers, laundry, dishwasher, and hand sinks for irrigation. Irrigation water may also be provided by condensation on cold water pipes buried at the root zone of landscape plants, as has been shown to be successful at the National Energy Laboratory of Hawai'i.
- Reduce demand on existing potable water sources through the possible use of desalination.

Alternative 1 would result in net decrease of about five percent in terms of potable water demand. Similar to wastewater flow estimates, water demand is based on unit counts and acreages of other uses. However, water demand estimates are not population based. The following water demand rates were used:

<u>Land Use</u>	<u>Average Daily Demand</u>
<u>Single-Family</u>	<u>400 gallons/unit</u>
<u>Multi-Family Low Rise</u>	<u>400 gallons/unit</u>
<u>Commercial</u>	<u>3,000 gallons/acre</u>
<u>Industrial</u>	<u>4,000 gallons/acre</u>
<u>Park</u>	<u>4,000 gallons/acre</u>
<u>School</u>	<u>4,000 gallons/acre</u>
<u>Public Facility</u>	<u>4,000 gallons/acre</u>
<u>Hotel</u>	<u>700 gallons/unit</u>

4.10.9 Energy and Communications

4.10.9.1 Electrical

Electrical power on the Island of Hawai'i is provided by Hawai'i Electric Light Company, Inc. (HELCo), a privately owned utility company regulated by the State Public Utilities Commission. HELCo's current generation system capacity is 240MW with a reserve of 29 MW. The Keāhole generating plant, along with some facilities in East Hawai'i, provides capacity to the Honokōhau area. Along Queen Ka'ahumanu Highway, HELCo's existing facilities consist of double 69 kV circuits and a single 12.47 kV circuit on a joint use pole line. HELCo's electrical service to the existing commercial properties adjacent to Honokōhau Harbor consists of a mixture of overhead and underground systems. As the new development roadways are constructed, new and replacement electrical services ductlines will be routed within the shoulders and/or sidewalks of the development roadways and accessways to minimize conflicts with sewer, water and drainage utilities.

4.10.9.2 Telecommunications and Cable

Hawaiian Telcom (HTCo) provides telephone and telecommunications services to the DLNR site while Sandwich Isles Communications has been contracted to serve the telecommunications needs of all DHHL lands. For the DLNR property, duct systems will extend HTCo telephone trunking cables from the existing lines on Queen Ka'ahumanu Highway into the development.

Sandwich Isles is prepared to extend its fiber optic network to this site to service all telecommunications needs on the DHHL parcel. The switch facility for Sandwich Isles Communications is located mauka of the DHHL parcel near Kealakehe High School.

Like telecommunications, Time Warner/Oceanic cable infrastructure will extend from the existing fiber node on Queen Ka'ahumanu Highway into the Kona Kai Ola development.

4.10.9.3 Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

Electrical

Based on discussions with HELCo, expansion of the existing Kealakehe Substation and provision of a Substation Site within the development may be required to accommodate the full extent of this development when coupled with the continuing development of the Villages of La'i 'Ōpua. HELCo's expansion of the Kealakehe Substation is intended to provide the bulk of the capacity for loads in this area. However, HELCo will extend a 12.47 kV feeder from Kaloko Substation to serve as an interim back-up source should Kealakehe Substation be out of service. Since the Villages of La'i 'Ōpua project may be developed in the same time frame as the Kona Kai Ola project, some of the HELCo substation development costs may be shared between the two developments.

Telecommunications

~~As the new development roadways are constructed, the existing telephone services must be reconnected to new infrastructure and the existing HTCo facilities will be removed. A new HTCo owned and maintained facilities will be situated in an easement placed within the development prior to the removal of the existing unit, to provide telephone circuits for the development. After HTCo places their cables, T-1 and higher speed data lines would be available if desired. It is anticipated that Sandwich Isles Communications will provide a fiber optic network to the DHHL property.~~

Seawater Air Conditioning

At this time, seawater air conditioning (SWAC) is being considered as an alternative energy option. A fullFurther description of the seawater air conditioning (SWAC) system is located in Section 3.9.67 of this DEISFEIS. This system consists of 16-18 nodes to circulate cooling water through the Kona Kai Ola development. The cold seawater used to air condition the new buildings at Kona Kai Ola is a very energy efficient system that not only reduces the cost of ownership of the facilities but also has environmental benefits in the reduction of emissions from electric generation stations. There is also less investment required by HELCo to provide electric power for the Kona Kai Ola development. SWAC provides a sustainable, renewable resource that could result in reduced energy costs for the project and a reduced impact on HELCo resources. ~~At this time, SWAC is being considered as an alternative energy option.~~

The following mitigation measures are proposed:

- Reduce building energy use by 50 percent compared to a building that does not incorporate energy efficient strategies such as incorporating significant wall and ceiling insulation, utilizing windows that allow daylight without allowing heat penetration, purchasing energy efficient lighting and appliances, and designing the buildings to maximize natural ventilation.
- Utilize renewable energy technologies on-site to provide the remaining 50 percent of overall building energy use. Examples would be incorporating solar thermal and photovoltaic technologies into each building's architectural features.
- Reduce the site's peak energy demand by 50 percent thus helping HELCo reduce the probability of brownouts and blackouts.
- Reduce site temperature and the need for cooling requirements for buildings by site vegetation, water features throughout the site, reduction of dark pavement, and shading of pathways.
- Implement a Seawater Air Conditioning (SWAC) facility as part of the project.

Telecommunications

As the new development roadways are constructed, the existing telephone services must be reconnected to new infrastructure and the existing HTCo facilities will be removed. A new HTCo-owned and maintained facilities will be situated in an easement placed within the development prior to the removal of the existing unit, to provide telephone circuits for the development. After HTCo places their cables, T-1 and higher speed data lines would be available if desired. It is anticipated that Sandwich Isles Communications will provide a fiber optic network to the DHHL property.

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains unchanged from the original master plan. Although, there is a 36 percent decrease in hotel and time-share units, the increase in other uses (219 percent) offsets the decrease in load demand for hotel and time-share.

4.10.10 Water Features and Lagoons

The seawater system for the marine life exhibits at Kona Kai Ola is a simple system that takes full advantage of the pristine water conditions found off the shores of Hawai'i. Minimal handling of the water ensures a clean, simple and energy efficient system that maintains the quality of the water for the health of the aquatic life and human swimmers while minimizing the impacts to the environment. The exhibits at Kona Kai Ola would consist of the following features:

- Interactive Snorkeling Lagoon
- Ray Lagoon
- Shark Lagoon
- Turtle Lagoon
- Swimming Lagoon
- Associated Holding Pools

The fish, ray, shark and turtle exhibits will display only those species which are found in Hawaiian waters. This is both to showcase the color and diversity found in Hawai'i's undersea ecosystem, as well as the need to protect this fragile environment.

The water treatment system for all exhibits is a simple flow-through system. Because of the pristine quality of the water found off the coasts of Hawai'i, particularly the area of the Kona Kai Ola development, there is no need to add additional treatment to the intake water for the exhibits. Each exhibit gets fresh seawater on a continuous basis. The water in some of the lagoons will get completely exchanged within three hours. All water in fish exhibits will be completely exchanged within two hours and the snorkel lagoon which has both fish and people will be exchanged in approximately 75 minutes. These rapid turnover times will ensure that the water in the exhibits will maintain high clarity and water quality. The high volume of sea water flowing through the exhibits into the harbor basin will dilute any pollutants that enter the harbor basin from the lagoons and the groundwater. This will improve the water quality and will be a positive impact on the nearshore marine environment.

Anticipated Impacts and ~~Recommended~~ Proposed Mitigation Measures

The water for lagoon exhibits is to be brought in through a pair of 56-inch diameter pipes tunneled beneath the shoreline and extending offshore down to a depth of approximately 150 feet. At this depth the pipes will break through the benthic substrate and will lie on the bottom of the ocean bed continuing down slope to a depth of about 200 feet. These pipes will be located just north of Kaiwi Point, along the south property line and will be constructed in parallel with the smaller (36") SWAC pipe that will extend down to a depth of about 3,000 feet. The terminus of the lagoon pipelines in 200 feet of water will be approximately 1,500 feet from the shoreline. The exposed length of pipe will be fitted with slotted risers to intake water from above the benthic substrate.

The depth of 150-200 feet was selected as the optimum extraction depth for several reasons. Nutrient concentrations at this depth are relatively low compared to surface near-shore water, but oxygen levels are still near saturation. Below the action of most surface waves, the water quality at this depth is both high and relatively constant throughout the year. While the temperature of surface waters may vary considerably over the course of a year, at this depth the water temperature is both slightly cooler and much more stable. The intake of high water quality is important both for the maintenance of healthy marine life exhibits and to assure that the quality of effluent water is higher than the natural water quality of the nearshore coastal waters.

Temperatures at the 150-200 foot depth mark are approximately one to two degrees Celsius colder than the water at the surface. Water temperature plays an important role in the health of the marine life. Water that is significantly too cold will stress the marine life and cause them to become less active than they should be. However, water that is too warm is ideal for the growth of algae, parasites, and other pathogens. It is essential that the water be kept cool at all times. The pumping system will add some heat to the water through mechanical agitation. The solar heat gain will also be a factor that must be considered. Supplying water that is one to two degrees Celsius colder than the normal surface water temperatures counteracts the heat gain from the pumping station and solar gain.

The 150-200 foot depth is ideal from a safety and construction standpoint. The depth is very easily achieved by means of directional drilling and the distance off shore is very minimal due to the steep topography of the underwater volcanic cliffs. While the depth of the exposed pipe is beyond the range typically reached by recreational divers, it is still within depths that can be attained by professional divers (using mixed gasses) for annual inspection and maintenance. Screens will be placed at the intake as additional protection from any harm coming to marine life or humans as well as to protect the pipes and pumps.

Seawater will be pumped at the rate of approximately 52,000 gallons per minute. The pumps will be located in an enclosure just inland of the shoreline park. This enclosure will be located just to the north of Kaiwi Point along the south property line. Water will then flow through a pair of buried pipes up to the marine exhibits in the center of the property. This water will be distributed through a network of pipes to the various exhibits. The pipe network will ensure an even distribution of water throughout the exhibits, keeping all areas of the exhibits clean and well circulated.

Water will leave the exhibits through a network of bottom drains and surface skimmers. This network will remove any floating debris through the skimmers as well as maintain good circulation and removal of heavier debris. The water will be discharged into the newly expanded harbor by one of two methods:

- Some water will flow along the surface through a series of lined streams and waterfalls. The liner will prevent saltwater intrusion into the soils, protecting the freshwater layer below ground.
- The remainder of the water will be piped into the harbor. This water will supplement the normal tidal and groundwater flushing of the harbor, increasing the cleanliness of the water within the harbor and improving the environmental impact of the overall development.

Although the total amount of nutrients that will be generated per day will increase from the nutrient output of marine animals and users, the concentration of the nutrients will be lower due to the large amount of water available for mixing within the basin. The overall impact will be a reduction of nutrient concentration in the outflowing water.

Initial calculations show that the large volume of high quality seawater pumped into the harbor (~10 times the groundwater flow volume) will cause all of the mixing with groundwater to occur in the harbor. This will eliminate the present condition where a plume of high nutrient low salinity water exits at the harbor mouth on the surface and mixes with ocean water within about ¼ to 1/2-mile radius of the harbor mouth. This extreme dilution of the incoming groundwater will result in a well mixed outflow of about 33 ppt salinity (full seawater is ~36 ppt) with nutrient loading that is lower than the present coastal waters.

Ammonia-nitrogen concentrations, which are within standards under existing conditions, could increase in the marina where the exhibit flow outfall is placed. This effect could be reduced by reducing the ammonia-nitrogen concentration in the exhibits flow, by reducing the amount of animals in the exhibit.

Kona Kai Ola will include the following proposed ~~Recommended~~ mitigation measures: ~~include:~~

- All water is to be screened prior to discharge for the removal of leaves, trash or other such debris that does not belong in the ocean.
- All surface water streams and waterfall features shall be lined to prevent saltwater intrusion into the soils, protecting the freshwater layer below.
- ~~SWAC~~ SWAC water, with its high nutrient load and cool temperatures should not be introduced into the lagoons or the harbor. The used SWAC water will be disposed of in a deep injection well to prevent temperature and nutrient impacts in the nearshore water. The well will be sufficiently deep to match the temperature of the effluent water.

The water features in Alternative 1 would significantly decrease by 74 percent, from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge.

5 Conformance with Public Plans and Policies

5.1 State

5.1.1 Chapter 343, Hawai'i Revised Statutes

This ~~DEIS~~ FEIS has been prepared in compliance with environmental requirements mandated in Chapter 343 of the Hawai'i Revised Statutes (HRS) and the Environmental Impact Statement Rules, Title 11, Chapter 200 of the Hawai'i Administrative Rules (HAR). An EIS is required for this project since the project will be developed on State lands, includes lands in the Shoreline Setback Area and requires an amendment to the Hawai'i County General Plan.

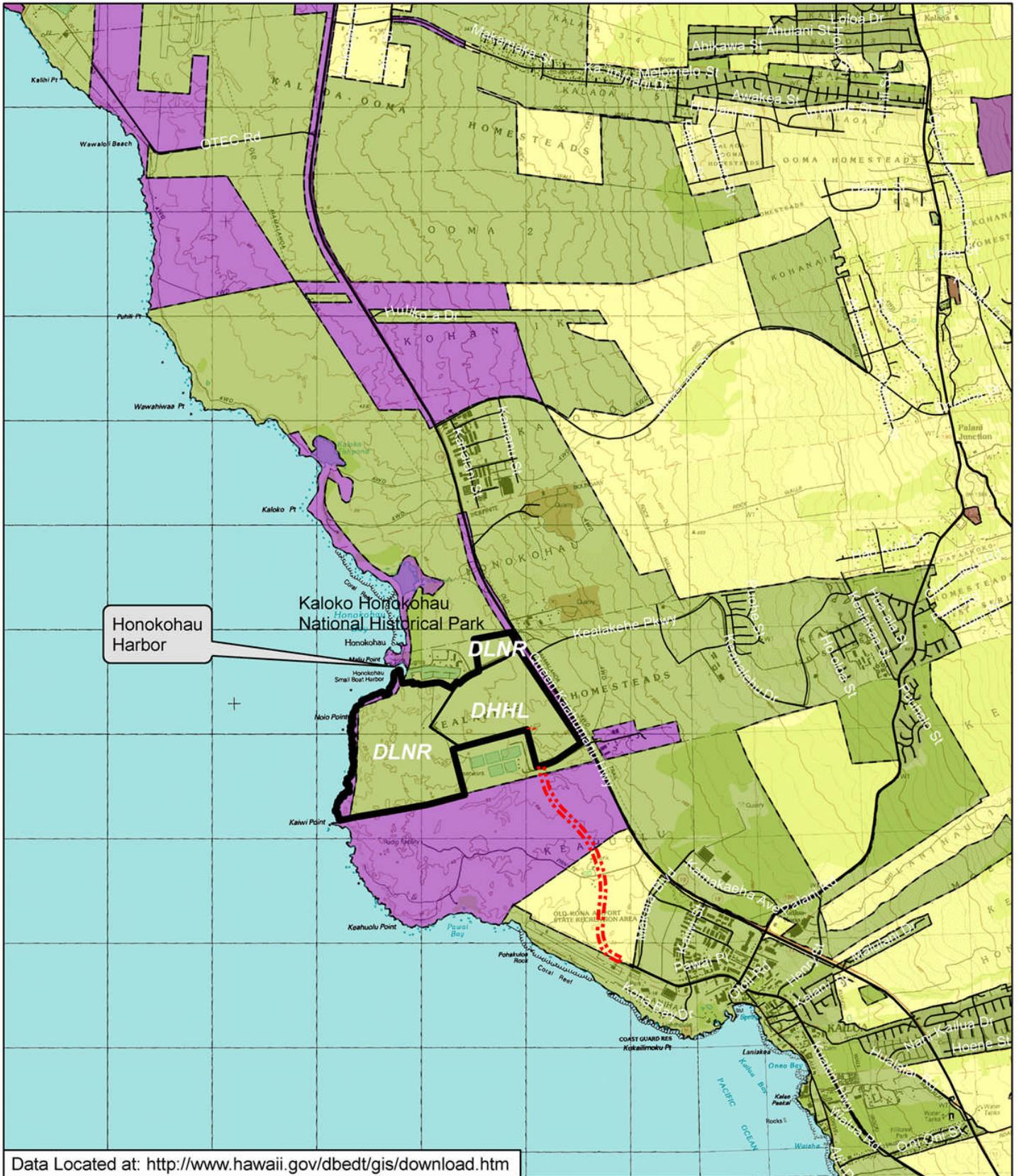
An Environmental Impact Statement Preparation Notice (EISPN) was published on July 8, 2006, and comment letters from agencies and citizens were received in the months of July and August of 2006. Responses to the comment letters were mailed in the week of October 20, 2006. A copy of the comment letters and corresponding response letters are included in Appendix A.

A Draft Environmental Impact Statement was published on December 23, 2006. Ninety-two public comments were received within a 45-day comment period ending February 6, 2007, and comments that were postmarked after this date are also included in this FEIS. All comments letters and corresponding response letters are included in Appendix B of Volume 1 of this FEIS.

5.1.2 State Land Use Law, Chapter 205, Hawai'i Revised Statutes

The State Land Use Law, as set forth in Chapter 205, HRS, establishes the State Land Use Commission (LUC) and provides this body the authority to designate all lands in the State into one of four districts: Urban, Rural, Agricultural, or Conservation. The project site lies with the Urban and Conservation State Land Use Districts. The proposed uses at Kona Kai Ola are consistent with those allowed in their respective Urban and Conservation Districts. The development itself will all be located in the State's "Urban" zone while the "Conservation" lands will remain undeveloped containing open space features such as trails and preserved cultural features. Figures W-8 and X-7 indicate State Land Use designations.

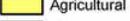
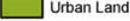
The developer is proposing a 400-foot setback along the shoreline of the project site. Most of the land in this setback is in the Conservation District. Consultations with the DLNR Office of Conservation and Coastal Lands occurred to identify Conservation District Use Permit (CDUP) requirements related to proposed uses in this setback. Separate CDUA applications will be submitted for 1) the Kuakini Highway Extension, SWAC pipe and shoreline park and 2) the Hawaiian Cultural Park and Ocean Front trail. ~~are taking place to identify the best use of this setback and how best to preserve it.~~ Requirements for this conservation setback will likely be incorporated into Conditions of Approval for the Conservation District Use Permit, at the time it is processed.



Data Located at: <http://www.hawaii.gov/dbedt/gis/download.htm>

Figure W: State Land Use Map

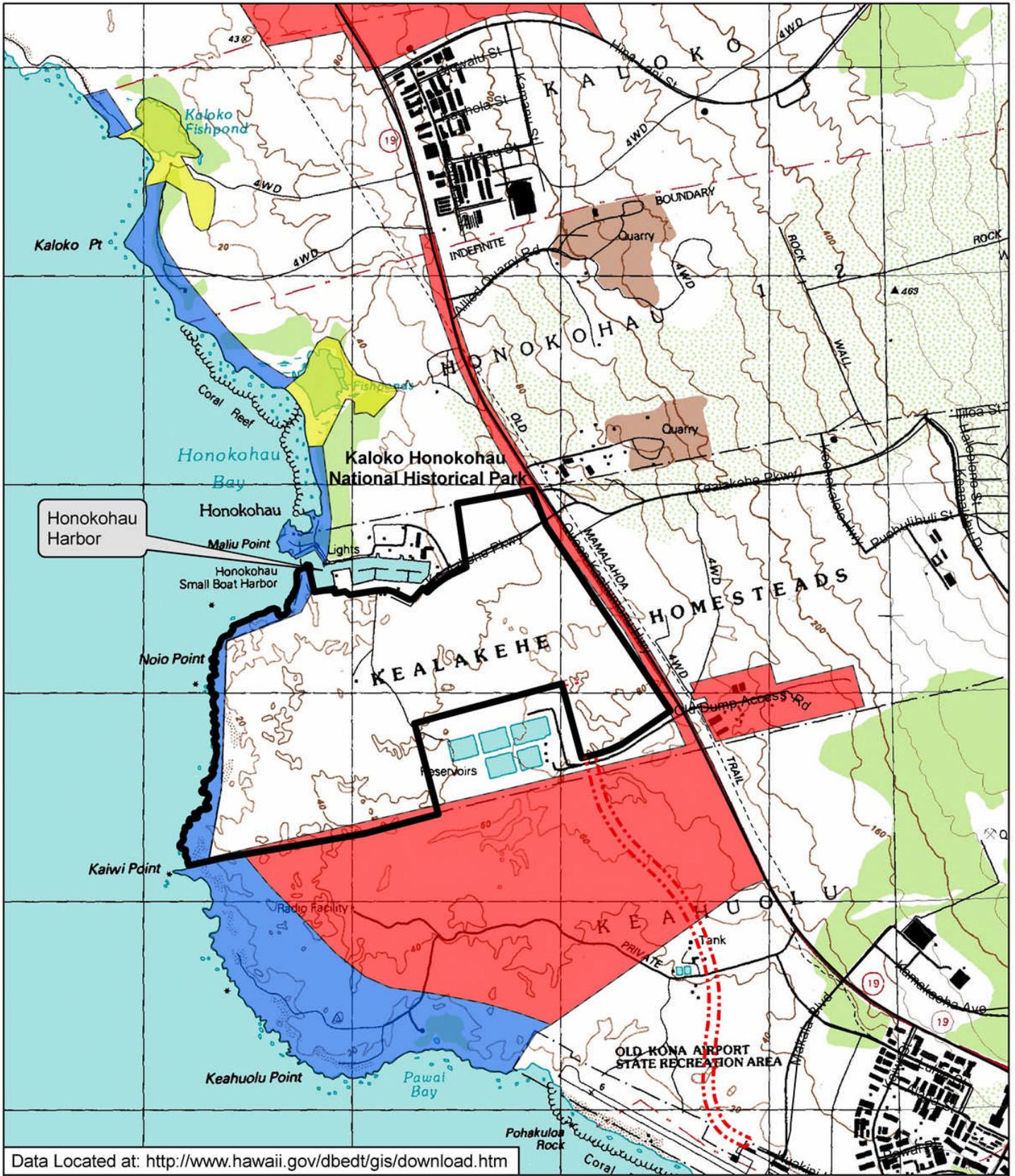
Legend

- | | |
|--|--|
|  Project Site |  Agricultural |
|  Proposed Parkway |  Conservation |
| |  Rural Land |
| |  Urban Land |



0 2,000 4,000 Feet



Data Located at: <http://www.hawaii.gov/dbedt/gis/download.htm>

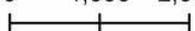
Figure X: Conservation District Map

Legend

-  Project Site
-  Conservation District: General Subzone
-  Protective Subzone
-  Proposed Parkway
-  Resource Subzone



0 1,000 2,000 Feet




JDI
 JACOBY DEVELOPMENT, INC.

5.1.3 Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

The Coastal Zone Management Program, or CZM, is intended to provide the public with recreational opportunities, protect historic and prehistoric resources, protect scenic and open space resources, protect coastal ecosystems, provide facilities for economic development, reduce hazards, and manage development. Objectives that are applicable to Kona Kai Ola are hereby discussed.

Recreational Resources

Objective: Provide coastal recreational opportunities accessible to the public.

Policies:

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

- (i) Protecting coastal resources uniquely suited for recreation activities that cannot be provided in other areas;*
- (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;*
- (vii) Developing new shoreline recreational opportunities, where appropriate, such as artificial lagoons, artificial beaches and artificial reefs for surfing and fishing;*
- (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.*

Discussion: Kona Kai Ola has a distinct ocean recreation theme that fully supports CZM objectives for recreational opportunities. The project includes an 800-slip marina that will expand the region's boating opportunities and support facilities, and a 400-foot shoreline setback will provide full public access along the coast. Throughout the project site, public access trails for walking and cycling will be designed to encourage public access throughout Kona Kai Ola to utilize the public parks, canoe launching areas, cultural areas, and community facilities that are proposed as part of this project. Further a proposed marine science center will help to educate people about coastal habitats and encourage responsible stewardship of these resources.

Alternatives 1 and 2 contain the same recreational resources as the proposed project and would also comply with CZM objective and policies related to recreational resources.

Historic Resources

Objective: Protect, preserve, and where desirable, restore those natural and man made 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 archaeological resources;*
- (B) *Maximize information retention through preservation of remains and artifacts or salvage operations;*
- (C) *Support state goals for protection, restoration, interpretation, and display of historic resources.*

Discussion: As discussed in Section 4.2.2, twenty-nine sites are ~~recommended~~ proposed for preservation based on State criteria and in accordance with the Site Preservation Plan prepared for DLNR – SHPD review and approval. Thirteen of these sites are located within the legislative boundary of Kaloko-Honokōhau National Historical Park. Forty-seven sites are ~~recommended~~ proposed for mitigation through data recovery, based on a detailed Data Recovery Plan that will be submitted to DLNR – SHPD for review and approval. The archaeological surveys found that the mapping, written descriptions, ~~photography and text excavations of 54 sites adequately documents~~ photography and text excavations of 54 sites adequately document them and no further work or preservation is ~~recommended~~ proposed.

Scenic and Open Space Resources

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

Policies:

- (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;*
- (D) *Encourage those developments that are not coastal dependent to locate in inland areas.*

Discussion: Kona Kai Ola will be designed to protect and preserve the area's scenic and open space resources. Consistent with the project's sustainability goals, 40 percent of the project site will be retained in open space. The same proportion of open space would be maintained in Alternatives 1 and 2.

A 400-foot buffer zone along the shoreline will be preserved as open space and no buildings or structures shall be proposed within the 400-foot shoreline setback area, with the possible exception of culturally-related structures. To control building mass near the shoreline, development sites directly adjacent to the shoreline setback area will be limited by design covenants to a lower unit density and height limits. Buildings located further mauka will increase to a maximum of four stories, in keeping with the “coconut tree height” general limit. Along Queen Ka‘ahumanu Highway, the northern edge of the large commercial parcel contiguous to the water feature will be limited to one-story structures. Structures on the remaining area of the parcel will be limited to the equivalent of three stories in height. Further, major roadways, parking areas, and areas surrounding all major structures will be landscaped in accordance with a landscape master plan.

Coastal Ecosystems

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

Policies:

- (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;*
- (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 development and implementation of point and nonpoint source water pollution control measures.*

Discussion: The proposed new marina would significantly increase the size of the water body, but would utilize the existing marina entrance for the water exchange. The proposed marina to the south will intercept additional groundwater, adding these flows to the existing harbor outflow. The proposed marina will not result in any significant increase in groundwater flow to the coastline, but rather a concentration of the existing flows to the harbor entrance. There will be an expanded zone of mixing between the brackish effluent and the surrounding ocean waters due to the concentration of flows at the harbor mouth. The large amount of water will dilute any pollutants that enter the harbor basin from ground water or surface water. This may have a neutral or will improve the water quality and will be a positive impact on the nearshore environment.

Construction of a new marina will have several ~~short-short~~-term negative impacts on coastal marine resources. Direct construction impacts are likely to be small due to the use of a berm separating the construction area from adjacent marine waters which would serve to minimize the discharge of sediment from excavation and dredging. When the final land bridge is removed, silt curtains will be used to minimize the suspended sediment entering ocean waters.

The new marina will serve as a collection point for materials utilized or generated at the development site, either through direct runoff or by interception of groundwater flow. There is the potential that fertilizers, pesticides, petroleum products, road wastes, etc, could be discharged from the mouth of Honokōhau Harbor into the coastal marine environment. Most of the anticipated impacts ~~can~~ will be minimized through a combination of proper facilities design, public education, and enforcement of harbor rules and regulations.

While there may be impacts to anchialine pools with potential changes in salinity in the groundwater, monitoring, management and mitigation measures will be taken to keep a healthy anchialine pool system.

Economic Uses

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

Policies:

- (B) *Ensure that coastal dependent development such as harbors and ports, and coastal related development such as visitor industry facilities and energy generating facilities, are located, designed and constructed to minimize social, visual and environmental impacts on the coastal zone management area;*
- (C) *Direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments and permit reasonable long-term growth at such areas, and permit coastal dependent development outside presently designated areas when:
 - (ii) *Adverse environmental effects are minimized;**

Discussion: The Kona Kai Ola project is being proposed in direct response to the State's efforts to meet the demand for more boating facilities through expansion of State harbors. Project planning and analysis have been undertaken to minimize social, visual and environmental impacts, and mitigate significant impacts that are anticipated. Locating this new marina basin adjacent to the existing Honokōhau Small Boat Harbor is consistent with the policy to direct the location and expansion of coastal dependent developments to areas presently designated and used for such developments. While Alternative 1 would include a smaller marina and less boat slips, it would nevertheless meet public demand for more boating facilities. Alternative 2 would have the same level of marina development as the proposed project.

Coastal Hazards

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

Policies:

- (B) *Control development in areas subject to storm wave, tsunami, flood, erosion, hurricane, wind, subsidence, and point and nonpoint source pollution;*
- (C) *Ensure that developments comply with requirements of the Federal Flood Insurance Program;*

(D) *Prevent coastal flooding from inland projects.*

Discussion: Base flood elevations and flood area designations will most likely change if the marina is expanded as proposed. Further, buildings, primarily along the perimeter of the enlarged marina, along the entrance to the marina and along the shoreline, could be negatively impacted by flooding. Mitigation measures to address flooding impacts include siting the proposed coastline developments out of the current Zone AE and VE flood zones. Further, finished pad elevations will be kept above base flood elevations per the Flood Insurance Rate Map.

Approximately half of the project site is located within a tsunami inundation zone, and structures currently proposed in the tsunami evacuation zone include time-shares, the expanded marina, roadways, infrastructure, and various accessory commercial uses. Most of the area subject to tsunami is within the planned 400-foot shoreline setback. This area could also be subject to high surf, hurricane-force winds, and coastal flooding due to its location along the shoreline. An effective evacuation plan will be prepared and implemented. These same considerations are included in Alternatives 1 and 2.

Public Participation

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

Policies:

- (A) *Promote public involvement in coastal zone management processes;*
- (C) *Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.*

Discussion: The community outreach program for Kona Kai Ola has included community members who are involved in coastal management. Their input was incorporated in project planning, and through an iterative planning process, the master development plan was revised and studies were expanded to address the community concerns. Several design and planning steps were taken to address these community concerns. In addition, the community outreach program continued after the publication of the DEIS. Further information on the community outreach program is presented in Sections 1.8 and 11.

In addition, Kona Kai Ola includes a marine science center that will help educate the community on the coastal environment and good stewardship practices.

Beach Protection

Objective: Protect beaches for public use and recreation

Policies:

- (A) *Locate new structures inland from the shoreline setback to conserve open space, minimize interference with natural shoreline processes and minimize loss of improvements due to erosion;*
- (C) *Minimize the construction of public erosion-protection structures seaward of the shoreline.*

Discussion: The entire shoreline area adjacent to Kona Kai Ola, including 'Alula Beach, will be protected and preserved. A 400-foot buffer zone along the shoreline will be preserved as open space and no buildings or structures shall be proposed within the 400-foot shoreline setback area, with the possible exception of culturally-related structures. Further, to control building mass near the shoreline, development sites directly adjacent to the shoreline area will be limited by design covenants to a lower unit density and height limits. No public erosion-protection structures will be installed seaward of the shoreline. Alternatives 1 and 2 would contain the same level of beach protection as the proposed project.

Marine Resources

Objective: *Promote the protection, use and development of marine and coastal resources to assure their sustainability.*

Policies:

- (A) *Ensure that the use and development of marine and coastal resources to assure their sustainability;*
- (B) *Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency.*

Discussion: JDI had made a corporate commitment to environmental sustainability throughout Kona Kai Ola. Various design initiatives are intended to protect marine and coastal resources. These components include the 400-foot shoreline setback, pumping seawater through the lagoons and marina to improve water quality, and including fisheries conservation and other marine and coastal stewardship education programs in the new marina and marine science center. When the water quality models showed that the 45 acre new harbor basin was not able to circulate well enough, JDI agreed to plan an alternative that included a smaller harbor basin of 25 acres that is projected to meet water quality standards. This responsive planning will ensure that the marine resources of the nearshore waters are protected. In addition, specific management measures will be taken to minimize any potential negative impacts on marine mammals and sea turtles from construction activities and additional vessel traffic from the new harbor facility.

5.1.4 Hawai'i State Plan, Chapter 226, Hawai'i Revised Statutes

The State has set forth a Hawai'i State Plan to serve as a guide for the future long-range development of the State; identify the goals, objectives, policies, and priorities for the State; provide a basis for determining priorities and allocating limited resources, such as public funds, services, human resources, land, energy, water, and other resources; improve coordination of federal, state, and county plans, policies, programs, projects, and regulatory activities; and establish a system for plan formulation and program coordination to provide for an integration of all major state, and county activities.

The following addresses sections of the Hawai'i State Plan that are applicable to Kona Kai Ola.

Section 226-4 State Goals: *In order to guarantee, for present and future generations, those elements of choice and mobility that insure that individuals and groups may approach their desired levels self-reliance and self determination, it shall be the goal of the State to achieve:*

- (1) *A strong, viable economy, characterized by stability, diversity and growth that enable fulfillment of the needs and expectations of Hawai'i'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 Hawai'i that nourishes a sense of community responsibility, of caring and participation in community life.*

Section 226-5 Objective and policies for population:

- (a) *It shall be the objective in planning for the State's population to guide population growth to be consistent with the achievement of physical, economic, and social objectives contained in this chapter.*
- (b) *To achieve the population objective, it shall be the policy of this State to:*
 - (3) *Promote increased opportunities for Hawai'i's people to pursue their socio-economic aspirations throughout the islands.*

Section 226-6 Objective and policies for the economy in general:

- (a) *Planning for the State's economy shall be directed toward achievement of the following objectives:*
 - (1) *Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai'i's people.*

Discussion: Kona Kai Ola is consistent with State goals to provide economic viability, stability and sustainability for present and future generations. The project will transform vacant land into a viable mixed-use development with a distinctive marina and boating focus, recreational attractions, and a wide range of visitor facilities and local resident features. The proposed uses at Kona Kai Ola will broaden the spectrum of business opportunities in the area, and provide a wider range of employment options.

Concurrent with the development of the site with hotel, time-shares, commercial and marina expansion features, the project seeks to create an attractive market for environmentally and socially sound investment activities for the West Hawai'i community. Unlike the recent trend to create secluded and exclusive golf resorts which welcome only higher end visitors, Kona Kai Ola is proposing a truly integrated mixed-use community which is designed equally for visitors and residents, enhances the existing marina and fishing and water recreational businesses, and provides a range of economic opportunities, not limited to typical West Hawai'i resort's employment opportunities. While a resort attracts visitors to spend most, if not all, of their stay within the resort area, the Kona Kai Ola mixed use project will contain features that will target both residents and visitors.

As discussed in Section 2, a golf course was considered as a central project feature in Alternative 2. It was eliminated as a project concept, however, due to market feasibility and the intent to achieve an integrated mixed use project.

The expanded marina will involve employment of skilled marina support jobs, SWAC facility will feature skilled mechanical jobs, marine wildlife park, water features and the marine science center will feature marine biology and environmental education jobs. Finally, the emphasis on preservation of cultural/archaeological features will provide a connection to the Hawaiian cultural emphasis of the area.

Section 226-8 Objectives and policies for the economy - the visitor industry:

- (a) *Planning for the State's economy with regard to the visitor industry shall be directed towards the achievement of establishing the industry as a major component in the steady growth of the State economy.*
- (b) *To achieve the visitor industry objective, it shall be the policy of this State to:*
 - (1) *Support and assist in the promotion of Hawai'i's visitor attractions and facilities.*
 - (2) *Ensure that visitor industry activities are in keeping with the social, economic, and physical needs and aspirations of Hawai'i's people.*
 - (4) *Encourage cooperation and coordination between the government and private sectors in developing and maintaining well-designed, adequately serviced visitor industry and related developments which are sensitive to neighboring communities and activities.*
 - (5) *Develop the industry in a manner that will continue to provide new job opportunities and steady employment for Hawai'i's people.*
 - (6) *Provide opportunities for Hawai'i's people to obtain job training and education that will allow for upward mobility within the visitor industry.*
 - (7) *Foster a recognition of the contribution of the visitor industry to Hawai'i's economy and the need to perpetuate the aloha spirit.*
 - (8) *Foster an understanding by visitors of the aloha spirit and of the unique and sensitive character of Hawai'i's cultures and values.*

Discussion: JDI has committed to sustainability principles in developing Kona Kai Ola, as discussed in Section 1.5.2. Sustainable development includes protection of environmental quality of coastal and marine resources. It also includes energy conservation and waste reduction in the project design, construction and operations. Kona Kai Ola is based on agreements between the State and JDI that call for a cooperative arrangement that meets State economic objectives and includes developer incentives. Project components, including the proposed hotel and time-share units, will help to ensure that the visitor industry is a major economic force.

The visitor industry is vital to the State of Hawai'i in general and West Hawai'i in particular. While diversification in employment opportunities continues to be pursued as a State policy, training and preparation for current and near-future employment in the expanded visitor industry must continue. The proposed project will result in a significant increase in the region's employment opportunities providing a wider range of potential opportunities than ~~atypically traditional~~ limited employment offered by a feature-typical resort. A resort is a concept in which visitors are attracted to spend most, if not all, of their stay within the resort area through the design of amenities that fulfill the needs of a particular visitor market segment. This self-containment is achieved to varying degrees in resort development, depending on the natural, historic/cultural, and recreational resources within a resort site and the intended scale of the resort. Kona Kai Ola is a mixed use development that offers hotel and time-share units that complement an expanded marina, a wide range of community and visitor facilities and commercial areas.

Foremost, the expanded marina will increase employment in the commercial water recreation businesses and marina serving industries.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

- (a) *Planning for the physical environment with regard to land-based, shoreline and marine resources shall be directed towards achievement of the following objectives:*
 - (2) *Effective protection of Hawai'i's unique and fragile environmental resources.*
- (b) *To achieve the land-based, shoreline, and marine resources objectives, it shall be the policy of this State to:*
 - (1) *Exercise an overall conservation ethic in the use of Hawai'i's natural resources.*
 - (2) *Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.*
 - (3) *Take into account the physical attributes of areas when planning and designing activities and facilities.*
 - (4) *Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.*
 - (6) *Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai'i.*
 - (7) *Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.*
 - (8) *Pursue compatible relationships among activities, facilities, and natural resources.*
 - (9) *Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.*

Discussion: The area's natural resources are an integral feature of Kona Kai Ola. These natural resources are what make the project unique. As such, it is in the developer's interest and the community's interest to see that these features are preserved and where appropriate, enhanced.

Per agreements with the State and consistent with State policies, the harbor will be expanded and harbor features enhanced. Anchialine ~~ponds~~ pools are situated on the project site and just north of the project site, within the bounds of the Kaloko-Honokōhau National Historical Park. The DEIS presented information that indicated that ~~While the Kona Kai Ola project will result in the destruction~~ loss of anchialine habitat in ~~of some of these pools due to a possible, and~~ change from brackish water to seawater ecosystems. Further studies conducted in response to DEIS comments (Appendix H-2 and Appendix G-3) indicate that the remaining pools may not change salinity to levels unhealthy to anchialine biology, and that there are realistic mechanisms employed elsewhere that would likely mitigate changes due to salinity changes. Mitigation to protect and enhance existing pools includes an environmental monitoring program that detects changes, and specific measures such as bioretention and salinity adjustment. -Further mitigation will be achieved through for other ponds, mitigation in the form of the creation of new pools. ~~restoration will be offered at other off-site ponds, preferably at locations at the National Historical Park.~~

The historical Hawaiian cultural resources such as heiau, ahu and burial sites, and as proposed by the archaeology study based on State criteria, will be preserved and culturally-related educational features added, where appropriate. The proposed 400-foot buffer along the shoreline will result in the preservation of significant cultural/archaeological, fauna and floral habitats, while ensuring that the shore is accessible and usable to residents and visitors. Alula beach will be protected and public access ensured for those seeking to carry out cultural and traditional practices such as cleansing ceremonies (hiu wai) at this beach location.

Section 226-12 Objectives and policies for the physical environment - scenic, natural beauty, and historic resources:

- (a) *Planning for the State's physical environment shall be directed towards achievement of the objective of enhancement of Hawai'i's scenic assets, natural beauty, and multi-cultural/historic resources.*
- (b) *To achieve the scenic, natural beauty, and historic resources objective, it shall be the policy of this State to:*
 - (1) *Promote the preservation and restoration of significant natural and historic resources.*
 - (2) *Provide incentives to maintain and enhance historic, cultural, and scenic amenities.*
 - (3) *Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.*
 - (4) *Protect those special areas, structures, and elements that are an integral and functional part of Hawai'i's ethnic and cultural heritage.*
 - (5) *Encourage the design of developments and activities that complement the natural beauty of the islands.*

Discussion: West Hawai'i has its own unique rugged natural beauty. While lacking lush vegetation, significant rainfall and an abundance of terrestrial fauna, it does contain a vibrant ocean ecosystem, panoramic vistas, a Hawaiian cultural heritage and a climate conducive to outdoor recreation.

The proposed structures are designed to blend with the natural terrain, use site appropriate xeriscape landscaping and utilize earth tone colors and natural materials, to the degree possible. The proposed harbormaster facility's close proximity to the National Historical Park boundary requires special consideration to ensure that the visitor visual experience from the Park is not compromised. While there are no actual visual guideline requirements for the preservation of views from the Park, Kona Kai Ola has been, and will continue to work with the National Historical Park Service to ensure that visual experience is preserved to the degree possible while ensuring safety of the harbor entrance. A visual impact study was conducted to illustrate various views of the Kona Kai Ola development and is presented in Section 4.3.

It is important for JDI and Kona Kai Ola to honor and protect the cultural history and practice on these lands. Historic sites will be protected according to the Site Preservation Plans prepared for DLNR-SHPD review and approval.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

- (a) *Planning for the State's physical environment with regard to land, air, and water quality shall be directed towards achievement of the objective of the following objectives:*
 - (1) *Maintenance and pursuit of improved quality in Hawai'i's land, air and water resources.*
- (b) *To achieve the land, air and water quality objective, it shall be the policy of this State to:*
 - (2) *Promote the proper management of Hawai'i's land and water resources.*
 - (3) *Promote effective measures to achieve desired quality in Hawai'i's surface, ground, and coastal waters.*
 - (4) *Encourage actions to maintain or improve aural and air quality levels to enhance the health and well-being of Hawai'i's people.*
 - (5) *Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.*
 - (6) *Encourage design and construction practices that enhance the physical qualities of Hawai'i's communities.*
 - (7) *Encourage urban developments in close proximity to existing services and facilities.*
 - (8) *Foster recognition of the importance and value of the land, air, and water resources to Hawai'i's people, their cultures and visitors.*

Discussion: Like any new development, Kona Kai Ola will alter land, air and water quality with its construction activities and long-term increase in on-site people, physical structures and activities. A fundamental approach to Kona Kai Ola will be the incorporation of long-term sustainable development and management features. The vision for the project is to develop a project that has minimal impact on the environment by striving to significantly reduce water consumption, waste disposal, energy use and carbon dioxide emissions. In general these practices are designed to minimize the use of potable water, electricity, vehicles, drainage infrastructure, disruption to groundwater hydrology and impacts to habitats and cultural resources.

The conditions proposed in this ~~DEIS~~-FEIS are designed to minimize, or in some cases improve, the impacts to the resources of the site and region. The project will be required to comply with all provisions and codes designed to reduce the threat to life and property from natural disasters. At the regional level, this development is located within an urbanizing corridor with existing and proposed development in the surrounding area. Infrastructure, while needing to be upgraded and extended, is in the immediate area already. The project is located in close proximity to existing services and facilities found at Honokōhau Small Boat Harbor.

Section 226-14 Objectives and policies for facility systems -- in general:

- (a) *Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, energy and telecommunication systems that support statewide social, economic, and physical objectives.*
- (b) *To achieve the general facility systems objective, it shall be the policy of this State to:*
 - (1) *Accommodate the needs of Hawai'i's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.*
 - (2) *Encourage flexibility in the design and development of facility systems to promote prudent use of resources and accommodate changing public demands and priorities.*
 - (3) *Ensure that required facility systems can be supported within resource capacities and at reasonable cost to the user.*
 - (4) *Pursue alternative methods of financing programs and projects and cost-saving techniques in the planning, construction, and maintenance of facility systems.*

Discussion: The master planning and phasing of Kona Kai Ola allow for coordinated development of infrastructure, consistency of design in the architecture, and economies of scale for capital improvements. The cost of the marina and project-related infrastructure improvements will be borne by the developer resulting in significant savings for the public. The revenues generated for the State through the leasing agreements for this site will provide a significant revenue stream for capital improvement and maintenance of a range of State facilities and projects, providing an added public benefit.

Alternative 1 would generate less impact on certain public facility systems due to a decrease in hotel and time-share units. Wastewater requirements would decrease by approximately ten percent, potable water requirements would decrease by approximately five percent. However, the increase in other uses, namely commercial areas, would result in a net demand load on electrical, telecommunications and cable systems, and the increase in roadways would require additional drainage infrastructure.

Section 226-15 Objectives and policies for facility systems--solid and liquid wastes:

- (a) *Planning for the State's facility systems with regard to solid and liquid wastes shall be directed towards the achievement of the following objectives:*
 - (1) *Maintenance of basic public health and sanitation standards relating to treatment and disposal of solid and liquid wastes.*
 - (2) *Provision of adequate sewerage facilities for physical and economic activities that alleviate problems in housing, employment, mobility, and other areas.*
- (b) *To achieve solid and liquid waste objectives, it shall be the policy of this State to:*
 - (1) *Encourage the adequate development of sewerage facilities that complement planned growth.*
 - (2) *Promote re-use and recycling to reduce solid and liquid wastes and employ a conservation ethic.*
 - (3) *Promote research to develop more efficient and economical treatment and disposal of solid and liquid wastes.*

Discussion: As part of the Kona Kai Ola development, upgrades will be required at the Kealakehe Waste-Water Treatment Plant (WWTP). These upgrades are currently needed at the aging facility to meet current development needs. To serve the waste-water treatment needs of Kona Kai Ola, JDI proposes to work with the County of Hawai'i so that the Kealakehe the WWTP will be brought up to current requirements for health, environment, operation and expanded capacity needs. As noted throughout this FEIS, sustainable development features will be incorporated in this development resulting in re-use, recycling and reduction in solid and liquid waste generated. These sustainable development features would also be present in Alternative 1.

Section 226-16 Objectives and policies for facility systems – water:

- (a) *Planning for the State's facility systems with regard to water shall be directed towards achievement of the objective of the provision of water to adequately accommodate domestic, agricultural, commercial, industrial, recreational, and other needs within resource capacities.*
- (b) *To achieve the facility systems water objective, it shall be the policy of this State to:*
 - (1) *Coordinate development of land use activities with existing and potential water supply.*

- (2) *Support research and development of alternative methods to meet future water requirements well in advance of anticipated needs.*
- (6) *Promote water conservation programs and practices in government, private industry, and the general public to help ensure adequate water to meet long-term needs.*

Discussion: The developer is required to secure new sources of potable water to serve the project site. To minimize the water needs for this development, water conservation measures will be incorporated into the design and operation of Kona Kai Ola. To achieve that end, drought tolerant, xeriscape landscaping will be used, R-1 water will be used for landscaping to the extent possible and low flow water fixtures will be used throughout the development. The developer is working with the County Department of Water Supply to ensure the proposed water infrastructure is designed to accommodate the County goals. In addition, desalination will be explored as another means to diversify potable water sources. Alternative 1 would result in a net decrease of approximately five percent in potable water demand.

Section 226-17 Objectives and policies for facility systems – transportation:

- (b) *To achieve the facility systems water objective, it shall be the policy of this State to:*
 - (6) *Encourage transportation systems that serve to accommodate present and future development needs of communities.*
 - (11) *Encourage safe and convenient use of low-cost, energy-efficient, non-polluting means of transportation.*
 - (13) *Coordinate intergovernmental land use and transportation planning activities to ensure the timely delivery of supporting transportation infrastructure in order to accommodate planned growth objectives.*

Discussion: Kona Kai Ola is in proximity to the State Honokōhau Small Boat Harbor. It is currently anticipated that the proposed marina and the existing harbor will operate independently except for the shared entrance channel. The proposed expanded marina will provide transportation opportunities, and provide for possible use of transit water shuttles to Kailua-Kona.

In terms of land transportation, Kona Kai Ola will generate impacts on roadways and traffic in an already stressed region. Numerous road improvements, including a makai extension of Kealakehe Parkway south to Kuakini Highway in Kailua-Kona, will help ease traffic, reduce air pollution through fewer idling cars in traffic and reduce emergency vehicle delays.

In addition, project sustainability goals include the reduction of transportation related impacts through provision of mass transit options. The project will provide shuttle service linking the airport, Kona Kai Ola, Kailua-Kona, and the mauka neighborhoods in the ahupua'a. Moreover, the development will establish a shuttle system to transport visitors and employees around the site. Further, Kona Kai Ola will be a walkable development. The development hopes to be easily navigable on-foot or on a bike. The proposed project will include numerous walking and biking trails linking site features. Additionally, reducing site temperatures will enhance the walkability of the site. Accessibility and enhanced options for transportation with a consistent theme of reducing vehicle use are proposed at Kona Kai Ola. Bikeways, walking paths, trails and enhanced pedestrian access to the shore are incorporated into the development design.

The layout of the development reduces the need for a personal vehicle. A shuttle service is planned to be used for transporting local residents and visitors between the project site and surrounding neighborhoods, the Kona International Airport, and Kailua-Kona.

Alternative 1 has also set aside 40 percent of the site as parks, open space, roads, seawater lagoons, and community use areas.

Section 226-18 Objectives and policies for facility systems – energy:

- (a) *Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:*
 - (1) *Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people.*
 - (2) *Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased.*
 - (3) *Greater energy security in the face of threats to Hawai'i's energy supplies and systems.*
 - (4) *Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use.*
- (c) *To further achieve the energy objectives, it shall be the policy of this State to:*
 - (2) *Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth.*
 - (4) *Promote all cost-effective conservation of power and fuel supplies through measures including development of cost-effective demand-side management programs, education and adoption of energy-efficient practices and technologies.*
 - (7) *Promote alternate fuels and energy efficiency by encouraging diversification of transportation modes and infrastructure.*
 - (8) *Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications.*

Discussion: Kona Kai Ola will feature the latest energy efficient design and technology available to reduce energy demand of the project. A project environmental sustainability goal is to reduce building energy use by 50 percent compared to a building that does not incorporate energy efficient strategies, as well as use renewable energy technologies on-site to provide the remaining 50 percent of overall building energy use. These measures will help to reduce the site's peak energy demand by 50 percent. By reducing the development's demand during the range of hours that most of the Hawai'i Island's citizens are using electricity, Kona Kai Ola can help HELCO reduce the probability of brownouts and blackouts. The reduction in peak energy demand can be achieved by using smart technologies that control energy use.

It will also maximize the use and production of renewable energy on the project through solar energy production, solar hot water heating, and the use of deep cold seawater for district cooling system. Using cold deep seawater piped throughout the development for air conditioning will result in substantial electrical energy savings and costs for the community and the developer.

Deep, cold, seawater technology is currently being used at NELHA, near the Kona International Airport. It is a logical use in this area considering the hot dry climate, accessibility of deep cold water and the increasing cost of energy and fossil fuels. It is a renewable alternative energy source that will result in long-term cost savings and reduced energy requirements, in keeping with goals and policies of the State and County. Solar hot water heating is also being planned for use throughout the development.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

- (a) *Planning for the State's socio-cultural advancement with regard to leisure shall be directed towards the achievement of the objective of the adequate provision of resources to accommodate diverse cultural, artistic, and recreational needs for present and future generations.*
- (b) *To achieve the leisure objective, it shall be the policy of this State to:*
 - (2) *Provide a wide range of activities and facilities to fulfill the cultural, artistic, and recreational needs of all diverse and special groups effectively and efficiently.*
 - (4) *Promote the recreational and educational potential of natural resources having scenic, open space, cultural, historical, geological, or biological values while ensuring that their inherent values are preserved.*
 - (5) *Ensure opportunities for everyone to use and enjoy Hawai'i's recreational resources.*
 - (10) *Assure adequate access to significant natural and cultural resources in public ownership.*

Discussion: Kona Kai Ola will integrate into its surrounding community, provide diverse activities for the visitors and residents, and result in the promotion and enhancement of cultural, economic, recreational and environmental features which make this specific site unique. The proximity to the Kaloko-Honokōhau National Historical Park provides the opportunity for collaboration for educational, environmental and cultural goals, while the expanded marina will provide new and enhanced water recreational and business opportunities. Instead of featuring a golf course providing relatively passive recreation for a limited number of participants, Kona Kai Ola will be developed around components that are more active, social and inclusive such as seawater swimming lagoons, trails, walkways, parks, and marine life educational and interactive areas. Access to significant natural and cultural resources will be enhanced with the project's proposed shoreline park and trail system.

Section 226-25 Objectives and policies for socio-cultural advancement—culture:

- (a) *Planning for the State's socio-cultural advancement with regard to culture shall be directed toward the achievement of the objective of enhancement of cultural identities, traditions, values, customs, and arts of Hawai'i's people.*
- (b) *To achieve the culture objective, it shall be the policy of this State to:*
 - (1) *Foster increased knowledge and understanding of Hawai'i's ethnic and cultural heritages and the history of Hawai'i.*
 - (2) *Support activities and conditions that promote cultural values, customs, and arts that enrich the lifestyles of Hawai'i's people and which are sensitive and responsive to family and community needs.*
 - (3) *Encourage increased awareness of the effects of proposed public and private actions on the integrity and quality of cultural and community lifestyles in Hawai'i.*

Discussion: The Cultural Impact Assessment and archaeological studies for this site identify various cultural features on the site and in the area, as well as proposing various actions to preserve and enhance them. Paramount among these recommendations, and consistent with the proposed development, is the 400-foot buffer for preservation along the shoreline. Most of the cultural/archaeological features are located here and shoreline access is a desired feature identified by the community. Since much of this proposed buffer is located in the State's Conservation Zone, the developer is working with relevant State agencies to plan on how to enhance and integrate various cultural and archaeological features such as trails, heiau and access in and around the site. Kona Kai Ola will also include close consultation with the local Hawaiian community, and cultural and lineal descendants in these planning efforts.

Section 226-104 Population Growth and Land Resources Priority Guidelines:

- (b) *Priority guideline for regional growth distribution and land resource utilization*
 - (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.*

- (5) *In order to preserve green belts, give priority to state capital-improvement funds which encourage location of urban development within existing urban areas except where compelling public interest dictates development of a noncontiguous new urban core.*
- (6) *Seek participation from the private sector for the cost of building infrastructure and utilities, and maintaining open spaces.*
- (9) *Direct future urban development away from critical environmental areas or impose mitigating measures so that negative impacts on the environment would be minimized.*
- (12) *Utilize Hawai'i'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.*
- (13) *Protect and enhance Hawai'i's shoreline, open spaces, and scenic resources.*

Discussion: The site proposed for Kona Kai Ola is identified as part of the “Preferred Urban Growth Area” for Kona in the Kona Community Development Plan currently being developed by Hawai'i County. In the Keāhole to Kailua Regional Development Plan, the Kona Kai Ola site is the same location selected for the new regional urban center of Kona, as well as a “harbor expansion complex”, connector road from the harbor to Kailua-Kona, and a shoreline park. This was to allow for the Kailua-Kona urban area to grow to meet the needs of Kona, while relieving the pressures of urbanization on the village of Kailua-Kona alone.

The Kona Kai Ola site is identified in the 2005 Hawai'i County General Plan as “Urban Expansion Area” for the DHHL lands, and “Open” for the DLNR lands. ~~Among other Interim General Plan Amendments, the Hawai'i County Planning Director and Planning Commission both recommended to the County Council to amend the General Plan designation for the DLNR lands to “Urban Expansion Area.”~~ On November 29, 2006, the Council approved this an amendment request to change the DLNR lands to Urban Expansion Area. This land use designation is consistent with other regional “Urban Expansion” LUPAG areas, which are located mauka of Queen Ka'ahumanu Highway, and in areas contiguous to the project site, including Queen Lili'uokalani Trust lands to the south. For the most part, these sites are vacant, ~~they~~ do not have an agricultural value, and are located proximate to an existing marina operation with associated support businesses.

DHHL and HHFDC are planning over 3000 homes in the ahupua`a mauka of the project site. As a proposed commercial development project, Kona Kai Ola can provide a stable employment base close to where people live.

From a regional perspective, the project site is located along a logical commercial and industrial corridor between the airport/NELHA and the urban area of Kailua-Kona. The infrastructure improvements associated with this project would not result in the expansion of the urban periphery but would instead be viewed as urban-infill and a response to existing infrastructure inadequacies (~~ie~~, i.e. road network and existing harbor).

Section 226-103 Economic priority guidelines:

- (a) *Priority guidelines to stimulate economic growth and growth and encourage business expansion and development to provide needed jobs for Hawai'i's people and achieve a stable and diversified economy:*
 - (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;*
 - (iii) *Diversify the economy;*
 - (iv) *Reinvest in the local economy;*
 - (v) *Are sensitive to community needs and priorities.*

Discussion: Kona Kai Ola is a State-initiated project intended to contribute to the State's and West Hawai'i's economy. By entering into agreements with the State, JDI is committing to a long-term relationship with DLNR and DHHL. Economic diversification is included in the project with the introduction of a new marina and marina industrial uses. Further, Kona Kai Ola will significantly contribute to the island's and region's economy by generating construction and long-term employment, and providing venues for a wide range of entrepreneurial opportunities and training local residents for the wide range of skilled jobs created by the marina and its surrounding mixed use commercial development.

5.1.5 DHHL Hawai'i Island Plan

In 2002, DHHL completed the Hawai'i Island Plan. This plan provides a comprehensive assessment of DHHL lands and recommends future uses for these lands. Four tracts of land in the West Region (North Kona District) were examined in the Hawai'i Island Plan. The land has been identified by DHHL as one of the only major DHHL parcels with income-generating potential on the west side of the Island of Hawai'i. The Plan lists the Honokōhau parcel as "recommended for commercial use." The plan notes that the parcel is close to Kailua-Kona, which provides various services and amenities. The proposed commercial development proposed at Kona Kai Ola is consistent with policies for this parcel under the Hawai'i Island Plan and provisions of DHHL (DHHL 2002). Figure YU shows the DHHL designation for the project site. DHHL has already begun development of the Villages at La'i 'Ōpua, which will grow into a residential community of over 3,000 homes. The DHHL plan is for Kona Kai Ola to provide a stable employment base close to where people live in DHHL neighborhoods. In addition to employment and business opportunities, DHHL envisions Kona Kai Ola to bring additional public parks, trails, and harbor in order to increase public recreational and cultural access to the shoreline and ocean.

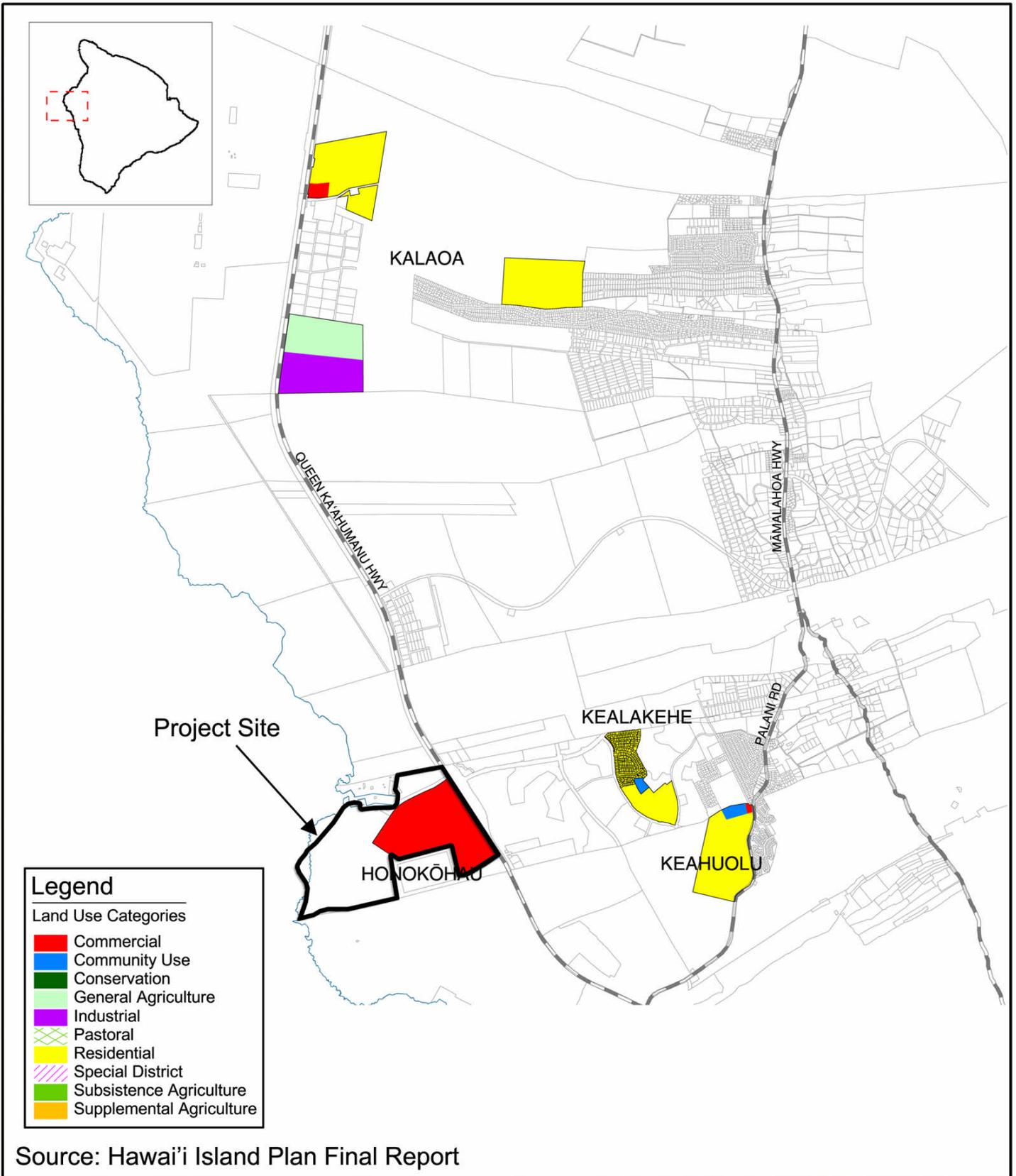


Figure Y: DHHL Island Plan Map



Not to Scale



JACOBY DEVELOPMENT, INC.

5.2 County of Hawai'i

5.2.1 General Plan

The County of Hawai'i's General Plan is the policy document for the long range comprehensive development of the Island of Hawai'i. The purposes of the General Plan are to

- *Guide the pattern of future development in this County based on long-term goals;*
- *Identify the visions, values, and priorities important to the people of this County;*
- *Provide the framework for regulatory decisions, capital improvement priorities, acquisition strategies, and other pertinent government programs within the County organization and coordinated with State and Federal programs;*
- *Improve the physical environment of the County as a setting for human activities; to make it more functional, beautiful, healthful, interesting, and efficient;*
- *Promote and safeguard the public interest and the interest of the County as a whole;*
- *Facilitate the democratic determination of community policies concerning the utilization of its natural, man-made, and human resources;*
- *Effect political and technical coordination in community improvement and development; ~~and~~*
- *Inject long-range considerations into the determination of short-range actions and implementation.*

In the 1989 Hawai'i County General Plan, the land of the project site is designated "Urban Expansion," "Resort" and "Open." All the plans and agreements between the State agencies and JDI were developed to be consistent with this plan. The General Plan was revised in February 2005, when the County Council adopted a revised General Plan for the County of Hawai'i changing the project site Resort designation to Open.

In December 2005, the County Planning Director ~~prepared Draft Interim General Plan Amendments for the County of Hawai'i with related proposed amendments to the Land Use Pattern Allocation Guide (LUPAG) map. The Planning Director~~ proposed that the DLNR portion of the Kona Kai Ola project, designated "Open" in the 2005 General Plan, be amended to "Urban Expansion Area." On November 29, 2006, the Hawai'i County Council approved this amendment. Figure Z contains the most recently released Land Use Pattern Allocation Guide (LUPAG) map that illustrates current designations.

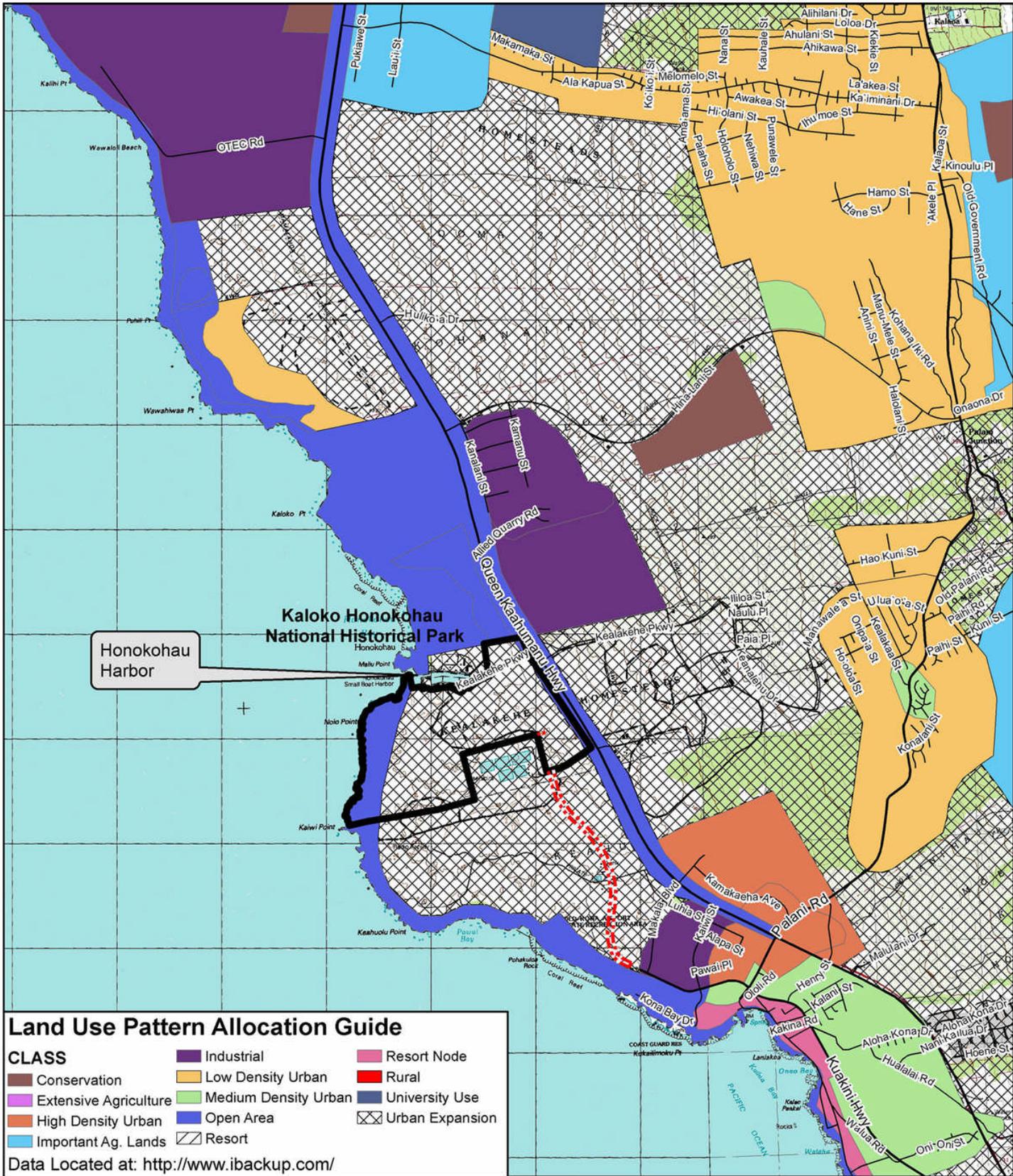


Figure Z: Hawaii County Land Use Pattern Allocation Guide Map

Legend

Project Site
 Proposed Parkway



0 2,000 4,000 Feet



The Planning Director describes the request as follows:

Open to Urban Expansion

Location: Area of Honokōhau Harbor

Rationale: *The State plans to expand the harbor and have some associated commercial and golf course development surrounding the harbor. The development should include a coastal open space buffer, but the exact dimensions can be set at the time of zoning.*

Kona Kai Ola is consistent with the Urban Expansion Area designation. The agreement between JDI and the State identifies hotel and time-share uses as possible development at Kona Kai Ola. The project is not a resort. A resort is a concept in which visitors are attracted to spend most, if not all, of their stay within the resort area through the design of amenities that fulfill the needs of a particular visitor market segment. This self-containment is achieved to varying degrees in resort development, depending on the natural, historic/cultural, and recreational resources within a resort site and the intended scale of the resort.

State and County laws recognize this distinction between a “resort” and a “hotel” or “time share unit.” Section 514E-5, Hawai‘i Revised Statutes, authorizes time share units to be located in a resort area or any other area in which a county may by ordinance allow a hotel unit. The Hawai‘i County Code correspondingly permits hotels and time share units in non-resort zoning districts. The proposed project may include up to 700 hotel units and 1,803 time-share units, and depending on the eventual location of these project components, rezoning may be required for implementation.

Alternative 1 may include 400 hotel units and 1,100 time-share units, intermixed with commercial, marina industrial, as well as the marina, parks, community areas, seawater lagoons, and open space.

Hawai‘i County’s General Plan (HCGP) objectives and policies applicable to the Kona Kai Ola project are hereby discussed:

HCGP 2 – Economic Goals, Policies and Courses of Action

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 Hawai‘i.*
- (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.*

Policies:

- (c) *Encourage the development of a visitor industry that is in harmony with the social, physical, and economic goals of the residents of the County.*

- (d) *Require a study of the significant cultural, social and physical impacts of large developments prior to approval.*
- (f) *Support all levels of educational, employment and training opportunities and institutions.*
- (g) *Capital improvements program shall improve the quality of existing commercial and industrial areas)*
- (p) *Identify the needs of the business community and take actions that are necessary to improve the business climate.*

Courses of Action for North Kona Economic:

- (a) *Resort development in the area shall be in balance with the social and physical goals as well as economic desires of the residents of the district. Necessary pollution controls shall be available prior to development. Other necessary support facilities such as transportation and nursery facilities shall also be provided.*
- (f) *Recognize the natural beauty of the area as a major economic and social asset. This resource should be protected through appropriate review processes when development is proposed.*

Discussion: Kona Kai Ola is consistent with Hawai'i County goals to provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments. Kona Kai Ola provides an economic environment that allows new, expanded, or improved economic opportunities that are compatible with the County's cultural, natural, and social environment. The project will transform vacant land into a viable mixed-use development with a distinctive marina and boating focus, recreational attractions, and a wide range of visitor facilities and local resident features. The proposed uses at Kona Kai Ola will broaden the spectrum of business opportunities in the area, and provide a wider range of employment options.

Concurrent with the development of the site with hotel, time-shares, commercial and marina expansion features, the project seeks to create an attractive market for environmentally and socially sound investment activities for the West Hawai'i community. Kona Kai Ola is proposing a truly integrated mixed-use community which is designed equally for visitors and residents, enhances existing marina, fishing and water recreational businesses, and provides a range of economic opportunities that is wider than offered in a resort, in which visitors are attracted to spend most, if not all, of their stay within the resort area through the design of amenities that fulfill the needs of a particular visitor market segment. ~~not limited to typical West Hawai'i resort's employment opportunities.~~ The expanded marina will involve employment related to skilled marina support jobs, SWAC facility mechanical jobs, and the water features and marine science center will involve employment of marine biology and environmental education jobs. Finally, the emphasis on preservation of cultural/archaeological features will provide a connection to the Hawaiian cultural emphasis of the area.

This ~~DEIS~~ FEIS addresses the HCGP policy for a thorough study of significant cultural, social and physical impacts related to a project of this size.

Kona Kai Ola is in balance with the social and physical goals of West Hawai'i residents, as well as economic desires. To help sustain this balance, JDI ~~will~~ is in the process of establishing the Kona Kai Ola Community Foundation to support community efforts such as community development, community health care, job training, educational and cultural programs and projects, and ~~will~~ contributed \$100,000 as initial funding.

HCGP Section 3 -Energy

Goals:

- (a) *Encourage the development of alternate energy resources.*
- (f) *Strive to assure a sufficient supply of energy to support present and future demands.*
- (k) *Strive to diversify the energy supply and minimize the environmental impacts associated with energy usage.*
- (n) *Encourage energy-saving design in the construction of buildings.*

Discussion: While Kona Kai Ola will feature the latest sustainable energy reducing technology available, its most visible energy-saving feature will be its proposed seawater air conditioning (SWAC) facility. The project is to use cold deep seawater piped throughout the development for air conditioning which will result in substantial electrical energy savings and costs for the community and the developer.

Deep, cold, seawater technology is currently being used at NELHA, near the Kona International Airport. It is a logical use in this area considering the hot dry climate, accessibility of deep cold water and the increasing cost of energy and fossil fuels. It is a renewable alternative energy source that will result in long-term cost savings and reduced energy requirements, in keeping with goals and policies of the State and County. In addition, all units will have photovoltaic energy provided from roof-top collectors as part of the designed energy efficient package. Solar hot water systems will also be used.

Further, the project's environmental sustainability goal is to reduce building energy use by 50 percent compared to a building that does not incorporate energy efficient strategies, as well as use renewable energy technologies on-site to provide the remaining 50 percent of overall building energy use. These measures will help to reduce the site's peak energy demand by 50 percent. By reducing the development's demand during the range of hours that most of the Hawai'i Island's citizens are using electricity, Kona Kai Ola can help HELCO reduce the probability of brownouts and blackouts. The reduction in peak energy demand can be achieved by using smart technologies that control energy use.

HCGP Section 4 - Environmental Quality Goals, Policies and Courses of Action

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.*

Policies:

- (c) *Advise the public of environmental conditions and research undertaken on the island's environment.*
- (d) *Encourage the concept of recycling agricultural, industrial, and municipal waste material.*
- (k) *Require implementation of the management measures contained in Hawai'i's Coastal Nonpoint Pollution Control Program as a condition of land use permitting.*
- (l) *Review the County grading and grubbing ordinances to ensure that they adequately address potential erosion and runoff problems.*

Discussion: Kona Kai Ola will alter land, air, and water quality with its construction activities and long-term increase in on-site people, physical structures, and activities. A fundamental approach to Kona Kai Ola will be the incorporation of long-term sustainable development and management features. In general these practices are designed to minimize the use of potable water, electricity, vehicles, drainage infrastructure, disruption to groundwater hydrology and impacts to habitats and cultural resources.

The mitigation measures discussed in this ~~DEIS~~-FEIS are designed to minimize, or in some cases improve, the impacts to the resources of the site and region. The project will be required to comply with all provisions and codes designed to reduce the threat on life and property, from natural disasters. At the regional level, this development is located within an urbanizing corridor with existing and proposed development in the surrounding area. Infrastructure, while needing to be upgraded and extended, is already available in the immediate area.

The master planning and phasing of Kona Kai Ola allow for coordinated development of infrastructure, consistency of design in the architecture, and economies of scale for capital improvements. The cost of the marina, connector roads, and project-related infrastructure improvements will be borne by the developer resulting in the significant savings for the public. The State expects to receive substantial lease rental revenues from the project due to the revenues generated through the leasing agreements for this site, of which the fee title will remain with the State.

HCGP Section 5 - Flooding and Other Natural Hazards Goals and Policies

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.*

Policies:

- (d) *Any development within the Federal Emergency Management Agency designated flood plain must be in compliance with Chapter 27.*
- (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.*
- (h) *Develop a comprehensive program for the coordinated construction of a drainage network along a single drainage system.*
- (j) *The County and the private sector shall be responsible for maintaining and improving existing drainage systems and constructing new drainage facilities.*
- (p) *Where applicable, natural drainage channels shall be improved to increase their capacity with special consideration for the practices of proper soil conservation, and grassland and forestry management.*
- (q) *Consider natural hazards in all land use planning and permitting.*

Discussion: The mitigation measures discussed in this ~~DEIS~~ FEIS are designed to minimize, or in some cases improve, the impacts to the resources of the site and region. The project will be required to comply with all provisions and codes designed to reduce the threat on life and property from natural disasters. At the regional level, this development is located within an urbanized corridor with existing and proposed development in the surrounding area. Infrastructure, while needing to be upgraded and extended, is already present in the immediate area.

HCGP Section 6 - Historic Sites Goals and Policies

Goals:

- (a) *Protect, restore, and enhance the sites, buildings, and objects of significant historical and cultural importance to Hawai'i.*
- (b) *Appropriate access to significant historic sites, buildings, and objects of public interest should be made available.*
- (c) *Enhance the understanding of man's place on the landscape by understanding the system of ahupua'a.*

Policies:

- (a) *Agencies and organizations, either public or private, pursuing knowledge about historic sites should keep the public apprised of projects.*
- (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.*
- (e) *Embark on a program of restoring significant historic sites on County lands. Assure the protection and restoration of sites on other public lands through a joint effort with the State.*
- (f) *Encourage the restoration of significant sites on private lands.*
- (g) *Collect and distribute historic sites information of public interest and keep an inventory of sites.*
- (i) *Signs explaining historic sites, buildings and objects shall be in keeping with the character of the area or the cultural aspects of the feature.*
- (n) *Consider requiring Cultural Assessments for certain developments as part of the rezoning process.*

Discussion: Archaeological studies are summarized in and appended to this ~~DEIS~~FEIS. The historical Hawaiian cultural resources such as heiau, ahu, and burial sites will be preserved and educational features added for residents and visitors, where appropriate. The proposed 400-foot buffer along the shoreline will result in the preservation of significant cultural/archaeological, faunal and floral habitats, while ensuring that the shore is accessible and usable to visitors and residents. A Data Recovery Plan, a Site Preservation Plan and a Burial Treatment Plan will be submitted to DLNR – SHPD for review and approval.

HCGP Section 7 - Natural Beauty Goals and Policies

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.*

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.*
- (d) *Access easement to public or private lands that have natural or scenic value shall be provided or acquired for the public.*
- (e) *Develop standard criteria for natural and scenic beauty as part of design plans.*
- (f) *Consider structural setback from major thoroughfares and highways and establish development and design guidelines to protect important viewplanes.*
- (h) *Protect the views of areas endowed with natural beauty by carefully considering the effects of proposed construction during all land use reviews.*

Discussion: West Hawai'i has its own unique rugged natural beauty. While lacking lush vegetation, significant rainfall, and an abundance of terrestrial fauna, it does contain a vibrant ocean ecosystem, panoramic vistas, a Hawaiian cultural heritage, and a climate conducive to outdoor recreation.

The proposed structures are designed to blend with the natural terrain, use site appropriate Hawaiian and other appropriate xeriscape landscaping, and utilize earth tone colors and natural materials, to the degree possible. The proposed harbormaster facility's close proximity to the National Historical Park boundary requires special consideration, to ensure that the visitor visual experience from the Park is not compromised. While there are no actual visual guideline requirements for the preservation of views from the Park, Kona Kai Ola has been, and will continue to work with the National Park Service to ensure that visual experience is preserved to the degree possible while ensuring safety of the harbor entrance.

HCGP Section 8 - Natural Resources and Shoreline

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 Hawai'i's unique, fragile, and significant environmental and natural resources.*
- (d) *Protect rare or endangered species and habitats native to Hawai'i.*
- (e) *Protect and effectively manage Hawai'i's open space, watersheds, shoreline, and natural areas.*
- (f) *Ensure 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.*

Policies:

- (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.*
- (e) *Coordinate programs to protect natural resources with other government agencies.*
- (g) *Promote sound management and development of Hawai'i's land and marine resources for potential economic benefit.*
- (i) *Encourage an overall conservation ethic in the use of Hawai'i's resources by protecting, preserving, and conserving the critical and significant natural resources of the County of Hawai'i.*

- (p) *Encourage the use of native plants for screening and landscaping.*
- (q) *Develop policies by which native Hawaiian gathering rights will be protected as identified under judicial decisions.*
- (r) *Ensure public access is provided to the shoreline, public trails and hunting areas, including free public parking where appropriate.*
- (s) *Establish a system of pedestrian access trails to places of scenic, historic, cultural, natural, or recreational values.*

Discussion: Kona Kai Ola has a distinct ocean recreation theme that fully meets Hawai'i County's objectives for ocean recreational opportunities. The project includes an 800-slip marina with a canoe and marina park that will expand the region's boating opportunities and support facilities. A 400-foot shoreline setback will provide full public access along the coast. Further, a proposed marine science center will help to educate people about coastal habitats and encourage responsible stewardship of these resources.

The beaches adjacent to Kona Kai Ola will be protected and preserved. A 400-foot buffer zone along the shoreline will be preserved as open space and no buildings or structures shall be proposed within the 400-foot shoreline setback area, with the possible exception of possible culturally-related structures. Further, to control building mass near the shoreline, development sites directly adjacent to the shoreline setback area will be limited by design covenants to a lower unit density and height limits.

Bikeways, walking paths, trails and enhanced pedestrian access to the shore are incorporated into the development design. Connecting the project's coastal trail system with the Ala Kahakai National Historic Trail will also add to this project's conformance with this policy.

HCGP Section 10 - Public Facilities Goals and Policies

Goals:

- (a) *Encourage the provision of public facilities that effectively service community and visitor needs and seek ways of improving public service through better and more functional facilities in keeping with the environmental and aesthetic concerns of the community.*

Policies:

- (b) *Coordinate with appropriate State agencies for the provision of public facilities to serve the needs of the community.*
- (c) *Develop short and long-range capital improvement programs and operating budgets for public facilities and services.*

Discussion: Kona Kai Ola includes significant measures to improve the region's public facilities. The proposed expanded marina will provide much-needed boat slips, as well as transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona. Additionally, public parks, trails, and gathering places will also be developed with this project.

Numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona and a project-sponsored regional shuttle service will help ease traffic, reduce air pollution through fewer idling cars in traffic, and reduce emergency vehicle delays.

HCGP Section 11 – Public Utilities Goals, Policies

Goals:

- (a) *Ensure that properly regulated, adequate, efficient and dependable public and private utility services are available to users.*
- (b) *Maximize efficiency and economy in the provision of public utility services.*

Policies:

- (a) *Public utility facilities shall be designed to complement adjacent land uses and shall be operated to minimize pollution or disturbance.*
- (b) *Provide utilities and service facilities that minimize total cost to the public and effectively service the needs of the community.*
- (d) *Improvement of existing utility services shall be encouraged to meet the needs of users.*
- (f) *Develop short and long range capital improvement programs and plans for public utilities within its jurisdiction that are consistent with the General Plan.*
- (g) *Water, sewerage, electricity, gas, and telecommunication services are treated individually in this section to clarify the factors that comprise the public utilities element.*

Courses of Action (North Kona - Water):

- (a) *Continue to pursue groundwater source investigation, exploration and development in areas that would provide for anticipated growth and an efficient and economic system operation.*
- (b) *Continue to evaluate growth conditions to coordinate improvements as required to the existing water system in accordance with the North Kona Water System Master Plan.*

Policies for Wastewater:

- (e) *Plans for wastewater reclamation and reuse for irrigation and biosolids composting (remaining solids from the treatment of wastewater is processed into a reusable organic material) shall be utilized where feasible and needed.*

Discussion: The master planning and phasing of Kona Kai Ola allow for coordinated development of infrastructure, consistency of design in the architecture, and economies of scale for capital improvements. The cost of the marina and project-related infrastructure improvements will be borne by the developer resulting in the significant savings for the public. The State expects to receive substantial lease rental revenues from the project due to the revenues generated through the leasing agreements for this site, of which the fee title will remain with the State.

The developer is required to secure new sources of potable water to serve the project site. To minimize the water needs for this development, water conservation measures will be incorporated into the design and operation of Kona Kai Ola. To achieve that end, drought tolerant, Hawaiian and other appropriate xeriscape landscaping will be used, R-1 water will be used for landscaping to the extent possible and low flow water fixtures will be used throughout the development. The developer is working with the County Department of Water to ensure the proposed water infrastructure is designed to accommodate the County goals on recycled water use.

As part of the Kona Kai Ola development, upgrades will be required at the Kealakehe Waste Water Treatment Plant (WWTP). These upgrades are currently needed at the aging facility to meet current development needs. To serve Kona Kai Ola, the WWTP will be brought up to current requirements for health, environment, operation and expanded capacity needs. As noted throughout this EIS, sustainable development features will be incorporated in this development resulting in re-use, recycling and reduction in waste generated.

HCGP Section 12 - Recreation

Goals:

- (a) *Provide a wide variety of recreational opportunities for the residents and visitors of the County.*
- (b) *Maintain the natural beauty of recreation areas.*
- (c) *Provide a diversity of environments for active and passive pursuits.*

Policies:

- (c) *Recreational facilities shall reflect the natural, historic, and cultural character of the area.*
- (i) *Coordinate recreational programs and facilities with governmental and private agencies and organizations. Innovative ideas for improving recreational facilities and opportunities shall be considered.*
- (l) *Public access to the shoreline shall be provided in accordance with an adopted program of the County of Hawai'i.*
- (m) *Develop a network of pedestrian access trails to places of scenic, historic, natural or recreational values. This system of trails shall provide, at a minimum, an island wide route connecting major parks and destinations.*
- (n) *Establish a program to inventory ancient trails, cart roads and old government roads on the island in coordination with appropriate State agencies.*
- (o) *Develop facilities and safe pathway systems for walking, jogging, and biking activities.*

Courses of Action (North Kona – Recreation):

- f) *Acquire, and/or encourage the development of additional public shoreline recreation areas.*

- (g) *Establish public access to and the development of shoreline regions along the North Kona Coast in areas such as Keawaiki, Kiholo Bay, Ka'ū-pūlehu, Kukio and Kapapa Bays, Kua Bay, Kahoiawa, Makalawena, and Honokōhau.*
- (j) *Protect 'Ōpae'ula, Kaloko, and Honokōhau (Aimakapa) Ponds as natural areas.*
- (k) *Encourage the development of historic trails.*

Discussion: Kona Kai Ola will integrate into its surrounding community, provide diverse activities for the visitors and residents, and result in the promotion and enhancement of cultural, economic, recreational and environmental features which make this specific site unique.

Kona Kai Ola has a distinct ocean recreation theme that fully meets Hawai'i County's objectives for ocean recreational opportunities. The project includes an 800-slip marina with a canoe and marina park that will expand the region's boating opportunities and support facilities. A 400-foot shoreline setback will provide full public access along the coast. Further, a proposed marine science center will help to educate people about coastal habitats and encourage responsible stewardship of these resources.

The shoreline adjacent to Kona Kai Ola will be protected and preserved. A 400-foot buffer zone along the shoreline will be preserved as open space and no buildings or structures shall be proposed within the 400-foot shoreline setback area, with the possible exception of culturally-related structures. Further, to control building mass near the shoreline, development sites directly adjacent to the shoreline setback area will be limited by design covenants to a lower unit density and height limits.

Bikeways, walking paths, trails, and enhanced pedestrian access to the shore are incorporated into the development design. Connecting the project's coastal trail system with the Ala Kahakai National Historic Trail will also add to this project's conformance with this policy.

The proximity to the Kaloko-Honokōhau National Historical Park provides the opportunity for collaboration for educational, environmental and cultural goals, while the expanded marina will provide new and enhanced water recreational and business opportunities.

Instead of featuring a golf course providing relatively passive recreation for a limited number of participants, Kona Kai Ola will be developed around a more active, social, and inclusive components such as public parks, trails, walkways, as well as seawater lagoons and possible marine life educational and interactive areas.

HCGP Section 13 – Transportation

Goals:

- (a) *Provide a transportation system whereby people and goods can move efficiently, safely, comfortably and economically.*
- (b) *Make available a variety of modes of transportation that best meets the needs of the County.*

Policies:

- (b) *The agencies concerned with transportation systems shall provide for present traffic and future demands, including the programmed development of mass transit programs for high growth areas by both the private and public sectors.*
- (c) *The improvement of transportation service shall be encouraged.*

HCGP Section 13.2 -- Transportation: Roadways

Goals:

- (a) *Provide a system of roadways for the safe, efficient and comfortable movement of people and goods.*
- (b) *Provide an integrated State and County transportation system so that new major routes will complement and encourage proposed land policies.*

Policies:

- (b) *Investigate various methods of funding road improvements, including private sector participation, to meet the growing transportation needs of the island.*
- (j) *Transportation and drainage systems shall be integrated where feasible.*

Courses of Action (North Kona – Transportation):

- (b) *Encourage the State to widen Queen Ka'ahumanu Highway as necessary to accommodate increases in traffic flows, in particular between Kona International Airport at Keāhole and Kailua-Kona.*
- (d) *Encourage the State to extend Kealakehe Parkway mauka to connect with the Māmalahoa Highway.*
- (m) *Support the installation of suitable bikeways and/or jogging paths.*

Discussion: The proposed expanded marina will provide transportation opportunities, and provide for possible use of transit water shuttles to Kailua-Kona.

In terms of land transportation, proposed numerous road improvements, including a makai extension of Kealakehe Parkway and Kuakini Highway south to the Kailua-Kona, will help ease traffic, reduce air pollution through fewer idling cars in traffic and reduce emergency vehicle delays. Accessibility and enhanced options for transportation with a consistent theme of reducing vehicle use are proposed at Kona Kai Ola. Bikeways, walking paths, trails, and enhanced pedestrian access to the shore are incorporated into the development design.

The layout of the development will reduce the need for a personal vehicle. A regularly scheduled shuttle service is proposed for moving people throughout the development, as well as between Kona Kai Ola, the airport, the surrounding neighborhoods, and Kailua-Kona.

HCGP Section 14 - Land Use

HCGP Section 14.3 -- Commercial Development

Goals:

- (a) *Provide for commercial developments that maximize convenience to users.*
- (b) *Provide commercial developments that complement the overall pattern of transportation and land usage within the island's regions, communities, and neighborhoods.*

Policies:

- (c) *Distribution of commercial areas shall meet the demands of neighborhood, community and regional needs.*
- (f) *The development of commercial facilities should be designed to fit into the locale with minimal intrusion while providing the desired services. Appropriate infrastructure and design concerns shall be incorporated into the review of such developments.*
- (h) *Require developers to provide basic infrastructure necessary for development.*
- (i) *Encourage commercial areas to develop on an axis perpendicular to the highway.*

Discussion: The project complies with all of the applicable goals and policies listed for commercial development in Hawai'i County. The proposed commercial developments will be oriented towards responding to retail needs of local residents with possible larger retailers, grocery stores and community-services. In keeping with the master plan approach to this development, the commercial areas will be incorporated with the rest of the development into a coherent architectural theme and design.

As part of the development agreements with the State, the developer is required to meet its infrastructure needs to serve the anticipated development. In addition, Kona Kai Ola will also expand the harbor, create open space, preserve cultural resources and complete off-site roadway improvements. The commercial developments on the DHHL property will be centered on Queen Ka'ahumanu Highway for direct and easy access to patrons, reducing traffic impacts on to side streets.

HCGP Section 14.7 -- Resort Development

Goals:

- (a) *Maintain an orderly development of the visitor industry.*
- (b) *Provide for resort development that maximizes conveniences to its users and optimizes the benefits derived by the residents of the County.*
- (c) *Ensure that resort developments maintain the cultural and historic, social, economic, and physical environments of Hawai'i and its people.*

Policies:

- (d) *Zoning of resort areas shall be granted when the proposed development is consistent with and incorporates the stated goals, policies and standards of the General Plan.*
- (f) *Designate and allocate future resort areas in appropriate proportions and in keeping with the social, economic, and physical environments of the County.*
- (h) *Encourage the visitor industry to provide resort facilities that offer an educational experience of Hawai'i as well as recreational activities.*
- (i) *Coastal resort developments shall provide public access to and parking for beach and shoreline areas.*
- (j) *Re-evaluate existing undeveloped resort designated and/or zoned areas, and reallocate these lands in appropriate locations.*
- (k) *Require developers to provide the basic infrastructure necessary for development.*

Courses of Action (North Kona – Resort Development):

- (c) *Improve and provide adequate roadways, sewer and water systems, and other basic amenities in all areas where higher density uses are allowed.*

Discussion: The visitor industry is vital to the State of Hawai'i in general and West Hawai'i in particular. The hotel and time-share project components will help to strengthen the visitor industry in this region, while implementing other visitor industry policies of Hawai'i County. Educational opportunities will be provided at the marine science center and the cultural park. Public shoreline access will be provided and enhanced with a 400-foot shoreline setback. In addition to meeting project infrastructure requirements, the project also includes major regional roadway improvements.

The agreement between JDI and the State identifies hotel and time-share uses as possible development at Kona Kai Ola. The project is not a resort, however. A resort is a concept in which visitors are attracted to spend most, if not all, of their stay within the resort area through the design of amenities that fulfill the needs of a particular visitor market segment. This self-containment is achieved to varying degrees in resort development, depending on the natural, historic/cultural, and recreational resources within a resort site and the intended scale of the resort.

State and County laws recognize this distinction between a “resort” and a “hotel” or “time share unit.” Section 514E-5, Hawai'i Revised Statutes, authorizes time share units to be located in a resort area or any other area in which a county may by ordinance allow a hotel unit. The Hawai'i County Code correspondingly permits hotels and time share units in non-resort zoning districts. The proposed project may include up to 700 hotel units and 1,803 time-share units, and depending on the eventual location of these project components, rezoning may be required for implementation.-

Alternative 1 would decrease hotel and time-share units. Hotel units would be reduced by 43 percent, from the proposed 700 units to 400 units in Alternative 1. Time-share units would be reduced by 39 percent, from the proposed 1,803 units to 1,100 units in Alternative 1.

HCGP Section 14.8 -- Open Space

Goals:

- (a) *Provide and protect open space for the social, environmental, and economic well-being of the County of Hawai'i and its residents.*

Policies:

- (b) *Open space in urban areas shall be established and provided through zoning and subdivision regulations.*
- (c) *Encourage the identification, evaluation, and designation of natural areas.*

Discussion: Kona Kai Ola will be designed to protect and preserve the area's scenic and open space resources. A 400-foot buffer zone along the shoreline will be preserved as open space and no buildings or structures shall be proposed within the 400-foot shoreline setback area, with the possible exception of possible culturally-related structures. To control building mass near the shoreline, development sites directly adjacent to the shoreline setback area will be limited by design covenants to a lower unit density and height limits. Buildings located further mauka will increase to a maximum of four stories, in keeping with the "coconut tree height" general limit. Along Queen Ka'ahumanu Highway, the northern edge of the large commercial parcel contiguous to the water feature will be limited to one-story structures. Structures on the remaining area of the parcel will be limited to the equivalent of three stories in height. Further, major roadways, parking areas, and areas surrounding all major structures will be landscaped in accordance with a landscape master plan.

HCGP Section 14.9 -- Public Lands Goals

- Goals:** (a) *Utilize publicly owned lands in the best public interest and to the maximum benefit for the greatest number of people.*

Discussion: This project complies with all provisions of these goals and policies in Section 14.9. Kona Kai Ola achieves the goals for public interest facilities, at the cost of a private developer. The State expects to receive substantial lease rental revenues from the project due to the revenues generated through the leasing agreements for this site, of which the fee title will remain with the State.

As part of the approval process, the developer is required to comply with the Housing Ordinance, resulting in additional housing options for residents. The revenues from the DHHL commercial development will help fund additional homestead housing including continued development of the Villages of La'i 'Ōpua, mauka of the project site. The marina, parks, trails, and community areas are designed as integral parts of this development. Approximately 42 percent of the project site is planned to be in open space.

5.2.2 Community Development Plans

As part of the General Plan update that the County of Hawai'i adopted in 2005, community development plans were to be formulated for different regions in the County and submitted to the Planning Commission and County Council for adoption as an ordinance. The Kona Kai Ola project is located in the *Kona Community Development Plan* area.

The maps associated with the preliminary efforts of the Kona Community Development Plan (CDP) include the Kona Kai Ola project site within the *Preferred Urban Growth* boundary of the Kona area. This CDP process was started in 2005 and is continuing as of this writing. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee, appointed by the Mayor and confirmed by the Council on February 1, 2006, will provide guidance, assist in the preparation of the plan, and recommend the plan's approval to the Planning Commission (NKona 2006).

Currently, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site.

The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed development is consistent with the recommendations in the Keāhole to Kailua Development Plan.

Since the DEIS was published, the Kona Community Development Plan (CDP) has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. To make sure that Kona Kai Ola is consistent with this new Kona CDP transit oriented plan, Kona Kai Ola Alternative 1 was prepared and includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

5.2.3 County Zoning

As shown on Figure AAW, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;

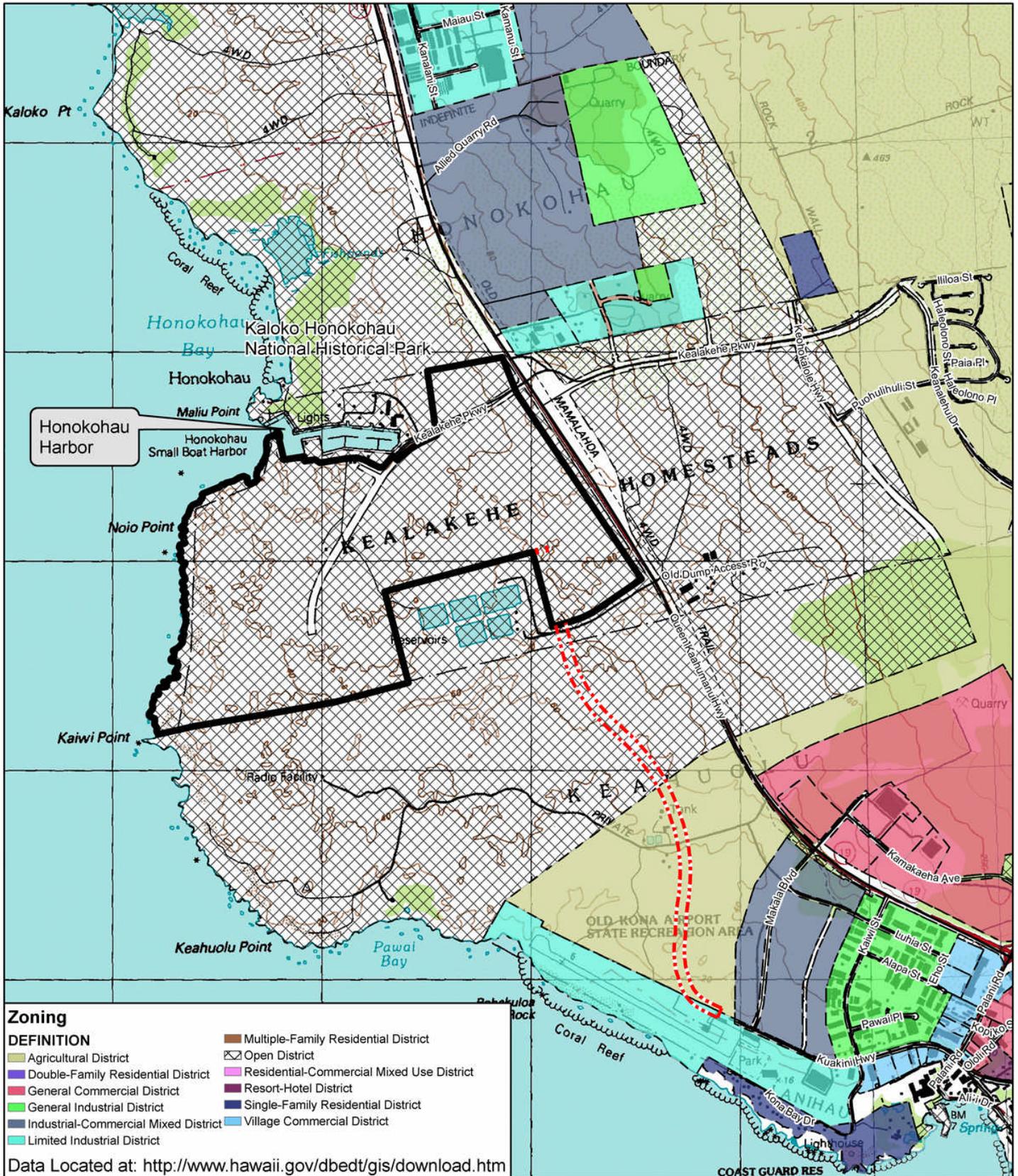


Figure AA: Hawaii County Zoning Map

Legend

- Project Site
- Proposed Parkway



0 1,000 2,000 Feet



-
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;
- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

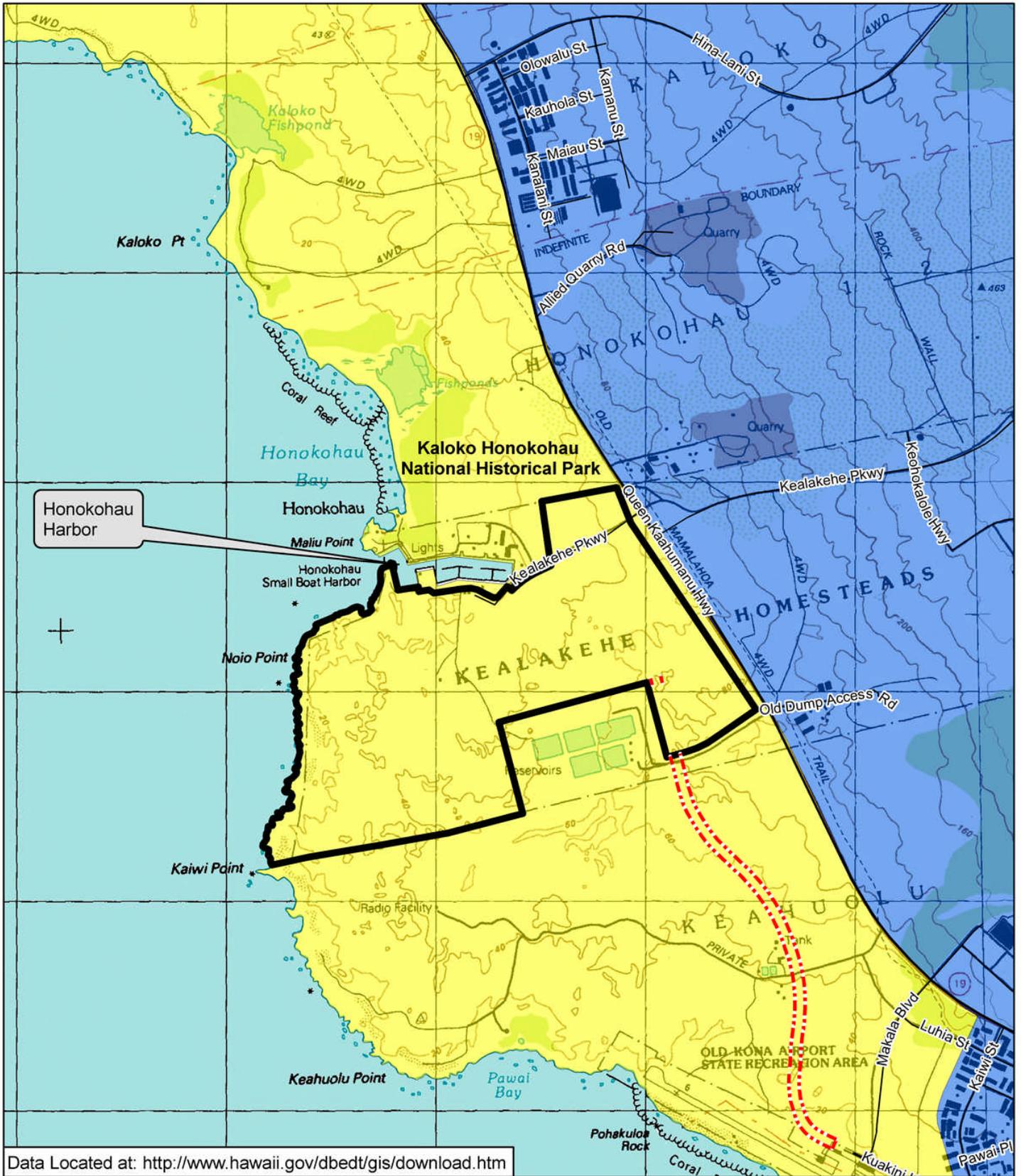
In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category.

5.2.4 Special Management Area

As shown in Figure ABX, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area, or SMA. At the County level, implementation of the CZM Program is through the review and issuance of the Special Management Area (SMA) permit. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3.



Data Located at: <http://www.hawaii.gov/dbedt/gis/download.htm>

Figure AB: Special Management Area Map

Legend

-  Project Site
-  Proposed Parkway
-  Not within Special Management Area
-  Within Special Management Area



0 1,000 2,000 Feet



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5.3 Permits Required for Project

Table 4 identifies permits required for project implementation, including the agency, permit triggers and time frame.

Table 4: Permits Required for the Project

<u>Agency</u>	<u>Permit or Approval</u>	<u>Requirement</u>	<u>Time Frame</u>
<u>U.S. Army Corps of Engineers</u>	<u>Department of the Army (DOA) Individual Permit</u>	<p><u>Work in navigable waters; placing fill in waters of the U.S., placing navigation aids</u></p> <p><u>Will incorporate:</u></p> <ul style="list-style-type: none"> ▪ <u>Rivers and Harbors Act Section 10</u> ▪ <u>Clean Water Act Sections 401 and 404</u> ▪ <u>Coastal Zone Management Act Section 307</u> ▪ <u>Endangered Species Act Section 7</u> ▪ <u>National Historic Preservation Act Section 106</u> 	<u>Prior to any in-water work or fill or placement of navigation aids or modification of terrestrial habitat that may impact species listed under Endangered Species Act</u>
<u>U.S. Coast Guard</u>	<u>Private Aids to Navigation approval</u>	<u>For approval for marking aids to navigation</u>	<u>Prior to placement. Note: placement requires DOA Permit.</u>
<u>State Board of Land and Natural Resources</u>	<u>Easement over Submerged Lands / Shared Harbor Channel Entrance</u>	<u>HRS Section 171-53 (6)</u>	<u>Prior to commencement of operations of new marina</u>
<u>State Department of Business, Economic Development & Tourism</u>	<u>Determination of Hotel Development</u>	<u>HRS Section 171-42</u>	<u>Prior to approval of Master Development Plan</u>
<u>State Department of Land and Natural Resources (DLNR) Office of Conservation and Coastal Lands (OCCL)</u>	<u>Conservation District Use Permit (CDUP)</u>	<p><u>For any work in the conservation district</u></p> <ul style="list-style-type: none"> ▪ <u>Kuakini Highway Extension and SWAC pipe; Shoreline Park</u> ▪ <u>Hawaiian Cultural Park, Ocean Front Trail</u> 	<u>Prior to any work in the conservation district</u>
<u>DLNR Commission on Water Resource Management</u>	<u>Well Construction Permit, Pump Installation Permit</u>	<u>For well construction or ground water source development</u>	<u>Prior to construction or development</u>
<u>State Department of Health (DOH) Clean Water Branch</u>	<u>401 Water Quality Certification</u>	<u>Triggered by DOA permit</u>	<u>Start simultaneously with DOA permit</u>
<u>NPDES</u>			

<u>Agency</u>	<u>Permit or Approval</u>	<u>Requirement</u>	<u>Time Frame</u>
	<u>- Individual Permit</u>	<u>Discharge into state waters</u>	<u>Prior to construction</u>
	<u>- NOI Appendix C</u>	<u>Construction activities on one or more acres</u>	<u>Prior to construction</u>
	<u>- NOI Appendix G</u>	<u>Construction dewatering</u>	<u>Prior to construction</u>
	<u>- NOI Appendix L</u>	<u>Discharge of circulation water from decorative ponds</u>	<u>Prior to construction</u>
	<u>All NPDES applications</u>	<u>Copy to DLNR/State Historic Preservation Division</u>	<u>Simultaneously with DOH NPDES submittals</u>
	<u>Zone of Mixing</u>	<u>Include with NPDES for discharge into state waters</u>	<u>Concurrent with NPDES application</u>
<u>DOH Safe Drinking Water Branch</u>	<u>Water Source Approval and capacity demonstration</u>	<u>For new drinking water sources</u>	<u>After source is identified</u>
	<u>Operator Certification</u>	<u>For operators of water systems</u>	<u>Before system use</u>
	<u>Construction Plan Review</u>	<u>For water system improvements and connections</u>	<u>Before construction</u>
	<u>Underground Injection Control (UIC) Permit</u>	<u>For injection well operations</u>	<u>Before operations</u>
<u>DOH Clean Air Branch</u>	<u>Dust control management plan</u>	<u>Recommended only, not required</u>	<u>During construction planning</u>
<u>DOH Noise, Radiation, & Indoor Air Quality Branch</u>	<u>No permit</u>	<u>Comply with Administrative Rules Chapter 11-46, Community Noise Control</u>	<u>During construction</u>
	<u>Special Management Area (SMA) Major Permit</u>	<u>Work in the SMA</u>	<u>Prior to any construction or other work in the SMA (does not include DHHL land)</u>
	<u>Zoning</u>	<u>Must be consistent with the General Plan</u>	<u>After acceptance of EIS</u>
<u>County of Hawai'i</u>	<u>Building Permit</u>	<u>To erect a new structure including fences, swimming pools and retaining walls more than 3'-0" in height, and water catchments regardless of depth or capacity</u>	<u>Prior to construction</u>
	<u>Grading, Grubbing, and Stockpiling Permits</u>	<u>For volumes as specified by county</u>	<u>Prior to activity</u>
	<u>Development, subdivision, drainage and flood zone reviews</u>	<u>For development</u>	<u>Prior to construction</u>

Federal

- U.S. Army Corps of Engineers Permit (Section 404)
- U.S. Army Corps of Engineers Permit (Section 10)

State of Hawai'i

Department of Health

- Office of Environmental Quality Control—Chapter 343—Environmental Impact Statement
- Clean Water Branch—National Pollutant Discharge Elimination System Permit
- Clean Water Branch—Water Quality Certification (401)
- Clean Water Branch—Zone of Mixing
- Noise, Radiation, and Indoor Air Quality Branch—Community Noise Permit
- Safe Drinking Water Branch—Injection Well Permit and Source Water Use Approval

Department of Land and Natural Resources

- Commission on Water Resource Management—Well Construction Permit, Pump Installation Permit, and Water Use Permit
- Office of Conservation and Coastal Lands—Conservation District Use Permit (SWAC pipe and parkway extension through Queen Lili'uokalani Trust property).

Department of Business, Economic Development and Tourism Office of Planning

- Coastal Zone Management—CZM Consistency

County of Hawai'i

- General Plan Amendment (in process)
- Rezoning
- Building Permit
- Grading/Grubbing Permit
- Special Management Area Permit (SMA)
 - Subdivision Approval

6 Irreversible and Irretrievable Commitment of Resources

Implementation of Kona Kai Ola will result in irreversible and irretrievable commitment of land, water, energy, and fiscal resources from the private sector and the State. As previously discussed, the State does not have sufficient funds to expand harbor facilities, and has entered into agreements with JDI to construct the harbor and exercise various options to develop the site.

The project site is mostly vacant, and project implementation will significantly alter the land use character and visual resource. The property would be transformed from an undeveloped open area to a built, planned, service-providing, income-generating facility.

This development will require on-site infrastructure, namely transportation, drainage, water and wastewater infrastructure, and private funds will be committed to construct the necessary improvements. The development will also increase the use of existing public infrastructure, including police and fire protection services, but will provide new business and employment opportunities, and new hotels and time-share complexes.

Labor and materials used to construct the project are mostly non-renewable and irretrievable resources. After construction, operation of the project will require continued use of water and electricity. However, JDI intends to incorporate the latest environmental design and technology to create an energy efficient, low environmental impact, sustainable development at Kona Kai Ola to optimize the use of environmental resources. In addition, the proposed shuttle service and pedestrian path system will help reduce the need for vehicular use, and systems will be included to produce electricity from renewable sources.

The impacts represented by the commitment of these resources are outweighed by the significant positive socio-economic benefits that could be derived from project implementation. Recreational, cultural, and economic opportunities will be made available through the development of Kona Kai Ola. Infrastructure to support the project will be improved, and private funds will be used to construct public facilities including a marina and a 1.5 mile extension of Kuakini Highway. In addition, a new marine science center will be featured, and residents and visitors alike will have access to on-site cultural and recreational parks

Further, Kona Kai Ola achieves goals for public interest facilities, at the cost of a private developer. The fee title in the land will remain with the State, and the State expects to receive substantial lease rental revenues from the project.

As part of the approval process, the developer is required to comply with the Housing Ordinance, resulting in additional housing options for residents. The revenues from the DHHL commercial development will help fund additional homestead housing including continued development of the Villages of La'i 'Ōpua, mauka of the project site.

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7 Relationship between Short-Term Uses of the Environment and the Maintenance of Long-Term Productivity

On a ~~short-short~~ short-term basis, construction equipment, earth movement, blasting and other activities would impact the area. Earth movement and construction would be visible from mauka areas, Queen Ka'ahumanu Highway, the adjacent shoreline areas and the ocean. Construction traffic would increase during work hours as cut material from the new harbor is transported if needed off-site. Short-term noise would increase, while air quality would diminish, with the commencement of construction activities. Construction activities will generate employment opportunities throughout the duration of the construction period, including overall site activities and construction of individual projects. It is anticipated that the majority of construction workers will originate from nearby communities, or commute from other regions. Due to the scope of the project, the anticipated phasing of the project encompasses a 15 year build-out. Most of the heavy grading, earth movement, marina construction and the majority of the infrastructure improvements will most likely be completed during the beginning of the build-out.

Construction of lodging and commercial facilities will be completed over a longer-term period. In the long-term, as portions of the project become operational and capital construction activities decline, the addition of structures and human activity will incrementally generate impacts above current levels for noise, air quality, and traffic. Completion and operation of the project will generate long-term impacts to public services including solid waste collection, wastewater collection and processing, energy generation and transmission, water use and distribution, and police, health, and fire protection.

Long-term productivity resulting from project implementation will significantly outweigh short-term costs. This productivity will be achieved through numerous ways. The project will generate significant economic benefits. The resulting increase in income, sales and property taxes will contribute to the public sector revenue base on a long-term, ongoing basis, and the increase in employment and business opportunities will improve overall economic conditions.

The project will also provide for long-term benefits for the visitor and boating industries. Regional ocean and land-based recreational resources will increase with on-site development. The boating industry will experience long-term benefits through the addition of new boat slips and the development of new marina serving facilities.

The natural environment, including the shoreline environment, will be altered; but its long-term sustainability, viability, and productivity will be enhanced. The infrastructure improvements to the site, primarily the upgrades and subsequent hookups to the wastewater treatment plant, will result in less effluent seeping into groundwater/nearshore waters from the temporary sump used for disposal of the effluent from the waste-water treatment plant, as well as input via the septic systems used at the existing marina.

The extension of Kealakehe Parkway to Kuakini Highway will reduce traffic delays resulting in improved air quality and traffic noise reductions. While some anchialine ~~ponds~~ pools will have to be removed, and the remaining ~~ponds~~ pools become marine ecosystems, as an unintended result of the development, improved water circulation, increased seawater flows and a zone of mixing closer to the shoreline will result in improved marine habitat overall.

The proposed open spaces, shoreline setback areas, water features and other formally designated habitats, or preserved areas, will result in better managed archaeological, cultural, habitat and educational opportunities for visitors and residents.

Short-term use and long-term productivity relationships are described below in context of the following four specific areas of potential concern as described in the Hawai'i State Office of Environmental Quality Control (OEQC) Guidelines for FEIS review. ~~The review.~~ The following discussion addresses each of these potential areas of concern.

- Narrowing the range of beneficial uses of the environment

The proposed improvements in the Kona Kai Ola project have, when measured against the impacts overall, a beneficial impact on the environment. The project has a strong ocean and cultural orientation, and the proposed marine science center will help visitors and residents understand and respect the natural environment. The proposed traffic infrastructure improvements will expand the range of beneficial uses of the environment by improving traffic flow through intersections thereby reducing emissions. The proposed designation of a 400-foot shoreline setback will preserve open space and improve public access to the shoreline for recreational and cultural uses. Creating a brackish water pond will enhance habitat for avian fauna.

- Long-term risks to health and safety

The proposed project is not expected to generate risks to health and safety. The project will comply with all drainage, natural hazard building codes, solid and liquid waste disposal requirements and water quality standards. The anticipated infrastructure improvements to the wastewater treatment plant are anticipated to actually improve the health and safety of the community by bringing an older facility up to higher operational standards. All structures will be built to current building and safety codes, while access to the shore and around the site will be improved.

- Foreclosure of future options

Implementation of Kona Kai Ola will preclude a range of potential other uses of the site including keeping the site in its current condition. However, the range of uses, type of development, quantity of open space and mitigations for preservation of various environmental impacts will not foreclose future options for enhancement, expansion or preservation of various environmental, cultural, and community servicing facilities.

- Trade-offs among short- and long-term gains and losses

Construction-related activities will result in short-term impacts and project implementation will result in a long-term loss of open space and the natural environment. Potential short- and long-term negative impacts are offset, however, by planned mitigation measures. Further, long-term benefits outweigh any short-term and long-term losses. Project design is intended to complement the natural landscape and on-site features will encourage understanding and respect for the environment. Sustainable design will be practiced based on the Leadership in Energy and Environmental Design (LEED) Green Building Rating System, which is a nationally accepted benchmark for the design, construction, and operation of high performance green buildings.

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8 Cumulative Impacts

In general, West Hawai'i is expected to continue to change with more urbanized uses being introduced to the region. West Hawai'i's population is forecasted to increase by 37 to 53 percent by 2020. It is expected that the economy will continue to be driven primarily by growth in the visitor industry and associated recreational real estate, ~~and~~ West Hawai'i is expected to continue to attract most of the island's visitors. Visitor units and tourism related employment are expected to experience corresponding increases.

The project is located in the midst of major changes due to development, and the projects nearest Kona Kai Ola are as follows:

Kula Nei Project: Located approximately 2.5 miles northeast of Kona Kai Ola, the Kula Nei project is on approximately 150 acres. The Shopoff Group is proposing to develop the property for low density residential development which would consist of about 270 residential units of which up to 220 single-family home sites that would include affordable housing units. The project published its Environmental Impact Statement Preparation Notice in November of 2006.

Kaloko Heights: The proposed Stanford Carr Development project is on approximately 400 acres of land approximately two miles northeast of the Kona Kai Ola project. The proposed development is for 1,500 residential units including affordable and moderately priced homes, and would include a five-acre commercial project.

Palani Ranch: Currently in its conceptual long-range planning, the Palani Ranch Co., Inc. owns approximately 500 acres of land approximately 1.6 miles east of the Kona Kai Ola project.

Villages of La'i'Ōpua: Less than a mile east of the Kona Kai Ola project is the 1,015 acre master-planned community that would include about 4,000 plus single-family and multi-family residential units, recreational facilities, and community and neighborhood commercial complexes. DHHL owns approximately 980 acres within the villages. The project consists of 14 different villages. Villages 4 and 5 are the next phases of development and would create approximately 300 lots including single-family homes. Additional Villages are planned for the future.

University of Hawai'i Community Colleges: The University of Hawai'i Center at West Hawai'i is planning and designing of a University of Hawai'i Community Colleges on land just east of the Kona Kai Ola project.

West Hawai'i Business Park/Kaloko-Honokōhau Business Park: Lanihau Partners L.P. is proposing the development of approximately 330 acres of land just northeast of the Kona Kai Ola project. The proposed use of the site is for light industrial, business and commercial. Phase 1, 100 acres for industrial/mixed use and 100-plus acres for general industrial zoning use (quarry and related), and Phase 2, about 80 acres for industrial/mixed use, are estimated to be completed in 2012. Phase 3, about 40 acres designated for industrial/mixed use, is anticipated to start in 2011 through 2015 in conjunction with the Phase 2 development.

Kaloko Industrial Park, Phases III & IV: Less than a mile northeast of the Kona Kai Ola project is the approximately 233 acre Kaloko Industrial Park developed by TSA International, Limited. The proposed development is light industrial and industrial-commercial mixed use. Phase III and IV would consist of approximately 102 acres and will provide 82 lots. Phases I and II approximately 130 acres of area consisted of 85 lots been completed.

West Hawai'i Hospital: Planned Medical Community 21st Century is in the process of planning a new hospital on 35 acres immediately east of Kona Kai Ola project, in the Villages of La'i'Ōpua Village 8. Construction is estimated to take place between 2008 and 2013.

West Hawai'i Civic Center: Located less than a mile east, the County of Hawai'i's West Hawai'i Civic Center is located on seven acres of County land located in the Villages of La'i'Ōpua. The civic center would be the County's one-stop service center that would include meeting rooms, motor vehicle registration, driver's licensing, offices for Real Property Tax, Department of Planning, Department of Public Works, Office of Aging, the Mayor's Office, the County Council office, Liquor Control and the Department of Parks and Recreation. Construction for the first phase was to begin in 2006.

Palamanui Development: Located near the Kona International Airport at Keahole, the Hiluhilu Development LLC proposes to develop a 725.2 acre parcel northeast of Kona Kai Ola. Palamanui will provide approximately 845 housing units (residences for the University of Hawai'i's West Hawai'i Campus and the community), a cultural center, commercial areas, an 18-hole golf course, athletic fields and medical wellness facilities.

Queen Lili'uokalani Trust: The Queen Lili'uokalani Trust owns land south and southeast to the Kona Kai Ola project. The 3,500 acres of land is a mix of both developed and undeveloped lands. Undeveloped entitled lands include 100 acres of mixed use, light industrial and commercial zoned and 20 acres of general commercial zoned.

Kona International Airport at Keāhole: Located 3.4 miles north of the Kona Kai Ola project is the Kona International Airport at Keāhole on approximately 4,422 acres of land, of which about 322 acres are leased to the Natural Energy Laboratory of Hawai'i and 421 acres to the Hawai'i Ocean Science and Technology Park. Plans for the airport include runway expansions and additional support facilities such as public parking, postal facilities, warehouses, and other facilities to meet the airport's growth needs. Expansion construction is expected to continue into 2015.

Kalaoa/Airport Properties: DHHL has preliminary plans for approximately 483 acres of land three miles north of the Kona Kai Ola project. Preliminary plans based on the Hawai'i Island Plan included 230 acres for general agriculture use, ten acres for commercial use, seven acres for community use, 100 acres for industrial use, and 136 acres for residential use.

Lokahi Subdivision: Located approximately 1.5 miles northeast of Kona Kai Ola is the Lokahi Subdivision proposed development by Westpro Development, Inc. The proposed development on an area of approximately 68 acres of land would include 190 lots for residential with park and related amenities. .

Kohanaiki Golf and Ocean Club: A project by the Rutter Development Corp./ KW Kohanaiki, LLC., is on approximately 450 acres of land approximately 1.5 miles north of the Kona Kai Ola project. The proposal project includes up to 500 homes, golf course, and clubhouse.

In addition to development projects, there are several proposed infrastructure improvements, as follows:

- Water
 - North Kona Water Source Development, Transmission and Storage for the Villages of La'i'Ōpua;
 - Palani Road to Keanalehu Drive Transmission Line for Villages of La'i'Ōpua;
 - Kealaka'a Street to Keanalehu Drive Transmission Line for Villages of La'i'Ōpua;
- Sewer
 - Sewer along extension along Keanalehu Drive for Villages of La'i'Ōpua;
 - Electrical Substation with in the Villages of La'i'Ōpua;
- Roads
 - Keanalehu Drive Extension to Manawale'a Street;
 - Ane Koehokalole Highway Extension to Henry Street;
 - Keanalehu Drive Extension to Palani Road;
 - Kealakehe Parkway to Kealaka'a Street Extension;
 - Kealakehe Parkway / Queen Ka'ahumanu Highway Intersection;
 - Kealakehe Parkway Extension to Kuakini Highway;
 - Queen Ka'ahumanu Road Widening;
 - Kamanu Street Extension to Kealakehe Parkway;

Several other projects are anticipated to be forces for change in West Hawai'i. Kona International Airport at Keāhole is planned for runway expansions and ancillary support facilities to meet growing airport needs projected for the next 15 years and areas for various commercial and industrial uses supporting airport activities are planned in three phases to the year 2015 and beyond. DHHH is proposing to make available 200 residential units in Kealakehe La'i'Ōpua Village 4 and plans to build 376 residential units in Keahuolū Subdivisions. Lanihau is a proposed 336-acre business park with mixed light industrial and commercial uses with retention and expansion of an existing quarry and quarry related facilities. It intends to add approximately 250 industrial lots to the region over the next ten years. The Queen Lili'uokalani Trust owns 3,500 acres in the Keahuolū ahupua'a in the area adjacent to Kailua Kona and just south of the proposed Kona Kai Ola development. Present developed areas include three shopping centers, a mature light industrial park and a residential low-rise condominium, and further development is anticipated.

~~To the north of the Kaloko-Honokōhau National Historical Park is Kohanaiki, a residential community that is being developed which includes 500 residences and a golf course. In the mauka areas of this part of North Kona, there are additional residential developments being planned.~~

Kona Kai Ola will be part of this overall context of change and growth. The most apparent cumulative change in the socio-economic environment is the visual impact of more urbanized areas replacing underdeveloped or vacant land. There will be an increase in visitor and resident populations, although Kona Kai Ola will not contribute significantly to resident population. Also expected are increases in housing and visitor units, more commercial establishments, more jobs, and more business opportunities.

As the region continues to develop, archaeological and cultural resources will be affected and evaluated for appropriate mitigation. The pressure for recreational areas and facilities will increase and the need for shoreline access will continue. The demand for increased public services, including schools, police and fire protection, and medical services, will increase.

The regional cumulative effects on the physical environment include the site-specific changes in topography and the increase in impervious surfaces which could affect regional drainage. There will be a change in flora and fauna habitat, and the ocean; and ~~ponds-pools~~ may be subject to runoff and pollution. Ocean habitats and the marine environment may also be affected by the increased number of resident and visitor users, more boats, and land-based runoff and activities.

Construction of the Kona Kai Ola project will also potentially add to the short-term cumulative underwater acoustic impacts related to land-based construction effort (i.e., the construction of buildings, roads and the infrastructure to service them) and, more importantly, the construction of the 45-acre, 800 boat slip harbor. Potential impact marine mammals and sea turtles, mitigation techniques will be employed to minimize these acute affects. Overall, the trend of development in the Kona area means increased anthropogenic noise.

The cumulative development will result in increased vehicular traffic, and the need for roadway improvements and alternative modes of transportation will increase. As the region continues to develop, noise levels may increase above current conditions, as more vehicles and new roadways, more structures, and generally increased human activity characterize the region. Emissions from cars and electricity-generating facilities will increase air pollution.

Infrastructure facilities will also be affected by cumulative development. The overall demand for potable water will increase with population growth. Wastewater flows will increase, and the North Kona Sewer Master Plan is being developed for Hawai'i County to address future sewer improvements. Solid waste disposal will also increase with the cumulative growth.

While the project will increase socio-economic and environmental impacts and demands on infrastructure systems, Kona Kai Ola will reduce or mitigate its impacts within the context of larger cumulative impacts. In working towards sustainability objectives, JDI intends to incorporate the latest environmental design and technology to create an energy efficient, low environmental impact, sustainable development at Kona Kai Ola. LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality, as discussed in Section 1.5.2 (LEED 2006). JDI's Kona Kai Ola impacts on public infrastructure and utilities will be mitigated as proposed in this ~~D~~EFEIS, and various measures are presented to reduce impacts related to the physical environment.

Further, the project includes components intended to serve the existing and future visitor and resident population, including a new marina. Shoreline access will be enhanced by a new 400-foot shoreline setback, various parks, including a canoe launching area, a marine science center and other recreational features. On-site commercial areas will expand shopping alternatives. Further, the extension of Kuakini Highway that is part of project implementation will help to mitigate project and cumulative traffic impacts.

In addition, JDI ~~will~~ is in the process of establishing the Kona Kai Ola Community Foundation as a 501(C)(3) non-profit corporation to promote community efforts such as community development, community health care, job training, educational and cultural programs and projects. The primary target service population includes North Kona, and Hawai'i Island residents with a focus on native Hawaiians. JDI ~~will~~ has contributed \$100,000 as initial funding. Ongoing financial support is to be provided by the land users of the Kona Kai Ola Project. The resources from this foundation can be used to address cumulative needs and efforts.

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9 Probable Adverse Environmental Impacts Which Cannot be Avoided

Environmental impacts anticipated to result from the implementation of Kona Kai Ola have been discussed throughout this FEIS. This section summarizes unavoidable adverse impacts.

Short-term effects are generally associated with construction, and prevail only for the duration of the construction period. Long-term effects generally follow completion of the improvements, relate either simply to their existence or to the operation of the new facilities, and are permanent. Effects that can be considered both adverse and unavoidable are discussed below.

Construction impacts to air quality are short-term and temporary in nature. If mitigation measures are not provided, significant airborne emissions could include fugitive dust. Fugitive dust emissions are expected to result from earth-moving, cement-mixing activities, and vehicular travel in construction areas. HAR Section 11-60.1-33 prohibits the generation of fugitive dust without taking reasonable precautions to limit these emissions. As a result, significant fugitive dust generating activities will be minimized through mitigation measures identified in Section 3.5 of this ~~DEIS~~FEIS.

Vehicular emissions will also result from combustion of fossil fuels from construction equipment and vehicles of commuting construction workers. In addition, noise impacts generated by the proposed action will come from the operation of equipment during the construction phase.

Construction of the new marina will cause the removal of ~~some three anchialine ponds~~ some three anchialine pools, as well as ~~possibly change the salinity in the remaining anchialine ponds~~ possibly change the salinity in the remaining anchialine pools ~~the change from brackish water to marine ecosystems in the remaining anchialine ponds~~ makai of the new harbor. Monitoring, management and mitigation measures to protect the health of these anchialine pool ecosystems is described in Section 3.9.2.2.

After the proposed project is completed, long-term impacts on air quality resulting from emissions from project-related motor vehicle traffic should be insignificant. The urbanization of this project will result in a loss of natural and open space. Further, there will be an increase in structural density and human activity, as well as a loss of archaeological sites classified as less significant. Solid waste and wastewater will be generated on-site, and energy and water will be consumed.

Typical of development projects in general, the transformation of undeveloped land into an urban landscape is an unavoidable impact. The incorporation of the latest environmental design and technology to create an energy efficient, low environmental impact, sustainable development at Kona Kai Ola will help to mitigate such impacts.

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10 Summary of Unresolved Issues

A comparison between impacts related to the proposed project and impacts related to Alternative 1, a 400-slip marina indicates that Alternative 1 would generate less environmental, social and economic impacts. This suggests that Alternative 1 might be the preferred alternative. While it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement, establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement would be needed to allow Alternative 1 to proceed with its 25 acre marina. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Air conditioning for the Kona Kai Ola development may be provided by a system utilizing deep, cold ocean water for cooling or Seawater Air Conditioning (SWAC). SWAC would significantly reduce energy consumption requirements, and is being considered in keeping with the sustainability goals of the overall Kona Kai Ola project. The specific design for the proposed SWAC facility has not been finalized. SWAC is a relatively new type of technology and its use at Kona Kai Ola requires a coordinated design concurrent with the buildings, infrastructure, open spaces and lagoons. If injection wells are chosen for circulated-water disposal, the location of these will be dictated by the underlying aquifer and groundwater system. The design of the SWAC will be established as the project progresses. If SWAC is not implemented, then conventional air conditioning systems will be used. This determination will be made based on further detailed study.

The lack of affordable housing continues to be a serious problem for the West Hawai'i region. The project will generate jobs possibly requiring workers to commute from existing distant housing areas, or to search for housing from the increasingly expensive West Hawai'i housing market. Affordable housing requirements generated by Kona Kai Ola will be determined in the rezoning application process.

Based on the current plan, it is anticipated that the development will need to secure water quantities estimated at 2.6 million gallons a day. Currently, Department of Water Supply (DWS) sources are not adequate to support the project needs. The developer is working with the County, DLNR and others on new sources, transmission, and storage of water for the development. Developed wells, storage tanks, transmission and distribution mains will be dedicated to the DWS.

Because it is known that turtles frequent both the harbor and very nearshore areas adjacent to the construction site, they will be impacted by underwater sound from the blasting. Prior experience from similar construction activities at Barbers Point Harbor suggests that turtles will be attracted to the blasting noise. It is reasonable to assume that modification of blasting techniques and in water monitoring can keep the in-water sound levels below the Level A take threshold where actual physical damage could occur. However, it is not likely that either the in-water Level B take threshold or the in-air Level B take threshold could be avoided. Attempting mitigation for the Level B take by excluding the animals from the area is not deemed feasible. Clearing the turtles from the Level B take zone prior to each blast would require physical movement of the animals or other harassment to scare them away - which in itself would constitute a Level B take. Given the lack of biological data on this species with regards to their responsiveness to underwater sound, the most reasonable approach may be to attach monitoring tags to turtles known to frequent the area and monitor their behavior during blasting operations.

The issue of potential impact to hawksbill and green sea turtles remains both poorly defined and unresolved. Due to the very limited knowledge concerning the acoustic hearing range of sea turtles, and a lack of knowledge concerning the noise levels that would impart a significant behavioral change (Level B take) or physiological damage (Level A take), we are forced by the precautionary principle to use data from other species. Unfortunately the species with known data, seals and dolphins, are phylogenetically distant and are perceived to have much lower thresholds. We are therefore applying very stringent sound level limits to a species that may not require this level of protection.

11 Public Participation in Planning for Kona Kai Ola

11.1 Public Participation Overview

Since From November 2005 through June 2007, over 920 Big Island community members have participated in about 550 people have been given the Kona Kai Ola presentations. Community input gathered from these presentations and facilitated by JDI's smart growth expertise, has shaped the vision for Kona Kai Ola. , and were asked for comment and input.

Approximately ~~180~~ 238 people were contacted individually or in very small groups. An additional ~~370~~ 682 people heard the Kona Kai Ola presentations that were given at larger meetings of different organizations. Each large group meeting included a presentation, and question and answer periods, with the members of the commission, council, or club. The community concerns and priorities expressed at these meetings were gathered in this communications program, and ~~they were~~ provided to the Kona Kai Ola planning and design team. Through this process, the plans for the project were redesigned, and the scope of the Draft Environmental Impact Statement was expanded to address these public concerns.

Over a period of ~~eleven~~ 17 months, the key issues that surfaced from these public meetings and presentations include the need for improvements of the road infrastructure in the existing area, traffic concerns on Queen Ka'ahumanu Highway, the potential impact on the growth of Kona of the proposed number of visitor accommodation units (hotel and time-share), the environmental impact of the marina and the proposed number of slips, concerns about the County of Hawai'i's Kealakehe Waste-~~W~~water Treatment Plant, the need for community gathering places (parks and other areas to play and learn), adequate shoreline setbacks, and greater sensitivity to Hawaiian cultural values.

The community concerns and priorities expressed at these meetings were gathered in this communications program, and ~~they were~~ provided to the Kona Kai Ola planning and design team. Through an iterative planning process, the master development plan was revised or the Environmental Impact Statement studies were expanded to address the community concerns. This planning process which includes consultation with neighbors and community stakeholders will help ensure a successful design of Kona Kai Ola. Some of the design and planning steps being taken to address these community concerns include:

- design the overall project to incorporate sustainability with energy efficiency, environmental protection, and pedestrian-friendly designs to enhance community health;
- plan to create a sustainable ahupua'a by developing a commercial mixed-use development around a new harbor in the makai region, and by developing affordable workforce housing in an area mauka of the project site in the same or adjacent ahupua'a - and connecting the ahupua'a with improved roadways, serviced by a regularly scheduled shuttle. This way, people can live close to where they work, play, and learn;— and they can get around the ahupua'a region without needing to own a car.

- design and plan for the Kealakehe Parkway extension to Kuakini Highway to be built in the first phase of the project as a major road connecting the harbor area to Kailua-Kona Village;
- evaluate the safety issues with the shared entrance channel that may limit the number of slips in the new harbor basin;
- evaluate the market for boat slips that may suggest changes to the number of slips in the new harbor basin;
- include a substantial shoreline park, with a 400-foot setback, providing increased public shoreline access to recreation areas and protection of culturally significant sites;
- perpetuate the cultural history of this land through the inclusion of a cultural center as an integral part of the project;
- include numerous community spaces in the plan including a canoe park, community gathering areas, and cultural center;
- include a marine science education center, which will provide new opportunities for local schools to learn about the ocean and the maritime heritage of Hawai'i;
- evaluate different options for upgrading the wastewater treatment plant to improve its performance and capacity;
- evaluate and analyze potential environmental impacts, and suggested mitigation measures that will be included in a comprehensive Environmental Impact Statement.

Table 52: Community Contacts Completed November 2005 through September 2006

• Denotes an individual or small group meeting

* Denotes a group meeting

Name	Affiliation and Participation
Bob Acree	Attended Hawai'i Leeward Planning Conference presentation*
Marie Aguilar	Attended Destination Kona Coast presentation*
Colleen Aiu	Ka 'Ohana o Na Kūpuna*•
Danny Akaka	Cultural Resources Director, Mauna Lani Resort•
Mahea Akau	Ironman Triathlon World Championship•
Cathie Amelotte	Rotary Club of Kona presentation*
Aric Arakaki	Superintendent, Ala Kahakai National Historic Trail•
James Arakaki	County Council person•
Ron Aronson	Attended Kona Kohala Chamber of Commerce Environmental and Natural Resources Committee Mtg*
Sue Aronson	Kealakehe 2020 Attended Na Hoapili o Kaloko Honokōhau Advisory Commission meeting *•
Rick Asbach	Rotary Club of Kona presentation*

Name	Affiliation and Participation
Tim Ashcraft	North Kona Vice President Kona Kohala Chamber of Commerce Attended Kona Kohala Chamber of Commerce Board of Directors presentation*
Alan Ayano	Captain, Lady Dee Sportfishing•
Chad Baybayan	Member, Na Hoapili o Kaloko Honokōhau Advisory Commission Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*
Ron Baird	Executive Director, Natural Energy Laboratory of Hawai'i Authority•
Earl Bakken	President, Five Mountains Hawai'i•
Ed Barnett	West Hawai'i Fisheries Council presentation*
Stephen Bauman	West Hawai'i Fisheries Council presentation*
Sallie Beavers	Marine Biologist, Kaloko Honokōhau National Historical Park Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*•
Geraldine Bell	Superintendent, Kaloko Honokōhau National Historical Park Member Na Hoapili o Kaloko Honokōhau Advisory Commission Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*•
Ulalia Ka'ai Berman	Member Na Hoapili o Kaloko Honokōhau Advisory Commission Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*
Diana Bertsch	Event Director, Ironman Triathlon World Championship•
R. Beesow	West Hawai'i Fisheries Council presentation*
Skip Bethea	Aide, Hawai'i County Council person Gary Safarik•
Jean Bevan-Marquez	West Hawai'i Fisheries Council presentation*
Elaine Blank	Education Director, Jack's Diving Locker•
Jody Bright	Tropidilla Productions Member, Small Boat Harbors and Boating Facilities Ad-Hoc Fact-Finding Committee •
Richard Boston	Integrated Resource Management, Kaloko Honokōhau National Historical Park•
Kater Bourdon	West Hawai'i Fisheries Council presentation*
James Boyle	Attended Lions Club of Kona presentation*
Marsha Boyle	Attended Lions Club of Kona presentation*
Tom Brown	Administrator, County of Hawai'i Mass Transit Agency Attended Kona Traffic Safety Committee presentation*
Nancy Burns	Engineer consultant, former engineer for the County of Hawai'i•
Barbara Bush	Treasurer, Rotary Club of Kona Attended Rotary Club of Kona presentation*

Name	Affiliation and Participation
Marion Bush	Board member, Kaniohale Community Association at the Villages of La'i 'Ōpua Attended Kaniohale Community Association at the Villages of La'i 'Ōpua Board of Directors presentation*
Joe Bussing	West Hawai'i Fisheries Council presentation*
Zack Caldwell	West Hawai'i Fisheries Council presentation*
Carl Carlson	Kukio Resort•
Brent Carmen	West Hawai'i Fisheries Council presentation*
Guy Cellier	Attended Hawai'i Leeward Planning Conference presentation*
Ray Chaikin	Kona environmental leader and Kona businessperson•
Serena Chamberlain	President, Peoples Advocacy for Trails Hawai'i•
Henry Cho	Former County of Hawai'i Deputy Managing Director Attended Kona Lions Club presentation*•
Winston Chow	First Hawaiian Bank Attended the Hawai'i Leeward Planning Conference presentation*
Greg Chun	President and General Manager, Keauhou Resort North Kona Vice President, Kona Kohala Chamber of Commerce Attended Kona Kohala Chamber of Commerce Board of Directors presentation*
Walter Chung	Attended Lions Club of Kona presentation*
Dennis Cintas	Captain and owner of Intrepid sport fishing Attended Hawai'i Fisheries Council presentation*
Terry Cisco	Architect Attended Destination Kona Coast presentation*
Alan Clark	Past President, Rotary Club of Kona Attended Rotary Club of Kona presentation*
Tim Clark	Director, Manta Pacific Research Foundation*•
Ken Clewett	Board member, University of the Nations; member, Rotary Club of Kona Attended Rotary Club of Kona presentation*
Bill Cliff	President Elect, Rotary Club of Kona Attended Rotary Club of Kona presentation*
LeeAnn Crabbe	Queen Lili'uokalani Trust Attended Hawai'i Leeward Planning Conference presentation*
Sabrina Crane	Member Kealakehe High School Student Council Attended Kealakehe High School Student Council presentation*•
Kathy Damon	Member, Rotary Club of Kona Attended Rotary Club of Kona presentation*
Mendy Dant	Owner, Fair Wind; member, Big Island Reef Fund and Kealakekua Bay Activity group•
Puhi Dant	Owner, Fair Wind•
David Dart	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*

Name	Affiliation and Participation
Neil Dart	Member (alternate), West Hawai'i Fisheries Council; attended West Hawai'i Fisheries Council presentation*
Kyle Datta	Managing Director, Rocky Mountain Institute•
Maile David	Staff to Hawai'i County Councilperson Angel Pilago•
Michael Davis	Attended Lions Club of Kona presentation*
Christie Dermengian	President Elect, Kona Kohala Chamber of Commerce; attended Kona Kohala Chamber of Commerce Board of Directors presentation*
Roger Dilts	Member, Kona Community Development Plan Steering Committee•
Printy Dinsmore	Architect, attended Destination Kona Coast presentation*
Ania Driscoll-Lind	Director, Kula Naia Foundation; marine mammal scientist•
Fred Duerr	President, Hawaiian International Billfish Association•
Roger Duquette	Captain, Autumn Marine Sportfishing•
Robin Dutson	Board member, Kona Kohala Chamber of Commerce; attended Kona Kohala Chamber of Commerce Board of Directors presentation*
Ivan Ebaniz	Member Kealakehe High School Student Council; attended Kealakehe High School Student Council presentation*
Isabel Eli	Director, Manta Pacific Research Foundation*•
Robbie Englehard	Hawai'i International Billfish Tournament Director•
Cindy Evans	State Representative, 7th District•
Karen Eoff	Staff to Hawai'i County Councilperson Angel Pilago•
Sean Fagan	Operations Manager, Atlantis Submarines•
Richard Farnham	Member, Rotary Club of Kona; attended Rotary Club of Kona presentation*
Joann Farnsworth	Member, Kona CDP Steering Committee•
Michael Federspiel	Attended Lions Club of Kona presentation*
Dale Fergerstrom	Member, Na Hoapili o Kaloko Honokōhau Advisory Commission; attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*
Billy Fields	Cultural mason in Kona•
Chuck Flaherty	Member, Citizens for Equitable and Responsible Government•
Brenda Ford	Member, Citizens for Equitable and Responsible Government, attended Destination Kona Coast presentation*
Bev Fraser	Past President, Rotary Club of Kona Attended Rotary Club of Kona presentation*
Alfreida Fujita	Board member, Kona Coffee Cultural Festival; member, Holualoa Business Association•
Marissa Furfaro	Planner, PBR Hawai'i Attended Hawai'i Leeward Planning Conference presentation*
Malia Fyffe	Member Kealakehe High School Student Council Attended Kealakehe High School Student Council presentation*
Scott Fuller	Captain and co-owner TARA II sport fishing•
Rick Gaffney	President, Pacific Boats & Yachts; member, Small Boat Harbors and Boating Facilities Ad-Hoc Fact-Finding Committee•

Name	Affiliation and Participation
Salvador Galindo	Attended Lions Club of Kona presentation*
Sam Gaughen	Commodore, Kona Sailing Club*•
Guido Giacometti	Attended Hawai'i Leeward Planning Conference presentation*
Kiah Gilbert	Member Kealakehe High School Student Council Attended Kealakehe High School Student Council presentation•
Gregory Gillette	Commodore, Kona Sailing Club*•
Joel Gimble	Member, Kona Traffic Safety Committee•
Glennon Gingo	Commercial realtor; former long-time executive with the Kona Family YMCA; Chair, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*•
Rick Gmirkin	Staff Archeologist, Kaloko Honokōhau National Historical Park•
Mike Gomes	Surety Kohala Corporation Attended Hawai'i Leeward Planning Conference presentation*
Don Goo	Wimberly, Allison, Tong and Goo•
Donna Goodale	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*
Les Goya	Queen Emma Foundation Attended Hawai'i Leeward Planning Conference presentation*
Josh Green, M.D.	State Representative, 6th District•
James Greenwell	Owner and General Manager, Lanihau Inc. and Palani Ranch•
Kelly Greenwell	Local business and community leader•
Steve Halsey	Commodore, Kona Sailing Club*•
Rodney Haraga	Director, State Department of Transportation Attended Kona Traffic Safety Committee presentation*
Isaac Harp	President, Public Access Shoreline Hawai'i; lineal descendant from family of the Honokōhau iki ahupua'a •
Tammy Harp	Kona environmental leader; cultural advocate•
Roger Harris	Planning Consultant Attended Hawai'i Leeward Planning Conference presentation*
Ikaika Hauanio	Tui Tonga Attended Rotary Club of Mauka Kona presentation*•
Lunakanawai Hauanio	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*
Mark Henshaw	Member (alternate), West Hawai'i Fisheries Council; attended West Hawai'i Fisheries Council presentation*
Doug Herkes	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*
Marni Herkes	Member, Kona Community Development Plan Steering Committee; Administrator, West Hawai'i Fisheries Council; board member, Kohala Center Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*; attended West Hawai'i Fisheries Council presentation*•

Name	Affiliation and Participation
Tommy Hickcox	Retired police officer; member, Kona Community Development Plan Steering Committee•
Stacy Higa	Chairperson Hawai'i County Council•
Nelson Ho	Deputy Director, County of Hawai'i Department of Environmental Management•
Pete Hoffmann	Hawai'i County Councilperson•
Cheryl Holdcroft	Member, Rotary Club of Kona Attended Rotary Club of Kona presentation*
Steve Holmes	Former Honolulu City Council person Attended Kona Kohala Chamber of Commerce Environmental and Natural Resources Committee presentation*
Peter Hoogs	Captain and owner of Pamela sport fishing Attended West Hawai'i Fisheries Council presentation*•
Jacqui Hoover	Executive Director, Hawai'i Leeward Planning Conference Attended Hawai'i Leeward Planning Conference presentation*•
Donald Ikeda	Hawai'i County Council person•
Gwen Ilaban	Kona environmental leader•
Akinore Imai	Attended Lions Club of Kona presentation*
Virginia Isbell	Hawai'i County Councilperson Attended Kona Traffic Safety Committee presentation* Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*•
Neal Isaacs	Captain and owner, Anxious Sportfishing•
John Iwane	Chairman, Hawai'i Community Federal Credit Union Attended Lions Club of Kona presentation*
Merna Izawa	Attended Lions Club of Kona presentation*
Take Izawa	Attended Lions Club of Kona presentation*
Bob Jacobson	Hawai'i County Council person•
Kate Jacobson	Member, Kona Community Development Plan Steering Committee; board member, Innovations Charter School•
Felicity Johnston	Principal, Hualālai Academy•
Frank Jung	Board member, Housing and Community Development Corporation of Hawai'i•
Dixie Kaetsu	Hawai'i County Managing Director•
Reynold Kahalewai	Community Policing Officer Attended Kona Traffic Safety Committee presentation*
Maurice Kahawai	Attended Lions Club of Kona presentation*
Edith Kahoalii	Board member, Kaniohale Community Association at the Villages of La'i 'Ōpua; member, Na Wai Puna O Kona Kūpuna Group; attended Kaniohale Community Association at the Villages of La'i 'Ōpua Board of Directors presentation* Attended Na Wai Puna O Kona Kūpuna Group presentation*•

Name	Affiliation and Participation
Bo Kahui	President, Kaniohale Community Association at the Villages of La'i 'Ōpuua; attended Kaniohale Community Association at the Villages of La'i 'Ōpuua Board of Directors presentation*•
Rachele Kalili	Member, Ka 'Ohana o Na Kūpuna o Kona*•
Ulalia Ka'ai Berman	Member, Na Hoapili o Kaloko Honokōhau Advisory Commission*
Josephine Keliipio	Member, Kona Traffic Safety Committee•
John Kellam	West Hawai'i Fisheries Council presentation*
Sue Kellam	West Hawai'i Fisheries Council presentation*
Linda Jane Kelly	Ironman Triathlon World Championship•
James Kent	James Kent and Associates Attended Kona Kohala Chamber of Commerce Environmental and Natural Resources Committee presentation*
Lei Kihoi	Attorney, attended Destination Kona Coast presentation*
Harry Kim	County of Hawai'i Mayor•
Alex Kinzler	Attended Hawai'i Leeward Planning Conference presentation*
Greg Knapp	Board member, Hawai'i Island Paddlers Association•
Vicky Kometani	Board member, Kona Kohala Chamber of Commerce Attended Kona Kohala Chamber of Commerce Board of Directors presentation*
Lily Kong	Ka 'Ohana o Ka Kūpuna o Kona*•
Barbara Kossow	County of Hawai'i Deputy Managing Director; attended West Hawai'i Fisheries Council presentation* Attended Kona Traffic Safety Committee presentation*•
Renee Kraft	Member, Rotary Club of Kona Attended Rotary Club of Kona presentation*
Michael Kramer	Owner, Natural Investment Services; founder, Kona Kohala Chamber of Commerce Kuleana Green Business Program•
Moana Kuma	Hawaiian cultural advocate Attended Destination Kona Coast presentation*
Brad Kurokawa	County of Hawai'i Deputy Planning Director•
Gary Lambert	Co-owner, Gentry's Kona Marina; member, Small Boat Harbors and Boating Facilities Ad-Hoc Fact-Finding Committee•
Vivian Landrum	Executive Director, Kona Kohala Chamber of Commerce Attended Kona Kohala Chamber of Commerce Board of Directors presentation*•
Keller Laros	Director, Manta Pacific Research Foundation*•
Wendy Laros	Director, Manta Pacific Research Foundation*•
Wally Lau	Neighborhood Place of Kona•
Gretchen Lawson	Member, Kona Community Development Plan Steering Committee; board member, Kona Kohala Chamber of Commerce Attended Kona Kohala Chamber of Commerce Board of Directors presentation*•

Name	Affiliation and Participation
Brenda Lee	Hawaiian cultural advocate Attended Destination Kona Coast presentation*
Elizabeth Lee	Kupuna, member of long-time Kona Hawaiian family•
Reggie Lee	Member of long-time Kona Hawaiian family•
Robert Lee	General Contractor, member of long-time Kona Hawaiian family•
Kawika Leicher	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*
Jeff Leicher	Owner, Jack's Diving Locker•
Teri Leicher	Owner, Jack's Diving Locker and Attended Destination Kona Coast presentation*•
Gene Leslie	President, Kuakini Hawaiian Civic Club, former President Kaniohale Community Association •
Andy Levin	Executive Director, Hawai'i County Mayor's Office Attended West Hawai'i Fisheries Council presentation*
Robert Liebasck	Attended Lions Club of Kona presentation*
Allan Liftee	Crew, Autumn Marie Sportfishing•
Laura Livnat	West Hawai'i Fisheries Council presentation* Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*
Carolyn Lucas	Reporter, West Hawai'i Today Attended West Hawai'i Fisheries Council presentation*•
Ruby MacDonald	Executive Director, Office of Hawaiian Affairs; Chair, Na Hoapili o Kaloko Honokōhau Advisory Commission Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*•
Lydia Mahi	Member, Kona Community Development Plan Steering Committee; Kona representative, Hawai'i County Economic Opportunity Council•
Trish Malone	James Kent & Associates Attended Kona Traffic Safety Committee presentation*
David Marquez	Kealakehe 2020•
Lisa Marrack	Staff Scientist, Kaloko Honokōhau National Historical Park•
Mike Matsukawa	Attorney in Kona; member, Kona Community Development Plan Steering Committee; board member, Kona Community Health Center•
Nancy Matsukawa	Principal, Kealakehe Elementary School•
Norma Matsumoto	Hawai'i State Teachers Association Attended Lions Club of Kona presentation*
Bruce McClure	Director, County of Hawai'i Department of Public Works Attended Kona Traffic Safety Committee presentation*
Mark McGuffie	Executive Director, Hawai'i Island Economic Development Board; board member, Kona Kohala Chamber of Commerce Attended Kona Kohala Chamber of Commerce Board of Directors presentation*•
Jan McLaughlin	Director, Manta Pacific Research Foundation presentation•

Name	Affiliation and Participation
Mike Melear	Attended West Hawai'i Fisheries Council presentation*
Jeff Melrose	Land Manager, Kamehameha Schools Attended Kona Kohala Chamber of Commerce Environmental and Natural Resources Committee*
Ken Melrose	Planning Consultant and Project Manager Attended Hawai'i Leeward Planning Conference presentation*
Randy Millare	Insurance Hawai'i Attended Lions Club of Kona presentation*
Robbie Mist	Attended Destination Kona Coast presentation*
Greg Mooers	Planning and Permitting Consultant Attended Hawai'i Leeward Planning Conference presentation*
Bill Moore	Kohala Ranch Attended Hawai'i Leeward Planning Conference presentation*
Rebecca Most	Staff Scientist-Resource Manager, Kaloko Honokōhau National Historical Park•
Wil Murakami	Principal, Kealakehe High School•
Harold Murata	Member, Kona Traffic Safety Committee Attended Kona Traffic Safety Committee presentation*•
Sachiko Murata	Mauna Lani Resort Attended Hawai'i Leeward Planning Conference presentation*
Joyce Murphy	Realtor•
Nancy Murphy	Hawai'i Island District Manager, Department of Land and Natural Resources, Division of Boating and Ocean Recreation•
Joseph Nahale	Member, Na Hoapili o Kaloko Honokōhau Advisory Commission Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*
Mike Nakachi	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*
Miles Nakahara	Wildlife Biologist, Department of Land and Natural Resources, Hawai'i Division of Forestry and Wildlife•
Teresa Nakama	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*
Cynthia Nazara	Member, Na Hoapili o Kaloko Honokōhau Advisory Commission Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*
Dickie Nelson	Former Department of Hawaiian Homes Commissioner; former Governor's Liaison•
Vicky Newman	Director, Manta Pacific Research Foundation*•
Allen Nobriga	Attended Lions Club of Kona presentation*
Mark Norman	Supervisor of Operations, Kealakehe Waste-Water Treatment Plant, County of Hawai'i•
Greg Ogin	Commercial realtor; President; Kona Family YMCA•
Ollie Ollinger	Treasurer, Royal Order of Kamehameha•

Name	Affiliation and Participation
Dan Olson	Co-chair, Kona Traffic Safety Committee Attended Kona Traffic Safety Committee presentation*
Michelle Orian	Queen Lili'uokalani Trust Attended Hawai'i Leeward Planning Conference presentation*
Kazumi Oshita	Attended Lions Club of Kona presentation*
Jan Ostman-Lind	Director, Kula Naia Foundation; member, Big Island Reef Fund and Kealakekua Bay Activity group; marine mammal scientist Attended West Hawai'i Fisheries Council presentation*•
Tina Owens	Member (alternate), West Hawai'i Fisheries Council; co-founder, Lost Fish Coalition Attended West Hawai'i Fisheries Council presentation*•
Jordan Ozaki	Member Kealakehe High School Student Council Attended Kealakehe High School Student Council presentation*•
Rob Pacheco	President, Hawai'i Forest & Trail•
Māhealani Pai	Lineal descendant from family of the Honokōhau ahupua'a; cultural consultant•
George Paleudis	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*
Sharon Paoa	Retailer; attended Destination Kona Coast presentation*
Weejay Paris	Attended Hawai'i Leeward Planning Conference presentation*
George Parker	Inductee, International Game Fish Association (IGFA) Hall of Fame; noted long-time Kona sport fishing captain•
Phil Parker	Long-time Kona sport fishing industry leader and Kona sport fishing tournament communication director•
Jillyn Parker	Co-owner, Paradise Gourmet Catering•
Marlin Parker	Captain, Marlin Magic II•
Sara Peck	Sea Grant Extension Agent, West Hawai'i; Ex-Officio, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*•
Nainoa Perry	Member, Na Hoapili o Kaloko Honokōhau Advisory Commission Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*
Ann Peterson	Board member, People Attentive to Trails Hawai'i (PATH); employed by the Kona Historical Society•
Angel Pilago	Hawai'i County Councilperson•
Nancy Pisicchio	County consultant; local coordinator, Kona Community Development Plan; member, Kona Farm Bureau; member, Plan to Protect•
Stephanie Place	Board member, Kaniohale Community Association at the Villages of La'i 'Ōpua; attended Kaniohale Community Association at the Villages of La'i 'Ōpua Board of Directors presentation*
Shelby Pudwell	Attended West Hawai'i Fisheries Council presentation*

Name	Affiliation and Participation
Cindi Punihaoale	Cultural committee member, Kukio Resort; youth related cultural and natural resource activities coordinator, Kealakehe High School Attended Na Hoapili o Kaloko Honokōhau Advisory Commission meeting*•
Doug Robbins	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*
Naomi Radtke	Member, Na Wai Puna O Kona Kūpuna Group Attended Na Wai Puna O Kona Kūpuna Group presentation*
Ed Rapoza	President, Island Land Co.; member, Kona Community Development Plan Steering Committee•
John Ray	Trustee, Parker Ranch; attended Hawai'i Leeward Planning Conference presentation*
Nadja Ray	Attended Hawai'i Leeward Planning Conference presentation*
David Reese-Thomas	Member, Rotary Club of Kona; attended Rotary Club of Kona presentation*
Theresa Reveira	Chief of Interpretation, National Park Service Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*
Monty Richards	Attended Hawai'i Leeward Planning Conference presentation*
Dana Riddle	Operator, Kealakehe Waste-Water Treatment Plant, County of Hawai'i•
Tim Robertson	Owner, Melton Tackle•
Mikahala Roy	Member, Na Hoapili o Kaloko Honokōhau Advisory Commission Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation; and attended Destination Kona Coast Presentation*
Verna Roy	Na Hoapili o Kaloko Honokōhau Advisory Commission presentation, and attended Destination Kona Coast presentation*
Gary Safarik	Hawai'i County Council person•
Sharon Sakai	Administrative Director, Kohala Coast Resort Association; board member, Kona Kohala Chamber of Commerce Attended Kona Kohala Chamber of Commerce Board of Directors presentation*•
Norman Sakata	President, Kona Coffee Cultural Festival; attended Lions Club of Kona presentation*
John Santangelo	Waimea Water Services Attended Hawai'i Leeward Planning Conference presentation*
Dale Sarver	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*
Donald Sasaki	Kona businessman Attended Lions Club of Kona presentation*
Laura Sciacqua Guluzzy	Member, Rotary Club of Kona Attended Rotary Club of Kona presentation*
Barbara Scott	Co-chair, Kona Traffic Safety Committee Attended Kona Traffic Safety Committee presentation*•
Danny Scott	USCG Captain, Jack's Diving Locker•

Name	Affiliation and Participation
Rob Shallenberger	The Nature Conservancy; member West Hawai'i Fisheries Council; Attended West Hawai'i Fisheries Council presentation*•
Janna Shackeroff	West Hawai'i Fisheries Council presentation*
Karin Shaw	Board member, Kona Kohala Chamber of Commerce Attended Kona Kohala Chamber of Commerce Board of Directors presentation*
Sonny Shimaoka	Member, Concerned Citizens for Kona•
Kirk Shorte	Marketing Director, Jack's Diving Locker•
Neil Sims	Principal, Kona Blue Water Attended West Hawai'i Fisheries Council presentation*
Andy Smith	Governor's West Hawai'i Liaison•
Riley Smith	Parker Ranch; attended Kona Kohala Chamber of Commerce Environmental and Natural Resources Committee presentation*
Mike Souther	Commodore, Kona Sailing Club*•
Art Souza	Department of Education Complex Area Superintendent, West Hawai'i Complex Area Schools•
Hannah Springer Tomich	Former County of Hawai'i Planning Commissioner; cultural committee member for Hui Laulima O Kekaha Kai Board, Hualālai Resort, Kukio and Kohanaiki Advisory Group•
Mike Stanton	General Manager-Kona, Atlantis Submarine; member, Small Boat Harbors and Boating Facilities Ad-Hoc Fact-Finding Committee Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*•
JoAnne Kahanamoku Sterling	Member, Na Hoapili o Kaloko Honokōhau Advisory Commission Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*•
M. Carolyn Stewart	President, Malama Kai Foundation•
Bobby Stivers	Executive Director, Kona Family YMCA•
Jessica Stone	Hawai'i Forest and Trails Attended Kona Kohala Chamber of Commerce Environmental and Natural Resources Committee presentation*
Ally Thompson	Member, Kealakehe High School Student Council Attended Kealakehe High School Student Council presentation•
Stanley Tokunaga	Attended Lions Club of Kona presentation*
Jeff Turner	Attended Kona Kohala Chamber of Commerce Environmental and Natural Resources Committee presentation*
Curtis Tyler	Former Kona County Council person; member, Kona Community Development Plan Steering Committee Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*•
Glen Uchimura	Contractor, Attended Lions Club of Kona presentation*
Edwin Ueda	Attended Lions Club of Kona presentation*

Name	Affiliation and Participation
Kim Uehara	Biologist and Wildlife Consultant for U.S.D.A. Natural Resources Conservation Service Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*•
Linda Underwood	Administrative Officer, National Park Service Administrative Officer; attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*
Scott Unger	Member, Rotary Club of Kona Attended Rotary Club of Kona presentation*
Larrio Ursua	Member, Kaniohale Community Association at the Villages of La'i 'Ōpua; Attended Na Wai Puna O Kona Kūpuna Group presentation *
David Vaughn	Friends of Natural Energy Laboratory of Hawai'i Authority•
Sue Vermillion	Producer and Event Director, G350 Productions•
Rick Vidgen	Member, Governor's Advisory Commission; board member, Kona Kohala Chamber of Commerce Attended Kona Kohala Chamber of Commerce Board of Directors presentation*•
Eric von Platen Luder	President, Kona Kohala Chamber of Commerce Attended Kona Kohala Chamber of Commerce Board of Directors presentation*•
Scott Waddington	Biologist and Wildlife Consultant, also works at Cyanotech Corporation Attended Na Hoapili o Kaloko Honokōhau Advisory Commission presentation*•
Jill Wagner	Member, TREE; attended Kona Kohala Chamber of Commerce Environmental and Natural Resources Committee presentation*•
George Wallace	Attended Lions Club of Kona presentation*
Marilyn Wallace	Attended Lions Club of Kona presentation*
Bill Walsh	Aquatic Biologist, Department of Land and Natural Resources, Division of Aquatic Resources; Ex-Officio, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*•
Brian Wargo	Owner, Bite Me Sportfishing•
Paul Warren	Captain and co-owner of Sunseeker and Manu Iwa Attended West Hawai'i Fisheries Council presentation*•
Ben Watai	Founding member, Kealakehe Homeowners Association•
Elaine Watai	Founding member Kealakehe Homeowners Association; member, Governor's West Hawai'i Advisory Council•
Wayne Watanabe	Attended Lions Club of Kona presentation*
Rodney Watanabe	Executive Vice President, Hawai'i Community Federal Credit Union; County Planning Commission member representing Kona•
Gretchen Watson Kabei	Secretary, Rotary Club of Kona; attended Rotary Club of Kona presentation*
Mariska Weijerman	Staff Scientist, Kaloko Honokōhau National Historical Park•
Andrew West	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*

Name	Affiliation and Participation
John Michael White	Attended Hawai'i Leeward Planning Conference presentation*
Phyllis White	Attended Lions Club of Kona presentation*
Tom Whittemore	Former Parker Ranch trustee; former board member, Natural Energy Laboratory of Hawai'i Authority•
Noelani Whittington	Staff to Hawai'i County Councilperson Virginia Isbell•
Anne Irene Wilcox	Member, Kona Community Development Plan Steering Committee; former president, Kona Outdoor Circle•
George Wilkins	Retired professor, Hawai'i Institute of Geophysics•
Marian Wilkins	League of Women Voters•
Ron Williams	CEO, Atlantis Submarines•
Vern Yamanaka	Member, West Hawai'i Fisheries Council Attended West Hawai'i Fisheries Council presentation*
Chris Yuen	Planning Director, County of Hawai'i•
Linda Zabolski	Owner, Captain Zodiac; board member, Kona Kohala Chamber of Commerce; attended Kona Kohala Chamber of Commerce Board of Directors presentation*

Table 64: Presentations to Community Organizations

Organization	Participation
Destination Kona Coast*	Approximately 70 people present
Hawai'i Leeward Planning Conference*	Approximately 50 people present
Ka 'Ohana o Na Kūpuna o Kona*•	3 members present
Kaniohale Community Association at the Villages of La'i 'Ōpua Board of Directors*•	7 members present
Kealakehe High School Student Council*•	7 Members present
Kona-Kohala Chamber of Commerce Board of Directors*	13 members present
Kona-Kohala Chamber of Commerce Environmental and Natural Resources Committee*	13 members present
Kona Sailing Club*•	4 members present (the current commodore, and three former commodores)
Kona Traffic Safety Committee*	Approximately 25 people present
Lions Club of Kona*	Approximately 30 members present
Manta Pacific Research Foundation Board of Directors*•	5 directors present
Na Hoapili o Kaloko Honokōhau Advisory Commission*	9 commissioners, at least three <u>Kaloko-Honokōhau National Historical Park NPS</u> staff, and approximately 35 other people present
Na Wai Puna O Kona Kūpuna Group*	More than 20 members present

Organization	Participation
Rotary Club of Kona*	Approximately 45 Rotary members, guests and visiting Rotarians present
West Hawai'i Fisheries Council*	17 Members present Approximately 23 Guests present

11.2 Ongoing Public Participation Process Continues After DEIS Publication

The Kona Kai Ola team continued its effort to meet with community members after the Draft EIS was released in September 2006. From October 2006 through June 2007, an additional 81 project presentations were delivered to an additional 361 community members. These presentations included individual meetings, small group presentations and larger gatherings. All of the meetings allowed for in-depth question and answer periods.

These presentations were productive and the project plan revisions reflect community input gathered throughout the communication process.

In addition to responding to formal comments generated from the draft EIS, the Kona Kai Ola team has worked with its ahupua'a neighbors regarding additional environmental studies and EIS alternatives.

Puwalu - Advocating for the Ahupua'a of Kealakehe: Live, Work, Play and Learn

Kona Kai Ola recently participated in the first of a series of Puwalu (or gatherings) *Advocating for the Ahupua'a of Kealakehe: Live, Work, Play and Learn*, initiated by the Kaniohale Community Association and its board president Bo Kahui.

Key ahupua'a stakeholders including kupuna and representatives from Kaloko-Honokōhau National Historical Park, County of Hawai'i, Kaniohale Community Association, Kealakehe Community Association, Department of Hawaiian Home Lands and Kona Kai Ola along with cultural descendants came together to:

1. collectively establish basic cultural values for the Kealakehe ahupua'a and
2. discuss external forces pressuring the ahupua'a.

Stakeholders identified immediate and future needs of Kealakehe ahupua'a and agreed to guiding principles for the Puwalu. These principles include looking at the Kealakehe ahupua'a from mauka to makai and in context with neighbors, and to strengthen the collective vision to include future generations.

The initial Puwalu established that the ahupua'a strive to be akamai (smart)—one that connects neighbors and neighborhoods with good roads, trails and paths, recognizes the importance of growing in balance, being lokahi (in balance) with nature, man and spirituality, and honor its Hawaiian culture and sense of place.

Kaniohale Community Association Support

Kona Kai Ola's community outreach has emphasized the importance of its closest neighbors, the Kaniohale at the Villages of La'i 'Ōpua Community Association (Kaniohale Community Association).

Kona Kai Ola engaged the Kaniohale Community Association's Board of Directors through presentations and ensuing discussions focusing on an alternative development plan to be presented in the FEIS with a smaller marina basin and less number of hotel and time share units (Alternative 1).

As a result of this ongoing dialog, the Kaniohale Community Association at the Villages of La'i 'Ōpua Board of Directors unanimously approved a resolution supporting Kona Kai Ola's plan for a smaller marina and less number of hotel and time share units at their regular meeting on June 6, 2007, which is excerpted below and included in the comment letters on the DEIS.

"As this process to plan Kona Kai Ola proceeds, the Kaniohale Community Association Board of Directors expresses its support for Kona Kai Ola project in its reduced density version..."

As neighbors in the Kealakehe ahupua`a, the Kaniohale Community Association welcomes the involvement of this partnership of Jacoby Development, Inc., Department of Hawaiian Home Lands, and Department of Land and Natural Resources, in cooperative efforts to plan and implement steps to achieve a sustainable ahupua`a and a healthy community."

Kaniohale at the Villages of La'i 'Ōpua Community Association.
approved June 6, 2007

Over the entire time of project design, preparation of the Draft EIS and preparation of the Final EIS, Jacoby Development has received input on Kona Kai Ola from over 920 Big Island community members, has adjusted and revised project plans, and is committed to build a sustainable development.

Community participation will continue to help guide and shape this project to protect the region's natural and cultural resources and better the West Hawai'i community's well being with recreational, educational and employment opportunities.

**Table 7: Kona Kai Ola Community Contacts Completed Since DEIS;
October 2006 through June 2007**

•Denotes an individual or small group meeting

**Denotes a group meeting*

<u>Name</u>	<u>Affiliation and Participation</u>
<u>Rudy Ai</u>	<u>Board member, Kaniohale Community Association at the Villages of La`i`opua</u> <u>Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*</u>
<u>Dora Aio</u>	<u>Board member, Kaniohale Community Association at the Villages of La`i`opua</u> <u>Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*</u>
<u>Danny Akaka</u>	<u>Cultural Resources Director, Mauna Lani Resort</u> <u>Individual project meeting•</u>
<u>Jim Anderson</u>	<u>Keauhou Punahale Home Owners Association</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Billie Baclig</u>	<u>Commissioner, Hawaiian Homes Commission</u> <u>Individual project meeting•</u>
<u>Sallie Beavers</u>	<u>Marine Biologist, Kaloko-Honokōhau National Historical Park</u> <u>Attended Na Hoapili o Kaloko-Honokōhau Advisory Commission presentation*</u> <u>Individual project meeting•</u>
<u>Billie Baclig</u>	<u>Commissioner, Hawaiians Homes Commission</u> <u>Individual project meeting•</u>
<u>Casey Ballao</u>	<u>General Manager, Roberts Hawai`i; cultural advocate</u> <u>Individual project meeting•</u>
<u>Scott Bell</u>	<u>Kona Realtor; former President, Kona Kohala Chamber of Commerce</u> <u>Individual project meeting•</u>
<u>Sarah Bello</u>	<u>President, Holualoa Village Association</u> <u>Attended Holualoa Village Association presentation*</u>
<u>Jane Bockus</u>	<u>Keauhou Canoe Club</u> <u>Attended Keauhou Outreach Group*</u>

<u>Name</u>	<u>Affiliation and Participation</u>
<u>Randi Botti</u>	<u>President, Hawai'i Island Paddlesport Association</u> <u>Individual project meeting•</u>
<u>Carla Brown</u>	<u>Attended Kailua Kona Lions Club presentation</u>
<u>Maggie Brown</u>	<u>President, Body Glove Cruises</u> <u>Individual project meeting•</u>
<u>Bo Campos</u>	<u>President, Kai 'Opua Canoe Club</u> <u>Individual project meeting•</u>
<u>Geri Cardoza</u>	<u>Keauhou Villas</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>David Chai</u>	<u>Director of Natural Resources, Hualālai Resort</u> <u>Individual project meeting•</u>
<u>Serena Chamberlain</u>	<u>President, PATH</u> <u>Attended PATH Board of Directors presentation*</u>
<u>Keala Ching</u>	<u>Founder, Na Wai Iwi Ola Foundation; Kumu hula</u> <u>Attended Na Wai Iwi Ola Foundation small group meeting</u>
<u>Linda Chinn</u>	<u>Land Management Division Administrator, Department of Hawaiian Home Lands</u> <u>Attended Ahupua'a o Kealakehe puwala*</u>
<u>Dick Choy</u>	<u>Executive Director, Kids for Kona</u> <u>Individual project meeting•</u>
<u>Boyd Coffman</u>	<u>Attended Kailua Kona Lions Club presentation</u>
<u>Bobby Command</u>	<u>Contributing Editor, West Hawai'i Today</u> <u>Individual project meeting•</u>
<u>Skip Cowell</u>	<u>Vice President & co-founder; TREE Hawai'i</u> <u>Individual project meeting•</u>
<u>Chuck Crowe</u>	<u>Keauhou Estates</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Nani Demasco</u>	<u>School clerk; Kealakehe Elementary School Community Council</u> <u>Attended Kealakehe Elementary School Community Council presentation*</u>
<u>Kevin Dayton</u>	<u>Big Island news bureau, Honolulu Advertiser</u> <u>Individual project meeting•</u>

<u>Name</u>	<u>Affiliation and Participation</u>
<u>Charlene David</u>	<u>Kaulana At Kona</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>James Dean</u>	<u>Owner, Blue Hawai'i Sportfishing</u> <u>Individual project meeting•</u>
<u>Laura Diernfield</u>	<u>Attended PATH Board of Directors presentation</u>
<u>Fred Duerr</u>	<u>President, Hawaiian International Billfish Association</u> <u>Individual project meeting•</u>
<u>Kelly Duff-DePoyo</u>	<u>Parent; Kealakehe Elementary School Community Council</u> <u>Attended Kealakehe Elementary School Community Council presentation*</u>
<u>Charmaine Duvouchelle</u>	<u>Vice President, Kaniohale Community Association at the Villages of La`i`opua</u> <u>Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*</u>
<u>Cindy Evans</u>	<u>State Representative, 7th District</u> <u>Individual project meeting•</u>
<u>Billy Fields</u>	<u>Cultural mason in Kona</u> <u>Individual project meeting•</u>
<u>Peter Fithian</u>	<u>Founder, Hawaiian International Billfish Tournament</u> <u>Individual project meeting•</u>
<u>Reed Flickinger</u>	<u>Editor, West Hawai'i Today</u> <u>Individual project meeting•</u>
<u>Alfreida Fujita</u>	<u>Board member, Kona Coffee Cultural Festival; member, Holualoa Business Association; member, Professional Business Women's Association</u> <u>Attended Professional Business Women's Association & Holualoa Business Association presentations*</u>
<u>Scott Fuller</u>	<u>Captain and co-owner of TARA II</u> <u>Individual project meeting•</u>
<u>Danny Garcia</u>	<u>Administration</u> <u>Attended Kealakehe High School Community Council presentation*</u>
<u>Michael Gardner</u>	<u>Keauhou Kona Surf & Racquet Club Homeowners Association</u> <u>Attended Keauhou Outreach Group presentation*</u>

<u>Name</u>	<u>Affiliation and Participation</u>
<u>Josh Green</u>	<u>M.D., State Representative, 6th District</u> <u>Individual project meeting•</u>
<u>James Greenwell</u>	<u>Owner and General Manager, Lanihau Inc. and Palani Ranch</u> <u>Attended Hawai'i Leeward Planning Conference presentation*</u> <u>Individual project meeting•</u>
<u>Kelly Greenwell</u>	<u>President, Kealakehe Community Association; member, Kealakehe Elementary School Community Council</u> <u>Attended Destination Kona Coast & Kealakehe Elementary School Community Council presentations*</u> <u>Individual project meeting•</u>
<u>Bob Goodwin</u>	<u>Attended Kailua Kona Lions Club presentation*</u>
<u>Jerry Halverson</u>	<u>President, Moku o Hawai'i Canoe Association</u> <u>Individual project meeting•</u>
<u>Lunakanawai Hauanio</u>	<u>Member, West Hawai'i Fisheries Council; member, Laiopua 2020</u> <u>Attended West Hawai'i Fisheries Council & Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentations*</u>
<u>Marlin Harris</u>	<u>Attended Kealakehe High School Community Council presentation*</u>
<u>Debbie Hecht</u>	<u>Aide, Councilperson Ford</u> <u>Attended Na Wai Iwi Ola Foundation small group meeting*</u>
<u>Marrisa Hendrickson</u>	<u>Parent; Kealakehe Elementary School Community Council</u> <u>Attended Kealakehe Elementary School Community Council presentation*</u>
<u>Tommy Hickcox</u>	<u>Retired police officer; member, Kona Community Development Plan Steering Committee; member, Concerned Citizens of Kona</u> <u>Individual project meeting•</u>
<u>Stephen Hicks</u>	<u>Director of Operations, Red Sail Sports</u> <u>Individual project meeting•</u>
<u>Janet Higa-Miller</u>	<u>Attended PATH Board of Directors presentation</u>
<u>Pete Hoffman</u>	<u>Chair, Hawai'i County Council</u> <u>Individual project meeting•</u>
<u>Mel Hoomana-wanui</u>	<u>Board member, Kaniohale Community Association at the Villages of La`i`opua</u> <u>Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*</u>

<u>Name</u>	<u>Affiliation and Participation</u>
<u>Roberta Jaques</u>	<u>Member, Professional Business Women's Association</u> <u>Attended Professional Business Women's Association presentation*</u>
<u>Linda Jeffery</u>	<u>Secretary, Kealakehe High School Community Council</u> <u>Attended Kealakehe High School Community Council presentation</u>
<u>Kathy Jensen</u>	<u>Clark Realty</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Lona Johnson</u>	<u>Attended Kailua Kona Lions Club presentation*</u>
<u>Terry Jones</u>	<u>Keauhou Akahi Homeowners Association</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Patrick Jones</u>	<u>Member, Kealakehe Community Association</u> <u>Attended Ahupua'a o Kealakehe puwala</u>
<u>Gretchen Watson-Kabei</u>	<u>Secretary, Rotary Club of Kona; Legal Administrator/Principal Broker</u> <u>SVC-Hawai'i, L.P.</u> <u>Attended Rotary Club of Kona presentation*</u> <u>Individual project meeting•</u>
<u>Dixie Kaetsu</u>	<u>Hawai'i County Managing Director</u> <u>Individual project meeting•</u>
<u>Bo Kahui</u>	<u>President, Kaniohale Community Association at the Villages of La`i`opua</u> <u>Attended Kaniohale Community Assoc at Villages of La`i`opua Board of Directors*</u> <u>Attended Ahupua'a o Kealakehe puwala*</u> <u>Individual project meeting•</u>
<u>Edith Kahoalii</u>	<u>Board member, Kaniohale Community Association at the Villages of La`i`opua; member,</u> <u>Na Wai Puna O Kona Kupuna Group</u> <u>Attended Kaniohale Community Assoc at Villages of La`i`opua Board of Directors & Na</u> <u>Wai Puna O Kona Kupuna presentations*</u>
<u>Malia Kamaka</u>	<u>Commissioner, Hawaiian Homes Commission</u> <u>Individual project meeting•</u>
<u>Marion</u> <u>Bush Keliikipi</u>	<u>Board member, Kaniohale Community Association at the Villages of La`i`opua</u> <u>Attended Kaniohale Community Association at the Villages of La`i`opua Board of</u> <u>Directors presentation*</u>
<u>Kathy Kirk</u>	<u>Attended West Hawai'i Explorations Academy presentation*</u>

<u>Name</u>	<u>Affiliation and Participation</u>
<u>Harry Kim</u>	<u>County of Hawai'i Mayor</u> <u>Individual project meeting•</u>
<u>Greg Knapp</u>	<u>Board member, Hawai'i Island Paddlers Association</u> <u>Individual project meeting•</u>
<u>Russell Kokubun</u>	<u>Hawai'i State Senator</u> <u>Individual project meeting•</u>
<u>Barbara Kossow</u>	<u>County of Hawai'i Deputy Managing Director</u> <u>Attended West Hawai'i Fisheries Council & Kona Traffic Safety Committee presentations*</u> <u>Attended Ahupua'a o Kealakehe puwalu*</u> <u>Individual project meeting•</u>
<u>Walter Kunitake</u>	<u>Former chancellor, UH-West Hawai'i</u> <u>Individual project meeting•</u>
<u>Nani Kupihe</u>	<u>Attended Kailua Kona Lions Club presentation*</u>
<u>Brad Kurokawa</u>	<u>County of Hawai'i Deputy Planning Director</u> <u>Individual project meeting•</u>
<u>Wally Lau</u>	<u>Executive Director, Neighborhood Place of Kona; Chair, Hui Laulima</u> <u>Attended Ahupua'a o Kealakehe puwalu*</u> <u>Individual project meeting•</u>
<u>Elizabeth Lee</u>	<u>Kupuna</u> <u>Attended Ahupua'a o Kealakehe puwalu*</u> <u>Individual project meeting•</u>
<u>Jamielynn Leialoha</u>	<u>Attended Kealakehe High School Community Council presentation*</u>
<u>Gene Leslie</u>	<u>President, Kuakini Hawaiian Civic Club; former President, Kaniohale Community Association at the Villages of La'i`opua</u> <u>Attended Kuakini Hawaiian Civic Club presentation*</u> <u>Individual project meeting•</u>
<u>Flash Libero</u>	<u>Attended Kailua Kona Lions Club presentation</u>
<u>Robert Lindsey</u>	<u>Trustee, Office of Hawaiian Affairs</u> <u>Individual project meeting•</u>

<u>Name</u>	<u>Affiliation and Participation</u>
<u>Mark Lossing</u>	<u>Business Agent, Hawai'i Carpenters Union</u> <u>Individual project meeting•</u>
<u>Mary Lovein</u>	<u>Member, Holualoa Village Association</u> <u>Attended Holualoa Village Association*</u>
<u>Stuart Lowry</u>	<u>Bayview Estates Homeowner Association</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Paul Maddox</u>	<u>Member, Holualoa Village Association</u> <u>Attended Holualoa Village Association presentation</u>
<u>Margaret Masunaga</u>	<u>Attorney, County Family Support Division</u> <u>Individual project meeting•</u>
<u>Nancy Matsukawa</u>	<u>Principal, Kealakehe Elementary School; member, Kealakehe Elementary School Community Council</u> <u>Attended Kealakehe Elementary School Community Council presentation*</u> <u>Individual project meeting•</u>
<u>Herb Maunu</u>	<u>Board member, Kaniohale Community Association at the Villages of La`i`opua</u> <u>Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*</u>
<u>Janet McClure</u>	<u>Attended Kealakehe High School Community Council presentation*</u>
<u>Lil McGuire</u>	<u>Attended Kailua Kona Lions Club presentation*</u>
<u>Chuck McGuire</u>	<u>Attended Kailua Kona Lions Club presentation*</u>
<u>Tom Metz</u>	<u>Triad Management, Inc.</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Robert Mierdicks</u>	<u>Hawai'i Carpenters Union</u> <u>Individual project meeting •</u>
<u>Ron Mitchell</u>	<u>Rainbow Asset Regulator and Physical Maintenance</u> <u>Individual project meeting•</u>
<u>Tomoe Nimori</u>	<u>Member, Holualoa Village Association</u> <u>Attended Holualoa Village Association presentation</u>

<u>Name</u>	<u>Affiliation and Participation</u>
<u>Dickie Nelson</u>	<u>West Hawai'i Liaison, U.S. Representative Mazie Hirono; Former Department of Hawaiian Homes Commissioner; former Governor's Liaison</u> <u>Attended Destination Kona Coast presentation*</u> <u>Individual project meeting•</u>
<u>Revel Newton</u>	<u>Sheraton Keauhou Bay Resort & Spa</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Tad Nottage</u>	<u>President, Aloha Insurance Services, Inc.</u> <u>Individual project meeting•</u>
<u>Gay Okada</u>	<u>Member, Professional Business Women's Association</u> <u>Attended Professional Business Women's Association presentation*</u>
<u>Chuck Okazaki</u>	<u>Kanaloa at Kona Homeowners Association</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Mahealani Pai</u>	<u>Lineal descendant from family of the Honokōhau ahupua`a; cultural consultant</u> <u>Attended Ahupua'a o Kealakehe puwalu*</u> <u>Individual project meeting•</u>
<u>Greg Paulson</u>	<u>Teacher; Kealakehe Elementary School Community Council</u> <u>Attended Kealakehe Elementary School Community Council presentation*</u>
<u>Maggie Penrose</u>	<u>Member, Professional Business Women's Association</u> <u>Attended Professional Business Women's Association presentation*</u>
<u>Kathy Penwell</u>	<u>West Hawai'i Explorations Academy School Services Coordinator</u> <u>Attended West Hawai'i Explorations Academy Leadership presentation*</u>
<u>Rowena Pike</u>	<u>Parent; Kealakehe Elementary School Community Council</u> <u>Attended Kealakehe Elementary School Community Council presentation*</u>
<u>Nitta Pilago</u>	<u>Member, Na Wai Iwi Ola Foundation</u> <u>Attended Na Wai Iwi Ola Foundation small group meeting*</u>
<u>Stephanie Place</u>	<u>Secretary, Kaniohale Community Association at the Villages of La`i`opua Board of Directors</u> <u>Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*</u>
<u>Janis Prinslow</u>	<u>Parent, Kealakehe High School Community Council</u> <u>Attended Kealakehe High School Community Council presentation*</u>

<u>Name</u>	<u>Affiliation and Participation</u>
<u>Cindi Punihaole</u>	<u>Cultural committee member, Kukio Resort; youth related cultural & natural resource activity coordinator, Kealakehe HS</u> <u>Attended Na Hoapili o Kaloko-Honokōhau Advisory Commission presentation*</u> <u>Individual project meeting•</u>
<u>Larry Rice</u>	<u>Teacher Kealakehe High School</u> <u>Attended Kealakehe High School Community Council presentation*</u>
<u>Bob Rhee</u>	<u>Attended Kailua Kona Lions Club presentation*</u>
<u>Jim Riley</u>	<u>Member, Big Island Sailing Foundation</u> <u>Attended Big Island Sailing Foundation small group meeting•</u>
<u>Debbie Riley</u>	<u>Member, Big Island Sailing Foundation</u> <u>Attended Big Island Sailing Foundation small group meeting •</u>
<u>Tom Roberts</u>	<u>Treasurer, Kaniohale Community Association at the Villages of La`i`opua</u> <u>Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*</u>
<u>John Rocha</u>	<u>Kamehameha Investment Company</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Bob Roesler</u>	<u>Attended Kailua Kona Lions Club presentation*</u>
<u>Gerry Rott</u>	<u>Attended PATH Board of Directors presentation*</u>
<u>Linda Sanborn</u>	<u>Parent, Kealakehe High School Community Council</u> <u>Attended Kealakehe High School Community Council presentation*</u>
<u>Conrad Sanborn</u>	<u>Student, Kealakehe High School Community Council</u> <u>Attended Kealakehe High School Community Council presentation*</u>
<u>Frank Sayer</u>	<u>Attended PATH Board of Directors presentation*</u>
<u>Barbara Scott</u>	<u>Chair, Kona Traffic Safety Committee</u> <u>Attended Kona Traffic Safety Committee presentation*</u> <u>Individual project meeting•</u>
<u>Dick Scritchfield</u>	<u>Attended Kailua Kona Lions Club presentation*</u>
<u>Jean Sellers</u>	<u>Keauhou Kai Condominiums Homeowners Association</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>John Sevick</u>	<u>Member, Holualoa Village Association</u> <u>Attended Holualoa Village Association presentation*</u>

<u>Name</u>	<u>Affiliation and Participation</u>
<u>Randy Shelor</u>	<u>Teacher, Kealakehe High School Community Council</u> <u>Attended Kealakehe High School Community Council presentation*</u>
<u>Sonny Shimaoka</u>	<u>Member, Concerned Citizens for Kona</u> <u>Individual project meeting•</u>
<u>Carol Simson</u>	<u>Hale Kehau Homeowners Association</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Andy Smith</u>	<u>Governor's West Hawai'i Liaison</u> <u>Individual project meeting•</u>
<u>Annabelle Smith</u>	<u>Outrigger Keauhou Beach Resort</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Hannah Springer Tomich</u>	<u>Former member, County of Hawai'i Planning Commission; member, Hui Laulima O Kekaha Kai, Hualālai Resort, Kukio, Kohanaiki Advisory Group</u> <u>Individual project meeting•</u>
<u>Alicia Starsong</u>	<u>Board member, Big Island Sailing Foundation; member, Hilo Sailing Club</u> <u>Attended Big Island Sailing Foundation small group meeting *</u>
<u>Daniel Starsong</u>	<u>Board member, Big Island Sailing Foundation</u> <u>Attended Big Island Sailing Foundation small group meeting*</u>
<u>JoAnne Kahanamoku-Sterling</u>	<u>Member, Na Hoapili o Kaloko-Honokōhau Advisory Commission; member, Polynesian Voyaging Society; curator, Kealakowaa Heiau Preservation Council; member, Kona Outdoor Circle</u> <u>Attended Na Hoapili o Kaloko-Honokōhau Advisory Commission presentation*</u> <u>Individual project meeting•</u>
<u>Roy Takemoto</u>	<u>Executive Assistant, County of Hawai'i</u> <u>Individual project meeting•</u>
<u>Verna Takemoto</u>	<u>Vice Principal; Kealakehe Elementary School Community Council</u> <u>Attended Kealakehe Elementary School Community Council presentation*</u>
<u>Roni Teshima</u>	<u>Member, Professional Business Women's Association</u> <u>Attended Professional Business Women's Association presentation*</u>
<u>Rod Thompson</u>	<u>Big Island news bureau, Honolulu Star Bulletin</u> <u>Individual project meeting•</u>
<u>Carol Trowbridge</u>	<u>Keauhou Kai Homeowners Association</u> <u>Attended Keauhou Outreach Group presentation*</u>

<u>Name</u>	<u>Affiliation and Participation</u>
<u>Terry Varney</u>	<u>Keauhou Akahi Homeowners Association</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Jan War</u>	<u>Ocean sports enthusiast; employed by NELHA</u> <u>Individual project meeting•</u>
<u>Elaine Watai</u>	<u>Founding member Kealakehe Homeowners Assoc; member, Governor's West Hawai'i Adv Council; community member, Kealakehe Elementary School Community Council</u> <u>Attended Kealakehe Elementary School Community Council presentation*</u> <u>Individual project meeting•</u>
<u>Dan Woolley</u>	<u>Bayview Estates Homeowners Association</u> <u>Attended Keauhou Outreach Group presentation*</u>
<u>Gene Vanderhoek</u>	<u>Captain, Sea Genie II Sportfishing</u> <u>Individual project meeting•</u>
<u>David Vaughn</u>	<u>Chairman, Friends of Natural Energy Laboratory of Hawai'i Authority</u> <u>Individual project meeting•</u>
<u>Sue Vermillion</u>	<u>Producer and Event Director, G350 Productions</u> <u>Individual project meeting •</u>
<u>Ron Yamashita</u>	<u>Pacific Pest Management</u> <u>Individual project meeting•</u>

Table 8: Kona Kai Ola Presentations to Community Organizations, October 2006 through June 2007

<u>Organization</u>	<u>Participation</u>
<u>Ahupuaa O Kealakehe puwala</u>	<u>10 people attended</u>
<u>Big Island Sailing Foundation</u>	<u>6 members were present</u>
<u>Holualoa Village Association</u>	<u>9 members were present</u>
<u>Hui Laulima</u>	<u>25 people in attendance</u>
<u>Ka Wai Iwi Ola Foundation</u>	<u>10 members in attendance</u>
<u>Kailua Kona Lions Club</u>	<u>13 members in attendance</u>
<u>Kaniohale Community Association at the Villages of La'i opua BOD</u>	<u>10 members in attendance (x2 mtgs)</u>
<u>Kealakehe Elementary School Community Council</u>	<u>10 council members were present</u>
<u>Kealakehe High School Community Council</u>	<u>10 council members were present</u>
<u>Keauhou Outreach Group</u>	<u>20 people were in attendance</u>

<u>Organization</u>	<u>Participation</u>
<u>Kona Executive Association</u>	<u>40 people attended</u>
<u>Kona Outdoor Circle Board of Directors presentation</u>	<u>9 board members attended</u>
<u>Kuakini Hawaiian Civic Club Presentation</u>	<u>20 members attended</u>
<u>North Hawai'i Rotary Club</u>	<u>40 people attended</u>
<u>PATH Board of Directors</u>	<u>8 board members in attendance</u>
<u>Professional Business Women's Association meeting</u>	<u>20 members present</u>
<u>West Hawai'i Explorations Academy</u>	<u>25 students and teachers were present</u>

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12 Supporting Documentation

12.1 Contributing Consultants

Table 94 lists preparers of information presented in this DEIS/FEIS.

Table 95: Contributing Consultants

Studies	Preparers
Master Planning	PBR Hawai'i
Marina Design	Moffatt and Nichol
<u>Harbor Water Quality Modeling Study</u>	<u>Moffatt and Nichol</u>
Water Feature Design	EDSA Cloward
Environmental Planning and Community Outreach	Marine and Coastal Solutions International, Inc.
Economic Study	The Hallstrom Group, Inc.
Groundwater Impact Analysis	Waimea Water Services Inc.
<u>Groundwater Contaminant Study</u>	<u>Oceanit</u>
Zone of Mixing	Oceanit
Wave Attenuation Study	Oceanit
Cooling Water Intake Analysis	Oceanit
Underwater Noise Impacts	Oceanit
Water Quality Testing	AECOS Labs of Hawai'i, LLC
Water Quality Baseline Survey	Oceanic Institute
Marine Biological Baseline Surveys	Oceanic Institute
<u>Inventory and Assessment of Anchialine Pools in Southern Complex</u>	<u>Aquatic Resources Management And Design</u>
<u>Affected Environment for Marine Mammals and Sea Turtles</u>	<u>Marine Acoustics, Inc.</u>
<u>Underwater Ambient and Acoustics Noise Impacts</u>	<u>Marine Acoustics, Inc.</u>
Cultural Impact Assessment (2006)	Taupōuri Tangarō, Ph.D.
Cultural Impact Assessment (2001)	Pualani Kanaka'ole Kanahale
Archaeological Inventory Surveys	Haun and Associates
Traffic and Transportation Analysis	Parsons Brinckerhoff
Geotechnical Analysis	Mactec Geotechnical
Air Quality Survey	B.D. Neal and Associates
Noise Impact Study	D.L. Adams Associates, Ltd.
Fauna Survey	Rana Productions Ltd.
Flora Survey	Environmental Consultant
Social Impact Analysis	John M. Knox and Associates

12.2 List of Consultation Agencies as Part of the DEIS Process

County of Hawai'i

Department of Environmental Management – Wastewater Division
Department of Parks and Recreation
Hawai'i County Mass Transit Agency
Civil Defense
Department of Public Works
Department of Research and Development
Fire Department
Planning Department
Police Department
Department of Water Supply
Office of Housing and Community Development

State of Hawai'i

Department of Accounting and General Services
Department of Business, Economic Development and Tourism, State Office of Planning
Department of Business, Economic Development and Tourism, State Energy Office
Department of Defense
Department of Land and Natural Resources, Commission on Water Resource Management
Department of Land and Natural Resources, Land Division
Department of Land and Natural Resources, Division of Conservation and Resources Enforcement
Department of Land and Natural Resources, Division of Boating and Ocean Recreation
Department of Land and Natural Resources, Division of Aquatic Resources
Department of Land and Natural Resources, Division of Fish and Wildlife
Department of Land and Natural Resources, State Historic Preservation Division
Department of Land and Natural Resources, Na Ala Hele Trails and Access Program
Department of Land and Natural Resources, Office of Conservation and Coastal Lands
Department of Health, Clean Water Branch
Department of Health, Safe Drinking Water Branch
Department of Health, Clean Air Branch
Department of Health, Noise Radiation and Indoor Air Quality Branch
Department of Hawaiian Home Lands
Office of Hawaiian Affairs
Office of Environmental Quality Control
Department of Transportation, Highways Division
Department of Transportation, Harbors Division
Department of Transportation, Airports Division

Federal

Department of Agriculture, Natural Resources Conservation Service
Department of Commerce, National Marine Fisheries Service
Army Corps of Engineers, Pacific Ocean Division
Department of the Interior, Fish and Wildlife Service
Department of the Interior, National Park Service, Ala Kahakai National Historic Trail

Department of the Interior, National Park Service, Kaloko-Honokōhau National Historical Park
Federal Aviation Administration
Department of Homeland Security, Coast Guard Division
National Oceanic and Atmospheric Administration – National Marine Sanctuaries

12.3 Comment Letters and Responses as Part of the Public Notice of the EISPN

An Environmental Impact Statement Preparation Notice (EISPN) was published on July 8, 2006, and comment letters from agencies and citizens were received in the months of July and August of 2006. Responses to the comment letters were mailed in the week of October 20, 2006. A copy of the comment letters and corresponding response letters are included in Appendix A. Table 105 contains information on comments received in response to the EISPN.

Table 105: Information on Comment Letters on EISPN

Agency/Party	Date Comments Received	Response/Action and Date Sent
OEQC	8/2/06	Response mailed 8/2/06 - All requested changes to be made to DEIS
Department of Hawaiian Home Lands	7/24/06	Response mailed 7/25/06 - All requested changes to be made to DEIS
Sierra Club, Hawai'i County	8/7/06	Response mailed 10/20/06
Marie Aguilar and Philip Mosher	8/8/06	Response mailed 10/20/06
Scott Gorrell	8/8/06	Response mailed 10/20/06
National Park Service	8/18/06	Response mailed 10/20/06

12.4 Comment Letters and Responses Related to the DEIS

The publication of the DEIS elicited 92 comment letters and information is presented in Table 11. Appendix B contains the letters and responses to comments.

Table 11: Information on Comment Letters on DEIS

<u>Agency/Party</u>	<u>Name</u>	<u>Date Comments Received</u>	<u>Date Envelope Postmarked</u>	<u>Response/Action and Date Sent</u>
<u>FEDERAL</u>				
<u>U.S. Army Corps of Engineers, Engineering and Construction Division</u>	<u>Todd C. Barnes, P.E., Chief</u>	<u>Originally addressed to DLNR. Transmittal Letter from DLNR to JDI, May 31 07. Received pdf file, Jun 04 07.</u>		<u>Response mailed July 23 07</u>
<u>U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Pacific Islands Regional Office</u>	<u>Chris E. Yates, Assistant Regional Administrator for Protected Resources</u>	<u>Feb 07 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>U.S. Department of the Interior, Fish and Wildlife Service</u>	<u>Patrick Leonard, Field Supervisor</u>	<u>Feb 08 07</u>	<u>Feb 07 07</u>	<u>Response mailed July 23 07</u>
<u>U.S. Department of the Interior, National Park Service, Ala Kahakai National Historic Trail</u>	<u>Aric Arakaki, Superintendent</u>	<u>Feb 07 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>U.S. Department of the Interior, National Park Service, Kaloko-Honokōhau National Historical Park</u>	<u>Geraldine Bell, Superintendent</u>	<u>Feb 07 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>STATE</u>				
<u>Environmental Planning Office, State of Hawai'i, Department of Health</u>	<u>Kelvin H. Sunada, Manager</u>	<u>Feb 09 07</u>	<u>Feb 08 07</u>	<u>Response mailed July 23 07</u>
<u>Department of Marine Science, University of Hawai'i at Hilo</u>	<u>Chelsie Settlemier, Research Assistant</u>	<u>Feb 08 07</u>	<u>Feb 07 07</u>	<u>Response mailed July 23 07</u>

<u>Agency/Party</u>	<u>Name</u>	<u>Date Comments Received</u>	<u>Date Envelope Postmarked</u>	<u>Response/Action and Date Sent</u>
<u>Environmental Center University of Hawai'i</u>	<u>Peter Rappa, Environmental Review Coordinator</u>	<u>Feb 06 07</u>	<u>Received Fax Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Department of Accounting and General Services, Division of Public Works</u>	<u>Ernest Y. W. Lau, Public Works Administrator</u>	<u>Jan 23 07</u>	<u>Jan 22 07</u>	<u>Response mailed Jan 29 07</u>
<u>State of Hawai'i, Department of Education</u>	<u>Duane Y. Kashiwai, Public Works Administrator</u>	<u>Feb 05 07</u>	<u>Fax Received Feb 05 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Department of Health, Wastewater Branch</u>	<u>Harold Yee, Chief</u>	<u>Feb 14 07</u>	<u>Fax Feb 14 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Department of Human Services, Hawai'i Public Housing Authority</u>	<u>Patti Miyamoto, Interim Executive Director</u>	<u>Jan 18 07</u>	<u>Jan 17 07</u>	<u>Response mailed Jan 29 07</u>
<u>State of Hawai'i, Department of Land and Natural Resources, Commission on Water Resource Management</u>	<u>W. Roy Hardy, Hydrologic Program Manager</u>	<u>Feb 06 07</u>	<u>Hand Delivered Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Department of Land and Natural Resources, Division of Boating and Ocean Recreation</u>	<u>Edmund Underwood, Administrator</u>	<u>Feb 06 07</u>	<u>Hand Delivered Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Department of Land and Natural Resources, Division of Forestry and Wildlife</u>	<u>Paul J. Conry, Administrator</u>	<u>Feb 06 07</u>	<u>Hand Delivered Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Department of Land and Natural Resources, Engineering Division</u>	<u>Eric T. Hirano, Chief Engineer</u>	<u>Feb 06 07</u>	<u>Hand Delivered Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Department of Land and Natural Resources, Land Division</u>	<u>Keith Chun, Planning and Development Manager</u>	<u>Feb 06 07</u>	<u>Hand Delivered Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Department of Land and Natural Resources, Land Division</u>	<u>Russell Y. Tsuji, Administrator</u>	<u>Feb 06 07</u>	<u>Hand Delivered Feb 06 07</u>	<u>Response mailed July 23 07</u>

<u>Agency/Party</u>	<u>Name</u>	<u>Date Comments Received</u>	<u>Date Envelope Postmarked</u>	<u>Response/Action and Date Sent</u>
<u>State of Hawai'i, Department of Land and Natural Resources, Office of Conservation and Coastal Lands</u>	<u>Samuel J. Lemmo, Administrator</u>	<u>Feb 06 07</u>	<u>Hand Delivered Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Department of Transportation</u>	<u>Barry Fukunaga, Interim Director of Transportation</u>	<u>Feb 08 07</u>	<u>Feb 07 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Department of Transportation, Statewide Transportation Planning Office</u>	<u>Barry Fukunaga, Interim Director</u>	<u>Feb 06 07</u>	<u>Fax Received Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Office of Environmental Quality Control</u>	<u>Genevieve Salmonson, Director</u>	<u>Jan 30 07</u>	<u>Fax received Jan 30 07</u>	<u>Response mailed July 23 07</u>
<u>State of Hawai'i, Office of Hawaiian Affairs</u>	<u>Clyde W. Nāmu'o, Administrator</u>	<u>Pdf Feb 06 07, orig Feb 07 07</u>	<u>Feb 06 07 received pdf in email, orig Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>Strategic Industries Division, State of Hawai'i Department of Business, Economic Development & Tourism</u>	<u>Maurice H. Kaya, Chief Technology Officer</u>	<u>Jan 08 07</u>	<u>Jan 05 07</u>	<u>Response mailed Jan 23 07</u>
<u>COUNTY OF HAWAI'I</u>				
<u>County of Hawai'i, Department of Water Supply</u>	<u>Milton D. Pavao, P.E., Manager</u>	<u>Feb 13 07</u>	<u>Feb 12 07</u>	<u>Response mailed July 23 07</u>
<u>County of Hawai'i, Fire Department</u>	<u>Darryl Oliveira, Fire Chief</u>	<u>Jan 04 07</u>	<u>Jan 03 07</u>	<u>Response mailed Jan 23 07 - All requested changes to be made to FEIS</u>
<u>County of Hawai'i, Planning Department</u>	<u>Christopher Yuen, Planning Director</u>	<u>Jan 18 07</u>	<u>Jan 17 07</u>	<u>Response mailed July 23 07</u>
<u>County of Hawai'i, Police Department</u>	<u>Lawrence K. Mahuna, Police Chief</u>	<u>Jan 19 07</u>	<u>Jan 18 07</u>	<u>Response mailed July 23 07</u>

<u>Agency/Party</u>	<u>Name</u>	<u>Date Comments Received</u>	<u>Date Envelope Postmarked</u>	<u>Response/Action and Date Sent</u>
<u>COMMUNITY ORGANIZATIONS</u>				
<u>Hawai'i Island Paddlesports Association</u>	<u>Rand Botti, President</u>	<u>Feb 07 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>Hawai'i Electric Light Company, Inc.</u>	<u>Hal Kamigaki, Acting Manager Engineering Department</u>	<u>Feb 05 07</u>	<u>Feb 02 07</u>	<u>Response mailed July 23 07</u>
<u>Hawai'i Island Economic Development Board</u>	<u>Mark McGuffie, Executive Director</u>	<u>Feb 12 07</u>	<u>Fax Feb 12 07</u>	<u>Response mailed July 23 07</u>
<u>Hawai'i's Thousand Friends</u>	<u>Hawai'i's Thousand Friends</u>	<u>Jan 10 07</u>	<u>Jan 09 07</u>	<u>Response mailed July 23 07</u>
<u>Hawaiian International Billfish Tournament</u>	<u>Fred Duerr, President</u>	<u>Feb 06 07</u>	<u>Fax Received Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>Kaniohale Community Association (KCA)</u>	<u>Stephanie Place, Board of Directors Secretary</u>	<u>Jul 13 07</u>		<u>Response mailed Jul 23 07</u>
<u>Kuakini Hawaiian Civic Club</u>	<u>Gene Leslie, President</u>	<u>Feb 06 07</u>	<u>Fax Received Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>Kula Nai'a</u>	<u>Jan Ostman-Lind, Ania Driscoll-Lind</u>	<u>Feb 07 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>Life of the Land</u>	<u>Henry Curtis, Executive Director</u>	<u>Feb 06 07</u>	<u>No Envelope</u>	<u>Response mailed July 23 07</u>
<u>Melton International Tackle</u>	<u>Tim Robertson</u>	<u>Feb 14 07</u>	<u>Feb 13 07</u>	<u>Response mailed July 23 07</u>
<u>Moku Loa Group of the Sierra Club</u>	<u>Janice Palma-Glennie</u>	<u>Feb 07 07</u>	<u>Email Received Feb 07 07</u>	<u>Response mailed July 23 07</u>
<u>Moku Loa Group of the Sierra Club</u>	<u>Janice Palma-Glennie</u>	<u>Feb 09 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>Na Kokua Kaloko-Honokōhau</u>	<u>Fred Cachola</u>	<u>Feb 08 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>Plan to Protect Kona</u>	<u>Duane Erway, President</u>	<u>Feb 08 07</u>	<u>Feb 07 07</u>	<u>Response mailed July 23 07</u>
<u>Student Na Wai Iwi Ola</u>	<u>Alice Bailey Knight</u>	<u>Feb 20 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
<u>Three Ring Ranch Exotic Animal Sanctuary</u>	<u>Ann Goody, Curator</u>	<u>Feb 05 07</u>	<u>Feb 02 07</u>	<u>Response mailed July 23 07</u>

<u>Agency/Party</u>	<u>Name</u>	<u>Date Comments Received</u>	<u>Date Envelope Postmarked</u>	<u>Response/Action and Date Sent</u>
<u>West Hawai'i Explorations Academy</u>	<u>Amber Adams</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Amber Matsumoto</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>B. J. Lawrence</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Benjamin Duke</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Bree Rivera</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Dominic F. Chinen</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Isaiah Chinen</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>J.D. Ansel</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Jared Wike</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Joey Donaldson</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>John Chadband</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Kainui Rapaport</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Kaniela Guieb</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Katie Clemons</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Lorelei Nakagawa</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Makena McCluskey</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Merjen Agayeva</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Micaela Pierce</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Mya Beck</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Roya Sabri</u>	<u>Feb 05 07</u>	<u>Certified Received Feb 05 07</u>	<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Savannah Onufer-Estrada</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>

<u>Agency/Party</u>	<u>Name</u>	<u>Date Comments Received</u>	<u>Date Envelope Postmarked</u>	<u>Response/Action and Date Sent</u>
<u>West Hawai'i Explorations Academy</u>	<u>Tony Eaton</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Una Burns</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>West Hawai'i Explorations Academy</u>	<u>Zachary McClure</u>	<u>Feb 05 07</u>		<u>Response mailed July 23 07</u>
<u>INDIVIDUALS</u>				
	<u>Adam S. Frankel, Ph.D.</u>	<u>Feb 08 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
	<u>Barbara E. Scott</u>	<u>Feb 08 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
	<u>Betsy Morrigan</u>	<u>Feb 28 07</u>	<u>Feb 27 07</u>	<u>Response mailed July 23 07</u>
	<u>Charles Flaherty</u>	<u>Feb 08 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
	<u>Charles Flaherty (second letter)</u>	<u>Feb 08 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
	<u>Curtis Tyler</u>	<u>Feb 09 07</u> <u>Via email</u>		<u>Response emailed Feb 12 07</u>
	<u>Diane Aoki</u>	<u>Feb 05 07</u>	<u>Feb 04 07</u> <u>via email</u>	<u>Response mailed July 23 07</u>
	<u>Diane Aoki</u>	<u>Feb 06 07</u>	<u>Feb 05 07</u>	<u>Response mailed July 23 07</u>
	<u>Dore Dokos-Loewenthal</u>	<u>Feb 07 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
	<u>Eric von Platten Luder</u>	<u>Feb 16 07</u>	<u>Feb 13 07</u>	<u>Response mailed July 23 07</u>
	<u>Harold Murata</u>	<u>Feb 07 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
	<u>Jene Michaud</u>	<u>Feb 05 07</u>	<u>Feb 02 07</u>	<u>Response mailed July 23 07</u>
	<u>Jennifer Bach</u>	<u>Feb 07 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
	<u>Jill Wagner</u>	<u>Feb 02 07</u>	<u>Feb 01 07</u>	<u>Response mailed July 23 07</u>
	<u>Kim Murphy</u>	<u>Feb 02 07</u>	<u>Feb 01 07</u>	<u>Response mailed July 23 07</u>
	<u>Lynn Olival</u>	<u>Feb 05 07</u>	<u>Feb 02 07</u>	<u>Response mailed July 23 07</u>
	<u>Marie Aguilar, Philip Mosher</u>	<u>Feb 08 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>

<u>Agency/Party</u>	<u>Name</u>	<u>Date Comments Received</u>	<u>Date Envelope Postmarked</u>	<u>Response/Action and Date Sent</u>
	<u>Marni Herkes</u>	<u>Feb 14 07</u>	<u>Feb 13 07</u>	<u>Response mailed July 23 07</u>
	<u>Michelle R. Disque</u>	<u>Feb 05 07</u>	<u>Feb 02 07</u>	<u>Response mailed July 23 07</u>
	<u>Nancy Redfeather</u>	<u>Feb 06 07</u>	<u>Feb 05 07</u>	<u>Response mailed July 23 07</u>
	<u>Pamela Greenaway</u>	<u>Feb 07 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
	<u>Philip Fernandez</u>	<u>Feb 05 07</u>	<u>Feb 02 07</u>	<u>Response mailed July 23 07</u>
	<u>Rick Gaffney</u>	<u>Feb 13 07</u>	<u>Fax Feb 13 07</u>	<u>Response mailed July 23 07</u>
	<u>Sara J. Peck</u>	<u>Feb 06 07</u>	<u>Feb 05 07</u>	<u>Response mailed July 23 07</u>
	<u>Shannon Rudolph</u>	<u>Feb 07 07</u>	<u>Feb 06 07</u>	<u>Response mailed July 23 07</u>
	<u>Sue Vermillion</u>	<u>Fax Feb 14 07, Original Feb 15 07</u>	<u>Fax Feb 14 07, Original Feb 14 07</u>	<u>Response mailed July 23 07</u>

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List of Abbreviations

AAQS: An Air Quality Study	DP: Development Plan
ALISH: State Department of Agriculture, Agricultural Lands of Importance to the State of Hawai'i	DPW: Hawai'i County Department of Public Works
BA: Basal Aquifer	DWS: Hawai'i County Department of Water Supply
BLNR: State Board of Land and Natural Resources	EA: Environmental Assessment
BMP: Best Management Practices	EJ: Environmental Justice
CDP: Kona Community Development Plan	EPA: U.S. Environmental Protection Agency
CDUP: Conservation District Use Permit	EIS: Environmental Impact Statement
CEQ: Center for Environmental Quality	EISPN: Environmental Impact Statement Preparation Notice
CIA: Cultural Impact Assessment	FEIS: Final Environmental Impact Statement
CPUE: Catch Per Unit Effort	FHWA: U.S. Federal Highway Administration
CZM: Coastal Zone Management Program	gpm: gallons per minute
dBa: Decibels	gpd: gallons per day
DBEDT: State Department of Business, Economic Development, and Tourism	HAR: Hawai'i Administrative Rules
DEIS: Draft Environmental Impact Statement	HCGP: Hawai'i County General Plan
DEM: Hawai'i County Department of Environmental Management	HCM: 2000 Highway Capacity Manual
DHHL: State Department of Hawaiian Home Lands	HHFDC: Hawai'i Housing Finance and Development Corporation
DLNR: State Department of Land and Natural Resources	HIBC: Hawai'i Island Burial Council
DOBOR: DLNR Division of Boating and Ocean Recreation	HRS: Hawai'i Revised Statutes
DOH: State Department of Health	HELCO: Hawai'i Electric <u>Light</u> Company, <u>Inc.</u>
DOT: Department of Transportation	HDOT: State Department of Transportation

JDI: Jacoby Development, Inc. and Kona Marina Development Group, LLC, an affiliate of Jacoby Development, Inc.

Kw: Kilowatts

Ldn: Day - Night Average Sound Level, diurnal noise levels

LEED: Leadership in Energy and Environmental Design

L_{eq}: Equivalent Sound Level

LOS: Levels of Service (traffic)

LUC: State Land Use Commission (LUC)

LUPAG: Land Use Pattern Allocation Guide

mauka: inland

makai: ocean

MGD/mgd: Million Gallons per Day

msl: mean sea level (ft.)

Mw: Megawatts

NAAQS: National Ambient Air Quality Standards

NELHA: Natural Energy Laboratory of Hawai'i Authority

NHP: Kaloko-Honokōhau National Historical Park

NMFS: National Marine Fisheries Service

NPDES: National Pollutant Discharge Elimination System

NPS: National Park Service

O₃: Ozone

OCCL: DLNR's Office of Conservation and Coastal Lands

OEQC: Office of Environmental Quality Control

ppt: parts per thousand

QLT: Queen Lili'uokalani Trust

rLw: Pāhoehoe lava

rLv: A'a lava

ROW: right-of-way

SAMBT: Simulation and Animation Model of Boat Traffic

SAP: Special Area Plan

SHPD: DLNR State Historic Preservation Division

SIA: Social Impact Assessment

SMA: Special Management Area

SWAC: Seawater Air Conditioning

UBC: Uniform Building Code

UIC: Underground Injection Well

USGS: U.S. Geological Survey

Vog: Volcanic Haze

WWS: Waimea Water Services

WWTP: Wastewater Treatment Plant

Appendices
