Appendix D:

Archaeological Conditions Report

Archaeological Monitoring Report

Preliminary Geotechnical Reports

Geological Status of the Shoreline Report

Structural Report

D-1 ARCHAEOLOGICAL CONDITION REPORT

SCS Project Number 426-3

AN ARCHAEOLOGICAL CONDITION REPORT FOR THE AHUKINI-LYDGATE SEGMENT OF THE KAUA`I PATHWAYS PROJECT KAUA`I ISLAND, HAWAI`I

Prepared by:
Michael Dega, Ph.D.
and
James Powell, B.A.
September 2006

Prepared for:
Merle D. Grimes, LLC.
1042 Broken Arrow Circle
Elizabeth, Colorado 80107

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

This interim report discusses the various archaeological and historic preservation issues related to construction and maintenance of the Kaua`i Pathway project and focuses on the segment stretching from Ahukini Point to Lydgate Park. The report lists the initial requirements per significant historic or cultural properties occurring within or near the alignment, describes known archaeological sites having been documented along this segment, the estimated significance of these sites, and potential mitigation of these sites and sensitive areas during construction of the pathway. As a quasi sensitivity zone report, predictive models are forwarded which detail any possible historic preservation challenges that could impact construction or location of the pathway.

PART I PROCESS SUMMARY

Several tasks were required concerning historic preservation issues related to this project. The results of several tasks are summarized below. The tasks outlined herein are born from discussions with N. McMahon of the State Historic Preservation Division (SHPD), LaFrance Kapaka-Arboleda, former Chair of the Kaua`i/Ni`ihau Islands Burial Council, and rules governing such work. These are essentially redundant to requirements established for other portions of the Bike and Pedestrian Path, particularly the Kapaa-Kealia segment. The tasks outlined in the latter segment were formalized through a Memorandum of Agreement (MOA). The present segment (Ahukini-Lydgate) does not have a formal MOA in place yet the tasks are the same and are in fact governed by the same rules. In essence, these tasks must be performed per SHPD request or a violation of State law will occur. Thus, it appears as though an MOA is fairly redundant in this case. Also, the required tasks are effectively outlined in the Environmental Assessment, a public document that has been available for review. Please note that the MOA for the Kapaa-Kealia phase of work did not require a formal Cultural Impact Assessment (CIA). A more parochial version of a CIA was completed for the Ahukini-Lydgate portion of the pathway even though it was not required.

Required/Completed Tasks

For the Ahukini-Lydgate segment of the Path, several tasks related to Historic Preservation were required. These tasks are somewhat duplicate to the tasks outlined in the Kapaa-Kealia MOA and all serve to show that no “adverse impact” will occur on the path alignment as mitigation will occur to prevent such.

1. Consultation with the SHPD (N. McMahon). This task has been completed on numerous occasions over the past three years, the latest being June, 2006. Ms. McMahon is in agreement as to required tasks for this project (see below).
2. Archaeological Monitoring Plan (AMP): An AMP was written and submitted to the SHPD for review in July, 2005. The AMP was accepted by the SHPD and outlines the provisions and procedures to be implemented during Path construction Monitoring work. Protocols were established in the AMP should significant cultural resources, inclusive of burials, be identified during Monitoring work. This AMP must be followed based on State law.
3. Mitigation of Historic Structures: Two historic properties were identified in the Ahukini-Lydgate path corridor: Hanamaulu Cane Haul Bridge (State Site No. -1845) and a concrete box culvert (State Site No. -1846) in Kawailoa. Modest modifications to both structures were proposed. As required in most MOA's, consultation with the SHPD has occurred. A letter dated May 1, 2006 was submitted to SHPD (S. Tasaki) for comment. As of this writing, no comment has been forwarded regarding modifications to these bridges and they are deemed acceptable (SHPD 30-day review period). SCS also forwarded these modifications for review to the KHPRC in April, 2006. The Commission generally agreed with the modifications and suggested a different railing system along the Hanama`ulu Cane Haul Bridge.
4. Burial Treatment Plan (BTP): No BTP is required at this stage as all burials occurring within or near the proposed corridor have been previously subject to BTP's, these all accepted by the SHPD and the Kaua`i/Ni`ihau Islands Burial Council (KNIBC). A BTP will be required if remains are identified during Monitoring (see above). In addition, once the final proposed corridor was established, SCS discussed the routing with the KNIBC at several full meetings of the council (February 2006; April 2006) and no new burial sites were discussed.
5. Data Recovery Plan (DRP)/Implementation: No DRP is required at this time, prior to construction of the path. If a significant cultural deposit is identified during Monitoring, SCS will consult with the SHPD and determine the level of Data Recovery testing needed for the deposit.
6. Field Inspection: Pedestrian survey of the entire Ahukini-Lydgate corridor was completed by SCS archaeological staff of several occasions. The data is presented in the Environmental Assessment.
7. Preservation Plan (PP): At this pre-construction juncture, there are no significant sites occurring within the proposed pathway corridor that required Preservation. As is presented in the Environmental Assessment, an initial draft of interpretive signage has been forwarded for review. This signage will be reviewed by SHPD, members of the local community, and members of the KHPRC prior to their manufacture and placement along the pathway.
8. Consultation: Section 106 consultation per this portion of the Path has occurred on numerous occasions, as is outlined in the Environmental Assessment and County website. Additional consultation pertaining to pathway historic properties has also occurred on numerous occasions with the SHPD (N. McMahon), KHPRC, KNIBC, and the Office of Hawaiian Affairs (OHA). The latter commented in a January 3, 2005 missive from Clyde W. Namu`o, OHA administrator, pertaining to the draft Environmental Assessment.

9. A formal Cultural Impact Assessment (CIA) was not required for this section of the path as the submitted document is an Environmental Assessment. The CIA would have been completed if the document were an EIS. A CIA was not completed for other portions of the path (Kapaa-Kealia, etc.). For the present Ahukini-Lydgate alignment, a cultural assessment was completed however, which is presented below. As part of a more formal CIA, community input was offered and provided during multiple meetings; no "adverse impact" statements were made during the meetings. In effect, through historic research, coordination and correspondence with the SHPD and KNIBC, and community meetings, a finding of "no adverse impact" can be determined for the suggested pathway route. These methods do not take the place of a more formal CIA as none was required for the present EA. However, the same principles have been applied and again deliver the same outcome.

In total, the requirements of an MOA, if one had been completed for this phase, have been met and even surpassed at this juncture of the project. The following details specific tasks required to complete the process during actual Path work itself. This work is regulated by the SHPD (State) and must be accomplished per State rules and regulations.

To be Accomplished:

1. Archaeological Monitoring: Per the accepted AMP, this work will commence during initial ground altering activities and occur for the duration of the project when construction requires intruding into subsurface contexts. Following all Monitoring activities, an Archaeological Monitoring Report will be prepared for review by the SHPD. This report outlines the methods and results of the Monitoring program.
2. Interpretive Signage: An initial list of proposed signs along this segment of the Path has been forwarded for review. SCS will be working with members of the community, SHPD, the KHPRC, and the KNIBC to finalize the wording of the signs. The signs will be informative and detail the history of certain areas along this segment of the Path.
3. Burial Treatment: This phase of research will only occur if burials are identified during Monitoring. Both the SHPD and KNIBC will be consulted during the burial mitigation process. As required, a Burial Treatment Plan will be written and submitted to the SHPD and KNIBC for review. Once approved, implementation of the plan will occur.
4. Data Recovery: This phase of research will only occur if significant cultural deposits are identified during Monitoring or as requested by the SHPD of known sites near the pathway corridor. A Data Recovery Plan will be written prior to the work and be submitted to SHPD for review. Following fieldwork, a Data Recovery Report must be written describing the results of the work. This document will be submitted to the SHPD for review.
5. Preservation: This phase of research will only occur if significant sites are identified during Monitoring and Preservation is warranted, per discussions with the SHPD. If a site warrants Preservation, a Preservation Plan document will be submitted to the SHPD for review. Once approved, the Plan will be enacted.
6. Community Input: While formal meetings are not scheduled during the actual work phase of this project, SCS archaeologists will continue seeking community input on past and present land use along the path corridor in preparation of the completed Monitoring work.

The completion date for a majority of the tasks will be somewhat dependent upon the construction timeline, with Monitoring being one of the most important phases of the work. As seen from the above task outline, these responsibilities are similar to previously established MOA's for the Path. The tasks are required, as outlined in State law regarding Historic Preservation in the State of Hawaii.

PART II KNOWN ARCHAEOLOGICAL SITES: A SUMMARY

A. Ahukini Point to the Raddison Hotel Area:

Based on a literature review of the proposed pathway alignments, there have been at least 15 archaeological projects conducted in this area from Thrum (1907) to Scientific Consultant Services, Inc. (SCS) in 2004. In 1906 Thrum compiled an inventory of *heiau* throughout the islands. Within the currently discussed segment from Ahukini to Lydgate, he "recorded" two *heiau*: Ahukini and Kalauokamanu. These *heiau* were not marked on maps but were simply described. Both *heiau* had been destroyed supposedly as of 1855. During Bennett's island-wide survey in 1928-1929, the two *heiau*, now known as Site 101 and Site 102 were also noted. Ahukini Heiau supposedly was built near Ahukini Point on a bluff overlooking the sea while the location of Kalauokamanu was never identified. Bennett (1931) did also note that both *heiau* were previously destroyed. Bennett makes first mention of Site 103, a burial ground in this area: "in the sand dunes that run along the shore half way between Hanamaulu and Wailua River are many burials."

From Hanamaulu Bay to the west, toward Lihue, multiple Land Commission Awards are present. In general, the LCA's primarily denote *lo`i* lands (taro fields). Here, dryland taro cultivation was probably practiced while coconut, sweet potato, and breadfruit were also likely grown. The Mahele records of the Hanamaulu area tell of native tenants living in the valleys and by the shoreline. House sites, taro pond fields, irrigation systems, dryland agricultural parcels, fishponds, pastures, and other features were constructed across the prehistoric-traditional landscape. Many of these lands were cleared during Plantation days, thus masking or erasing much evidence for these sites.

At least eleven known archaeological sites are present in the Hanamaulu area toward the Wailua Golf Course. As one moves from south to north, or Ahukini Point toward Wailua, several sites are present of both a historic and prehistoric nature. First, Ahukini landing itself, a probable late 19th construction, is present inside the breakwall of the bay. Plantation housing for

sugar cane workers has been noted just to the south of the point. Foundations still exist in remnant state. Moving inland to the west, several more sites are present:
Site 1845 is the historic Hanamaulu Railroad Bridge. This bridge is being preserved and represents the plantation era.

Site 2066 consists of multiple features: an upright (burial?), historic road, and historic house foundation;

Site 2067 consists of a historic cemetery perhaps dating to the 1880s. The cemetery is present on the *mauka* side of the highway on the edge of former sugar cane lands.

Site 1843: prior to construction of Ahukini Landing, an old wharf was present on the northern flank of the bay. This is Site 1843 and consists of a concrete wall, foundation, and sugar cane road. This is the location of the old wharf.

Site 1841 occurs just to the north and also represents the historic period: a road and trail running along the coast. It is possible this trail has some time depth from prehistoric times but it has not yet been dated.

As one rounds the point to the north, three archaeological sites are present above the rocky coastline. Site 2068 consists of a looted, historic-period trash dump dating between 1880 and 1910. Datable artifacts include glass and ceramic fragments that were recovered from the bluff, at the edge of plantation lands. Site 1840, nearby, consists of a historic-period retaining wall related to sugar cane or military transport; Site 1839, occurring about 25 m to the east of the trash dump represents the first fully known prehistoric site in this coastal area. This site is a prehistoric complex occurring on the flats and composed of a wall and terrace suspected to be related to temporary habitation. No carbon dates are available for this site.

Proceeding to the north, around the point and onto the flat coastal plains toward Wailua, both historic and prehistoric sites are present. Site 1838 consists of a prehistoric cultural deposit partially eroding out of modified sand dunes. The layers contained charcoal, shells, and coral fragments, this expected so near the coastline. The site had been disturbed during military training exercises in the 1940s. The cultural deposit, now a small remnant, was dated to AD 1170-1400, and represents temporary habitation of the area. This pattern of remnant cultural deposits and temporary activities near the coast holds through the Kealia area and beyond, and is one concern for the present work. The final historic site in this area is Site 1846, two historic

railroad bridges used for hauling sugar cane from the fields to Lihue. This site is present more inland and south of the Radisson Hotel.

Site 885, also occurring just to the south of the Raddison hotel, represents a possible traditional Native Hawaiian burial ground. Multiple burials have been documented in this sandy location, from the Raddison through Wailea Golf Course and Lydgate Park.

Overall, this first section contains abundant evidence for historic networks related to plantation-era days and prehistoric sites related to burial and temporary habitation loci. While none of the sites beyond Ahukini landing remain in spectacular form, they do allude to land tenure in the area during the late 1880s onwards. The two prehistoric sites identified near the rocky coastline provide foreshadowing for the immense number of sites occurring to the north along the sandy coastal flats. Site 885 and beyond provide our first glimpses at this pattern.

B. Wailua Golf Course to Wailua River

The most well-known site in this area, due to the influx of CRM research related to golf course activities and development of Lydgate Park, is Site 103, originally recorded by Bennett during island-wide survey in 1928-1929. At this writing, over 66 burials have been identified throughout the golf course alone, with most of these having been re-interred in a burial crypt and preserve area at the golf course itself. This discussion focuses on the area from the south end of the golf course and west to the Correctional Facility to the Wailua River. In this location, we enter one of the most sacred and site-rich areas of the island, an area that will be crucial for pathway development.

The *ahupua`a* of Wailua is situated in the old district of Puna but today is located in two separate judicial districts: south of Wailua River is Lihue District or *moku* and north of the river is Kawaihau District. Wailua Ahupua`a is the largest *ahupua`a* in both districts and extends from the shoreline to Mt. Wai`ale`ale. In this segment, we stop at the southern bank of the Wailua River, the largest navigable stream in the Hawaiian Islands. The southern extent of this area is relatively minor compared with the near-river areas. In this tract, very few LCA's were issued. The flatlands between the dunes and Kalepa Ridge contain swampy areas fed by springs at the base of the ridge that allowed for limited taro cultivation on the margins of the marsh. The coastal dunes between the marshland and the sea were primarily used for human interment (Site 103) while the direct coastline would contain evidence for temporary or seasonal fishing camps and other marine acquisition.

The first site we visit in this artificial corridor is Site 1980, which occurs on the golf course to the east of the correction facility. This site consists of eight traditional-period burials identified in sandy contexts between coastline and marshy areas to the west. It is likely this site could be included as a portion of Bennett's Site 103. As we move north into golf course lands, several more sites are present, particularly Site 103 and its 66+ known burials. Forty-four burials were identified during trenching by SCS in 2000. Also recovered were prehistoric implements (two adzes, sinkers, hammerstone) and historic items (glass and porcelain). Sites -542 through -546 and Site -819 compose portions of Site 103 burials found during monitoring work in 1977. Site -9357, a burial also part of the Site 103 complex, was identified on the grounds of the County correctional facility. A burial preserve area has also been established at the golf course, across from the first tee box.

Two archaeological sites were identified and documented during monitoring in 2003 by SCS at the Kumalani area of Lydagate, just off the golf course. Additional burials related to Site -103 were identified. A total of three incomplete burial sites and two isolated findspots from previously disturbed burials were identified. All were thought to be from traditional contexts. The second site, Site -356, consisted of a traditional cultural layer located within natural sand dune deposits. The site was assessed as a habitation layer and dated to A.D. 1440–1660, a traditional time period consistent with other archaeological finds in the area. Stone tool implements, charcoal, and shell were found at the site. Scattered stone tools (hammerstone, adze fragment) were identified in the sand dune during construction of the Kumalani playground.

While not directly impacting the pathway in this segment, the following is presented to provide additional context to the archaeology of the area. Staying on the south side of the river, near the coastline, we enter the more sacred Wailua River mouth area. On one side is Lydgate Park and across the highway from the hotel is a heiau complex. Staying near the coast, Site -105 is present within the park, much of the site having been preserved today. This site consists of Hikinaakala Heiau and Pu`uhonua o Hauola (city of refuge). This site was first recorded by Thrum in 1906 and later by Bennett (1931), Kikuchi (1974), and Yent (1989). This site is part of the Wailua Complex of Heiau National Historic Landmark. Yent's work at the site concluded that there were two occupational episodes at this site, one historic-period and one earlier occupation. This occupation may or may not have been associated with the *heiau* itself.

Another significant site is present in the area. In 1949, Mrs. Rebecca Banks recorded 36 petroglyph figures on boulders stretching across the mouth of Wailua River. These boulders became a National Historic Landmark in 1962. This petroglyph field was re-surveyed in 1973

and 1984 by Bill Kakuchi and he noted that there may be more in the river and that some boulders had been damaged during clearing the mouth of the river. Jim Powell of SCS states that you can see the site at times of low tide, etc.

The final area of concern on the southern bank of the Wailua River, prior to actually reaching the river, is Site -104 and Site -104a. The main site is Malae Heiau, part of the Wailua Complex of Heiau National Historic Landmark. The *heiau* is a walled, square enclosure measuring over 2 acres in size. Construction of this site occurred in phases through time, with early episodes from AD 1480-1580 and later construction at 1700-1800 and 1720-1840 respectively. Site -104a was identified by Kikuchi in 1987 and consists of an adze workshop/flake scatter occurring to the north-northeast of the *heiau* and extending to the marina. It is likely that the lithic manufacturing workshop was related to prehistoric occupation and use of the *heiau* and environs.

This summary was meant to provide a brief overview of known archaeological sites within the Ahukini-Lydgate pathway corridor in order to understand potential impacts to the sites and to gauge additional site types (*i.e.*, burials) that may be identified during archaeological Monitoring of the area.

C. Cultural Resources from Ahukini-Lydgate

As Corbin *et al*. (2002) state, Hanamaulu translates as "tired (as from walking) bay" and is said to be the birthplace of the hero Kawelo. This area was referred to as Puna District at the time of the Great Mahele of 1848, not Lihue District as it is now known. The Hanamaulu area is not specifically mentioned in many historical texts. However, Hanamaulu is noted *Olelo No`eau*, a book of Hawaiian sayings and epithets (Corbin *et al*. 2002:B-1):

*No Hanama`ulu ka ipu puehu* ("The quickly emptied container belongs to Hanama`ulu")

Pukui (1983:No. 2230) identified another quote about the area:

> "Said of the stingy people of Hanama`ulu, Kaua`i—no hospitality there. At one time, food containers would be hidden away and the people of Hanama`ulu would apologize for having so little to offer their guests."

From Hanamaulu Bay to the west, toward Lihue, multiple Land Commission Awards are present. In general, the LCA's primarily denote *lo`i* lands (taro fields). Here, dryland taro cultivation was probably practiced while coconut, sweet potato, and breadfruit were also likely grown. The Mahele records of the Hanamaulu area tell of native tenants living in the valleys and by the shoreline. House sites, taro pond fields, irrigation systems, dryland agricultural parcels,

fishponds, pastures, and other features were across the landscape. Many of these lands were cleared during Plantation days, thus masking or erasing these sites.

The cultural significance of the Wailua Area, further to the North, is well documented. Center of the isle's political and economic universe, Wailua was the chiefly seat of Kaua`i during prehistoric times, as is attested by the numerous *heiau* and other ceremonial sites occurring along the Wailua River basin. The Wailua area is covered in some detail in other sources.

PART III SIGNIFICANCE AND MITIGATION OF THE SITES

The following table denotes significant sites previously identified along this portion of the pathway from Lydgate Park to Ahukini and provides introductory mitigation possibilities for these sites.

Table 1: Lydgate to Ahukini Sites (North to South)

Site #	Location	Mitigation
# 103 WGC burials Burial Preservation Area	Between driving range & 1st Tee / fairway, along fiber optic cable route. Exact boundaries Unknown.	Reroute path to avoid burials-preserve area.
# 103 WGC Burials	Throughout dunes of WGC.	Monitor all pathway excavations.
# 1838, Habitation site	NE corner of Moody property at shoreline	Monitor all pathway excavations
# 1839, Temporary Habitation site	East side of Moody property	Monitor all pathway excavations
# 1840, possible retaining wall for RR / cane haul road	East side of Moody property	Rehabilitate and include in bike path
# 1841, original RR bed / cane haul road to Kou Wharf	Along SE edge of Moody property	Rehabilitate and include in bike path
# 1843, Kou Wharf, wall and road.	South side of Moody property on Hanamaulu Bay. Orginal wharf and access for Hanamaulu Sugar Plantation.	Rehabilitate and include in bike path as rest stop / fishing area. Signage.
# 1845, RR Bridge	Crosses Hanamaulu Stream, west of beach park.	Rehabilitate and include in bike path. Signage.
# 1846, Two concrete bridges.	RR bridges crossing Kawailoa marsh area.	Rehabilitate and include in bike path.
# 2066 Habitation complex	North west of RR Bridge 3 1845	Avoid Fea. A, (possible burial) Include Fea. B (road), and Test Fea. C. (possible habitation).
# 2068 Historic trash dump	Along eastern edge of Moody property	Monitor as pathway is built through area

The primary form of archaeological mitigation during pathway construction is Monitoring. In certain areas, particularly along the coastline and known burial areas, full-time Monitoring is required due to the likelihood of encountering burials or isolated remains. Other forms of mitigation for this project include rehabilitation of historic features (see above), Data Recovery (in the instance new or significant deposits are identified), Burial Treatment and

Preservation, as needed. This mitigation is required and primarily important as there has been a lack of formal Inventory Survey completed along sensitive portions of the pathway, particularly from the plains north of Hanamaulu Bay to the Wailua Golf Course and south of Hanamaulu Stream.

SCS will continue to discuss mitigation requirements with the SHPD throughout this process. Again, mitigation requirements are often dependent upon the final course of the pathway and the findings during construction. To aid in preparing for all scenarios, we have employed an ecological model for examining potential site types in the pathway segment area.

PART IV SENSITIVE AREAS DURING CONSTRUCTION OF THE PATHWAY

Site sensitivity along this pathway is partially determined by the types of soils encountered. There are five main ecological zones along the pathway, with several being sensitive in terms of archaeological resources. The zones are presented first, followed by a listing of pathway areas that may be sensitive for various cultural resources.

The first zone (Zone I) consists of coastal dunes, which include frontal accretion deposits, backslopes, the crest, and the slip face. Zone I predominantly consists of an area spanning from the high-tide water mark of the ocean to the lower portion of the slip face near the interdune area, or, where the backside of the dune becomes flat and expansive. Zone I sediments are primarily composed of beach sands. These sands are subject to variable sorting when high-energy depositional events such as storm surges or tsunamis typically lead to the deposition of courser sand grains while low energy events can lead to well-sorted, often fine-grained, sedimentary deposition. This is a dynamic zone in terms of landscape morphology as it constantly evolves through wind and tides, particularly if vegetation or modern impediments do not curtail dune migration. It is often in Zone I that archaeological signatures for temporary occupation activities such as fishing camps are identified.

Zone II represents a more stable land surface occurring leeward and inland from the terminus of Zone I. This zone composes the coastal plain or back beach environment. The latter term alludes to the formation of interdune deposits. Both Zone I and Zone II primarily consist of calcareous sand beaches derived from the decomposition of coral and seashells. These sandy deposits and associated coralline basements occur far inland in some areas, a symptom of the Holocene high sea stand occurring between *c.* 5,500 years ago and lasting until about 2,000 years

ago (Fletcher and Jones 1996:639). It is frequently within this sandy, back beach area that significant archaeological resources related to permanent habitation and burials are found (e.g., Site 103; see Table 1).

Zone III consists of a landform located at or very near sea level, but removed from the coastal inland of Zone II. This zone is characterized as 'marsh land,' or ponded areas that are approximately equal in elevation to sea level yet retain more terrigenous characteristics. Zone III often consists of slightly depressed areas amenable to water and soil catchment. This marsh land does contain some sandy sediment, but alluvial clays dominate soil matrices. It is within Zone III that *lo`i* agriculture was suggested to have been practiced during traditional times (see Creed et al. 1995) and fishponds are often present (e.g., Kawailoa Pond south of the Radisson Hotel). Later, these lands were filled and utilized for rice cultivation and modern occupation. Zone III contrasts brilliantly with Zone II in that it provides a near-coastal alternative for agricultural production normally only afforded at much more inland locations. Permanent residents of the near coastal environment (Zone II in particular) could practice both intensive agriculture while gathering resources from an immediately adjacent ecological zone. It is this situational affordability that allowed for Zone II occupation at the interface of several other significant resource zones.

Zone IV is demarcated by considerable increases in elevation and changes in topography. This zone is common mostly along the southern flank of the pathway route near Hanamaulu and along the highway, if the pathway is to be placed there. This zone primarily consists of rolling hills and plateaus that lead into more mountainous terrain. Now primarily consisting of grassy plains, subsurface deposits are dominated by the presence of red clays. Some historic and modern uses of this landscape include sugar cane cultivation and pasturing activities. Due to the intensive landscape modifications associated with these historic and modern uses, surface archaeological structures are fairly uncommon, although there are exceptions (Malae Heiau in Wailua). This zone contains red clay soils derived from the decomposition of underlying basalt. The soils are rich in iron and other nutrients amenable to the industrial production of certain crops (*e.g.*, sugar cane). During prehistoric and early historic times, Zone IV could have been used as another transition zone between lowland and upland locales. Trails linking lowland and upland sites and resource procurement zones, small-scale agricultural sites, habitation sites (both permanent and temporary loci), and some *heiau* were constructed in this zone. However, although several site classes may have occurred in Zone IV, the archaeological signatures of these site types may be minimal or non-existent. Zone IV gives way to another zone, the uplands.

The fifth zone (Zone V) consists of the uplands/steep slope lands cut by widely spaced erosional gullies and major drainages consisting of deep ravines. These drainages often create alluvial flats at their terminal points near the coastline (forming Zone III; Hanamaulu area). Also, plateaus are formed between the valleys and the routes occasionally course along side slopes. Rock outcropping is common is several areas, particularly along the northern flank of Hanamaulu Bay.

While each of these zones contributed to traditional and historic economies, archaeological signatures for traditional habitation and activity have been most evident in the back beach zone (Zone 2). This zone contained the artifacts produced for on-site use and off-site procurement of resources, midden and faunal remains indicative of food preparation and consumption, subsurface features such as postholes indicative of dwellings, and hearths characteristic of cooking locales, among others. Typically, the greatest quantity of archaeological sites indicating continuous use of the eastern Kaua`i landscape has been recovered from this back beach, accretion zone, the current project area not being an exception. While there is a specific correlation between soil types and the presence/absence of sites along this eastern coast, in this case, the documentation of the greatest proportion of sites being in Zone II does not provide such a simple association. Archaeological inquiry has been primarily conducted in Zone II as infrastructure and housing construction has rapidly expanded. Naturally, the more inquiry into one zone versus other zones skews the results somewhat. It is this caveat that archaeological models defining intensive landscape use through time must address

Ecological Subzones and Archaeological Sites

The back beach, or accretion zone area (Zone II), containing the predominant cultural layers identified in this project area, occurs at the interface of two other ecological zones. Zone I is represented by the immediate coastline, which often includes interdune deposits, crests and slipfaces, and backslope areas. Zone III, a bounding surface for Zone II, consists of an inland marshy area used through history for *lo`i*, fishponds, and wetland resources. This dynamic coastal to slightly inland ecological setting containing three discrete ecological zones, was utilized on a continuous basis along eastern Kaua`i for at least 800 years (see Creed *et al*. 1995).

It has been postulated elsewhere (Dega and Buffum 2001; Dega and Morawski 2002) that Zone II back beach locations were the stable, lowland land surfaces on which primary permanent occupation and associated activities occurred during pre-Contact times. Temporary habitation loci, work areas (e.g., lithic workshops), recreational activity areas, fishing camps, and some

burial areas are site types occurring directly along the coastline (Zone I). For the most part, direct coastal areas were transient in that dune movement and erosion were common. Back beach, accretion deposit areas were much more stable and selected for sustained, permanent habitation. Permanent house sites, ceremonial structures, some agricultural features, and such have been documented with more frequency in the Zone II area of eastern Kaua`i. Both burials and subsurface cultural layers often denoted as the paleo A-horizon along eastern Kaua`i have been most often identified in this ecological zone. The present archaeological project may reinforce this hypothesis. The western flank of the back beach zone (Zone III) commingled with depressed, marshy areas extending to the base of hill slopes to the west. These marshy areas, as noted above, were also utilized continuously throughout history, from lo`i and fishpond use to resource gathering areas. During historic times, these marshy areas were often filled and utilized for rice cultivation (see Creed et al. 1995). We continue to explore the possibility that a fishpond also occurred in this back beach area, the Kawailoa Pond south of the Radisson Hotel.

Historic Preservation Challenges

As discussed further above, several avenues of mitigation are possible for historic properties discovered prior to, or during, construction of the pathway. These include archaeological Monitoring, Data Recovery, Burial Treatment, and site Preservation. The primary impact to construction or location of the pathway appears to be in the form of traditional Native Hawaiian burials. Several known burial areas occur within or near proposed pathway routes. Such is the nature of coastal pathways in Hawaii. The singular challenge will be to more readily define the possible boundaries of the burial areas (and established preserve area such as occur at Wailua Golf Course) and to practice avoidance of the these areas. In working with the SHPD, other site types, such as traditional-period temporary habitation locations or camps and such, may be mitigated through Data Recovery sampling. Rehabilitation and Preservation of sites (see Table 1) will occur as part of the Preservation effort of known sites in the area, none of these occurring in the proposed pathway corridors. The greatest challenge again will be avoidance and protection of known burial preserve areas along the pathway. SCS and the contractors will work with the SHPD and Kaua`i/Ni`ihau Islands Burial Council to assess and mitigate known burials and those that are inadvertently discovered during construction.

Part V: Interpretive Signs along Ahukini-Lydgate Pathway

This section provides a table (Table 2) listing possible signs and interpretations that may be placed along this portion of the bikepath. This table is open for revision and consultation will occur to refine potential signs in the area.

Table 2: Potential Signage: Ahukini Landing toward Wailua River

#	Location	Sign Site	Size	Description
1	Ahukini Landing	Overlooking Bay and Wharf	L	Description of sugar plantations Lihue to Kapaa. Landing history
2	Ahukini Bluff, South Shore	Beginning of decline into valley	S	Description of RR
3	Hanamaulu Valley	South end of historic RR Bridge	L	Description of traditional agriculture activities
4	Hanamaulu Bay	North end of historic RR bridge	L	Description of traditional shoreline activities
5	Kou, Old Landing	At landing north shore of Hanamaulu Bay	S	Use by Hanamaulu Sugar Plantation
6	Hanamaulu / Wailua Ahupua'a	Border between Hanamaulu & Wailua Ahupua'a	S	Quote Historic descriptions from 19th century travelers and residents
7	Marine Camp	Beach area near Motocross track	S	Historical account
8	Wailua Golf Course/ Hawaiian Burial Area Site -103	Beach south of # 2 green, on trail	S	Description of Hawaiian Burial Area
9	Hanamaulu Sugar Company	Undetermined	L	Chronology and Sugar Company Information
10	Historic Sites of Hanamaulu Ahupua`a	Ahukini Point (start of path)	L	Nu`ukoli, Kawailoa, Hanamaulu Dairy, Wailua Airport, Marine Camp, Luckenback Shipwreck
11	Prehistoric and Historic Sites of Hanamaulu	Ahukini Point (start of path)	L	Ahukini Heiau, Ahukini Terminal and Railway Company, Ahukini Camp, Ahukini Landing, Railroad Track of Old Bridge, Hanamaulu Park

CONCLUSIONS

This interim report sought to discuss the various archaeological and historic preservation issues related to construction and maintenance of the Kaua`i Pathway project and focuses on the segment stretching from Ahukini Point to Lydgate Park. The report lists the known archaeological sites having been documented along this segment, the estimated significance of these sites, and potential mitigation of these sites and sensitive areas during construction of the pathway. The historic preservation challenges that may be faced during construction of the coastal pathway are presented, with recommendations for mitigation also being forwarded. SCS will continue to refine this document in consultation with the SHPD and various community organizations. In total, the relationship between known archaeological sites and possible pathway routes presents a dynamic opportunity to further explore the history of the Ahukini-Lydgate area while preserving the rich history of the area.

References Available

This page left intentionally blank

D-2 ARCHEOLOGICAL MONITORING REPORT

This page left intentionally blank

SCS Project Number 426-AMP

AN ARCHAEOLOGICAL MONITORING PLAN FOR THE COUNTY OF KAUA`I DEPARTMENT OF PLANNING AHUKINI-LYDGATE PARK COASTAL BIKE AND PEDESTRIAN PATHWAYS PROJECT HANAMA`ULU, LIHU`E DISTRICT, ISLAND OF KAUA`I, HAWAI`I [TMK: VARIOUS]

Prepared by:
Elizabeth Pestana, B.A.
And
Michael F. Dega, Ph.D.
May 2006

Prepared for:
County of Kaua`i,
Department of Public Works
Building Division
4444 Rice Street, Suite 175
Lihue, Hawaii 96766-1340

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

At the request of the State of Hawai`i, County of Kaua`i Department of Public Works, Scientific Consultant Services, Inc. (SCS) has prepared this Archaeological Monitoring Plan (AMP) in advance of construction to occur for the proposed Ahukini-Lydgate Bike and Pedestrian Path project (Path) along eastern Kaua`i, Hawai`i. The proposed route commences near Ahukini Landing in Hanama`ulu and terminates at a pre-existing segment of the Path within Lydgate Park, Wailua. The current project is a segment of the overall Nawiliwili to Anahola coastal Path project. A Draft Environmental Assessment more specifically outlining the route of the Path and its various land divisions is available online at the County of Kaua`i website. These large maps are not included herein but are available for viewing at the following address: http://www.kauai.gov/Default.aspx?tabid=435. This document accurately demarcates the location of the proposed Path and is a substitute for any less precise maps which would be included herein.

The Path discussed herein extends along a coastal route from the Ahukini/Hanama`ulu area and takes a more inland route along the Wailua Golf Course toward the southern end of Lydgate Park (Note: The proposed routes are available for review in the draft Environmental Assessment). This segment of the Path will extend c. four miles long and consist of a twelve-foot wide, six inch thick concrete pathway. The Path crosses multiple Tax Map Key and *ahupua*`a divisions.

This Archaeological Monitoring plan is being prepared for the SHPD due to the archaeologically sensitive nature of portions of the project area. While a majority of the Path project area is removed from beach sand contexts, there remains the possibility that remnant or even intact cultural deposits and/or burials may be present in portions of the work area. Multiple archaeological investigations conducted in the general vicinity of this Path segment have resulted in the identification of traditional Native Hawaiian burials and significant prehistoric and historic-era cultural deposits. Monitoring is considered a necessary mitigation strategy based on the potential for the inadvertant discovery of human remains and/or cultural deposits during excavation work in support of the Path construction.

Monitoring procedures will be conducted in accordance with the rules and regulations established by the Department of Land and Natural Resources (DLNR) State

Historic Preservation Division (SHPD) under rule ' 13-279-5. If human remains are identified in the project area, the monitoring program will carry out appropriate and lawful protocols concerning the Inadvertent Discovery of Human Remains as identified in administrative rule 13-300-HAR. In the event that any culturally significant findings are identified, the features shall be investigated, adequately documented, and evaluated for their historical significance. This work will be accomplished only through consultation with the SHPD.

Prior to the commencement of any excavation work within the project area, this AMP will be submitted for review and require the approval of SHPD (Ms. N. McMahon). This AMP provides information regarding background of the project area, previous archaeological work conducted in the area and the results of this research, potential site types that may be encountered during monitoring, monitoring conventions, methodology for fieldwork, methodology for laboratory work, curation, and reporting.

PROJECT AREA BACKGROUND INFORMATION

The Ahukini-Lydgate Path segment generally runs from the rocky shores of Ahukini-Hanama`ulu through the back beach areas of Kawailoa, along red clays of Kuhio Highway, toward the sandy near-coastal area of the Wailua Golf Course, and continues to its terminal point at Lydgate Park. As is the nature of pathways, multiple natural and political boundaries are crossed from starting point to terminal point. The present Path is no exception. Based on previous archaeological work along eastern Kaua`i, a landscape model has evolved to provide insight into the nature of archaeological sites which are (and may be) present along the Path corridor.

Environmental Modeling of Project Area and Environs

Soil matrices and landform have long been determinant for predicting the presence/absence of significance cultural resources in the Hawaiian Islands. There is often a correlation between soil types and site types, environment and complex systems. The following provides some background to soil and landform types in the project area with an attempt to briefly estimate the types and nature of archaeological sites that could be encountered along this portion of the Path.

Soil Regimes

As the proposed Path corridor covers some distances, various soil environments are crossed. The path meanders along portions of the coast in Ahukuni/Hanama`ulu and

toward Wailua. Natural soils within these segments primarily consist of the Jaucas-Mokuleia association: deep nearly level to moderately sloping, excessively drained and well-drained soils that have coarse-textured underlying material and occur primarily on coastal plains. These beach deposits are light colored sand derived from marine shell and coral. Through time, coral and marine shell are transported through wind and water and are also impacted and broken down by ocean waves, forming sand. Similar to Jaucas sands from the Jaucas Series (*ibid*), beach sands (BS) are single grain, pale brown to very pale brown calcareous soils that have rapid permeability with very slow to slow runoff. The surface layer of Jaucas sands are commonly dark brown as a result of alluvium and the accumulation of organic matter. While sandy coastal areas are ill-suited for agricultural cultivation and farming, these beach areas were often used during pre- and post-Contact periods for activities from temporary and permanent settlement, thus providing direct access to marine resources. Beaches were also used as locales for human burial re-interment throughout the Hawaiian Islands (see Kirch 1985). This is one main reason Monitoring is recommended for portions of the Path.

Portions of the pathway occur both near the coastline and further removed from the coastline, with both areas having different soil contexts. For example, as the proposed pathway winds from the southern terminus at Ahukini Point to the south end of Lydgate Park area, with the concomitant increase in elevation, a change in soils occurs. This area is characterized by rock outcropping/rocky headland and hill slopes occurring between two coastal plains (Hanama`ulu and Lydgate Park). Soil formation is limited in this area due to the ubiquity of bedrock. The beach soils have effectively transitioned from sands to silty clays of the Lihue-Puhi association: deep, nearly level to steep, well drained soils that have fine textured or moderately fine textured subsoil and occur as more inland deposits (Foote *et al*. 1972). This reddish clay often underlies fill, particularly along Kuhio Highway and other previously developed infrastructure. As elevation increases from the coastline, the sediment changes from beach sand to clays overlying bedrock. These areas are not as culturally sensitive as the beach areas, but must be monitored nonetheless. Finally, one other soil zone may be present, depending upon the pathway route. Occurring in low-lying areas behind dunes (back beach area), marshy areas composed of mixed marine and terrestrial sediment are present. This would include areas on the coastal flank of Hanama`ulu Lands and near Kawailoa (Dega and Powell 2003). These low-lying areas are often marshy but were utilized in the past, primarily for intermittent activities related to gathering, fishing, and other raw material acquisition.

Environmental Zoning

The route of the Ahukini-Lydgate Bike and Pedestrian Path project courses through various segment of the eastern Kaua`i landscape. A landscape model devised from work by Dega and Powell (2003) is an effort to identify the relationship between environmental zones and the presence/absence of cultural materials for eastern Kaua`i, inclusive of the Path routing. In the model, landforms are divided into five general zones, some of which may be divided further into sub zones (Figure 1). A review of these zones is directly comparable to the known sites along or near the proposed corridor (see below).

The first zone (Zone I) consists of coastal dunes, which include frontal accretion deposits, backslopes, the crest, and the slip face. Zone I predominantly consists of an area spanning from the high-tide water mark of the ocean to the lower portion of the slip face near the interdune area, or, where the backside of the dune becomes flat and expansive. Zone I sediments are primarily composed of beach sands. These sands are subject to variable sorting when high-energy depositional events such as storm surges or tsunamis typically lead to the deposition of courser sand grains while low energy events can lead to well-sorted, often fine-grained, sedimentary deposition. This is a dynamic zone in terms of landscape morphology as it constantly evolves through wind and tides, particularly if vegetation or modern impediments do not curtail dune migration. It is often in Zone I that archaeological signatures for temporary occupation activities such as fishing camps are identified. Examples of Zone I along the Path include sections of Hanamaulu Bay area, the Wailua Golf Course, and Lydgate Park (coastal reaches only).

Zone II represents a more stable land surface occurring leeward and inland from the terminus of Zone I. This zone composes the coastal plain or back beach environment. The latter term alludes to the formation of interdune deposits. Both Zone I and Zone II primarily consist of calcareous sand beaches derived from the decomposition of coral and seashells. These sandy deposits and associated coralline basements occur far inland in some areas, a symptom of the Holocene high sea stand occurring between c. 5,500 years ago and lasting until about 2,000 years ago (Fletcher and Jones 1996:639). It is frequently within this sandy, back beach area that significant archaeological resources related to permanent habitation and burials are found. However, this traditionally utilized zone has also been modified to suit current societal needs such as housing and commercial development. Examples of Zone II include the Hanamaulu Bay area, Wailua Golf Course, and coastal portions of Lydgate Park.

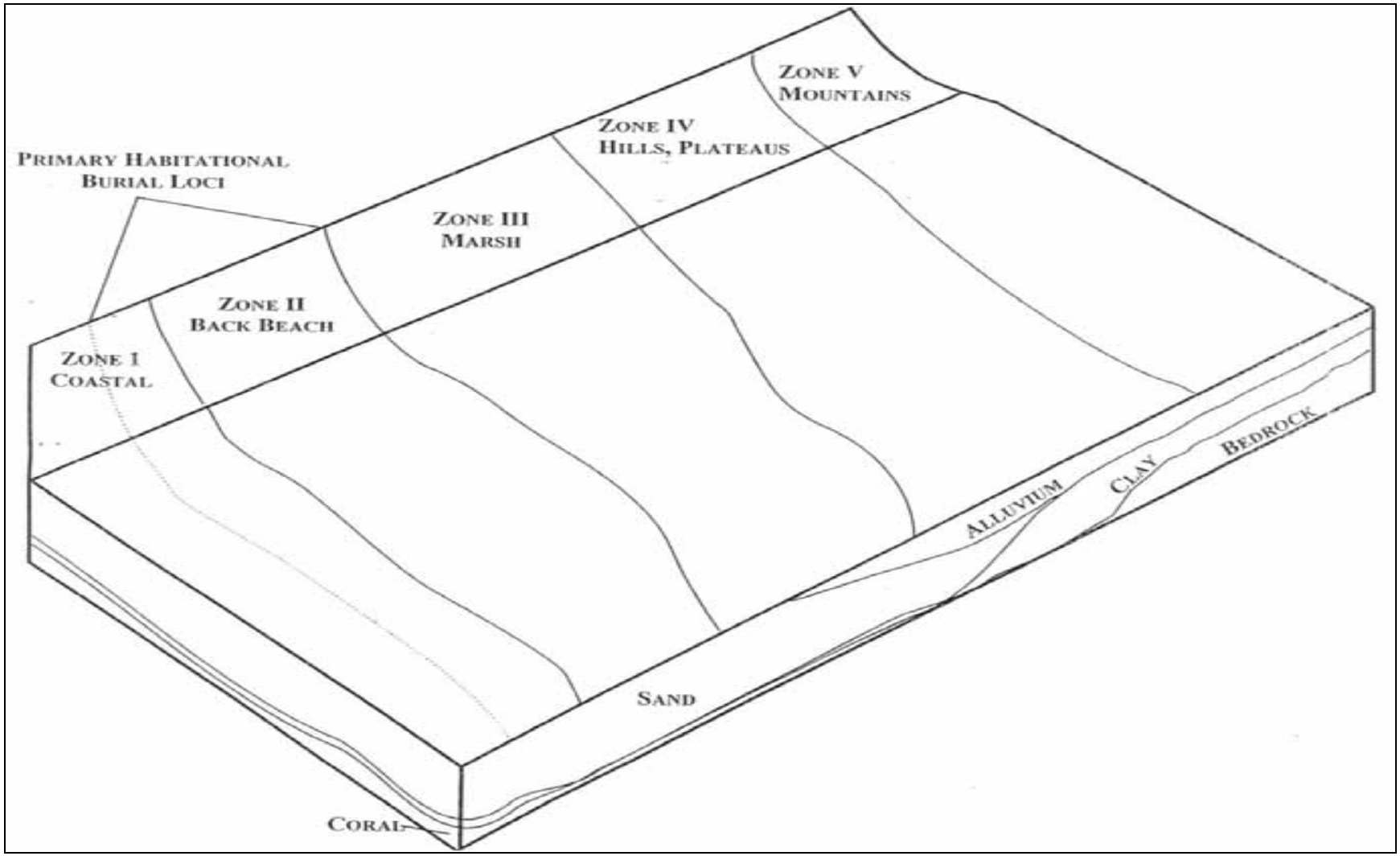


Figure 1: Cross-section of Primary Landzones.

Zone III consists of a landform located at or very near sea level, but removed from the coastal inland of Zone II. This zone is characterized as 'marsh land' or ponded areas that are approximately equal in elevation to sea level yet retain more terrestrial characteristics. Zone III often consists of slightly depressed areas amenable to water and soil catchment. This marsh land does contain some sandy sediment, but alluvial clays dominate soil matrices. It is within Zone III that *lo`i* agriculture was suggested to have been practiced during traditional times (see Creed *et al*. 1995). Later, these lands were filled and utilized for rice cultivation and modern occupation. Zone III contrasts brilliantly with Zone II, in that it provides a near-coastal alternative for agricultural production normally only afforded at much more inland locations. Permanent residents of the near coastal environment (Zone II in particular) could practice intensive agriculture while also gathering resources from an immediately adjacent ecological zone. It is this situational affordability that allowed for Zone II occupation at the interface of several other significant resource zones. An example of Zone III would be the Kawailoa area (near the former Radisson Hotel).

Zone IV is demarcated by considerable increases in elevation and changes in topography. This zone is most common beyond Wailua and primarily consists of rolling hills and plateaus that lead into more mountainous terrain. Now primarily consisting of grassy plains, subsurface deposits are dominated by the presence of red clays. Some historic and modern uses of this landscape include sugar cane cultivation and pasturing activities. Due to the intensive landscape modifications associated with these historic and modern uses, surface archaeological structures are fairly uncommon, although there are exceptions (Malae Heiau in Wailua). This zone contains red clay soils derived from the decomposition of underlying basalt. The soils are rich in iron and other nutrients amenable to the industrial production of certain crops (e.g., sugar cane). During prehistoric and early historic times, Zone IV could have been used as another transition zone between lowland and upland locales. Examples of Zone IV include a long stretch of the proposed Path along Kuhio Highway from Ahukuni/Hanamaulu to the Wailua Golf Course.

The final zone, Zone V, consists of more mountainous terrain. Red soils, outcrops, and more inland riverine environments characterize this zone. Trails linking lowland and upland sites and resource procurement zones, small-scale agricultural sites, habitation sites (both permanent and temporary loci), and some *heiau* were constructed in this zone. No segments of the proposed Path from Ahukini to Lydgate occur in this zone.

previous archaeology

Part 1: Known Archaeological Sites: A Summary

Ahukini Point to the Raddison Hotel Area:

Based on a literature review of the proposed pathway alignments, there have been at least 15 archaeological projects conducted in this area from Thrum (1907) to Scientific Consultant Services, Inc. (SCS) in 2004 (Morawski and Dega 2004). In 1906 Thrum compiled an inventory of *heiau* throughout the islands. Within the currently discussed segment from Ahukini to Lydgate, he "recorded" two *heiau*: Ahukini and Kalauokamanu. These *heiau* were not marked on maps but were simply described. Both *heiau* had been destroyed supposedly as of 1855. During Bennett's island-wide survey in 1928-1929, the two *heiau*, now known as Site 101 and Site 102, were also noted. Ahukini Heiau supposedly was built near Ahukini Point on a bluff overlooking the sea while the location of Kalauokamanu was never identified. Bennett (1931) did also note that both *heiau* were previously destroyed. Bennett makes first mention of Site 103, a burial ground in this area: "in the sand dunes that run along the shore half way between Hanamaulu and Wailua River are many burials."

From Hanamaulu Bay to the west, toward Lihue, multiple Land Commission Awards are present. In general, the LCA's primarily denote *lo`i* lands (taro fields). Here, dryland taro cultivation was probably practiced while coconut, sweet potato, and breadfruit were also likely grown. The Mahele records of the Hanamaulu area tell of native tenants living in the valleys and by the shoreline. House sites, taro pond fields, irrigation systems, dryland agricultural parcels, fishponds, pastures, and other features were constructed across the prehistoric-traditional landscape. Many of these lands were cleared during Plantation days, thus masking or erasing much evidence for these sites.

At least eleven known archaeological sites are present in the Hanamaulu area toward the Wailua Golf Course. As one moves from south to north, or Ahukini Point toward Wailua, several sites are present of both a historic and prehistoric nature. First, Ahukini landing itself, a probable late 19th construction, is present inside the breakwall of the bay. Plantation housing for sugar cane workers has been noted just to the south of the point. Foundations still exist in remnant state. Moving inland to the west, several more sites are present:

Site 1845 is the historic Hanamaulu Railroad Bridge. This bridge is being preserved and represents the plantation era.

Site 2066 consists of multiple features: an upright (burial?), historic road, and historic house foundation.

Site 2067 consists of a historic cemetery perhaps dating to the 1880s. The cemetery is present on the *mauka* side of the highway on the edge of former sugar cane lands.

Site 1843: prior to construction of Ahukini Landing, an old wharf was present on the northern flank of the bay. This is Site 1843 and consists of a concrete wall, foundation, and sugar cane road. This is the location of the old wharf.

Site 1841 occurs just to the north and also represents the historic period: a road and trail running along the coast. It is possible this trail has some time depth from prehistoric times but it has not yet been dated.

As one rounds the point to the north, three archaeological sites are present above the rocky coastline. Site 2068 consists of a looted, historic-period trash dump dating between 1880 and 1910. Datable artifacts include glass and ceramic fragments that were recovered from the bluff, at the edge of plantation lands. Site 1840, nearby, consists of a historic-period retaining wall related to sugar cane or military transport; Site 1839, occurring about 25 m to the east of the trash dump represents the first fully known prehistoric site in this coastal area. This site is a prehistoric complex occurring on the flats and composed of a wall and terrace suspected to be related to temporary habitation. No radiocarbon dates are available for this site.

Proceeding to the north, around the point and onto the flat coastal plains toward Wailua, both historic and prehistoric sites are present. Site 1838 consists of a prehistoric cultural deposit partially eroding out of modified sand dunes. The layers contained charcoal, shells, and coral fragments, this expected so near the coastline. The site had been disturbed during military training exercises in the 1940s. The cultural deposit, now a small remnant, was dated to AD 1170-1400, and represents temporary habitation of the area. This pattern of remnant cultural deposits and temporary activities near the coast holds through the Kealia area and beyond, and is one concern for the present work. The final historic site in this area is Site 1846, two historic railroad bridges used for hauling

sugar cane from the fields to Lihue. This site is present more inland and south of the former Radisson Hotel.

Site -885, also occurring just to the south of the Raddison hotel, represents a possible traditional Native Hawaiian burial ground. Multiple burials have been documented in this sandy location, from the Raddison through Wailea Golf Course and Lydgate Park.

Overall, this first section contains abundant evidence for historic networks related to plantation-era days and prehistoric sites related to burial and temporary habitation loci. While none of the sites beyond Ahukini landing remain in spectacular form, they do allude to land tenure in the area during the late 1880s onwards. The two prehistoric sites identified near the rocky coastline provide foreshadowing for the immense number of sites occurring to the north along the sandy coastal flats. Site -885 and beyond provide our first glimpses at this pattern.

Wailua Golf Course to Wailua River

The most well-known site in this area, due to the influx of CRM research related to golf course activities and development of Lydgate Park, is Site 103, originally recorded by Bennett during island-wide survey in 1928-1929. At this writing, over 66 burials have been identified throughout the golf course alone, with most of these having been re-interred in a burial crypt and preserve area at the golf course itself. This discussion focuses on the area from the south end of the golf course and west to the Correctional Facility to the Wailua River. In this location, we enter one of the most sacred and site-rich areas of the island, an area that will be crucial for pathway development.

The *ahupua`a* of Wailua is situated in the old district of Puna but today is located in two separate judicial districts: south of Wailua River is Lihue District or *moku* and north of the river is Kawaihau District. Wailua Ahupua`a is the largest *ahupua`a* in both districts and extends from the shoreline to Mt. Wai`ale`ale. In this segment, we stop at the southern bank of the Wailua River, the largest navigable stream in the Hawaiian Islands. The southern extent of this area is relatively minor compared with the near-river areas. In this tract, very few LCA's were issued. The flatlands between the dunes and Kalepa Ridge contain swampy areas fed by springs at the base of the ridge that allowed for limited taro cultivation on the margins of the marsh. The coastal dunes between the

marshland and the sea were primarily used for human interment (Site 103) while the direct coastline would contain evidence for temporary or seasonal fishing camps and other marine acquisition.

The first site encountered within this artificial corridor is Site 1980, which occurs on the golf course to the east of the correction facility. This site consists of eight traditional-period burials identified in sandy contexts between coastline and marshy areas to the west. It is likely this site could be included as a portion of Bennett's Site 103. As we move north into golf course lands, several more sites are present, particularly Site 103 and its 66+ known burials. Forty-four burials were identified during trenching by SCS in 2000 (Fagher and Spear 2000). Also recovered were prehistoric implements (two adzes, sinkers, hammerstone) and historic items (glass and porcelain). Sites -542 through -546 and Site -819 compose portions of Site 103 burials found during monitoring work in 1977. Site -9357, a burial also part of the Site 103 complex, was identified on the grounds of the County correctional facility. A burial preserve area has also been established at the golf course, across from the first tee box.

Two archaeological sites were identified and documented during monitoring in 2003 by SCS at the Kumalani area of Lydagate, just off the golf course (Morawski and Dega 2004). Additional burials related to Site -103 were identified. A total of three incomplete burial sites and two isolated findspots from previously disturbed burials were identified. All were thought to be from traditional contexts. The second site, Site -356, consisted of a traditional cultural layer located within natural sand dune deposits. The site was assessed as a habitation layer and dated to A.D. 1440–1660, a traditional time period consistent with other archaeological finds in the area. Stone tool implements, charcoal, and shell were found at the site. Scattered stone tools (hammerstone, adze fragment) were identified in the sand dune during construction of the Kumalani playground.

While not directly impacting the pathway in this segment, the following is presented to provide additional context to the archaeology of the area. Staying on the south side of the river, near the coastline, we enter the more sacred Wailua River mouth area. On one side is Lydgate Park and across the highway from the hotel is a heiau complex. Staying near the coast, Site -105 is present within the park, much of the site having been preserved today. This site consists of Hikinaakala Heiau and Pu`uhonua o Hauola (city of refuge). This site was first recorded by Thrum in 1906 and later by

Bennett (1931), Kikuchi (1974), and Yent (1989). This site is part of the Wailua Complex of Heiau National Historic Landmark. Yent's work at the site concluded that there were two occupational episodes at this site, one historic-period and one earlier occupation. This occupation may or may not have been associated with the *heiau* itself.

Another significant site is present in the area. In 1949, Mrs. Rebecca Banks recorded 36 petroglyph figures on boulders stretching across the mouth of Wailua River. These boulders became a National Historic Landmark in 1962. This petroglyph field was re-surveyed in 1973 and 1984 by W. Kikuchi and he noted in a letter report that there may be more in the river and that some boulders had been damaged during clearing the mouth of the river. J. Powell of SCS states that you can see the site at times of low tide.

The final area of interest on the southern bank of the Wailua River, prior to actually reaching the river, is Site -104 and Site -104a. The main site is Malae Heiau, part of the Wailua Complex of Heiau National Historic Landmark. The *heiau* is a walled, square enclosure measuring over 2 acres in size. Construction of this site occurred in phases through time, with early episodes from AD 1480-1580 and later construction at 1700-1800 and 1720-1840 respectively. Site -104a was identified by Kikuchi in 1987 and consists of an adze workshop/flake scatter occurring to the north-northeast of the *heiau* and extending to the marina. It is likely that the lithic manufacturing workshop was related to prehistoric occupation and use of the *heiau* and environs.

This summary was meant to provide a brief overview of known archaeological sites within the Ahukini-Lydgate pathway corridor in order to understand potential impacts to the sites and to gauge additional site types (*i.e.*, burials) that may be identified during archaeological Monitoring of the area.

Cultural Resources from Ahukini-Lydgate

As Corbin *et al*. (2002) state, Hanamaulu translates as "tired (as from walking) bay" and is said to be the birthplace of the hero Kawelo. This area was referred to as Puna District at the time of the Great Mahele of 1848, not Lihue District as it is now known. The Hanamaulu area is not specifically mentioned in many historical texts. However, Hanamaulu is noted *Olelo No`eau*, a book of Hawaiian sayings and epithets (Corbin *et al*. 2002:B-1):

*No Hanama`ulu ka ipu puehu* ("The quickly emptied container belongs to Hanama`ulu")

Pukui (1983:No. 2230) identified another quote about the area:

"Said of the stingy people of Hanama`ulu, Kaua`i—no hospitality there. At one time, food containers would be hidden away and the people of Hanama`ulu would apologize for having so little to offer their guests."

From Hanamaulu Bay to the west, toward Lihue, multiple Land Commission Awards are present. In general, the LCA's primarily denote *lo`i* lands (taro fields). Here, dryland taro cultivation was probably practiced while coconut, sweet potato, and breadfruit were also likely grown. The Mahele records of the Hanamaulu area tell of native tenants living in the valleys and by the shoreline. House sites, taro pond fields, irrigation systems, dryland agricultural parcels, fishponds, pastures, and other features were across the landscape. Many of these lands were cleared during Plantation days, thus masking or erasing these sites.

The cultural significance of the Wailua Area, further to the North, is well documented. Center of the isle's political and economic universe, Wailua was the chiefly seat of Kaua`i during prehistoric times, as is attested by the numerous *heiau* and other ceremonial sites occurring along the Wailua River basin. The Wailua area is covered in some detail in other sources.

REASON FOR MONITORING AND POTENTIAL SITE TYPES TO BE ENCONTERED: LANDFORM AND SENSITIVE AREAS DURING CONSTRUCTION OF THE PATHWAY

Site sensitivity along this pathway is partially determined by the types of soils encountered. The five main ecological zones discussed above are now related to the potential of archaeological sites along this portion of the Path. The zones are presented first, followed by a listing of pathway areas that may be sensitive for various cultural resources.

The first zone (Zone I) consists of coastal dunes, which include frontal accretion deposits, backslopes, the crest, and the slip face. Zone I predominantly consists of an area spanning from the high-tide water mark of the ocean to the lower portion of the slip

face near the interdune area, or, where the backside of the dune becomes flat and expansive. Zone I sediments are primarily composed of beach sands. These sands are subject to variable sorting when high-energy depositional events such as storm surges or tsunamis typically lead to the deposition of courser sand grains while low energy events can lead to well-sorted, often fine-grained, sedimentary deposition. This is a dynamic zone in terms of landscape morphology as it constantly evolves through wind and tides, particularly if vegetation or modern impediments do not curtail dune migration. It is often in Zone I that archaeological signatures for temporary occupation activities such as fishing camps are identified.

Zone II represents a more stable land surface occurring leeward and inland from the terminus of Zone I. This zone composes the coastal plain or back beach environment. The latter term alludes to the formation of interdune deposits. Both Zone I and Zone II primarily consist of calcareous sand beaches derived from the decomposition of coral and seashells. These sandy deposits and associated coralline basements occur far inland in some areas, a symptom of the Holocene high sea stand occurring between *c.* 5,500 years ago and lasting until about 2,000 years ago (Fletcher and Jones 1996:639). It is frequently within this sandy, back beach area that significant archaeological resources related to permanent habitation and burials are found (e.g., Site 103; see Table 1).

Zone III consists of a landform located at or very near sea level, but removed from the coastal inland of Zone II. This zone is characterized as 'marsh land,' or ponded areas that are approximately equal in elevation to sea level yet retain more terrigenous characteristics. Zone III often consists of slightly depressed areas amenable to water and soil catchment. This marsh land does contain some sandy sediment, but alluvial clays dominate soil matrices. It is within Zone III that *lo`i* agriculture was suggested to have been practiced during traditional times (see Creed et al. 1995) and fishponds are often present (e.g., Kawailoa Pond south of the Radisson Hotel). Later, these lands were filled and utilized for rice cultivation and modern occupation. Zone III contrasts brilliantly with Zone II in that it provides a near-coastal alternative for agricultural production normally only afforded at much more inland locations. Permanent residents of the near coastal environment (Zone II in particular) could practice both intensive agriculture while gathering resources from an immediately adjacent ecological zone. It is this situational affordability that allowed for Zone II occupation at the interface of several other significant resource zones.

Zone IV is demarcated by considerable increases in elevation and changes in topography. This zone is common mostly along the southern flank of the pathway route near Hanamaulu and along the highway, if the pathway is to be placed there. This zone primarily consists of rolling hills and plateaus that lead into more mountainous terrain. Now primarily consisting of grassy plains, subsurface deposits are dominated by the presence of red clays. Some historic and modern uses of this landscape include sugar cane cultivation and pasturing activities. Due to the intensive landscape modifications associated with these historic and modern uses, surface archaeological structures are fairly uncommon, although there are exceptions (Malae Heiau in Wailua). This zone contains red clay soils derived from the decomposition of underlying basalt. The soils are rich in iron and other nutrients amenable to the industrial production of certain crops (*e.g.*, sugar cane). During prehistoric and early historic times, Zone IV could have been used as another transition zone between lowland and upland locales. Trails linking lowland and upland sites and resource procurement zones, small-scale agricultural sites, habitation sites (both permanent and temporary loci), and some *heiau* were constructed in this zone. However, although several site classes may have occurred in Zone IV, the archaeological signatures of these site types may be minimal or non-existent. Zone IV gives way to another zone, the uplands.

The fifth zone (Zone V) consists of the uplands/steep slope lands cut by widely spaced erosional gullies and major drainages consisting of deep ravines. These drainages often create alluvial flats at their terminal points near the coastline (forming Zone III; Hanamaulu area). Also, plateaus are formed between the valleys and the routes occasionally course along side slopes. Rock outcropping is common is several areas, particularly along the northern flank of Hanamaulu Bay.

While each of these zones contributed to traditional and historic economies, archaeological signatures for traditional habitation and activity have been most evident in the back beach zone (Zone 2). This zone contained the artifacts produced for on-site use and off-site procurement of resources, midden and faunal remains indicative of food preparation and consumption, subsurface features such as postholes indicative of dwellings, and hearths characteristic of cooking locales, among others. Typically, the greatest quantity of archaeological sites indicating continuous use of the eastern Kaua`i landscape has been recovered from this back beach, accretion zone, the current project area not being an exception. While there is a specific correlation between soil types and the presence/absence of sites along this eastern coast, in this case, the documentation of

the greatest proportion of sites being in Zone II does not provide such a simple association. Archaeological inquiry has been primarily conducted in Zone II as infrastructure and housing construction has rapidly expanded. Naturally, the more inquiry into one zone versus other zones skews the results somewhat. It is this caveat that archaeological models defining intensive landscape use through time must address.

Ecological Subzones and Archaeological Sites

The back beach, or accretion zone area (Zone II), containing the predominant cultural layers identified in this project area, occurs at the interface of two other ecological zones. Zone I is represented by the immediate coastline, which often includes interdune deposits, crests and slipfaces, and backslope areas. Zone III, a bounding surface for Zone II, consists of an inland marshy area used through history for *lo`i*, fishponds, and wetland resources. This dynamic coastal to slightly inland ecological setting containing three discrete ecological zones, was utilized on a continuous basis along eastern Kaua`i for at least 800 years (see Creed *et al*. 1995).

It has been postulated elsewhere (Dega and Buffum 2001; Dega and Morawski 2002) that Zone II back beach locations were the stable, lowland land surfaces on which primary permanent occupation and associated activities occurred during pre-Contact times. Temporary habitation loci, work areas (*e.g.*, lithic workshops), recreational activity areas, fishing camps, and some burial areas are site types occurring directly along the coastline (Zone I). For the most part, direct coastal areas were transient in that dune movement and erosion were common. Back beach, accretion deposit areas were much more stable and selected for sustained, permanent habitation. Permanent house sites, ceremonial structures, some agricultural features, and such have been documented with more frequency in the Zone II area of eastern Kaua`i. Both burials and subsurface cultural layers often denoted as the paleo A-horizon along eastern Kaua`i have been most often identified in this ecological zone. The present archaeological project may reinforce this hypothesis. The western flank of the back beach zone (Zone III) commingled with depressed, marshy areas extending to the base of hill slopes to the west. These marshy areas, as noted above, were also utilized continuously throughout history, from *lo`i* and fishpond use to resource gathering areas. During historic times, these marshy areas were often filled and utilized for rice cultivation (see Creed *et al*. 1995). We continue to explore the possibility that a fishpond also occurred in this back beach area, the Kawailoa Pond south of the Radisson Hotel.

MONITORING CONVENTIONS AND METHODOLOGY

This AMP has been prepared in accordance with DLNR-SHPD rules governing standards for Archaeological Monitoring (§13-279). Archaeological monitors will adhere to the following guidelines during monitoring:

1. A qualified archaeologist from SCS familiar with the project area and the results of previous archaeological work conducted in the area will monitor subsurface construction activities in the project area. If significant deposits or features are identified and additional field personnel are required, the archaeologist will notify the contractor or representatives before additional personnel are brought to the site.

2. If features or cultural deposits are identified during Archaeological Monitoring, the on-site archaeologist will have the authority to temporarily suspend construction activities at the significant location so that the cultural feature(s) or deposit(s) may be fully evaluated and appropriate treatment of the cultural deposit(s) is conducted. These actions are needed to fulfill the reporting requirements specified in §13-279-5(5) through (6). SHPD archaeologists will be consulted to establish feature significance and potential mitigation procedures. Treatment activities primarily include documenting the feature/deposit through plotting its location on an overall site map, illustrating a plan view map of the feature/deposit, profiling the deposit in three dimensions, photographing the finds (with the exception of human burials), artifact and soil sample collection, and triangulation of the finds. Construction work will only continue in the significant location when all documentation has been completed.

3. Stratigraphy in association with subsurface cultural deposits will be noted and photographed, particularly from deposits containing significant cultural materials. If deemed significant by SHPD and SCS, these deposits will be sampled.

4. In the event that human remains are encountered, all work in the immediate area of the find will cease; the area will be secured from further activity until compliance with §6E-43.6, HRS, and §13-300-40, HAR, has occurred. The SHPD-Oahu archaeologist and SHPD-Burial Sites Program (located in Kapolei, O‘ahu) will both be immediately notified about the inadvertent discovery of human remains on the property. Notification of the inadvertent discovery will also be made to the Kaua`i/Ni`ihau Islands Burial Council by either SHPD or by SCS (Dr. Michael Dega). Procedures to determine the minimum number of individuals, age of the site, and ethnicity of the individual(s) will conform to the relevant procedures established in §13-300, HAR, as directed by the SHPD. Profiles, plan view maps, and illustrative documentation of skeletal parts will be recorded to document the burial(s). The burial location will be identified and marked. If a burial is disturbed, materials excavated from the vicinity of the

burial(s) will be manually screened through 1/8-inch wire mesh screens in order to recover any displaced skeletal material. Only SHPD has the authority to approve the removal of human remains, which is typically conducted in consultation with the appropriate burial council members.

5. To ensure that contractors and the construction crew are aware of this AMP and possible site types to be encountered in the project area, a brief coordination meeting will be held between the construction personnel and monitoring archaeologist prior to initiation of the project. The construction crew will also be informed as to the possibility that human burials could be encountered and how they should proceed if they observe such remains.

6. SCS will provide all coordination with the contractor, SHPD, and any other group involved in the project. SCS will coordinate all monitoring and sampling activities with the safety officers for the contractors to ensure that proper safety regulations and protective measures meet compliance. Close coordination will also be maintained with construction representatives in order to adequately inform personnel of the possibility that open archaeological units or trenches may occur in the project area.

7. As necessary, verbal reports will be made to SHPD, and any other agencies as requested.

LABORATORY ANALYSIS

All samples collected during the project, except human remains, will undergo analysis at the SCS laboratory in Honolulu, in accordance with SHPD rules (§13-279, HAR). In the event that human remains are identified and the SHPD and Kaua`i/Ni`ihau Islands Burial Council authorize their removal, they will be curated at an acceptable location on O`ahu. All photographs, illustrations, and field notes accumulated during the project will be curated at the Honolulu laboratory (SCS). All retrieved artifacts and midden samples will be cleaned, sorted, and analyzed at SCS. Significant artifacts will be photographed, sketched, and classified (qualitative analysis). All metric measurements and weights will be recorded (quantitative analysis). These data will be presented in tabular form within the final monitoring report. Midden samples will be minimally identified to major ‘class’ (e.g., bivalve, gastropod mollusk, echinoderm, fish, bird, and mammal). All data will be clearly recorded on standard laboratory forms which also include number and weight (as appropriate) of each constituent category. These counts will also be included in the final report.

Should any samples amenable to dating be collected from a significant cultural deposit, they will be prepared in the SCS laboratory and submitted for taxa identification (Gail Murakami, International Archaeological Research Institute, Inc., Honolulu). If short-lived native and/or Polynesian-introduced taxa are identified, they shall be selected for radiocarbon dating, if necessary. While primary emphasis for dating is placed on charcoal samples, we do not preclude the use of other materials such as marine shell or nonhuman bone materials. SCS will consult with SHPD and with the client if radiocarbon dates are deemed necessary.

All stratigraphic profiles will be drafted for presentation in the final report. Representative plan view sketches showing the location and morphology of identified sites/features/deposits will be compiled and illustrated.

CURATION

SCS will curate all recovered materials in Honolulu (except human remains, which would remain on-island) until the work is completed, reviewed, and accepted by the state. All materials gathered during this project (including documentation) are ultimately the property of the client, who may request their transfer subsequent to the acceptance of the final Archaeological Monitoring Report (see below).

REPORTING

An Archaeological Monitoring Report documenting all aspects of the work will be submitted within 180 days of the completion of fieldwork, in accordance with SHPD administrative rules (§13-279-5). This time line is requested to account for any radiocarbon age determinations (typically 45 days), if necessary.

If cultural features or deposits are identified during fieldwork, the sites will be evaluated for historic significance according to criteria established in §13-275-6(b), HAR. The Archaeological Monitoring Report will be drafted until accepted by SHPD and final revised reports will be submitted to SHPD and to the client.

REFERENCES

Bennett, W.C.
1931 *Archaeology of Kaua`i*. B.P. Bishop Museum Bulletin No. 80. Honolulu

Corbin, Alan B. and P. H. Rosendahl
2002 *Archaeological Inventory Survey Ocean Bay Plantation at Hanama`ulu Land of Hanama`ulu, Lihu`e District Island of Kaua`i (TMK: 4-3-7-3:1; 4-3-9-5:5)* Paul H. Rosendahl, Ph.D., Hilo

Creed, V.S., H.H. Hammatt, G.K. Ida, and J. Winieski
1995 A *Summary of Archaeological Monitoring for the Kapa`a Sewerline Project, Waipouli and Kapa`a Ahupua`a, Puna District, Kaua`i (TMK:4-3-09 and 4-5-03 to 11)*. Cultural Surveys Hawaii, Kailua, Hawai`i.

Dega, M.F., and A. Buffum
2001 *Archaeological Monitoring and Sampling at Site 50-30-03-987 Papa`a Bay Ranch, Papa`a Ahupua`a, Kawaihau District, Kaua`i Island, Hawai`i (TMK 4-09-06:5).* Scientific Consultant Services, Inc., Honolulu.

Dega, M. F., and Morawski L.
2002 *Archaeological Monitoring During Construction of the Lydgate Park Bike and Pedestrian Path, Kaua`i Island*, Hawai`i, Scientific Consultant Services, Honolulu

Dega, Michael F., and Powell, James
2003 *Archaeological Monitoring During Phase I of The Kaua`i Rural Fiber Optics Duct Lines Project, Kaua`i Island, Hawai`i*, Scientific Consultant Services, Honolulu

Fager, M.W., and R.L. Spear
2000 *Monitoring During Wailua Golf Course Irrigation System Renovation, County of Kaua`i, Department of Public Works, Division of Parks and Recreation, Wailua Ahupua`a, Puna District, Kaua`i (TMK:3-9-05:por 1)*. Scientific Consultant Services, Inc., Honolulu.

Fletcher, C.H. III, and A.T. Jones
1996 Sea-Level Highstand Recorded in Holocene Shoreline Deposits on Oahu, Hawaii. *Journal of Sedimentary Research, Vol. 66(3):632-641*.

Foote, D.E., E. Hill, S. Nakamura, and F. Stephens
1972 *Soil Survey of the Islands of Oahu, Maui, Molokai, and Lanai, State of Hawaii.* U.S. Department of Agriculture Soil Conservation Service, Washington. D.C.

Kirch, Patrick V.
1985 *Feathered Gods and Fishhooks: An Introduction to Hawaiian Archaeology and Prehistory.* University of Hawai`i Press, Honolulu

Morawski, L. and M. Dega
2004 *Archaeological Monitoring Report During Construction of the Lydgate Park Bike and Pedestrian Path, County of Kaua`i, Wailua Ahupua`a, Lihue District, Kaua`i Island [TMK:3-09-06-01 and :3-09-02-34].* Scientific Consultant Services, Inc., Honolulu.

Pukui, M.
1983 *`Olelo no`eau: Hawaiian proverbs and poetical sayings*. Bishop Museum Press, Honolulu.

Thrum, T.G.
1906 Heiaus and Heiau Sites Throughout the Hawaiian Islands, Kauai. In *Hawaiian Almanac and Annual* 1907, pp. 36-48, Honolulu.

Yent, M.
1989 *Archaeological Investigations Mapping and Testing of Hikinaakala Heiau and Hauola. Lydgate Area. Wailua River State Park. Wailua, Kauai. Report prepared for the DLNR, Division of State Parks*. On File, SHPD Kapolei.

D-3 PRELIMINARY GEOTECHNICAL REPORTS

This page left intentionally blank

October 6, 2005
W.O. 5411-00

Mr. Merle D. Grimes
MDG, Inc.
1042 Broken Arrow Circle
Elizabeth, CO 80107

HANAMA'ULU RIVER BRIDGE
AHUKINI-LYDGATE BIKE/PEDESTRIAN PATH
FEDERAL-AID PROJECT NO. STP-0700(51)
LIHUE, KAUAI, HAWAII

Dear **Mr. Grimes:**

This letter describes the findings from our literature research performed and presents our preliminary geotechnical considerations for the Hanama'ulu River Bridge for the proposed Ahukini-Lydgate Bike/Pedestrian Path project on the Island of Kauai, Hawaii.

We understand that the bike and pedestrian path will be about 10 to 12 feet wide and will consist of a 6-inch thick concrete path. One of the path alignment alternatives travels primarily along the existing shoreline from Ahukini Landing to Lydgate Park. The other path alignment alternative travels further inland along Kapule/Kuhio Highway. One of the path alignment alternatives will traverse one existing major structure, the Hanama'ulu River Bridge. Since the Hanama'ulu River Bridge may be historic, construction of a replacement bridge structure may not be possible. Therefore, the Hanama'ulu River Bridge structure will probably require modifications.

The existing Hanama'ulu River Bridge is a 2-span concrete arch bridge with 53 and 79-foot long spans. The bridge was built in the 1920's with a bridge deck about 10 feet wide. The bridge piers and abutments are supported on a pile foundation except for the Kapaa-side abutment that is supported on spread footings bearing on rock. The type of pile and other details of the pile foundation were not shown on the available drawings. In addition, subsurface soil information was not provided on the drawings.

Based on geologic maps, the Hanama'ulu River area is underlain by recent alluvial deposits. The recent alluvial deposits are characterized as unconsolidated, non-calcareous soils. These recent alluvial deposits tend to be soft in consistency and compressible. We anticipate that the existing bridge structure is mainly underlain by recent alluvial deposits.

We understand that the existing bridge will be renovated with a new bridge deck on the existing bridge. The bridge deck will consist of precast concrete planks with stainless steel cable railings and concrete railing posts. In addition, new concrete end post structures will be constructed.

The load capacity of the existing bridge foundation will need to be determined for the additional loads of the new bridge deck structure. We understand that bridge scour need not be considered in the bridge design.

We appreciate the opportunity to be of continued service to you on this project. If you have questions or need additional information, please contact our office.

Respectfully submitted,

GEOLABS, INC.

By _____
Gerald Y. Seki, P.E.
Senior Geotechnical Engineer

GS:cj

(h:\5400 Series\5411-00.gs1)

October 5, 2005
W.O. 5411-00

Mr. Merle D. Grimes
MDG, Inc.
1042 Broken Arrow Circle
Elizabeth, CO 80107

PRELIMINARY GEOTECHNICAL ENGINEERING STUDY
AHUKINI-LYDGATE BIKE/PEDESTRIAN PATH
FEDERAL-AID PROJECT NO. STP-0700(51)
LIHUE, KAUAI, HAWAII

Dear **Mr. Grimes:**

This report describes the findings from our literature research performed and presents our preliminary geotechnical considerations for the proposed Ahukini-Lydgate Bike/Pedestrian Path project between Ahukini Landing and Lydgate Park on the Island of Kauai, Hawaii. This report is intended to provide preliminary geotechnical considerations for planning and for the development of the Environmental Assessment only. Our work was performed in general accordance with the scope of services outlined in our revised fee proposal of June 9, 2005. The general location and vicinity of the project site are shown on the Project Location Map, Plate 1.

SUMMARY OF FINDINGS

Based on our literature research performed for the proposed Ahukini-Lydgate Bike/Pedestrian Path project, we anticipate that the proposed path alignments will traverse beach and dune sand deposits, alluvial soils and volcanic rock. The beach and dune sand deposits generally consist of poorly-graded sands. Portions of the project site are underlain by recent alluvial deposits that are typically soft and compressible. One of the path alignments travels close to an estimated wetland area. In addition, portions of the proposed alignments are underlain by basalt formations. We anticipate that the areas with basalt formations are covered by stiff residual and saprolitic soils, to basalt rock formation.

Several geotechnical considerations that may have a significant impact on project cost and construction time were identified during our literature research. In addition, the geotechnical considerations may have adverse impacts to the project during construction. These geotechnical considerations include settlement due to soft soil deposits, slope raveling, potential rockfall hazards, seepage of groundwater, and flooding associated with high rainfall storms. Special attention should be given to soft ground stabilization, cut slope design, subgrade stabilization, drainage design, and erosion control measures during the design and construction of the bike/pedestrian path project.

We anticipate that the proposed path alignments will traverse soft, loose, and/or unstable ground, such as gullies and stream crossings underlain by recent alluvial soils. Methods to reduce the anticipated path settlements and increase the path stability include removal of the soft and/or loose soil deposits and replacement with compacted fill materials, installation of a working platform or drainage blanket prior to fill placement, and utilizing soil stabilization methods, such as vibro-replacement or jet-grouting to improve the soft and/or loose soil deposits for construction.

In addition, a settlement waiting period likely will be required for embankment construction over the soft ground areas to reduce the potential for shear failure in the soft material and to reduce post construction settlements of the embankment. In addition, a surcharge program with settlement monitoring may be required to reduce the settlement waiting period.

It is proposed to place the new path on the existing Hanama'ulu River Bridge structure. The load capacity of the existing bridge foundation will need to be determined for the additional loads of the new bridge deck structure. New bridge structures will be required for the drainageway crossing near the Radisson Hotel and for the roadway crossing near the Kamalani Bridge. Since poor subsoil conditions may be encountered at the crossing sites, a deep foundation system such as drilled shafts or driven piles may be required to support the new bridge structures. In areas subjected to scour, the new bridge structure should be designed for scour. We understand that the use of viaduct bridge structures is being considered for crossing the soft ground areas. Because of the soft subsoil conditions, we anticipate that a deep foundation system will likely be required to support the viaduct bridge structures.

It should be noted that the findings and preliminary recommendations provided in this report are intended for planning and development of the Environmental Assessment only. The text of this report should be referred to for detailed discussion of our findings and preliminary recommendations.

PROJECT CONSIDERATIONS

The proposed Bike/Pedestrian Path project is located between Ahukini Landing and the existing Lydgate Park on the Island of Kauai, Hawaii. The project involves completion of the planning phase, including obtaining approval of the environmental assessment. The study corridor is located between Ahukini Landing and a point near the existing Lydgate Park, and from the shoreline to the Kapule/Kuhio Highway.

Alternative path alignments were developed during the initial phase of the planning study for the project. These path alignments were reduced to two main alternative path alignments for engineering evaluation to quantify potential costs for grading and major structures. Geotechnical input will be required to identify potential hazards, such as soft ground conditions, rockfall, and other conditions that may have a large impact on project costs and construction time.

We understand that the bike and pedestrian path will be about 10 to 12 feet wide and will consist of a 6-inch thick concrete path. One of the path alignment alternatives travels primarily along the existing shoreline from Ahukini Landing to Lydgate Park. The other path alignment alternative travels further inland along Kapule/Kuhio Highway.

One of the path alignment alternatives will traverse one existing major structure, the Hanama'ulu River Bridge. Since the Hanama'ulu River Bridge is historic, construction of a replacement bridge structure may not be possible. Therefore, the Hanama'ulu River Bridge structure will probably require modifications. In addition, two new bridge structures and a tunnel structure are proposed along the alignments.

Based on the relatively flat site topography along most of the path alignments, we anticipate that the majority of the cuts and fills will be on the order of less than 10 feet. However, major cuts and fills on the order of up to about 20 to 30 feet are anticipated for the construction of the proposed path alignment located between Hanama'ulu Bridge and Ahukini Landing.

PATH ALIGNMENT ALTERNATIVES

We understand that two main path alignment alternatives were developed for the project. These selected path alignment alternatives were studied for this report and are described below. The different paths and segments for the path alignment alternatives are shown on the Site Plans, Plates 2.1 through 2.6.

Alternative No. 1

Path Alternative No. 1 generally runs along the existing shoreline. The path starts from Ahukini Landing, circles around Hanama'ulu Bay, and travels near the shoreline to Lydgate Park. At the back of Hanama'ulu Bay, the path alignment is located away from the shoreline and within a low-lying area. In addition, the path crosses over the existing historic Hanama'ulu Bridge in this area.

An alternative segment that connects the shoreline path up to Kapule/Kuhio Highway is proposed near the Wailua Golf Course driving range. This alternative segment includes a tunnel section that crosses an existing pathway. In addition, new bridge structures are proposed near the Radisson Hotel and the Kamalani Play Bridge at Lydgate Park.

Alternative No. 2

Path Alternative No. 2 connects with Path Alternative No. 1 near the northern portion of Hanama'ulu Bay. This alternative path alignment follows existing cane haul roads and runs along the eastern side of Kapule/Kuhio Highway to Lydgate Park. This path alternative also includes alternative path segments that travels from Kapule/Kuhio Highway down to the shoreline near the Radisson Hotel.

GEOLOGIC CONDITIONS

The Island of Kauai is composed of a single basalt shield volcano built by the extrusion of lava of the Waimea Canyon Volcanic Series during the late Pliocene Epoch (more than 2¼ million years before present). Following the cessation of this main shield building phase, there was renewed volcanic activity with the extrusion of basaltic lava of the post-erosional Koloa Volcanic Series and the concurrent deposition of the alluvial sediments of the Palikea Formation.

The majority of the Island of Kauai is covered by lava of the Waimea Canyon Volcanic Series. These lavas consist of four distinct formations: Napali, Olokele, Haupu, and Makaweli. These formations are comprised of thin-bedded a'a and pahoehoe flows to massive basalt flows that ponded in calderas and graben.

Rocks of the Koloa Volcanic Series cover most of the eastern half of the Island of Kauai. These rocks are generally characterized as thick flows of dense basalt extruded from groups of vents aligned in north-south trends in various locales. Associated with the vents are pyroclastic materials, which usually form low cinder cones at the vent.

During the Pleistocene Epoch (Ice Age), there were many sea level changes as a result of widespread glaciation in the continental areas of the world. As the great continental glaciers accumulated, the level of the ocean fell since there was less water available to fill the oceanic basins. Conversely, as the glaciers receded, or melted, global sea levels rose because more water was available. The land mass of Kauai remained essentially stable during these changes, and the fluctuations were eustatic in nature. These glacio-eustatic fluctuations resulted in stands of the sea that were both higher and lower relative to the present sea level of Kauai.

The basaltic rock built by the extrusion of lavas of the Koloa Volcanic Series are generally characterized by flows of jointed dense vesicular basalt inter-bedded with thin clinker layers. The weathering process has formed a mantle of residual soils which grade to saprolite with depth. In general, saprolite is composed of mainly silty material and is typical of the tropical weathering of volcanic rocks. The saprolite grades to basaltic rock formation with depth.

Erosion of the upper Koloa and Waimea Canyon Volcanic Series has deposited alluvial sediments along streams, drainageways, and low-lying areas. These sediments are generally unconsolidated to moderately consolidated, non-calcareous soil deposits. Agricultural and commercial developments within the last century have brought the project site to its present conditions.

The geology for the proposed path alignments were developed based on geologic references. The site geology for the two path alternatives is described in the following subsections.

Alternative No. 1

The proposed path alignment for Alternative No. 1 is mainly underlain by beach and dune sand deposits. The beach and dune sand deposits are characterized as unconsolidated calcareous deposits. These deposits are poorly graded and uniform in particle size. Recent alluvial deposits may be encountered further inland from the shoreline near the Kawailoa area and within the Hanama'ulu Stream area. The recent alluvial deposits are characterized as unconsolidated, non-calcareous soils. These recent alluvial deposits tend to be soft in consistency and compressible. In addition, basalt rock formation of the Koloa Volcanic Series may be encountered along the southern portion of the path alignment at the sides of Hanama'ulu Bay.

Alternative No. 2

This alternative alignment is mainly underlain by alluvial deposits consisting of recent and older alluvium. Characteristics of the recent alluvium are described above. The older alluvial deposits are more consolidated and stiffer in consistency compared to the recent alluvial deposits. The southern portion of path alignment is underlain by basalt rock formation of the Koloa Volcanic Series. We anticipate the presence of residual and saprolitic soils near the ground surface. These soils are developed from the in-situ weathering of the basalt formation. In addition, the northern portion of the path alignment near Lydgate Park is underlain by a dune sand deposit.

SURFACE TERRAIN

The terrain along the bike/pedestrian path project limits varies significantly from level, low-lying areas to sloping hillside areas. A brief description of the topography along the proposed alignments is presented below. These descriptions are based on United States Geological Survey (USGS) topographic maps.

Alternative No. 1

The initial roadway alignment from Ahukini Landing travels around Hanama'ulu Bay with the ground surface varying from low-lying near the mouth of the bay to sloping hillsides along the sides of the bay with ground surface elevations up to about +80 feet Mean Sea Level (MSL). The remaining portion of the alignment travels along the shoreline with ground surface elevations from about +5 to +20 feet MSL.

Alternative No. 2

Since this alternative path alignment is further inland, the ground elevations along Alternative No. 2 are generally higher compared to Alternative No. 1. The existing ground surface near Hanama'ulu Bay is about Elevation +80 feet MSL and generally slopes downwards as the alignment travels along Kapule/Kuhio Highway to Lydgate Park to about Elevation +5 to +20 feet MSL.

EXISTING/NEW BRIDGE STRUCTURES AND TUNNEL

The proposed path alignments will traverse existing and new bridge structures and a new tunnel structure. Description of the bridge and tunnel structures is provided in the subsequent subsections.

Existing Hanama'ulu River Bridge

The Hanama'ulu River Bridge is a 2-span concrete arch bridge with 53 and 79-foot long spans. The bridge was built in the 1920's with a bridge deck about 10 feet wide. The bridge piers and abutments are supported on a pile foundation except for the Kapaa-side abutment that is supported on spread footings bearing on rock. The type of pile and other details of the pile foundation were not shown on the available drawings. In addition, subsurface soil information was not provided on the drawings. We anticipate that the existing bridge structure is underlain by recent alluvial deposits.

We understand that the existing bridge will be renovated with a new bridge deck on the existing bridge. The bridge deck will consist of precast concrete planks with stainless steel cable railings and concrete railing posts. In addition, new concrete end post structures will be constructed.

The load capacity of the existing bridge foundation will need to be determined for the additional loads of the new bridge deck structure. We understand that bridge scour need not be considered in the bridge design.

New Bridge Near Radisson Hotel

A new one-span bridge structure is proposed to cross an existing drainageway near the Radisson Hotel. The new bridge will be supported at it ends by concrete abutment structures and will be about 90 feet in length. The use of prestressed planks or girders is being considered with stainless steel cable railings. Based on the geologic maps, the new bridge site is generally underlain by recent alluvial and beach sand deposits.

New Tunnel Structure Near Driving Range

A new path tunnel structure is proposed near the Wailua Golf Course Facility. The 160-foot long tunnel will be composed of concrete construction and will be about 12 feet wide by 10 feet high. The tunnel structure is situated on a path connecting the Alternative No. 1 Coastal Path with the Alternative No. 2 Highway Path. Based on the geologic maps, the tunnel site is generally underlain by dune sand deposits.

New Bridge Structure Near Kamalani Bridge

A new three-span bridge structure is proposed near the existing Kamalani Bridge within the Lydgate Park area. The new bridge will be about 140 feet in length with span lengths of 35 and 70 feet. The proposed bridge will consist of wooden deck and railings, concrete pier columns, and concrete abutment structures. The wooden deck will be supported by stainless steel cables. We anticipate that the new bridge site is underlain by a dune sand deposit.

WETLAND AREA

We estimate that the proposed Alternative No. 2 path alignment will travel close to an estimated wetland area. In general, these areas are characterized by swamp or marsh-like environment with possible presence of standing water. Wetland sites may contain various forms of unique wildlife, which may require preservation. The approximate location of the estimated wetland site is shown on Plates 2.4 and 2.5.

From a geotechnical engineering point-of-view, swamps and marshlands often imply the presence of soft soils. It should be noted that areas not designated as a "Wetland Site" may also contain deposits of soft soils. These areas are further discussed in the Geotechnical Considerations section.

GEOTECHNICAL CONSIDERATIONS

Based on our desk-top study of the project site, several types of geotechnical considerations may have the potential for adverse impacts on the stability of the planned structures as well as the future maintenance of the proposed path. The geotechnical considerations may include, but are not limited to, the following:

- Settlement Due to Soft Soils
- Slope Raveling or Failure
- Rockfall Hazard
- Seepage of Groundwater
- Flooding by Rainfall

Settlement Due to Soft Soils

Areas underlain by recent alluvium are susceptible to consolidation and settlement over time as man-made fills are placed over these soft ground areas. Based on our literature research, soft soils are likely to be encountered at stream crossings, drainageways, wetland areas and other localized areas. A thorough field exploration should be performed at these locations where soft soil deposits are suspected in order to determine the lateral extent, thickness, and consolidation characteristics under the proposed fill loading conditions. The soft soil areas should be further evaluated to provide recommendations for design and construction of embankments and/or bridge viaduct structures over these areas. The estimated soft ground areas are shown on the Plates 2.1 through 2.6.

Slope Raveling or Failure

Based on the aerial photographs and available topographic maps of the project site, we anticipate that earthwork for the proposed bike and pedestrian path project will involve cuts at various locations throughout the site. We anticipate that substantial cuts of up to about 20 feet in the saprolite and/or weathered rock may be required. Therefore, some slope raveling and localized slope failures may occur on very steep cut slopes. Most of these slope raveling and failures tend to occur in steeply cut slopes with slope inclinations of about 1H:1V or steeper. Because of these existing conditions, cut slope inclinations for the larger cut slopes will need to be evaluated on a case-by-case basis when the vertical profile of the alignment is established.

Rockfall Hazard

It should be noted that areas adjacent to relatively steep hillsides are susceptible to rockfall. Rockfall involves the detachment and fall of rock material from the slope face that can present dangerous conditions for bike and pedestrian traffic. Because of these potential issues, cut slope inclinations for the larger cut slopes will need to be evaluated on a case-by-case basis when the vertical profile of the alignment is established.

Seepage of Groundwater

We anticipate that the soils encountered during path construction may have relatively high water contents due to the high rainfall and high groundwater levels. In addition, perched groundwater tables may exist in some areas. Because of the high moisture anticipated in the weathered materials, earthwork cuts may expose permeable layers responsible for transmitting seepage of subsurface groundwater, which in turn may cause potentially unstable cut faces.

Flooding by Rainfall

Based on a review of available topographic maps of the site, the Island of Kauai contains numerous rivers, streams, and drainage paths as a result of the high volume of tropical rainfall. Extended periods of heavy rainfall may swell drainage pathways to their capacity and flood low-lying areas. We wish to emphasize that adequate modeling of scour potential and storm water runoff should be performed for the design of new bridge structures.

CLOSURE

We appreciate the opportunity to provide geotechnical services to you on this project. If you have questions or need additional information, please contact our office.

Respectfully submitted,

GEOLABS, INC.

By _____
Gerald Y. Seki, P.E.
Senior Geotechnical Engineer

By _____
Clayton S. Mimura, P.E.
President

CLAYTON S. MIMURA
LICENSED PROFESSIONAL ENGINEER
No. 4176-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

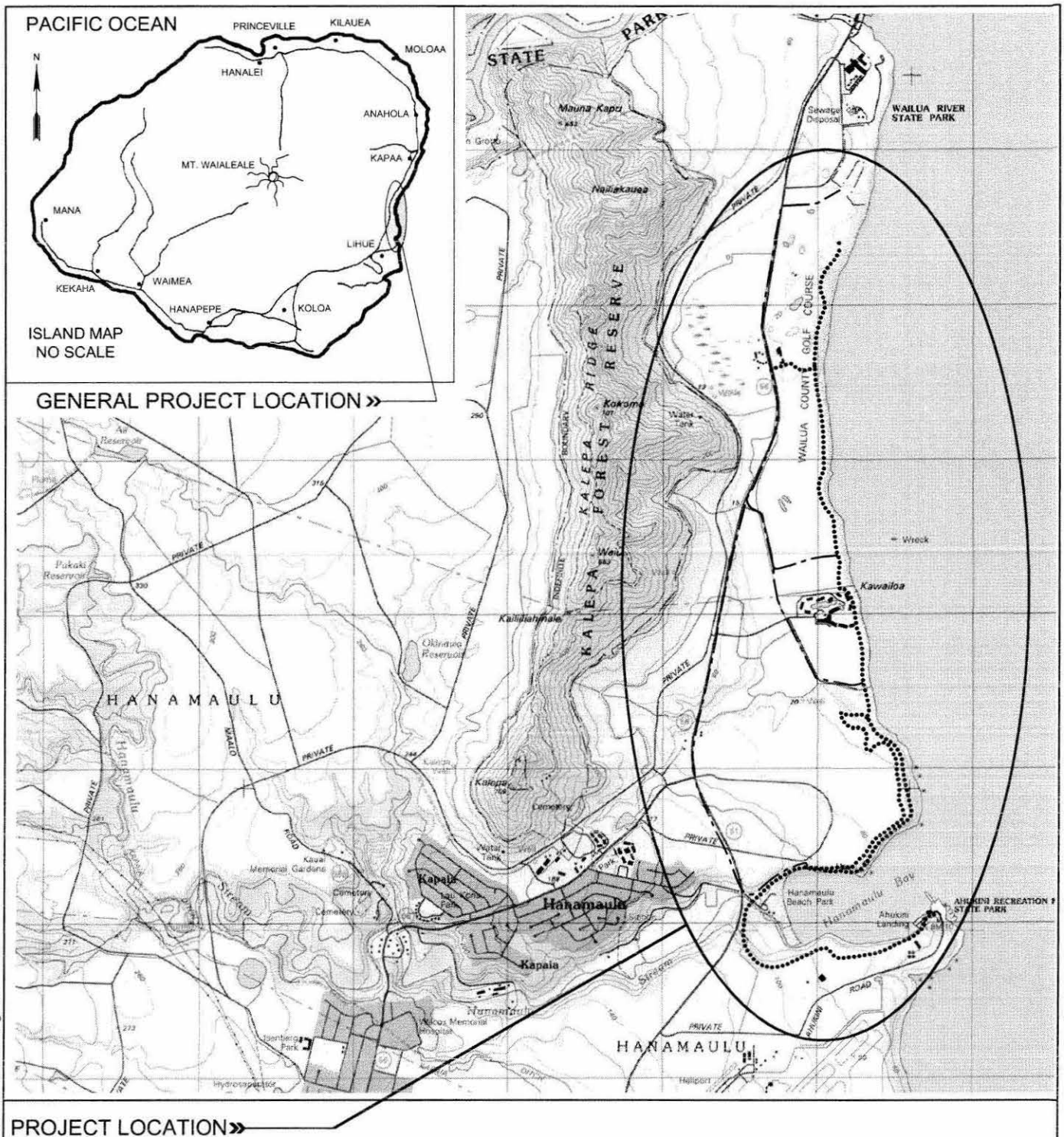
_____ 4-30-06
SIGNATURE EXPIRATION DATE OF THE LICENSE

CSM:GS:as

Attachments: Project Location Map, Plate 1
Site Plans, Plates 2.1 thru 2.6

(4 Copies to Addressee)

(h:\5400Series\5411-00.gs1)



LEGEND:

····· ALTERNATE NO. 1

—·— ALTERNATE NO. 2

3000 1500 0 3000 FT.

GRAPHIC SCALE

N

REFERENCE: MAP CREATED WITH TOPO!® ©2001 NATIONAL GEOGRAPHIC (WWW.NATIONALGEOGRAPHIC.COM/TOPO).

PROJECT LOCATION MAP

AHUKINI-LYDGATE BIKE/PEDESTRIAN PATH
FEDERAL AID PROJECT NO. STP-0700(51)
LIHUE, KAUAI, HAWAII

GEOLABS, INC.

Geotechnical Engineering

DATE	DRAWN BY	PLATE
SEPTEMBER 2005	HYC	1
SCALE	W.O.	
1" = 3,000'	5411-00	

User: KIM File Created: September 30, 2005 File Last Updated: October 04, 2005 11:51:22am
File: T:\Drafting-9904\Working\5411-00Ahukini-LydgateBikePath\5411-00PLM.dwg\PLM

D-4 GEOLOGICAL STATUS OF THE SHORELINE REPORT

Charles H. Fletcher, Ph.D.
University of Hawaii
School of Ocean and Earth Science and Technology
Department of Geology and Geophysics
1680 East West Road
Honolulu, HI 96822
ph. 808-956-2582
fx. 808-956 5512
fletcher@soest.hawaii.edu

Charles Fletcher, Ph.D.

October 2, 2009

Merle D. Grimes, LLC
1042 Broken Arrow Circle
Elizabeth, Colorado 80107
303-571-5787 wk
303-571-5788 fx

Dear Mr. Grimes:

Following is my report on the geologic status of the shoreline at Wailua.

Physical Setting

The shoreline at Wailua on Kauai's east coast experiences persistent trade winds that blow 50 to 80% of the winter months, and 85 to 95% of the summer months[1]. These winds are incident to the shore at Wailua from a northeasterly angle such that they create a southward littoral current capable of transporting suspended sand and other materials in the water column. These winds may accelerate under the influence of the east Kauai vortex that develops due to diurnal heating of the upland. As a result, 25 to 35 knot winds are not uncommon and a moderate alongshore coastal current develops from the north to the south during gusting periods.

The trades cause the formation of a strong and persistent sea state in the waters offshore. Most of the long-period swell energy is dissipated at the seaward crest of the fringing reef, and the shoreline is characterized by 1 to 3 foot wind-waves with short periods (5-10 sec.), but openings and channels in the reef do allow shoreline access to higher energy waves. The primary energy controlling marine sediment transport at Wailua comes from tidal flow, long period surge, local wind-waves and their resulting currents across the reef-flat surface moving predominantly from north to south as well as directed offshore through channels and into depressions in the reef. The result is a shoreline that is not straight. Rather it has evolved pronounced curvatures and protuberances due to sediment accumulation and removal in response to both alongshore sediment transport and channel incision.

The reef-flat at Wailua is dominated by carbonate sediments produced as skeletal debris from various benthic organisms on the adjacent reef (carbonate algae, micromolluscs, coral fragments, and fossil carbonate lithic (rock) fragments). Closer to shore and along the littoral zone and beach, sediments tend to be clean carbonate sands produced by the reefal organisms.

The immediate upland on the northern and central sections is a sandy coastal plain with an origin related to a recent, past higher sea level (ca. 2000 yr ago), dune formation, and alongshore sediment accumulation. The upland along the southern section is basaltic, of volcanic origin.

[1] Sanderson, M. 1993. Prevailing Trade Winds, University of Hawaii Press, 126 p.

Controls on Shoreline Position

Shorelines maintain equilibrium (their position) under the influence of three environmental controls: sediment supply, waves and currents, and sea-level movements. These three factors compete for control over shoreline position. Sea level has been rising at approximately 1.5 to 2.4 mm/yr for most of the last century or more, and may, more recently, have experienced an acceleration in rate. Waves and currents have likely experienced little change in the last few centuries, although structures intersecting the littoral zone (such as the swimming pond) will influence their local impact. Sediment supply may vary widely due to human influences, seasonal changes in sediment production and delivery, and long-term shifts in sediment availability. A shoreline with sufficient sediment supply can maintain its position even while sea level and wave energy increase.

The shoreline at Wailua can be analyzed for changes in physical position over the last 75 years using a time series of historical aerial photographs and maps.

Methodology

The following map displays results of our historical shoreline analysis. Historical beach positions, color coded by year (see figure), were determined for the Wailua coastline using orthorectified and georeferenced aerial photographs and National Ocean Survey (NOS) topographic survey charts. We use the low water mark as the historical shoreline position (or shoreline change reference feature, SCRF). For locations in which there is coastal armoring or rocky shoreline seaward of any vegetation, the SCRF is delineated along the high water mark. Movement of the SCRF is used to calculate erosion/accretion rates at shore-normal transects spaced every 20 m (66 ft) along the shoreline. The 1987 SCRF is not used in the calculation of the annual erosion hazard rate, however it provides a gauge of seasonal uncertainty.

Erosion rates are determined at yellow shore normal transects (20 m). Annual erosion rates are displayed in a shore-parallel histogram graph located offshore of the coast on the diagram. Colored bars on the graph correspond to shore-normal transects; approximately every fifth transect and bar are numbered. Where necessary, some transects have been purposely deleted during data processing; as a result, transect numbering is not consecutive everywhere. Where complete beach loss has occurred, erosion rate calculations apply only to the time period when a beach existed.

Results

Our historical shoreline analysis reveals that the Wailua coast experiences intermittent historical variability in the form of some coastal segments that have long-term stability and others that display chronic erosion.

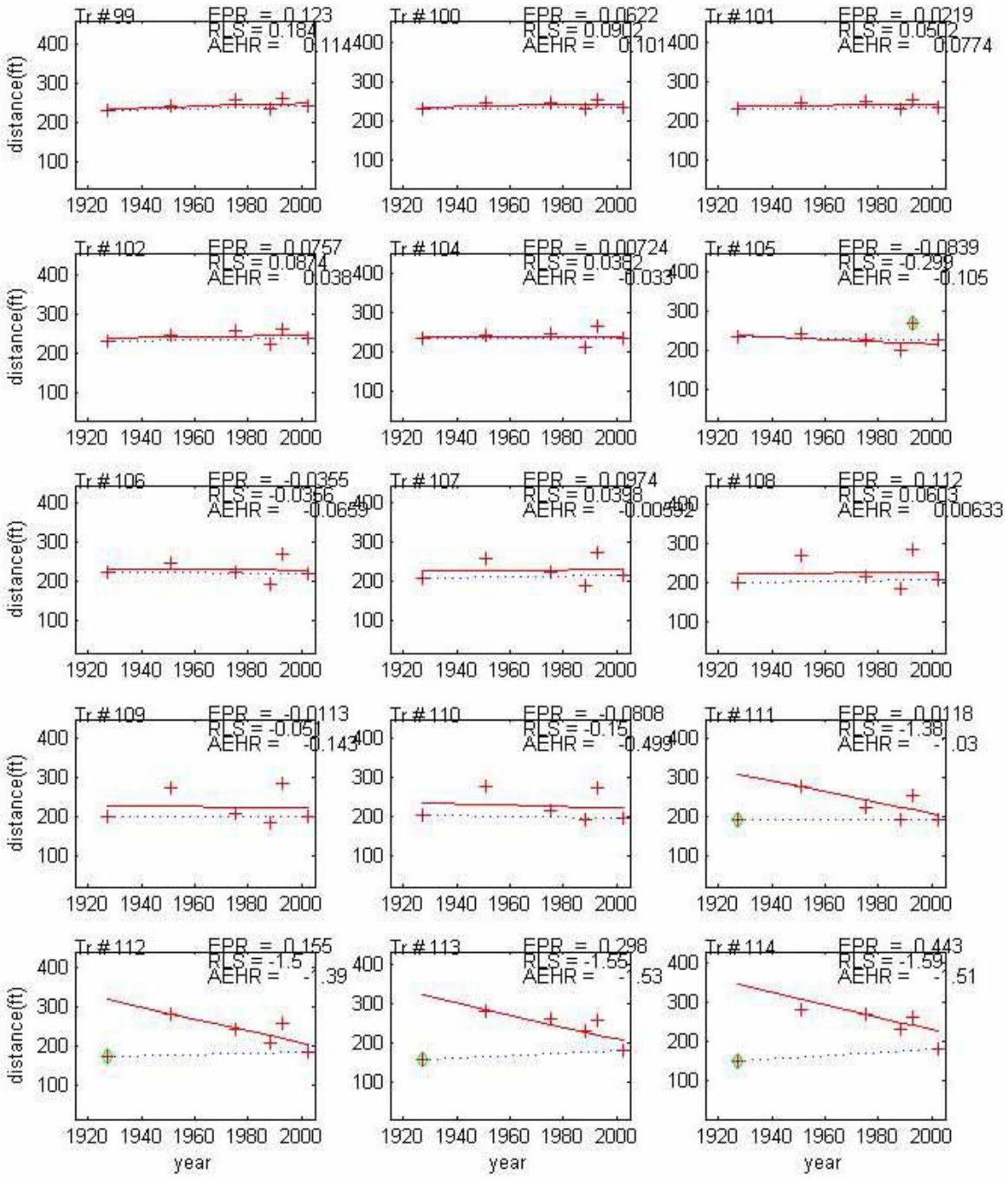
The northern portion of the coast at Lydgate Park suffers from chronic erosion at rates exceeding 2 ft/yr in places. This is due to the negative influence of the rock-wall swimming pond on sediment availability to the adjacent coast immediately to the south. The negative effects of the rock wall taper off at a distance of about 1500 feet to the south and the shoreline achieves greater long-term stability beyond this.

Along the Wailua Golf Course shoreline, the effects of erosion tend to be temporally sporadic and inconsistently spaced. Localized erosion characterizes places where reef channels and depressions intersect with the sandy beach to capture sands and divert them offshore. These are locations where

sands might otherwise reside along the beach. The practice range is one such location where erosion rates of 1 to 2 ft/yr characterize the last several decades.

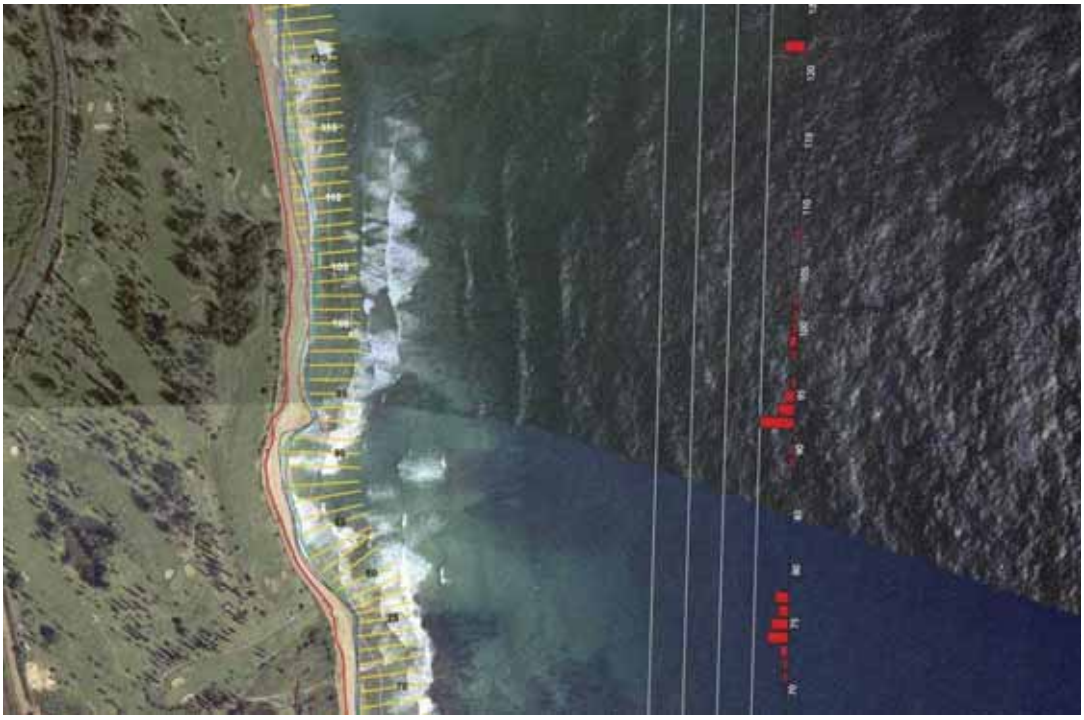

Kauai
HISTORICAL SHORELINES
EROSION RATES

The first and second fairways show a history of relative stability when averaged over time. However, direct inspection of the coastline, and interviews with observers, indicate that the coast undergoes periods of retreat during high wave and wind events. The presence of large stone blocks at the location where a natural dune would otherwise exist, confirm a history of attempts to armor the coast to prevent land loss. A closer look at the history of shoreline positions on this section of coast, between transects 125 and 75, reveals the intermittent history. Transects 99-114 (below) illustrate and exemplify this.



The plot of shoreline positions through time, as typically captured in transect (Tr) #108, shows that two episodes of erosion characterize the otherwise stable shoreline. The period 1927-1950 is characterized by a strong erosion trend that apparently recovered over the following decades. Another erosion trend from 1988-1992 also displays strong shoreline displacement that also recovered in the subsequent decade.

The 1927-1950 trend may be due to a storm event, sand-mining from the beach, or reef blasting all of which are known to have occurred periodically over the course of the early to middle 20th century. The fact that the low water mark (the seaward front of the beach) recovered to nearly its original position following each erosion period suggests that a storm event, causing temporary sand removal, was the culprit for displacing the shoreline rather than permanent sand removal associated with blasting or mining. The 1992 erosion trend is the result of high wave energy related to Hurricane Iniki.



Overall, it appears that the position of the low water mark, which we map as the shoreline reference feature, and which is located at the seaward edge of the beach at the base of the sloping foreshore, has essentially maintained its position over the past 75 years. That history has been characterized by erosion events that temporarily displace the toe landward, which subsequently recovers, but permanently cuts-back the edge of the fairway, which does not recover. This has led to placement of stone blocks in a fruitless effort to stop erosion that would cease on its own anyway upon the termination of the storm. Net stability of the beach toe, and chronic retreat of the dune edge, suggest that the beach width has increased over time and that the beach relies on dune sand released by erosion to maintain its position.

Nature of the Erosion Problem

Coastal erosion occurs when a sandy shoreline (with a beach) experiences a deficiency in sand volume preventing it from maintaining a stable position on the edge of the ocean. The sand

deficiency may be caused by human actions, a rise in sea level, or a major event such as a storm or tsunami.

In response to a sand deficiency, the land abutting the beach may erode. This releases sand from the abutting dunes to feed the beach – in the process the shoreline migrates landward some distance and may stabilize once again if the sand deficiency is restored. Although the beach will migrate landward, it may not experience any narrowing due to erosion if it receives the sand eroded from the dunes. That is, a wide beach can persist even as it migrates landward at the expense of the abutting land. Hence, there is a difference between coastal erosion (land loss) and beach erosion (beach loss). Because of this phenomenon, for the environmental health of the beach (and because the beach is often more valuable than the land) it may be appropriate to let the erosion continue as a means of restoring a sand deficiency.

If a sand deficiency is temporary (such as a seasonal event associated with seasonal wave changes) any erosion will be temporary and repair itself from one year to the next. If a deficiency persists from year to year this signifies an ongoing impact to sand volume. Likely causes may include ongoing sea-level rise, ongoing human impacts, or continuing recovery from a large one-time impact such as a storm or tsunami. In such a case the landward recession is chronic.

In cases where chronic erosion destroys private land and/or threatens built structures, abutting owners have a tendency to develop remedial measure to stop the erosion. The most common measure is to build a seawall. However, this impounds the dune sand that would otherwise nourish the beach, and on a chronically eroding shoreline, seawalls will cause the beach to disappear. This is an undesirable result as the original goal of most coastal land use is to enjoy the economic and environmental benefits of the beach. In Hawaii particularly, the beach is a public resource and it is inappropriate to allow private land use to impact conservation land.

Unfortunately, in Hawaii where chronic erosion is a widespread problem, past practice has been to build seawalls in response to erosion. As a result, the total length of beaches on the island of Oahu has decreased by 25% due to seawall building, over 400 seawalls exist on the Maui shoreline with fewer than half being properly permitted, and public access to the sea is significantly decreased throughout the state because beach loss limits shoreline use.

Ironically, the attempt to armor the Wailua fairway coastline has not prevented landloss, and because the armoring is haphazard and poorly engineered, neither has it significantly interfered with sand movement from the dune to the beach. However, the dune does have a sand deficiency, and were the dune to undergo sand augmentation it would likely experience enhanced stability, ecological restoration, and offer better protection to the recessing fairway.

Appropriate Development - Pathway

Although the most appropriate coastal development emphasizes mitigating coastal hazards such as storm surge, erosion, and tsunami inundation by avoiding the problem through broad setbacks of several hundred feet or more, too many times we are forced to develop in the coastal hazard zone because of logistical, economic, and even philosophical constraints.

The Pathway project is a typical example. Laudably promulgated on the philosophy of “public access forever”, the pathway would be ideally sited on a modular, low-impact surface with minimal solid area facing the sea at a distance of at least 100 feet and most appropriately 200 feet setback from the vegetation line. Unfortunately, at locations where upland improvements force the pathway to a

considerably more seaward position, or landward, away from the coast altogether, attempts must be made to accommodate the presence of unexpected traits in the new venue.

Pushed to the seaward edge of the fairway, perched on the edge of an episodically retreating upland surface, the design of the path should attempt to minimize hazard exposure, environmental impact, and negative influences on the function of the golf course. Hence, the following general guidelines are proposed.

The pathway should:

1. Restore the natural sand volume and geometry of the original coastal dune, as well as its critically important function as a coastal environment;
2. Present an absolute minimum surface area toward seaward forces;
3. Withstand strong instantaneous buoyant, shearing, and concussive forces associated with marine inundation and high winds;
4. Withstand temporary erosion events associated with storms;
5. Be amenable to future post-erosional sand placement to restore the dune system.

This results in essentially two structural options.

1. Build a lightweight pathway surface consisting of lockable modular sections floating on a sand foundation in connection with dune restoration. Dune construction should be located as far landward as possible, between the seaward-most line of stable vegetation on the beach and the fairway rough. It should emphasize a slope of 2:1 or greater (3:1) and a fill volume of approximately 8-10 yds^3/ft of frontage. Modular path sections should have a tethering system to prevent scattering during flooding. A small retaining wall to prevent sand spillage onto the pathway is acceptable. The dune should be strongly vegetated. A source of sand needs to be identified both for the initial restoration, as well as for replacement of sand eroded in future years.
2. Build a hanging pathway on narrow externally threaded auger piles of sufficient strength to allow broad spacing to avoid interference with wave processes. This version would likely survive marine forces intact and allow sand placement below and between the pathway superstructure. Piles would be augered several feet below grade and allow for marine flooding and erosion without subsequent damage to the path. Following the season of high wave action, sand restoration could ensue.

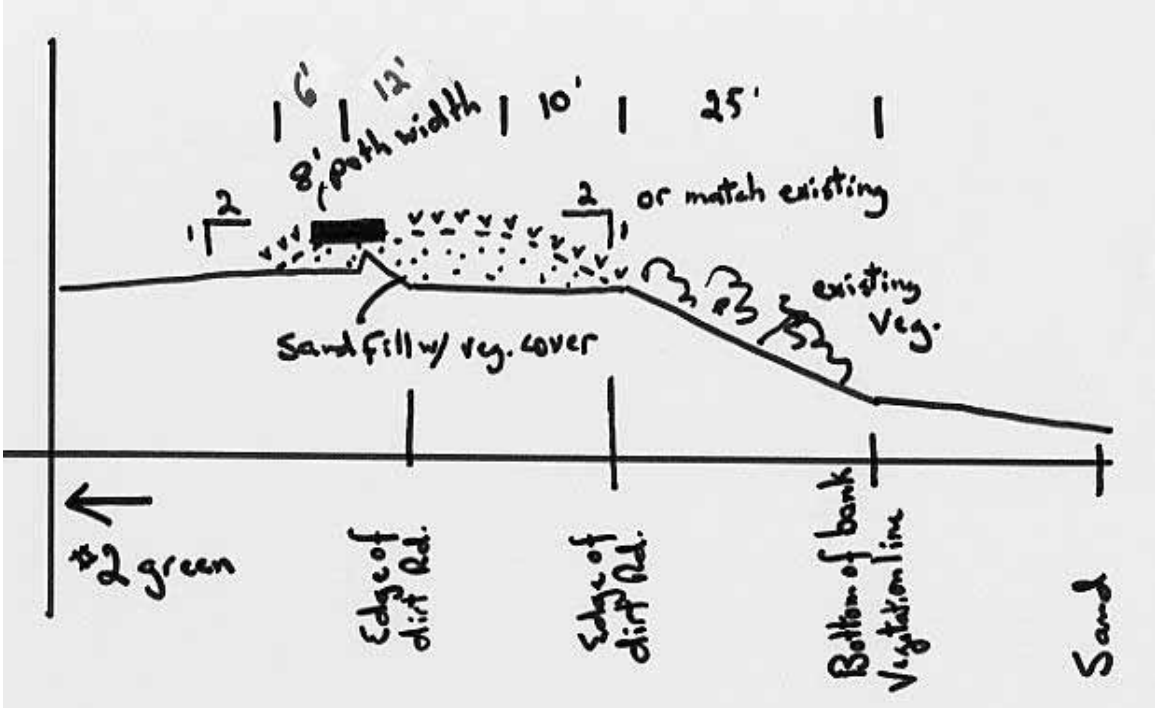
In both cases the existing topographic grade will simply be buried by the restored dune. This includes burying the stone blocks, dirt road, eroded escarpments, and other topographic features.

Both of these approaches emphasize the application of sand nourishment to the coastline. Although sand nourishment is not a permanent solution to coastal recession, it is the most consistent with natural environmental processes, it is the most permitable approach from a regulatory point of view, it represents a maintenance commitment, and does entail ongoing costs in repairing future erosion damage.

Kauai has three sand sources: Mana, Mahaulepu, and offshore. Offshore sand mining has not been considered here although this option is viable if the County wishes to pursue it further. Mana sand is the best developed resource at this time. However, the sand from Mana has shown a tendency to compact and harden when placed in the intertidal zone. This effect should be mitigated in the present

circumstance due to its removal from daily tidal inundation as part of a dune. The most effective approach to improving the sand is to wash it using a wet elevator and airfall system. With this treatment it is unlikely that the dune fill will undergo hardening. A sand improvement system such as this exists at the Mahaulepu quarry.

The following figure provides a generalized restoration section.



Shoreline South of Wailua Golf Course

Data on shoreline change to the south of the golf course indicates that erosion increases in the area of the Kauai Hilton hotel and to its south. Erosion on the south end of the Hilton property reaches a chronic rate of ~0.3 ft/yr and to the south in the area of the dirt road that accesses the shore, erosion reaches ~0.5 ft/yr.

The remainder of the shoreline to Ahukini Point was not analyzed with regard to shoreline change history. The majority of this coastline is rocky and not subject to pronounced erosive forces. Despite this, the placement of the bike path does present a challenging permitting issue as it will be subject to marine inundation during storm and tsunami events and frequent wave forces if it is placed too close to the higher intertidal zone. The bath should be structurally designed to withstand shearing, concussive, and buoyant marine forces.

The location of the path along the rocky shoreline should emphasize keeping the widest possible open space (set-back) between any evidence of marine influence and the seaward edge of the path. Where the path will have to be squeezed between rocky shore and heavy vegetation, it is most advantageous to conduct vegetation cutback, and locate the path in the upland direction.

The photo(s) below illustrates where it would be problematic to permit a pathway on the upper most boulders and seaward of the vegetation – the path will need to be located within the vegetation zone and *well* (~20ft) landward of the uppermost boulder zone. Exact location of the pathway in this section would be best performed with a coastal expert, a chainsaw, and flagging ribbon. In the bottom photo, the location of the old road/railbed does not *exactly* represent the optimal location. The bike path would be best located mauka of the road, or at least on the mauka edge of this feature.

Charles Fletcher
Professor of Marine Geology and Geophysics

D-5 STRUCTURAL REPORT

AHUKINI LANDING TO LYDGATE PARK
STRUCTURAL STATUS REPORT

KSF, Inc.

October 5, 2005

The path from Ahukini Landing to Lydgate Park may require the following proposed new structures or retrofit work on existing structures (refer to Map S-1), depending on the final path alignment.

1. Proposed Ramp South of the Existing Hanama'ulu Railroad Bridge
2. Existing Hanama'ulu Railroad Bridge Retrofit
3. Proposed Retaining Wall for Path Access Ramp at the Hanama'ulu Beach Park
4. Proposed Retaining Wall Path on the North Shore of Hanama'ulu Bay
5. Existing Cane Haul Box Culvert Bridge - Radisson Bypass Alternative
6. Proposed Temporary Integrated Boardwalk Plank System
7. Proposed Radisson Hotel Bike/Pedestrian Bridge
8. 4th Fairway – Proposed Bike/Pedestrian Bridge
9. 2nd Fairway – Proposed Helical Pile Boardwalk Path with Dune Restoration
10. 1st. Fairway – Proposed Helical Pile Boardwalk Path with Dune Restoration
11. 17th Green – Proposed Helical Pile Boardwalk Path
12. Proposed Lydgate Park Bike/Pedestrian Bridge

The following is a status report of structural assessment work completed to date:

1. Proposed Ramp South of the Existing Hanama'ulu Railroad Bridge

Three alternatives were prepared for this structure.

a. **Embankment**: Fill and re-grade the entire area to keep slopes within the ADA 5% maximum. This should be a low cost solution but accessibility problems and large height/grade differentials will increase construction difficulty. This solution impacts a wide area. The filled areas are likely to cause drainage problems, as runoff will be accumulated on the uphill side of the fill.

b. **MSE:** Use a mechanically stabilized earth, segmental retaining wall system to define the path. This system utilizes a system comprised of concrete masonry units with geotextile tiebacks to retain and stabilize the backfill. This may be the most cost effective system with the least impact on the area. Drainage concerns will be similar to "a" above as uphill runoff will be accumulated (Refer to Drawing S-2).

c. **Bridge:** Construct an elevated structure. A bridge requires foundation and superstructure work and would be the most costly especially if deep foundations (piles) are required. A major advantage of an elevated structure will be its limited impact on the surrounding area as the topography will be minimally affected and drainage will not be an issue (Refer to Drawing S-3).

Estimate of Probable Construction Costs:

- Embankment Option: Not available at this time. Estimate requires detailed topographic survey
- MSE/Segmental Retaining Wall Option: $1,000,000.00
- Elevated Bridge/Ramp Option: $1,5000,000.00 ($250.00 per s.f. plan area of deck)

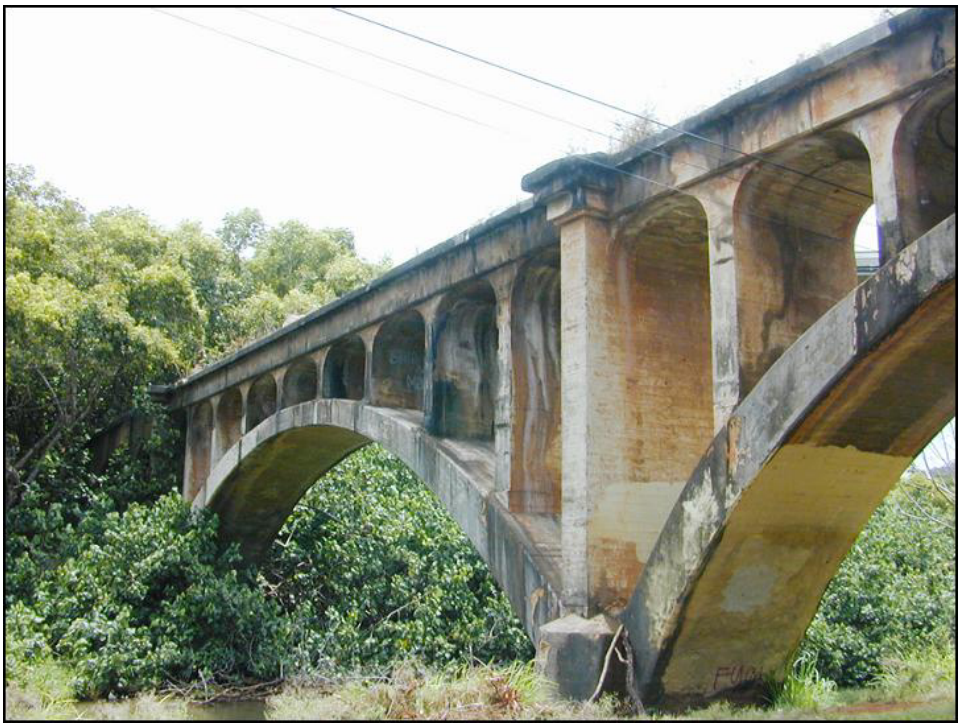
2. Existing Hanama'ulu Railroad Bridge Retrofit

The following is a report summarizing our work regarding the Structural Assessment and Recommendations for the Historic Hanama'ulu Railroad Bridge (Refer to Drawing S-4).

a. Observations

The bridge appears to be in very good condition considering its age and ocean front exposure. Several site visits have been conducted. At this time, no exploratory evaluations such as coring and concrete sampling have been performed. Several minor spalled areas are visible from the ground. The top "trough" which formed the original roadway for the railway was filled with dirt and debris. Once cleaned, additional concrete damage can be expected due to constant moisture from the organic material. It is expected that these concrete defects can be readily repaired using conventional chip-and-patch methods. (See Section "E")

Photo of the Hanama'ulu Railroad Bridge



Another view of the Hanama'ulu Railroad Bridge

b. **Structural Assessment**

An original plantation drawing was available indicating dimensions but containing very little other information regarding reinforcing steel or the foundation piles. The bridge was modeled using a STRUDL finite element program neglecting any reinforcing steel. Loading from the proposed, new concrete deck used to widen the path was included. The structure, with smaller secondary arches supported on longer span primary arches, was found to be completely in compression. Concrete compressive stresses were in the 500-psi range. This would partially explain the few observed spalls as the absence of tensile cracks has allowed the concrete to continue to protect the reinforcing steel.

c. **Foundation Assessment**

Geolabs, Inc is assessing the substructure. Initial indications are that the existing foundation will be adequate to support the new path as the new loads will be of the same order of magnitude as originally intended. Field assessments to probe the depth of the top of the pile cap and collection of boring samples have yet to be completed. Unknown will be the size, depth, number and condition of the original piles, assumed to be timber. This information will be extremely difficult to ascertain.

d. **Design and Recommendations**

Various schemes to modify the top deck for an increased width and guardrails have been reviewed. The recommend solution uses pre-cast concrete planks attached to the existing structure with epoxy embedded steel dowels. The planks span across the width of the existing bridge to provide a widened path and will provide a durable, low maintenance pathway. Intermittent concrete posts that support steel cables are used for their minimal visual impact and low cost.

e. **Concrete Repairs**

All concrete repairs shall be done in accordance with recommended practices of the International Association of Concrete Repair Specialists. Properly installed repairs will assure that the life of the structure can be extended with a minimum of additional concrete maintenance. All repairs visible from the ground shall be finished to match the color and texture of the existing concrete. In areas such as the upper trough, where continuous moisture and debris build up can be anticipated, any reinforcing steel exposed for repairs shall be coated with an anti corrosion material. Replacement segments of reinforcing shall be galvanized, stainless steel coated or FRP.

It is recommended that additional drains be installed along the length of the upper trough to remove any accumulated water. Also, the entire trough surface area should be coated with a waterproofing membrane as this area will be in accessible and difficult to maintain once the new roadway decking is installed.

Estimate of Probable Construction Costs:
$300,000.00 to $500,000.00

3 and 4. Proposed Retaining Wall Path – Hanama'ulu Beach Park and on the North Shore of Hanama'ulu Bay

Retaining walls will be required on steep slopes in order to provide a location for the bike/pedestrian path (Refer to Drawing S-5). Typically, the slope of the path shall not exceed a 5 percent grade for accessibility requirements. The path grade can exceed 5 percent, but not greater than 8.33 percent for a length, not to exceed 30 feet before a landing of at least 5 feet long is required that does not exceed a 2 percent grade. Whenever the path grade exceeds 5 percent, hand railing is required.

Estimate of Probable Construction Costs:
$2,700.00 per lineal foot

5. Existing Cane Haul Box Culvert Bridge - Radisson Bypass Alternative

An existing cane haul box culvert structure located upstream and mauka of the Radisson may be used as an alternate route. The concrete appears to be in good condition. Substantial cost savings may be realized with this alternative as only retrofit safety railings and an overlay surfacing material will be required.

Estimate of Probable Construction Costs:
$65,000.00 (railing and concrete path surface)

6. Proposed Temporary Segmental Boardwalk Plank System

The temporary integrated boardwalk plank system is designed to sit directly on top of the existing sand with minimal disturbance to the sand sub-grade and vegetation. The 12 - foot by 12 - foot planks (Refer to Drawing S-6) are prefabricated off-site. They

are connected with stainless steel bolts and can easily be removed. Stainless steel anchor/augers that are attached to the planks will be screwed into the sand in order to keep the planks from washing away or becoming projectiles during flood and high wind conditions.

Estimate of Probable Construction Costs:
$90.00 per square foot

7. Proposed Radisson Hotel Bike/Pedestrian Bridge

In order to span the ditch at this location, a 90 - foot span bridge is required. Three single span alternatives are proposed. All alternatives are designed to expedite construction and keep the work out of the water to avoid permitting issues.

a. **Pre-stressed Concrete Plank:** A pre-stressed concrete planks with a cast in place concrete topping (Refer to Drawing S-5). The pre-cast plank has a thin cross section and will have a lesser impact on the stream flow than a concrete girder bridge would have.

b. **Pre-stressed Concrete Girder:** Pre-stressed girders with a concrete deck are considered as an alternate (Refer to Drawing S-6). The advantage of this system is a lighter structure requiring a more economical foundation. The depth of the girders is a disadvantage. Raising the bridge will affect the on-grade portion of the trail on either end of the bridge, as retaining walls may be required. If the girder structure is lowered, stream flow may be adversely affected.

c. **Pre-fabricated Carbon Steel Bridge:**

Pre-fabricated steel bridges have become common, low cost alternatives on the mainland. For marine environments such as the Kauai bike/pedestrian path, the bridge will need to be hot-dipped galvanized and then painted with a marine grade coating of which there are many color options.

The pre-fabricated bridge sits on two abutments and can easily span without a center support pier for distances up to 140 lineal feet. They are typically 10 foot in width and have a concrete deck that is installed after the bridge has been set on its two abutments. The bridge has a 10,000 LBS vehicle load and a lifting weight of 37,543 LBS.

The manufacturer has a limited warranty of 10 years for the bridge. The actual life of the bridge will greatly depend on the maintenance routine that is implemented on the bridge. Steel bridges such as the Golden Gate Bridge are examples of painted steel bridges that can last indefinitely with proper maintenance.

Estimate of Probable Construction Costs:
Pre-stressed Concrete Plank Option: $500,000.00
Pre-stressed Concrete Girder Option: $450,000.00
Pre-fabricated Steel Bridge Option: $250,000.00

8. **4th Fairway – Proposed Bike/Pedestrian Bridge**

A bridge with a span of approximately 80 lineal feet will be required in order to cross over the ditch at this location. The same three bridge design options that were considered for the Proposed Radisson Hotel Bridge in Section Seven are proposed for this bridge and there is no significant difference in cost.

Estimate of Probable Construction Costs:
Pre-stressed Concrete Plank Option: $500,000.00
Pre-stressed Concrete Girder Option: $450,000.00
Pre-fabricated Steel Bridge Option: $200,000.00

9. **2nd Fairway – Proposed Helical Pile Boardwalk Path with Dune Restoration**

A helical pile supported boardwalk system is used along the coastline where there is tidal erosion and limited space (Refer to Drawings S-9 and S-10). Environmental and permitting constraints in the shoreline area prohibit permanent structures. The helical pile is removable; yet stable enough to support the boardwalk even if there is substantial sand erosion. The entire boardwalk system may be dismantled and the helical piles removed thus qualifying the structure as "temporary

Estimate of Probable Construction Costs:
$850.00 per lineal foot, including safety railing and excluding dune restoration

10. **1st. Fairway – Proposed Helical Pile Boardwalk Path with Dune Restoration**

The same Helical Pile Boardwalk Design used for the 2nd fairway will be utilized for the 1st fairway; however, the dune restoration design is slightly different (refer to drawing S-11).

Estimate of Probable Construction Costs:
$850.00 per lineal foot, including safety railing and excluding dune restoration

11. **17th Green – Proposed Helical Pile Boardwalk Path**

The same Helical Pile Boardwalk Design used for the 1st and 2nd fairways will be utilized for the 1st fairway; however, no dune restoration is needed (Refer to Drawing S-9).

Estimate of Probable Construction Costs:
$850.00 per lineal foot, including safety railing and excluding dune restoration

12. Proposed Lydgate Park Bike/Pedestrian Bridge

A bridge over the unpaved sand road is required mauka of the play structure. A 140 - foot span bridge will allow continued vehicular access to the beach via the sand road. Two alternatives were considered:

a. **Suspension Bridge.** In keeping with the aesthetic theme of the Kamalani Play Bridge structure, a suspension bridge is recommended (Refer to Drawing S-12). Reinforced concrete piers and a stainless steel cable will support the bridge span. The decking will be framed of either Trex or wood timber planks.

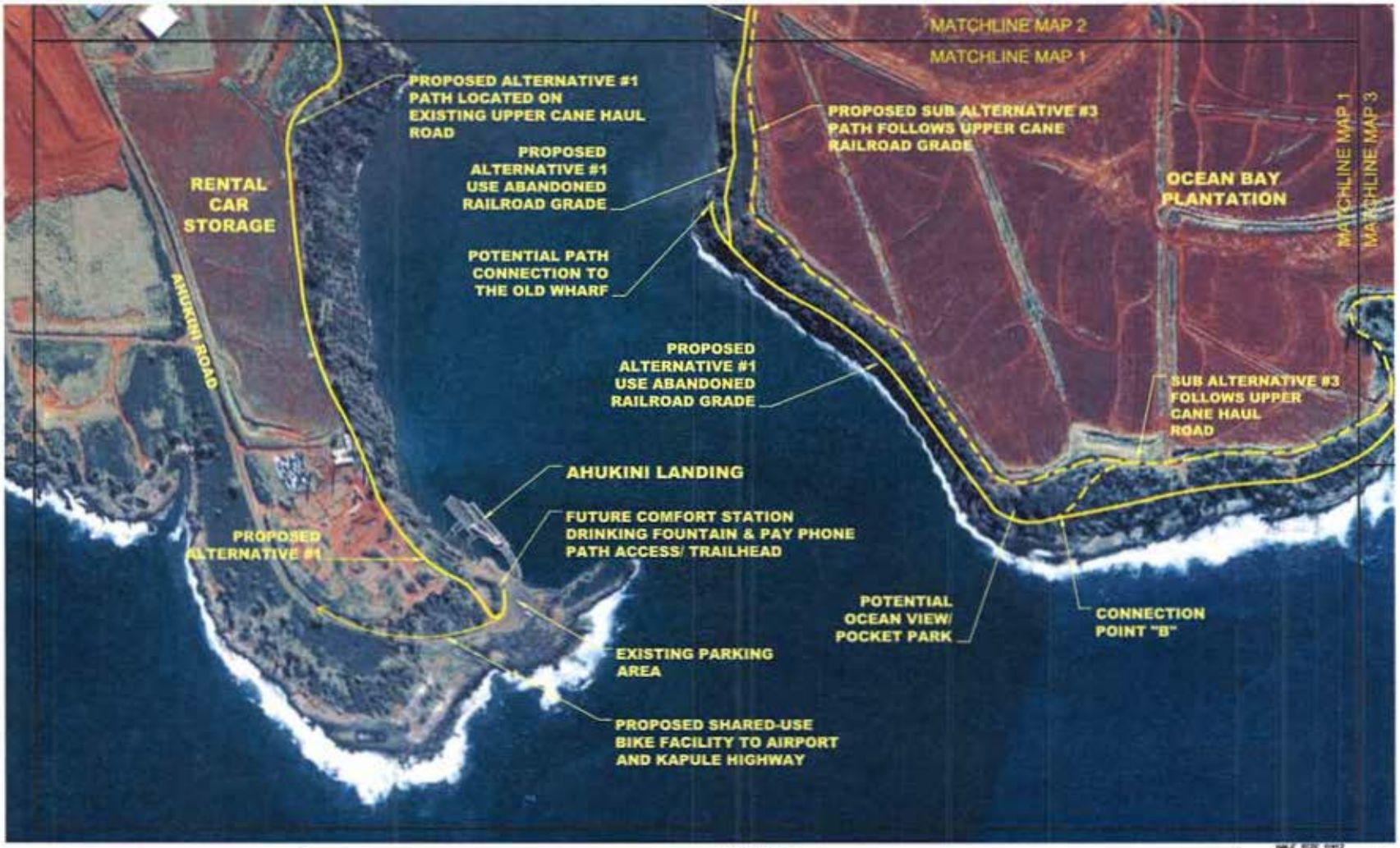
b. **Concrete Girder Bridge.** As an alternate to the suspension structure, a 3 span concrete girder bridge is proposed (Refer to Drawing S-13). Although more costly, a concrete structure will be more durable and require much less maintenance than the suspension bridge option.

Estimate of Probable Construction Costs:
Suspension Bridge Option: $500,000.00
Concrete Girder Bridge Option: $700,000.00

This Page Left Intentionally Blank

Appendix E:

Alternative Alignment Maps 1-6



MAP 2 | MAP 6 | MAP 3 | MAP 4 | MAP 5 | MAP 1

LEGEND

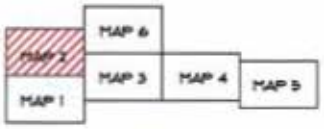
- EXISTING PATH
- PROPOSED ALTERNATIVE #1 - COASTAL PATH
- PROPOSED ALTERNATIVE #2 - KAPULE/KUHIO HIGHWAY PATH
- PROPOSED SUB ALTERNATIVE #3 - OCEAN BAY PLANTATION-UPPER CANE HAUL ROAD
- PROPOSED SUB ALTERNATIVE #4 - HILTON LANE & MARINE CAMP CONNECTIONS
- PROPOSED SUB ALTERNATIVE #5 - RADISSON HOTEL BYPASS
- PROPOSED SUB ALTERNATIVE #6 - WAILUA GOLF COURSE TUNNEL
- FUTURE PHASE
- EXISTING & PROPOSED BRIDGE

HALF SIZE 11X17
0 100 200 400
Scale: 1"=400'

FULL SIZE 24X36
0 100 200 400
Scale: 1"=200'
North

AHUKINI - LYDGATE PARK
BIKE & PEDESTRIAN PATH
PATH ALTERNATIVE ALIGNMENTS STP-0700 (51)
COUNTY OF KAUAI Lihue, Kauai, Hawaii

A-A
MAP 1



LEGEND

- EXISTING PATH
- PROPOSED ALTERNATIVE #1 - COASTAL PATH
- PROPOSED ALTERNATIVE #2 - KAPULE/KUHIO HIGHWAY PATH
- PROPOSED SUB ALTERNATIVE #3 - OCEAN BAY PLANTATION-UPPER CANE HAUL ROAD
- PROPOSED SUB ALTERNATIVE #4 - HILTON LANE & MARINE CAMP CONNECTIONS
- PROPOSED SUB ALTERNATIVE #5 - RADISSON HOTEL BYPASS
- PROPOSED SUB ALTERNATIVE #6 - WAILUA GOLF COURSE TUNNEL
- FUTURE PHASE
- EXISTING & PROPOSED BRIDGE

HALF SIZE (11X17)
0 100 200 400
Scale: 1"=400'

FULL SIZE (24X36)
0 100 200 400
Scale: 1"=200'
North

AHUKINI - LYDGATE PARK
BIKE & PEDESTRIAN PATH
PATH ALTERNATIVE ALIGNMENTS STP-0700 (51)
COUNTY OF KAUAI Lihue, Kauai, Hawaii

AA
MAP 2

LEGEND

- EXISTING PATH
- PROPOSED ALTERNATIVE #1 - COASTAL PATH
- PROPOSED ALTERNATIVE #2 - KAPULEAKAHIO HIGHWAY PATH
- PROPOSED SUB ALTERNATIVE #3 - OCEAN BAY PLANTATION-UPPER CANE HAUL ROAD
- PROPOSED SUB ALTERNATIVE #4 - HILTON LANE & MARINE CAMP CONNECTIONS
- PROPOSED SUB ALTERNATIVE #5 - RADISSON HOTEL BYPASS
- PROPOSED SUB ALTERNATIVE #6 - WAILUA GOLF COURSE TUNNEL
- FUTURE PHASE
- EXISTING & PROPOSED BRIDGE

HALF SIZE 11X17
0 100 200 400
Scale 1"=400'

FULL SIZE 24X36
0 100 200 400
Scale 1"=200'
North

AHUKINI - LYDGATE PARK
BIKE & PEDESTRIAN PATH
PATH ALTERNATIVE ALIGNMENTS STP-0700 (51)
COUNTY OF KAUAI Lihue, Kauai, Hawaii

A A
MAP 3

MAP 6
MAP 2
MAP 3
MAP 4
MAP 5
MAP 1

LEGEND

- EXISTING PATH
- PROPOSED ALTERNATIVE #1 - COASTAL PATH
- PROPOSED ALTERNATIVE #2 - KAPULEKUHIO HIGHWAY PATH
- PROPOSED SUB ALTERNATIVE #3 - OCEAN BAY PLANTATION-UPPER CANE HAUL ROAD
- PROPOSED SUB ALTERNATIVE #4 - HILTON LANE & MARINE CAMP CONNECTIONS
- PROPOSED SUB ALTERNATIVE #5 - RADISSON HOTEL BYPASS
- PROPOSED SUB ALTERNATIVE #6 - WAILUA GOLF COURSE TUNNEL
- FUTURE PHASE
- EXISTING & PROPOSED BRIDGE

HALF SIZE (11X17)
0 100 200 400
Scale: 1"=400'

FULL SIZE (24X36)
0 100 200 400
Scale: 1"=200'
North

AHUKINI - LYDGATE PARK
BIKE & PEDESTRIAN PATH
PATH ALTERNATIVE ALIGNMENTS STP-0700 (51)
COUNTY OF KAUAI Lihue, Kauai, Hawaii

AA
MAP 4

MAP 6
MAP 2
MAP 3
MAP 4
MAP 1
MAP 5

LEGEND

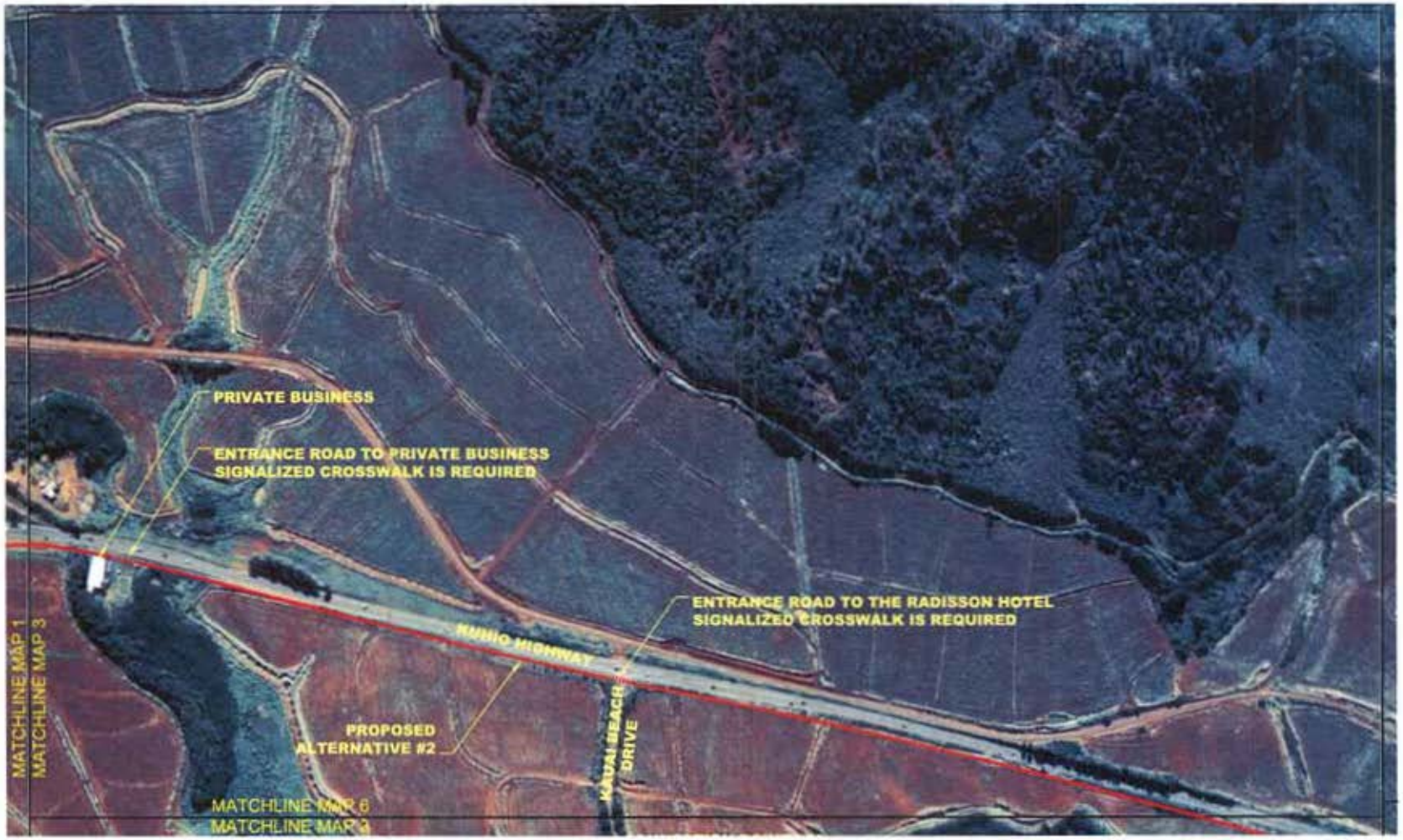
- EXISTING PATH
- PROPOSED ALTERNATIVE #1 - COASTAL PATH
- PROPOSED ALTERNATIVE #2 - KAPULEAOHIO HIGHWAY PATH
- PROPOSED SUB ALTERNATIVE #3 - OCEAN BAY PLANTATION-UPPER CANE HAUL ROAD
- PROPOSED SUB ALTERNATIVE #4 - HILTON LANE & MARINE CAMP CONNECTIONS
- PROPOSED SUB ALTERNATIVE #5 - RADISSON HOTEL BYPASS
- PROPOSED SUB ALTERNATIVE #6 - WAILUA GOLF COURSE TUNNEL
- FUTURE PHASE
- EXISTING & PROPOSED BRIDGE

HALF SIZE 11X17
0 100 200 400
Scale 1"=400'

FULL SIZE 24X36
0 200 400 800
Scale 1"=200'
North

AHUKINI - LYDGATE PARK
BIKE & PEDESTRIAN PATH
PATH ALTERNATIVE ALIGNMENTS STP-0700 (51)
COUNTY OF KAUAI | Lihue, Kauai, Hawaii

A A
MAP 5



LEGEND

- EXISTING PATH
- PROPOSED ALTERNATIVE #1 - COASTAL PATH
- PROPOSED ALTERNATIVE #2 - KAPULE/KUHIO HIGHWAY PATH
- PROPOSED SUB ALTERNATIVE #3 - OCEAN BAY PLANTATION-UPPER CANE HAUL ROAD
- PROPOSED SUB ALTERNATIVE #4 - HILTON LANE & MARINE CAMP CONNECTIONS
- PROPOSED SUB ALTERNATIVE #5 - RADISSON HOTEL BYPASS
- PROPOSED SUB ALTERNATIVE #6 - WAILUA GOLF COURSE TUNNEL
- FUTURE PHASE
- EXISTING & PROPOSED BRIDGE

HALF SIZE (11X17)
0 100 200 400
Scale 1"=400'

FULL SIZE (24X36)
0 100 200 400
Scale 1"=200'
North

AHUKINI - LYDGATE PARK
BIKE & PEDESTRIAN PATH
PATH ALTERNATIVE ALIGNMENTS STP-0700 (51)
COUNTY OF KAUAI Lihue, Kauai, Hawaii

A A
MAP 6

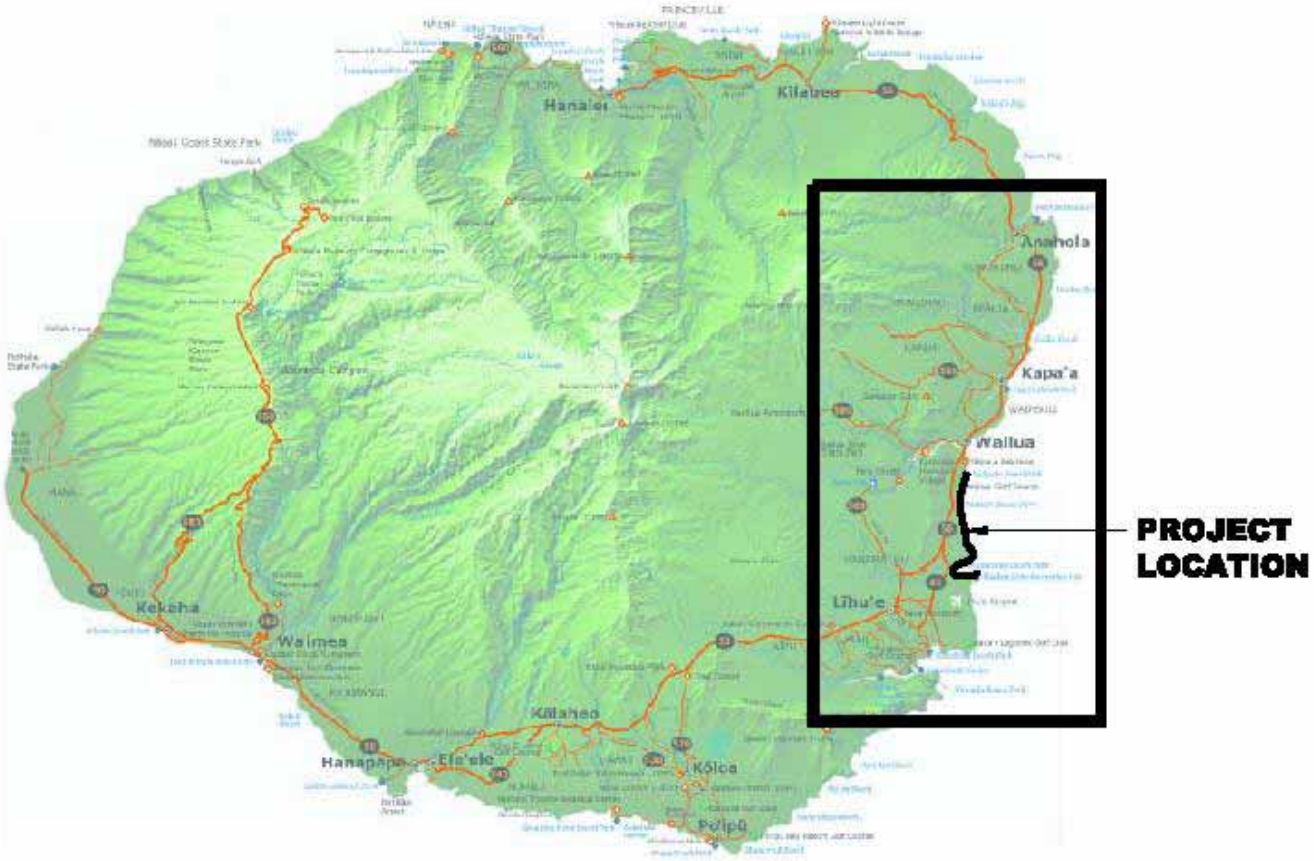
This Page Left Intentionally Blank

Appendix F:

Location Map

F-1 MAPS OF THE AFFECTED ENVIRONMENT

Location Map



KAUA'I
PROJECT LOCATION MAP

Appendix G:

Estimate of Probable Construction Costs

ESTIMATE OF PROBABLE CONSTRUCTION COSTS

The Estimate of Probable Construction Costs should be utilized for planning purposes only. Factors such as utilization of not-for-construction base map information and preliminary data typical of planning projects and Environmental Assessments were used to calculate this estimate. As more accurate topographic and existing conditions mapping and data is made available during design more accurate cost estimates can be determined.

The following Estimate of Probable Construction and Land Acquisition Costs are separated into the following Construction Reaches (Refer to Implementation Reach Map):

- Construction Reach A – Ahukini Landing to Hanamaulu Beach Park
- Construction Reach B – Hanamaulu Beach Park to Hilton Lane
- Construction Reach C – Hilton Lane to Wailua Golf Course
- Construction Reach B – Wailua Golf Course to Lydgate Park

SUMMARY OF ESTIMATED COST

IMPLEMENTATION REACH	APPROXIMATE PATH LENGTH	TOTAL ESTIMATED PROBABLE CONSTRUSTRUCTION COSTS
Ahukini Landing to Hanamaulu Beach Park	6,000 ft.	$6,814,800
Hanamaulu Beach Park to Hilton Lane	7,200 ft.	$1,795,800
Hilton Lane to Wailua Golf Course	6,700 ft.	$1,975,200
Wailua Golf Course to Lydgate Park	17,300 ft.	$9,507,120
GRAND TOTAL		**$20,092,920**

IMPLEMENTATION REACH – A.
Ahukini Landing to Hanamaulu Beach Park

DESCRIPTION	AMOUNT	UNIT	UNIT PRICE	TOTAL
Concrete Path (12 ft. width x 6 in. thick)	6,000	L.F	$140.00	$840,000
Rest Pavilion / Overlook	1	EA	15,000	15,000
Security Fence (8 ft. tall, standard chain link)	2,600	L.F.	60.00	156,000
Interpretive Signs	4	EA	7,500	30,000
Mile / Kilometer & Boundary Markers		L.S		3,000
Hanamaulu Bridge Approach Ramp (concrete deck on piles)		L.S.		1,800,000
Comfort Station at Ahukini Landing		L.S.		350,000
Comfort Station at Hanamaulu Beach Park		L.S.		300,000
Path Ramp with Retaining Walls and Railing	800	L.F.	2,700	2,160,000
Archaeological Monitoring		L.S.		25,000
SUBTOTAL				**$ 5,679,000**
Construction Contingency	20%			$1,135,800
TOTAL				**$6,814,800**

IMPLEMENTATION REACH - B.
Hanamaulu Beach Park to Hilton Lane

DESCRIPTION	AMOUNT	UNIT	UNIT PRICE	TOTAL
Concrete Path (12 ft. width x 6 in. thick)	7,200	L.F	$140.00	$1,008,000
Rest Pavilion / Overlook	2	EA	15,000	30,000
Concrete Box Culvert Ditch Crossing at Hilton Lane (16 ft. X 30 ft.)		L.F.		400,000
Interpretive Signs	4	EA	7,500	30,000
Mile / Kilometer and Boundary Markers		L.S.		3,500
Archaeological Monitoring		L.S.		25,000
SUBTOTAL				**$1,496,500**
Construction Contingency	20%			$299,300
TOTAL				**$1,795,800**

IMPLEMENTATION REACH - C.
Hilton Lane to Wailua Golf Course

DESCRIPTION	AMOUNT	UNIT	UNIT PRICE	TOTAL
Concrete Path (12 ft. width x 6 in. thick)	6,700	L.F	$140.00	$938,000
Concrete Box Culvert Bridge Retrofit		L.S.		10,000
Signalized Crosswalk at Hotel Entrance Drive		L.S.		175,000
Interpretive Signs	2	EA	7,500	15,000
Parking Lot / Trailhead (unpaved)		L.S.		100,000
Comfort Station		L.S.		350,000
Rest Pavilion	2	EA	15,000	30,000
Mile / Kilometer and Boundary Markers		L.S.		3,000
Archaeological Monitoring		L.S.		25,000
SUBTOTAL				**$1,646,000**
Construction Contingency	20%			$329,200
TOTAL				**$1,975,200**

IMPLEMENTATION REACH – D.
Wailua Golf Course to Lydgate Park
(Includes golf course parking lot improvements for path user safety)

DESCRIPTION	AMOUNT	UNIT	UNIT PRICE	TOTAL
Concrete Path (12 ft. width x 6 in. thick)	17,300	L.F	$140.00	$2,422,000
Relocate Golf Course Entrance, New Accel and Decel Lanes, Stripping	6,000	S.F.	150.00	900,000
Relocate Utility Poles	5	EA	20,000	100,000
Guardrail (irrigation pump house to Leho Drive)	2,700	L.F.	75.00	202,500
Golf Course Parking Lot Improvements, Stairs, Stripping	75,000	S.F.	35.00	2,625,000
Golf Course Landscaping, Irrigation (along path)	48,500	S.F.	16.00	776,000
Safety Fence (10 ft. tall, black chain link, 1 in. fabric)	4,500	L.F.	80.00	360,000
Safety Fence Between Canal and Path (4 ft. tall, black chain link, standard fabric)	2,360	L.F.	60.00	141,600
Solid Plastic Composite Fence (8 ft. tall, white)	2,600	L.F.	120.00	312,000
Golf Course Entry Sign		L.S.		30,000
Mile / Kilometer & Boundary Markers		L.S		3,500
Archaeological Monitoring		L.S.		50,000
SUBTOTAL				**7,922,600**
Construction Contingency	20%	.		1,584,520
TOTAL				**$9,507,120**

Appendix H:

Maintenance Plan

PATH MAINTENANCE PLAN

Path Maintenance Program Goals

- design methods and materials—durable and low maintenance
- maintenance pro-active, not reactive
- path corridor kept clean and safe on a daily basis
- maintenance activities should:
    - avoid damage to the path & amenities
    - not interfere with safe and enjoyable path use
    - be cost effective, efficient, and appropriate

Parks & Recreation Department Maintenance Tasks

- daily cleaning of amenities
- activities requiring safety training or certification (some machinery)
- maintenance requiring specialized tools or equipment
- mowing operations
- removal of heavy debris such as trees, boulders, etc
- moving or installing amenities that require machinery **w/ assistance from DPW.**

Parks & Recreation Department Maintenance Personnel

- Park Caretakers – Assigned to sections of path for daily maintenance
- Park Rangers – Assigned island wide and monitor path for safety and compliance to rules
- Path Rangers – Potential future program
- Volunteers – Community volunteers

Park Caretakers

- daily cleaning of restrooms\trash collection & removal
- painting and graffiti removal
- installation of small items not requiring machinery such as path signs (installation/replacement by DPW)
- planting, watering, and weed removal, edging vegetation from the path
- public relations by assisting the public
- note problems not related to park maintenance function & refer to appropriate department/division

Park Rangers

- periodic checks along the path to enforce path and park rules
    - monitor path usage
    - dog walkers compliance (checking for correct leash length/no retractable leashes, poop bags, current dog license, cleaning up after their dogs and keeping dogs within the designated portions along the path)
    - no motorized vehicles
    - unauthorized use

Attachment B: National Historic Preservation Act, Section 106 Concurrence Letter; State Historic Preservation Division, HRS 6E-8 Review Submittal

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

June 28, 2018

IN REPLY REFER TO:
Log No.: 2017.01385
Doc. No.: 1806SH21
Archaeology, Architecture

Meesa Otani
U.S. Department of Transportation
Federal Highway Administration
300 Ala Moana Blvd, Rm 3-306
Box 50206
Honolulu, Hawai'i 96850
Email: meesa.otani@dot.gov

Dear Meesa Otani:

SUBJECT: **National Historic Preservation Act (NHPA) Section 106 Review – Request for Concurrence with the No Adverse Effect Determination Ahukini to Lydgate Bicycle/Pedestrian Path Ref. No. HDA-HI, Federal Aid Project No. STP-0700(51) Hanama'ulu Ahupua'a, Puna District, Island of Kaua'i TMK: (4) 3-5-007:008, (4) 3-5-007:159, (4) 3-7-002:001, (4) 3-7-002:002, (4) 3-7-003:001, (4) 3-7-003:007, (4) 3-7-003:014, (4) 3-9-002:040, (4) 3-9-005:001, (4) 3-9-006:001**

On July 10, 2017, the State Historic Preservation Division (SHPD) received a letter dated June 29, 2017 from the Federal Highway Administration (FHWA) requesting the State Historic Preservation Officer's (SHPO's) concurrence with their Section 106 effect determination for the Ahukini to Lydgate Bicycle/Pedestrian Path project, on the island of Kaua'i.

The project would be funded from a combination of Federal and County funds. The FHWA serves as the lead federal agency. The County of Kaua'i, Department of Public Works DPW, in cooperation with the State Department of Transportation HDOT, serves as the Proposing Agency under the state environmental review process. The project will receive funding from the Federal Highway Administration (FHWA) and is therefore a federal undertaking as defined in 36 CFR 800.16(y). The proposed undertaking is subject to compliance with Section 106 of the NHPA and historic preservation review under Hawaii Revised Statutes (HRS) §6E-8. Pursuant to the Programmatic Delegation of Authority (May 2016), the FHWA has delegated Section 106 consultation to state and county agencies.

The area of potential effect (APE) has been defined as approximately 18-acres that includes the 6.7 miles of the 12-ft-wide path and ancillary improvements, the footprint of three new comfort stations, two parking lots, and the construction staging area in the lower Wailuā Golf Course parking lot.

The proposed project will consist of a 10-12-ft-wide concrete shared-use path along approximately 6.7 miles of coastal Kaua'i. The path would begin at Ahukini Point and would end by connecting with an existing path to the north of Lydgate Park. Additional design elements include trailheads and three comfort stations, one of which would be a refurbished existing comfort station ay Hanamā'ula Beach Park. Two historical bridges would be restored. Improvements would be made to the parking lot at Marine Camp and to the entrance and lower parking lot at Wailuā Golf Course.

FHWA has identified three historic properties within the APE: State Inventory of Historic Places (SIHP) 50-30-08-1845 (Hanamā'ulu Railroad Bridge), SIHP 50-30-08-1846 (a historic concrete box culvert associated with sugar cane production), and SIHP 50-30-08-103 (a human remains reinterment site at Wailua Golf Course).

Hanamā'ulu Railroad Bridge was constructed between 1921 and 1924 by Ahukini Terminal and Railway Company. The Company was formed in 1920 to provide railroad service between Ahukini and Anahola. The bridge was originally wooden trestle, but was replaced as concrete in 1900 by Hanamā'ulu Plantation part of Lihu'e Plantation. FHWA determined the bridge may be eligible for the National Register of Historic Places (NRHP) under Criterion A because it is associated with an event that made significant contribution to the broad pattern of history, and because it embodies a distinctive characteristic of a type, period, and method of construction. As discussed in the February 23, 2016 letter from the DPW, there would be some retrofitting and restoration to this bridge, which includes widening the deck to a width of 12 feet and adding a safety railing. Concrete planks would be added to the top of the existing bridge and doweled into the existing structure for added stability.

SIHP 50-30-08-1846, a historical concrete box culvert, is one of two historic railroad bridges that were used for hauling sugar cane from the fields of Lihu'e. FHWA has determined the structure as eligible for the NHRP under Criterion A because of its association with an event that made significant contribution to the broad patterns of history. As discussed in the February 23, 2016 letter from the DPW, the culvert would be retrofitted with a new concrete deck and safety railings on each side.

SIHP 50-30-08-103, is an reinterment site in the Wailuā Golf Course parking lot. When the golf course was built, remains were re-interred at this site. FHWA has determined the site as eligible for the NHRP under Criterion B because it is associated with the lives of persons significant in the past and embodies a distinctive characteristic of a type, period, and method of burials. Please note, human burials are not eligible for the NHRP, but are protected under state law per HAR §13-300. As listed in the table of Mitigation Activities in the February 23, 2016 letter, DPW has committed to installing a protective barrier around the reinternment site.

The SHPO concurs with FHWA's finding of *no adverse effect*.

SHPD received notification that the FHWA plans to make a de minimis impact determination under Section 4(f) of the U.S. Department of Transportation Act of 1966.

The HDOT and FHWA are the offices of record for this undertaking. Please maintain a copy of this letter with your environmental review record for this undertaking.

Please contact Kaiwi Yoon, Architecture Branch Chief, at (808) 692-8032 or at Kaiwi.N.Yoon@hawaii.gov for matters regarding architectural resources. Please contact Stephanie Hacker, Historic Preservation Archaeologist IV, at (808) 692-8046 or at Stephanie.Hacker@hawaii.gov for matters regarding archaeological resources or this letter.

Aloha,

Alan Downer

Alan S. Downer, PhD
Administrator, State Historic Preservation Division
Deputy State Historic Preservation Officer

cc: Douglas Haigh, County of Kaua'i Department of Public Works (dhaigh@kauai.gov)
Christine Yamasaki, Hawai'i Department of Transportation (Christine.yamasaki@hawaii.gov)

DEPARTMENT OF PUBLIC WORKS
THE COUNTY OF KAUA'I
DEREK S. K. KAWAKAMI, MAYOR
MICHAEL A. DAHILIG, MANAGING DIRECTOR

LYLE TABATA
DEPUTY COUNTY ENGINEER

January 2, 2020

TO: Alan Downer PhD, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
601 Kamokila Boulevard, Suite 555
Kapolei, Hawai'i 96707
via: dlnr.intake.shpd@hawaii.gov

SUBJECT: State Historic Preservation Review – HRS Chapter 6E-8
Ahukini-Lydgate Bike/Pedestrian Path
Hanamā'ulu Ahupua'a, Puna District, Island of Kaua'i
TMK: (4) 3-7-002:002, (4) 3-5-001:008, (4) 3-5-001:159, (4) 3-7-002:001, (4) 3-7-003:001, (4) 3-7-003:007, (4) 3-7-003:014, (4) 3-9-005:001, (4) 3-9-002:004, (4) 3-9-006:001

The County of Kaua'i, Department of Public Works (DPW) submits this letter to provide a project summary for the State Historic Preservation Division (SHPD) review per Hawai'i Revised Statutes (HRS) Chapter 6E-8 in connection with the Ahukini-Lydgate Bike/Pedestrian Path. The proposed project consists of a 10 ft. to 12 ft. wide concrete shared-use path along approximately 6.7 miles of coastal Kaua'i, starting from Ahukini Point and ending at Lydgate Park. Additional design elements include trailheads and three comfort stations. Per HRS Chapter 6E-8 and Hawai'i Administrative Rules (HAR) Chapter 13-275, the DPW offers the following documentation:

I. IDENTIFICATION AND INVENTORY OF HISTORIC PROPERTIES

The proposed path traverses near or through three (3) historic properties; State Inventory of Historic Places (SIHP) 50-30-08-1845 Hanamā'ulu Railroad Bridge, SIHP 50-30-08-1846 a historic concrete box culvert associated with sugar cane production, and SIHP 50-30-08-103 a human remains reinternment site at Wailuā Golf Course.

II. EVALUATION OF SIGNIFICANCE

Hanamā'ulu Railroad Bridge, identified as SIHP 50-30-08-1845, was constructed between 1921 and 1924 by Ahukini Terminal and Railway Company. The Company was formed in 1920 to provide railroad service between Ahukini and Anahola. The bridge was originally wooden trestle, but was replaced as concrete in 1900 by Hanamā'ulu Plantation part of Līhu'e Plantation. The bridge may be

eligible for the National Register of Historic Places (NRHP) under Criterion A because it is associated with an event that made significant contribution to the broad pattern of history, and because it embodies a distinctive characteristic of a type, period, and method of construction.

A historical concrete box culvert, identified as SIHP 50-30-08-1846, is one of two historic railroad bridges that were used for hauling sugar cane from the fields of Līhu‘e. The structure is eligible for NHRP under Criterion A because of its association with an event that made significant contribution to the broad patterns of history.

A reinternment site in the Wailuā Golf Course parking lot, identified as SIHP 50-30-08-103, is the location where remains were re-interred during the construction of the golf course. This site is eligible for NHRP under Criterion B because it is associated with the lives of persons significant in the past and embodies a distinctive characteristic of a type, period, and method of burials. Human burials are not eligible for the NHRP but are protected under State law per HAR §13-300.

III. EFFECT DETERMINATION

DPW offers a “effect, with proposed mitigation commitments” determination for this project.

IV. PROPOSED MITIGATION COMMITMENTS

The County of Kaua‘i, Department of Public Works (DPW) will commit to the following measures to avoid, minimize and mitigate any significant impacts to the three historic properties along the Ahukini-Lydgate Bike/Pedestrian Path:

SIHP 50-30-08-1845 Hanamā‘ulu Railroad Bridge

The Hanamā‘ulu Railroad Bridge will be retrofitted to make it a safer structure for bicycles and pedestrians by strengthening the superstructure, repairing the spalling, and adding a concrete deck and handrails. To protect the historic character of the bridge, work to the bridge will be limited to minor structural repairs for restoration and retrofitting for a new concrete deck and safety railings.

SIHP 50-30-08-1846 Historic Concrete Box Culvert

The historical concrete box culvert structure will be left intact; additions will be minimal, including deck pavement with concrete and safety railings. The box culvert will also be retrofitted for safety with a new concrete deck and safety railings on the side.

SIHP 50-30-08-103 Wailuā Golf Course Reinternment Site

A 30-foot protective buffer will be installed around the internment site at Wailuā Golf Course to the extent possible. The internment site in the parking lot of the Wailuā Golf Course will not be disturbed. Wailuā Golf Course personnel will be consulted during all phases of the design process. The public will be provided the opportunity to review and comment on proposed design solutions.

Other Mitigation Measures

There will be no physical destruction or damage to the historic properties. Alterations will be consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68). No historic properties will be removed from their location. There will be no change of character or physical features. No visual, atmospheric or audible elements will diminish the integrity of the historic properties. There will be no transfer, lease or sale of any historic properties.

An Archaeological Monitoring Plan will be the primary form of mitigation to address the presence/absence of sites not previously identified along the path corridor. This determines what measures will be taken when and if cultural artifacts are found during or before construction. Monitoring procedures will be conducted in accordance with rules and regulations established by DLNR.

V. FEDERAL FUNDING

The proposed project will be funded from a combination of Federal and County funds. The project will receive funding from the Federal Highway Administration (FHWA) and is therefore a federal undertaking as defined in 36 CFR 800.16(y).

Consultation under Section 106 of the National Historic Preservation Act (NHPA) has been completed for the project. The SHPO concurred with FHWA's finding of "no adverse effect" determination in a letter dated June 28, 2018 (Log No.: 2017.01385, Doc. No.: 1806SH21).

Sincerely,

Lyle Tabata Digitally signed by Lyle Tabata Date: 2020.01.02 15:22:11 -10'00'

Lyle Tabata
Deputy County Engineer

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING
601 KAMOKILA BLVD, STE 555
KAPOLEI, HAWAII 96707

HRS 6E Submittal Filing Fees

All submittals must have the appropriate filing fee in accordance with HAR §13-275-4 or HAR §13-284-4.
All contact fields below must be complete and accurate.

Landowner: _____
(if privately-owned historic property on Hawaii Register, HRS §6E-10)

Agency: County of Kauai, Department of Public Works
Contact Name: Douglas Haigh
Mailing Address: 4444 Rice Street, Suite 275
Phone: 808-241-4849 Email: dhaigh@kauai.gov

Title of Report/Plan: HRS 6E Submittal Form

Ahupua'a: Hanamaulu District: Puna Island: Kauai
TMK(s): (4) 3-7-002:002, (4) 3-5-001:008, (4) 3-5-001:159, (4) 3-7-002:001, (4) 3-7-003:001, (4) 3-7-003:007, (4) 3-7-003:014, (4) 3-9-005:001, (4) 3-9-002:004, (4) 3-9-006:001

Contract Firm: SSFM International, Inc.
(firm who completed the work on behalf of the agency)
Contact Name: Jared Chang
Phone: 808-356-1242 Email: jchang@ssfm.com

_____ Check if Report/Plan is a re-submittal (no fee)
_____ Check if Field Inspection Report requested by SHPD (no fee)
_____ Check if **Final Report** (no fee)

_____ $0 Archaeological Monitoring Report, no resources reported
_____ $25 Archaeological Monitoring Plan
_____ $25 Burial Disinterment Report
X $25 Request from Agency for Determination Letter per HAR §13-275
_____ $50 Archaeological Assessment (AIS with negative findings)
_____ $50 Osteological Analysis Report
_____ $100 Archaeological Monitoring Report, resources reported
_____ $150 Archaeological Inventory Survey Plan, Archaeological Data Recovery Plan, or Preservation Plan
_____ $250 Burial Treatment Plan (BTP)
_____ $450 Archaeological, Architectural, or Ethnographic Survey Report
_____ $450 Archaeological Data Recovery Report
_____ Fee Total: Make check payable to "Hawaii Historic Preservation Special Fund"

For Office Use Only:

Date Received:	Payment Method: Cash Amount $
Log No.:	Check No. Amount $
Receipt Issued:	Money Order Amount $

rev. 11/9/2017

State Historic Preservation Division
HRS 6E Submittal Form

Per §6E, Hawai'i Revised Statutes, if the Project requires review by the State Historic Preservation Division (SHPD), please review and fill out this form and submit all requested information to SHPD. Please submit this form and project documentation **electronically** to:

dlnr.intake.shpd@hawaii.gov

If you are unable to submit electronically, please contact SHPD at (808) 692-8015. Mahalo.

The submission date of this form is:

1. APPLICANT (select one)

☐ Property Owner ☑ Government Agency

2. AGENCY (select one)

☐ Planning Department ☑ Department of Public Works ☐ Other (specify):

Type of Permit Applied For:

3. APPLICANT CONTACT

3.1) Name: Douglas Haigh 3.2) Title: Building Division Chief

3.3) Street Address: 4444 Rice Street, Suite 275

3.4) County: Kauai 3.5) State: Hawaii 3.6) Zip Code: 96766

3.7) Phone: 808-241-4849 3.8) Email: dhaigh@kauai.gov

4. PROJECT DATA

4.1) Permit Number (if applicable): N/A

4.2) TMK [e.g. (3) 1-2-003:004]: (4) 3-7-002:002, (4) 3-5-001:008, (4) 3-5-001:159, (4) 3-7-002:001, (4)

4.3) Street Address: Not Applicable

4.4) County: Kauai 4.5) State: Hawaii 4.6) Zip Code: Various

4.7) Total Property Acreage: Approx. 1,660-acres

4.8) Project Area (acreage, square feet): Approx. 18-acres

4.9) List any previous SHPD correspondence (LOG Number & DOC Number, if applicable):

LOG NO. 2017.01385 DOC NO. 1806SH21

5. PROJECT INFORMATION

5.1) Does the Project involve a Historic Property? A Historic Property is any building, structure, object,

district, area, or site, including heiau and underwater site, **which is over 50 years old** (*HRS §6E-2*).

☑ Yes ☐ No

5.2) The date(s) of construction for the historic property (building, structure, object, district, area, or site, including heiau and underwater site) is The Hanamaulu Railroad Bridge was built between 1921

5.3) Is the Property listed on the Hawai‘i and or National Register of Historic Places? To check: http://dlnr.hawaii.gov/shpd/

☑ Yes ☐ No

5.4) Detailed Project Description and Scope of Work:

The proposed project will consist of a 10 - 12-foot wide concrete shared-use path along approximately 6.7 miles of coastal Kauai. The path would begin at Ahukini Point and would end by connecting with an existing path to the north of Lydgate Park. Other amenities that would be provided include

5.5) Description of **previous** ground disturbance (e.g. previous grading and grubbing):

None.

5.6) Description of **proposed** ground disturbance (e.g. # of trenches, Length x Width x Depth):

Construction of the 10-12 foot wide concrete shared use path extending for 6.7 miles. Final design of the project is not available.

5.7) The Agency shall ensure whether historic properties are present in the project area, and, if so, it shall ensure that these properties are properly identified and inventoried. Identify all known historic properties:

State Inventory of Historic Places (SIHP) 50-30-08-1845 (Hanamaulu Railroad Bridge)
SIHP 50-30-08-1846 (historic concrete box culvert)
SIHP 50-30-08-103 (re-internment site located at Wailua Golf Course)

5.8) Once a historic property is identified, then an assessment of significance shall occur.

Integrity (check all that apply):

☑ Location ☐ Design ☐ Setting ☐ Materials ☑ Workmanship ☐ Feeling ☑ Association

Criteria (check all that apply):

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

5.9) The effects or impacts of a project on significant historic properties shall be determined by the agency.

Effect Determination (select one):

☐ No Historic Properties Affected
☐ Effect, with Agreed Upon Mitigation Commitments (§6E-42, HRS)
☑ Effect, with Proposed Mitigation Commitments (§6E-8, HRS)

5.10) This project is (check all that apply, if applicable):

☐ an activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency;

☑ carried out with Federal financial assistance; and or

☐ requiring a Federal permit, license or approval.

If any of these boxes are checked, then the Project may also be subject to compliance with Section 106 of the National Historic Preservation Act (NHPA).

6. PROJECT SUBMITTALS

6.1) Please submit a copy of the Tax Map Key (TMK) map

6.2) Please submit a copy of the property map showing the project area and indicate if the project area is smaller than the property area.

6.3) Please submit a permit set of drawings. A permit set is a set of drawings prepared and signed by a licensed architect or engineer and is at least 65% complete.

6.4) Are you submitting a survey?

☐ Yes ☑ No

Specify Survey:

6.5) Did SHPD request the survey?

☐ Yes ☑ No

If 'Yes', then please provide the date, SHPD LOG NO, and DOC NO:

Date: LOG NO. DOC NO.

6.6) **SURVEY REVIEW FEES**. Fee for Review of Reports and Plans (§§13-275-4 and 284-4). A filing fee will be charged for all reports and plans submitted to our office for review. Please go to:

http://dlnr.hawaii.gov/shpd/about/branches/archaeology/filing-fee-schedule/

A check payable to the Hawaii Historic Preservation Special Fund should accompany all reports or plans submitted.

6.7) Please submit color photos/images of the Historic Property (any building, structure, object, district, area, or site, including heiau and underwater site) that will be affected by the Project.

The following are the minimum number and type of color photographs required:

Quantity	Description
1-2	Street view(s) of the resource and surrounding area
1-2	Over view of exterior work area
1	exterior photo of the North elevation (if applicable)
1	exterior photo of the South elevation (if applicable)
1	exterior photo of the East elevation (if applicable)
1	exterior photo of the West elevation (if applicable)
1-2	interior photos(s) of areas affected (if applicable)

CHECKLIST

☑ **SHPD FORM 6E** (this form)

☑ **PROJECT SUBMITTALS** (any requested documentation for items 6.1 - 6.7 of this form)

☑ **FILING FEE FORM** (if applicable)

RAMP REQUIRED TO TRANSITION BETWEEN RR BRIDGE + LOWER LAND (5% DESIRABLE 8.33% MAXIMUM PER ADA

BRIDGE REFURBISHMENT

HISTORIC CEMETERY

SIHP 1845

SIHP 2066

TMK 3-7-002:999

RAMP TO/FROM PARK (5% DESIRABLE-8.33% MAXIMUM PER ADA APPROX 800 LINEAR FT.

ELEVATED PATH ACROSS AE FLOOD ZONE

TMK: 3-7-002:001

TMK: 3-7-003:008

NEW COMFORT STATION

HANAMA'ULU BEACH PARK

RAMP REQUIRED TO TRANSITION BETWEEN RR GRAND + UPPER CANE HAUL ROAD (5% DESIRABLE 8.33% MAXIMUM PER ADA

CONSTRUCT BOX CULVERT OVER DITCH

DECREASE IN ELEVATION. RAMP TO HILTON LANE (5% DESIRABLE 8.33% MAXIMUM PER ADA)

TMK: 3-7-003:017

SIHP 2066

EXISTING COMFORT STATION

HILTON HOTEL & KAUAI BEACH VILLAS TMK: 3-7-003:015

TMK: 3-7-003:007

TMK: 3-7-003:001

TMK: 3-5-001:158

TMK: 3-7-002: 14

TMK: 3-7-002: 16

SIHP 1843

PROJECT LIMITS

OCEAN BAY PLANTATION

TMK: 3-7-003:001

SIHP 1840

SIHP 1841

RENTAL CAR STORAGE TMK: 3-5-001:158

8' FENCE BETWEEN PATH AND RENTAL CAR STORAGE

TMK: 3-5-001: 008

SIHP 1838

TMK 3-7-002:999

TMK: 3-5-001:160

AHUKINI LANDING

FUTURE PARKING AREA

TMK: 3-5-001:159

TMK 3-7-002:002

TMK 3-5-001:085

SIHP 2068,1840, 1839

TMK: 3-5-001:08

FUTURE COMFORT STATION DRINKING FOUNTAIN AND PAY PHONE PATH ACCESS/TRAILHEAD

MATCHLINE

LEGEND:

- ARCHAEOLOGICAL SITE
- AREA OF POTENTIAL EFFECT
- 10' BIKE PATH
- CHAIN LINK FENCE
- BRIDGE REPAIR, ELEVATED PATH, GRADE RAMP TRANSITIONS
- 10' CHAIN LINK FENCE ON MAUKA SIDE AND CHAIN LINK FENCE ON SIDE OF GOLF COURSE
- 8' SOILD FENCE ON ROAD SIDE AND SOLID FENCE ON SIDE OF GOLF COURSE
- 4' CHAIN LINK FENCE ON CANAL SIDE AND CHAIN LINK FENCE ON SIDE OF GOLF COURSE
- COMFORT STATION

GRAPHIC SCALE:

500 0 500' 1000'

SSFM INTERNATIONAL
SSFM International, Inc.
501 Sumner Street
Suite 620
Honolulu, Hawaii 96817

REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

PROJECT:
AHUKINI -LYDGATE PARK BICYCLE/PEDESTRIAN PATH
TMK: VARIOUS
KAUAI, HAWAII

AREA OF POTENTIAL EFFECT
1 OF 2

DATE
February 2016

MATCHLINE

REFURBISH EXISTING BOX CULVERT WITH DECK AND RAILINGS

REDESIGN OF PARING LOT AND DECL AND ACCEL LANES, MAY REQUIRE RECONSTRUCTION ON STAIRS THAT LEAD TO UPPER PARKING LOT

4' SAFETY FENCE ON CANAL AND GOLF COURSE EDGE

PATH FOLLOW ALONG MAKAI EDGE OF LOWER PARKING LOT

8' SAFETY FENCE BETWEEN PATH AND PUMP HOUSE

10' SAFETY FENCE ALONG HIGHWAY AND GOLF COURSE EDGE

8' SAFETY FENCE BETWEEN PATH AND #12 TEE BOX

PROJECT LIMITS

SIHP 1846

SIHP 103
RE-INTERNMENT SITE

SIHP 356

SIHP 103 BURIAL PRESERVATION AREA

FUTURE COMFORT STATION
DRINKING FOUNTAIN, GRAVEL
PARKING LOT

KUHIO HIGHWAY

KUHIO HWY

TMK: 3-9-005:009

TMK: 3-9-005:005

TMK: 3-9-005:007

TMK 3-9-005:003

TMK: 3-9-005:011

TMK: 3-9-005:009

TMK: 3-9-005:012

TMK 3-9-005:002

EXISTING MOT CROSS PARK

MARINE CAMP

WAILUA GOLF COURSE
TMK: 3-9-005:001

TMK: 3-9-005:020

KAUAI COMMUNITY CORRECTIONAL CENTER
TMK: 3-9-005:013

CLUBHOUSE

TMK: 3-9-002:004

DRIVING RANGE

TMK: 3-9-002:010

TMK: 3-9-002: 025

TMK: 3-9-002-999

WAILUA GOLF COURSE

TMK: 3-9-006: 959

TMK: 3-9-006: 011

TMK: 3-9-006: 023

LYDGATE PARK
TMK: 3-9-002:034

TMK: 3-9-002:032

TMK: 3-9-006: 001

TMK: 3-9-006: 004

LEGEND:

- ARCHAEOLOGICAL SITE
- AREA OF POTENTIAL EFFECT
- 10' BIKE PATH
- CHAIN LINK FENCE
- BRIDGE REPAIR, ELEVATED PATH, GRADE RAMP TRANSITIONS
- 10' CHAIN LINK FENCE ON MAUKA SIDE AND CHAIN LINK FENCE ON SIDE OF GOLF COURSE
- 8' SOILD FENCE ON ROAD SIDE AND SOLID FENCE ON SIDE OF GOLF COURSE
- 4' CHAIN LINK FENCE ON CANAL SIDE AND CHAIN LINK FENCE ON SIDE OF GOLF COURSE
- COMFORT STATION

GRAPHIC SCALE:

500 0 500' 1000'

SSFM INTERNATIONAL
SSFM International, Inc.
501 Sumner Street
Suite 620
Honolulu, Hawaii 96817

REVISION	DATE	DESCRIPTION	MADE BY	APPROVED

PROJECT:
AHUKINI-LYDGATE PARK
BICYCLE/PEDESTRIAN PATH
TMK: VARIOUS
KAUAI, HAWAII

AREA OF POTENTIAL EFFECT
2 OF 2

DATE
February 2016

SIHP 50-30-08-1845 Hanamaulu Railroad Bridge

View looking north towards bridge

View looking north towards bridge

View looking south towards bridge

View looking south towards bridge

SIHP 50-30-08-1846 Historic Concrete Box Culvert

View looking south towards culvert

View of top of culvert

SIHP 50-30-08-103 Wailua Golf Course Parking Lot

Parking lot entry/exit

View looking north of parking lot

Northern point of parking lot looking towards reinternment site

Reinternment site

Attachment C: Special Management Area Use Permit Application

December 14, 2020

Jared K. Chang, AICP
c/o SSFM International Inc.
501 Sumner Street, Suite 620
Honolulu, Hawai'i 96817

Subject: Special Management Area Use Permit SMA(U)-2021-3
Tax Map Keys: (4) 3-7-001:008, 159; 3-7-002:001, 002; 3-7-003:001, 017;
3-9-002:004, 032; 3-7-005:001-003, 009
Līhu'e, Kaua'i
COK Department of Public Works, Applicant

Dear Mr. Chang,

This letter memorializes the action taken by the Kaua'i Planning Commission effective December 8, 2020 concerning approval of the above subject permits to allow construction of a multi-use path (bicycle & pedestrian) extending from Ahukini Point to the existing path at the northern section of Lydgate Park and associated improvements affecting portions of the parcels referenced above. The approval, per your consent and as amended, is subject to the following conditions:

1. The proposed improvements shall be completed as outlined in the Application. Any changes are subject to review by the Planning Director. Should the path be impacted from coastal processes, the Applicant shall submit those revisions to the Planning Director for review. The Director reserves the right to forward requests to alter or change the proposed development to the Planning Commission should there be any potential design or visual impacts that could not be mitigated, or because of anticipated impacts that may adversely impact the environment or the safety and welfare of the community.

2. The Applicant is advised that all development shall be subject to the shoreline setback requirements, as prescribed in Section 8-27.3 of the Comprehensive Zoning Ordinance (CZO), Chapter 8 of the Kaua'i County Code (1987), as amended.

3. In order to minimize adverse impacts on the Federally Listed Threatened Species, Newell's Shearwater and other seabirds, all external lighting shall be only of the following type: *downward-facing shielded lights*. Spotlights aimed upward or spotlighting of structures, landscaping or the ocean shall be prohibited.

4. The Applicant shall resolve and comply with the applicable standards and

requirements set forth by the State Health Department, State Historic Preservation Division-DLNR, and the County Departments of Public Works, Fire, Transportation and Water.

5. The Applicant is advised that should any archaeological or historical resources be discovered during ground disturbing/construction work, all work in the area of the archaeological/historical findings shall immediately cease and the Applicant shall contact the State Department of Land and Natural Resources – Historic Preservation Division at (808) 692-8015 and the Planning Department at (808) 241-4050.

6. The Applicant shall develop and utilize Best Management Practices (BMP's) during all phases of development in order to minimize erosion, dust, and sedimentation impacts of the project to abutting properties.

7. The Applicant shall obtain the necessary building permit and commence construction within two (2) years from the date of approval of the SMA Permit, and complete construction within four (4) years from the date of approval of the building permit.

8. The Applicant is advised that prior to construction and/or use, additional government agency conditions may be imposed. It shall be the Applicant's responsibility to resolve those conditions with the respective agency(ies).

9. The Planning Commission reserves the right to revise, add, or delete conditions of approval in order to address or mitigate unforeseen impacts the project may, create, or to revoke the permits through the proper procedures should conditions of approval not be complied with or be violated.

10. The Applicant shall comply with conditions and mitigations as outlined in the Memorandum of Agreement pursuant to Section 106 State Historic Preservation Review.

11. No other improvements or additional structures (other than those represented in the application) such as comfort stations, rest pavilions, or picnic areas are authorized by the approval of the subject permits.

12. A work plan showing the location of any areas to be used for temporary staging for the storage of materials, supplies, equipment, employee parking, and supplemental beach parking along with a construction schedule shall be submitted prior to issuance of a building and/or zoning permit.

13. To the extent possible within the confines of union requirements and applicable legal prohibitions against discrimination in employment, the Applicant shall seek to hire Kaua'i contractors as long as they are qualified and reasonable competitive with other contractors, and shall seek to employ residents of Kaua'i

in temporary construction and permanent resort-related jobs. It is recognized that the Applicant may have to employ non-Kaua'i residents for particular skilled jobs where no qualified Kaua'i resident possesses such skills. For the purposes of this condition, the Commission shall relieve the Applicant of this requirement if the Applicant is subjected to anti-competitive restraints on trade or other monopolistic practices.

If you have further questions regarding this matter, please contact Dale A. Cua of my staff at (808) 241-4050.

Sincerely Yours,

KA'ĀINA S. HULL
Clerk, Kaua'i Planning Commission

xc: COK – Public Works, Fire, Water, Housing Agency, Finance-Real Property Division
State Health Dept.

Ahukini to Lydgate Park Bicycle and Pedestrian Path

Special Management Area Use Permit Application

April 14, 2020

SUBMITTED TO:
County of Kaua‘i
Planning Department
4444 Rice Street., Ste A473
Lihue, Hawaii 96766

SUBMITTED BY:
County of Kaua‘i
Department of Public Works
Building Division
4444 Rice Street, Suite 175
Lihue, Hawaii 96766-1340

PREPARED BY:
SSFM International, Inc.
501 Sumner Street, Suite 620
Honolulu, Hawai‘i 96817

TABLE OF CONTENTS

LIST OF APPENDICES

1.0 SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT FORM

COUNTY OF KAUA'I
DEPARTMENT OF PLANNING

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

I. Part A

APPLICANT INFORMATION			
Applicant:	SSFM International, Inc. on behalf of County of Kauai Department of Public Works		
Address:	501 Sumner Street, Suite 620 Honolulu, HI 96817	Phone:	(808) 356-1242
Applicant's Status: (Check one)			
☐ Owner of the Property	(Holder of at least 75% of the equitable and legal title)		
☐ Lessee of the Property	Lessee must have an **unexpired and recorded** lease of five (5) years or more from the date of filing of this application. If not, Owner(s) must provide a Letter of Authorization.		
☑ Authorized Agent	Attach Letter of Authorization		
Contact Person:	Jared Chang	Address:	SSFM International, Inc.
Phone:	(808) 356-1242		501 Sumner Street, Suite 620, Honolulu, HI 96817
Email:	jchang@ssfm.com		

PROJECT INFORMATION (attach additional sheets if necessary)			
Site Address:	See Section 2.0 of the written attachment with this application	Tax Map Key:	437002999, 437002002, 435001085, 435001008, 435001159
		Lot Area:	See Section 1.0 of written attachment
State Land Use District:	Agricultural, Conservation, Urban	County Zoning:	Conservation, Agriculture, Open, Special
General Plan Designation:	Parks and Recreation, Transportation, Urban Center, Natural, Residential Community, A		
Nature of Development:	The purpose of the proposed project, referred to as "Ahukini to Lydgate Park Bicycle and Pedestrian Path," is to provide a shared-use bicycle and pedestrian path for residents and visitors to Kaua'i. The path will begin at Ahukini Point and will end by connecting with an existing path to the north at Lydgate Park, covering a distance of approximately 6.7 miles. Construction of this path will be a key segment of the Nawiliwili to Anahola Bike and Pedestrian Path proposed in the 1994 State of Hawai'i Master Plan – Bike Plan Hawai'i.		

* **NOTE**: An Environmental Assessment in accordance with HRS Chapter 343 is required for actions requiring a Shoreline Setback Variance (SSV). Please contact the Planning Department for further information.

Valuation of Development: $20 million
(Estimate Attached)

Date of Application: _____

COUNTY OF KAUA'I
DEPARTMENT OF PLANNING

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

II. Part B

The petitioner shall be responsible for filing the following required information with the department before an application is considered complete:

1. A **written** description of the proposed project, location and a statement of reasons/justification for project.
2. If property abuts a shoreline, a certified shoreline survey conducted by a registered land surveyor within 6 months of an application shall be submitted, when required by the Planning Agency.
3. A plot plan of the property, drawn to scale, with all proposed and existing structures and other pertinent information. Also, preliminary building sketch plans are to be submitted.
4. Any other plans or information requirements by the Director.

   Note: An Environmental Assessment or Environmental Impact Statement that has been declared adequate under the National Environmental Policy Act (NEPA) or under Chapter 343, HRS, may constitute a valid filing under this section.
5. Project Assessment:

   a. Description of the area and environment involved including flora and fauna, and other features;

   See Section 4.0 of the Final EA included as Appedix B with this application.

   b. Description of the existing land uses of the project site and surrounding areas;

   See Section 3.0 of the Final EA included as Appendix B with this application.

   c. Description of how the proposed project will affect the area involved and surrounding areas. Specifically the assessment should evaluate if the proposal:

	YES	NO
i. Involves an irrevocable commitment to loss or destruction of any natural or cultural resources, including but not limited to, historic sites, Special Treatment Districts as established by the County of Kauai Comprehensive Zoning ordinance, view planes or scenic corridors as outlined in the Community Development Plans, and recreation areas and resources;	☐	☑

Discussion:

See Section 4.0 in the written attachment with this application.

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

ii. Curtails the range of beneficial uses of the environment; YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

iii. Conflicts with the County's or the State's long-term environmental policies or goals; YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

iv. Curtails the range of beneficial uses of the environment; YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

v. Substantially affects the economics or social welfare and activities or the community, County or State; YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

vi. In itself has no significant adverse effect but cumulatively has considerable effect upon the environment or involves a commitment for larger actions; YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

vii. Substantially affect a rare threatened, or endangered species of animal or plant, or its habitat; YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

viii. Detrimentally affects air or water quality or ambient noise levels; or — YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

ix. Affects an environmentally sensitive area, such as flood plain, shoreline, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water or coastal water; — YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

x. May have a major effect on the quality of the environment or affect the economic or social welfare of the area; and — YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

xi. Would possibly be contrary to the policies and guidelines of the Rules and Regulations, the County's General Plan, Development Plans, and Zoning and Subdivision Ordinances. — YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

d. Evaluation of the proposed development relative to the objective and policies as contained in Chapter 205A, HRS; and Section 3.0 of the Special Management Area (SMA) Rules and Regulations: (complete following questionnaire)

RECREATIONAL RESOURCES:	Objective Provide coastal recreation opportunities accessible to the public.

Check either "Yes" or "No" for each of the following questions. If your answer below is "**Yes**" or "**No**" it is necessary to elaborate by providing comments in the "Discussion" section below the question.

COUNTY OF KAUA'I
DEPARTMENT OF PLANNING

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

		YES	NO
1.	Will the proposed development adversely affect coastal resources uniquely suited for recreational activities that cannot be provided in other areas?	☐	☑

Discussion:

See Section 4.0 in the written attachment with this application.

		YES	NO
2.	Will the project require replacement of coastal resources having significant recreational value, including but not limited to surfing sites, sandy beaches and fishing areas, when such resources will be unavoidably damaged by the proposed development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable?	☐	☑

Discussion:

See Section 4.0 in the written attachment with this application.

		YES	NO
3.	Is the project site near a State or County Park?	☑	☐

Discussion:

See Section 4.0 in the written attachment with this application.

		YES	NO
4.	Will the proposed development affect an existing public access to or along the shoreline?	☐	☑

Discussion:

See Section 4.0 in the written attachment with this application.

		YES	NO
5.	Will the proposed development provide public access to and/or along the shoreline?	☑	☐

Discussion:

See Section 4.0 in the written attachment with this application.

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

6. Will the proposed development encourage expanded recreational use of County, State, or federally owned or controlled shoreline lands and waters having recreational value? YES ☑ NO ☐

Discussion:

See Section 4.0 in the written attachment with this application.

7. Will the development generate point or non-point sources of pollution that will affect recreation value of coastal area? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

HISTORICAL RESOURCES:	Objective Protect, preserve, and where desirable, restore those natural and man-made historic and pre-historic resources in the Special Management Area that are significant in Hawaiian and American history and culture.

Check either "Yes" or "No" for each of the following questions. If your answer below is "**Yes**" or "**No**" it is necessary to elaborate by providing comments in the "Discussion" section below the question.

1. Is the project site within a Federal, State and/or County designated historical/cultural district? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

2. Is the project site listed on or nominated to the Hawaii or National Register of Historic Places? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

3. Does the project site include land(s) which have not been previously surveyed by an archaeologist? YES ☐ NO ☑

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

Discussion:

See Section 4.0 in the written attachment with this application.

4. If an archeological survey has been conducted for the project site, has the survey been submitted to the State Historic Preservation Office for review and recommendations? YES ☑ NO ☐

Discussion:

See Section 4.0 in the written attachment with this application.

5. Has any site survey revealed any information on historic or archaeological resources? (Please provide a copy or reference of survey) YES ☑ NO ☐

Discussion:

See Section 4.0 in the written attachment with this application.

6. Is the project site within or near a Hawaiian fishpond? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

7. Is the project located within or near a historic settlement area? (Cemeteries, burials, heiaus, etc.) YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

SCENIC & OPEN SPACE RESOURCES:	Objective Protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources.

Check either "Yes" or "No" for each of the following questions. If your answer below is "**Yes**" or "**No**" it is necessary to elaborate by providing comments in the "Discussion" section below the question.

COUNTY OF KAUA'I
DEPARTMENT OF PLANNING

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

1. Does the project site abut or affect a valued scenic resources or landmark within the SMA? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

2. Does the proposed development affect existing shoreline open space and scenic resources? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

3. Does the proposed development involve alteration to natural landforms and existing public views to and along the shoreline? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

4. Is the project compatible with the visual environment? YES ☑ NO ☐

Discussion:

See Section 4.0 in the written attachment with this application.

5. Does the proposed action involve the construction of structures visible between the nearest coastal roadway and the shoreline? YES ☑ NO ☐

Discussion:

See Section 4.0 in the written attachment with this application.

6. Is the project site within the Shoreline Setback Area (20 or 40 feet inland from the shoreline)? YES ☑ NO ☐

Discussion:

See Section 4.0 in the written attachment with this application.

COUNTY OF KAUA'I
DEPARTMENT OF PLANNING

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

COASTAL ECOSYSTEMS:	Objective Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.

Check either "Yes" or "No" for each of the following questions. If your answer below is "**Yes**" or "**No**" it is necessary to elaborate by providing comments in the "Discussion" section below the question.

1. Is the project site a habitat for endangered species of flora and fauna? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

2. Will the proposed development adversely affect valuable coastal ecosystems of significant biological or economic importance? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

3. Will the proposed involve disruption or degradation of coastal water ecosystems through stream diversions, channelization, and similar land and water uses? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

4. Will the proposed development include the construction of special waste treatment facilities, such as injection wells, discharge pipes, septic tank systems or cesspools? YES ☑ NO ☐

Discussion:

See Section 4.0 in the written attachment with this application.

5. Is there a wetland on the project site? YES ☑ NO ☐

Discussion:

See Section 4.0 in the written attachment with this application.

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

6. Is the project site situated in or abutting a Natural Area Reserve or Wildlife Refuge or Sanctuary? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

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

Check either "Yes" or "No" for each of the following questions. If your answer below is "**Yes**" or "**No**" it is necessary to elaborate by providing comments in the "Discussion" section below the question.

1. Does the project involve a harbor or port? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

2. Is the proposed development related to or near to an existing major hotel, multi-family, or condominium project? YES ☑ NO ☐

Discussion:

See Section 4.0 in the written attachment with this application.

3. Does the project site include agricultural lands designated for such use? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

4. Does the proposed development relate to commercial fishing or seafood production? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

		YES	NO
5.	Does the proposed development relate to commercial fishing or seafood production?	☐	☑

Discussion:

See Section 4.0 in the written attachment with this application.

COASTAL HAZARDS:	Objective Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.

Check either "Yes" or "No" for each of the following questions. If your answer below is "**Yes**" or "**No**" it is necessary to elaborate by providing comments in the "Discussion" section below the question.

		YES	NO
1.	Is the project site within a potential tsunami inundated area as depicted on the National Flood Insurance Rate maps (FIRM)?	☑	☐

Discussion:

See Section 4.0 in the written attachment with this application.

		YES	NO
2.	Is the project site within a potential flood inundation area according to a FIRM?	☑	☐

Discussion:

See Section 4.0 in the written attachment with this application.

		YES	NO
3.	Does the project comply with the requirements of the Federal Flood Insurance Program?	☑	☐

Discussion:

See Section 4.0 in the written attachment with this application.

		YES	NO
4.	Has the project site or nearby shoreline areas experienced shoreline erosion?	☑	☐

Discussion:

See Section 4.0 in the written attachment with this application.

SPECIAL MANAGEMENT AREA (SMA) PERMIT ASSESSMENT

5. Have any seawalls/revetments/etc. been constructed or exist in the immediate vicinity? YES ☐ NO ☑

Discussion:

See Section 4.0 in the written attachment with this application.

PROJECT ASSESSMENT:	

e. Evaluation of the impacts which cannot be avoided and mitigating measures proposed to minimize that impact:

Discussion:

See Section 4.0 in the written attachment with this application.

f. Evaluation of the proposed development relative to Section 4.0 of the SMA Rules and Regulations in accordance with the following aspects:

i. Substantial adverse environmental or ecological effects;

Discussion:

See Section 4.0 in the written attachment with this application.

ii. Consistency or compliance of the proposed development relative to the goals and objectives of Chapter 205A, HRS; and Section 3.0 of the SMA Rules and Regulations; and

Discussion:

See Section 4.0 in the written attachment with this application.

iii. Consistency or compliance of the proposed development relative to the County General Plan, Development Plan, and Zoning Ordinances.

Discussion:

See Section 4.0 in the written attachment with this application.

Jared K. Chang, Manager, Strategic Services Group — April 14, 2020

[name], [title] — Date

2.0 APPLICANT & PROJECT INFORMATION

APPLICANT & CONTACT PERSON	County of Kauaʻi Public Works Department 4444 Rice Street, Suite 275 Lihue, HI 96766 Phone: (808) 241-4992
	Douglas Haigh Phone: (808) 241-4849 Email: dhaigh@kauai.gov
AGENT	SSFM International, Inc. 501 Sumner Street, Suite 620 Honolulu, HI 96817 Jared Chang Phone: (808) 356-1242 Email: jchang@ssfm.com
LOCATION	Līhuʻe, Kauaʻi
TAX MAP KEY(S)	(4) 3-7-002:002, (4) 3-7-001:008, (4) 3-7-001:159, (4) 3-7-002:001, (4) 3-7-003:001, (4) 3-7-003:017, (4) 3-9-005:001, (4) 3-9-005:002, (4) 3-9-005:003, (4) 3-9-005:009, (4) 3-9-002:004, (4) 3-9-002:032
STATE LAND USE DISTRICT	Agricultural, Conservation, Urban
COUNTY ZONING	Conservation, Agriculture, Open
GENERAL PLAN LAND USE DESIGNATION	Parks and Recreation, Transportation, Urban Center, Natural, Residential Community, Agricultural, Resort, Golf Course, Neighborhood Center
NATURE OF DEVELOPMENT	The purpose of the proposed project, referred to as "Ahukini to Lydgate Park Bicycle and Pedestrian Path," is to provide a shared-use bicycle and pedestrian path for residents and visitors to Kauaʻi. The path will begin at Ahukini Point and will end by connecting with an existing path to the north at Lydgate Park, covering a distance of approximately 6.7 miles. Construction of this path will

<table>
<tr><td></td><td colspan="4">be a key segment of the Nawiliwili to Anahola Bike and Pedestrian Path proposed in the Bike Plan Hawai‘i 2003 (update to the 1994 State of Hawai‘i Master Plan – Bike Plan Hawai‘i).</td></tr>
<tr><td>VALUATION OF DEVELOPMENT</td><td colspan="4">$20,092,920</td></tr>
<tr><td rowspan="14">LANDOWNERS</td><td>Tax Map Key</td><td>Owner</td><td>Parcel Size (acres)</td><td>Abutting Shoreline</td></tr>
<tr><td>(4) 3-7-002:002</td><td>State of Hawai‘i</td><td>0.692</td><td>Yes</td></tr>
<tr><td>(4) 3-7-001:008</td><td>State of Hawai‘i</td><td>720.974</td><td>Yes</td></tr>
<tr><td>(4) 3-7-001:159</td><td>State of Hawai‘i</td><td>4.93</td><td>Yes</td></tr>
<tr><td>(4) 3-7-002:001</td><td>Visionary LLC</td><td>171.869</td><td>Yes</td></tr>
<tr><td>(4) 3-7-003:001</td><td>EWM Kaua‘i LLC</td><td>420.237</td><td>Yes</td></tr>
<tr><td>(4) 3-7-003:017</td><td>"Kaua‘i Beach Resort Association
Knickerbocker Life Ins Co"</td><td>4.597</td><td>Yes</td></tr>
<tr><td>(4) 3-9-005:001</td><td>State of Hawai‘i</td><td>107.403</td><td>Yes</td></tr>
<tr><td>(4) 3-9-005:002</td><td>Līhu‘e Plantation Co Ltd</td><td>3.35</td><td>No</td></tr>
<tr><td>(4) 3-9-005:003</td><td>State of Hawai‘i</td><td>1.26</td><td>No</td></tr>
<tr><td>(4) 3-9-005:009</td><td>State of Hawai‘i</td><td>1.33</td><td>No</td></tr>
<tr><td>(4) 3-9-002:004</td><td>State of Hawai‘i</td><td>136.18</td><td>No</td></tr>
<tr><td>(4) 3-9-002:032</td><td>County of Kaua‘i</td><td>.061</td><td>No</td></tr>
</table>

3.0 PROJECT DESCRIPTION

3.1 INTRODUCTION

The County of Kaua‘i, Department of Public Works (DPW) plans to develop a shared-use bicycle and pedestrian path between Ahukini Landing and Lydgate Park (“project”). The project is a key segment of *Ke Ala Hele Makalae*, a coastal shared-use path that will span Kaua‘i’s eastern coastline from Nāwiliwili to Anahola. The project will benefit residents and visitors by preserving coastal access, creating a new safe recreational resource and supporting alternate modes of transportation. In addition, the path will provide health benefits through exercise, education and learning from interpretive signs located along the path, ecotourism and improved ecological health from design concepts that protect and enhance the environment.

The proposed path will consist of a 10 to 12-foot wide concrete shared-use path that will begin at Ahukini Point and end by connecting with an existing path segment to the north at Lydgate Park, spanning a total distance of approximately 6.7 miles. Other design elements will include trailheads and three comfort stations. Two historic bridges would be restored (SIHP 50-30-08-1845 Hanamā‘ulu Railroad Bridge and SIHP 50-30-08-1846 a historic concrete box culvert) for path use. Improvements would be made to the parking lot at Marine Camp, and to the entrance and lower parking lot at Wailuā Golf Course. Low maintenance materials would be used including wood, composite plastics, stainless steel, and concrete.

The project will be funded by a combination of federal and county funds; the Federal Highway Administration (FHWA) is the lead federal agency. An FHWA-approved Categorical Exclusion (CATEX) was completed on May 21, 2019. Since the project will receive federal financial assistance, National Historic Preservation Act (NHPA) Section 106 consultation was required. The State Historic Preservation Division (SHPD) concurred with the FHWA’s finding of “no adverse effect” on historic properties in a letter dated June 28, 2018.

Consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to Section 7 of the Endangered Species Act was completed for this project. The USFWS concurred with FHWA that the project “may affect, but is not likely to adversely affect” endangered species based on the implementation of the conservation measures listed in their letter dated October 25, 2013. The conservation measures described are incorporated into this application as commitments to be made by the project.

A State of Hawai‘i, Hawai‘i Revised Statutes (HRS), Chapter 343 Final Environmental Assessment (FEA) and Finding of No Significant Impact (FONSI) determination was completed for the proposed project in June 2016 by the County of Kaua‘i Department of Public Works. The proposed project has not significantly changed in size, scope, intensity, use, location, timing, or other means since the publication of the FEA in June 2016, however portions of the path alignment have been adjusted to avoid traversing through flood zones AE and VE, as identified on the Federal Emergency Management Agency’s (FEMA) Special Flood Hazard Areas map. A copy of the FEA and FONSI are included in Appendix B.

The proposed path will traverse properties that abut the shoreline through various segments. An approved certified shoreline survey dated October 15, 2019 is included in Appendix C.

3.2 PURPOSE AND NEED

The purpose of the proposed project is to provide an alternative transportation route for bicyclist and pedestrians to access Kauaʻi's eastern shoreline areas.

This alternative transportation project is needed through east Kauaʻi because Kūhiō Highway is a principal arterial and the only main thoroughfare between Līhuʻe and Kapaʻa. Kuhio Highway provides high mobility and carries high traffic volumes, but is primarily designed for motorized vehicles. Kauaʻi's ocean and coastlines are frequently visited areas for recreational activities and gatherings, especially during weekends and holidays. The popularity of these areas creates a need to improve existing pathways or create new pathways to provide Kauaʻi residents and visitors (of all ages and mobility levels) with alternative transportation modes to access the shoreline. This project presents opportunities to provide an improved pathway for walkers, joggers, bicyclists, and other non-motorized forms of transportation which need a safe thoroughfare to and along the coastline.

The rising costs of fuel and transportation have increased public interest in bicycling, however bicyclists on Kauaʻi have limited or no riding space in the project area. In addition, many of the popular coastline sites in the project area are not easily accessible and do not have improved access ways. This alternative route would help bicyclist and pedestrians travel between the Airport, Ahukini Point and Lydgate Park along a pathway that is accessible to a variety of users of differing ages and skill levels. The paths for bicyclists would be consistent with State Department of Transportation (DOT) plans and County of Kauaʻi policies for promoting bicycling and pedestrian modes within the State.

This shared-use bicycle and pedestrian facility will meet the following needs for residents and visitors to Kauaʻi by providing options to use a form of transportation other than the automobile, thereby reducing fuel consumption, pollution, roadway congestion and the need for parking lots; by providing affordable recreation for persons of all ages and abilities; by providing a safe mode of transportation and recreation; and by providing a means for ecotourism. There is also need to provide supporting facilities for current coastal resources such as comfort stations and parking.

3.3 RELATIONSHIP TO PLANS, OBJECTIVES AND POLICIES

3.3.1 2018 KAUAʻI COUNTY GENERAL PLAN

The 2018 Kauaʻi County General Plan contains 19 policies to guide the growth and development of the island. Of these policies, the proposed path satisfies three policies, as listed below.

Policy #4 Design healthy and complete neighborhoods: Ensure new and existing neighborhoods have safe roads and functional parks, as well as access to jobs, commerce, transit, and public services.

Response: The proposed path provides a safe and alternate mode of transportation for neighborhoods along the eastern coastline of Kauaʻi. The path allows these neighborhoods to be more walkable and is accessible for people of all ages, skill levels and economic classes.

Policy #5 Make strategic infrastructure investments: New government investment should support growth areas and include priority projects as identified in Community Plans.

Response: The Līhu‘e Community Plan 2015 identifies the proposed path on the “Future Bicycle Facilities in the Līhu‘e District Map,” under section 5.4.3 Bicycle Facilities. Under section 5.4.4 Pedestrian Facilities, one of the policies calls to “implement the programs and policies outlined in the Kaua‘i Multimodal Land Transportation Plan that are applicable to Līhu‘e District.” The Kaua‘i Multimodal Land Transportation Plan lists the coastal shared-use path as one of the priorities for immediate implementation.

Policy #7 Build a balanced multimodal transportation system: Reduce congestion conditions through strategic infrastructure improvements and increase multimodal transportation options.

Response: The proposed path supports this policy in increasing multimodal transportation options. The path addresses the needs of all transportation users by allowing access for bicyclists and pedestrians without impacting vehicular traffic flow.

3.3.2 LĪHU‘E COMMUNITY PLAN (2015)

The 2015 Līhu‘e Community Plan includes policies to implement the vision for the Līhu‘e District. Under Section 5.4 Transportation, the proposed path is identified on the “Future Bicycle Facilities in the Līhu‘e District” map. The proposed path also satisfies the following policies that pertain to transportation in the Līhu‘e District:

- *Implement the programs and policies outlined in the Kaua‘i Multimodal Land Transportation Plan that are applicable to Līhu‘e District.*
- *Provide visitors with viable alternatives to driving, including shuttle services to resorts, access to transit, bike share facilities and car share facilities at resorts.*

Response: The Kaua‘i Multimodal Land Transportation Plan identifies the proposed path and the completion of the *Ke Ala Hele Makalae* as a priority under section 6B Bicycle Program. Since the proposed path travels along Kaua‘i Beach Road it is part of a network of paths to provide easy access for residents and guests staying at the Kaua‘i Beach Resort and Kaua‘i Beach Villas. It would provide visitors an alternative to car-based touring and sight-seeing.

3.3.3 COMPREHENSIVE ZONING ORDINANCE (CZO)

The proposed path traverses through land zoned as Conservation, Agriculture, and Open under the County’s CZO. The portion of the path that runs along the Wailuā Golf Course and Kūhiō Highway will be through land that has no zoning designation.

Under the CZO, outdoor recreation use is considered a permitted use or structure within the Agriculture and Open districts. The CZO defines “outdoor recreation” as “uses and facilities pertaining primarily to recreation activities that are carried on primarily outside of structures.” For the portion of the path that traverses through lands designated as Agriculture, a Class I permit may be required. For lands designated as Open, a Class II permit may be required. The proposed path and comfort stations are compliant with both zoning districts’ development standards.

3.4 IMPACTS AND MITIGATION MEASURES

Probable impacts and mitigations measures are discussed in Section 4.0 of the FEA, included in Appendix B.

3.5 ALTERNATIVES TO THE PROPOSED DEVELOPMENT

Alternatives to the proposed path are discussed in Section 5.0 of the FEA, included in Appendix B.

3.6 COASTAL ZONE MANAGEMENT, HRS CHAPTER 205A

An evaluation of the project in relation to the objectives and policies of the State's Coastal Zone Management Act, Chapter 205A, HRS is discussed in this application in Section 3.0, Project Assessment.

3.7 CERTIFIED SHORELINE SURVEY

A certified shoreline survey set is provided with this application in Appendix A.

3.8 SITE PLAN

A plot plan of the properties affected, and proposed path is attached to this application in Appendix C.

3.9 OTHER PLANS OR INFORMATION

The proposed project has not significantly changed in size, scope, intensity, use, location, timing, or other means since the publication of the FEA in June 2016. The FEA/FONSI is attached to this application as Appendix B.

4.0 PROJECT ASSESSMENT

4.1 DESCRIPTION OF THE AREA AND ENVIRONMENT INVOLVED;

A description of the affected environment is provided in Section 3.0 in the FEA, included in Appendix B.

4.2 EXISTING LAND USES OF THE PROJECT SITE AND SURROUNDING AREAS

The proposed path starts near Ahukini Recreational Pier State Park, which has a fishing pier and jetty. The area above the parking lot at the Ahukini Fishing Pier rises sharply to a bluff that separates this property from the State of Hawai'I, Department of Transportation, Airport Division lands. The path moves west along the coast and into dense shrubbery located on State-owned parcels. The path continues into undeveloped land owned by Visionary LLC, and then approaches the abutments of the existing Hanamā'ulu Railroad Bridge. The path crosses the bridge onto an undeveloped parcel owned by EWM Kaua'i LLC and follows abandoned cane haul roads until it joins Kaua'i Beach Road. From there, the path continues down along Kaua'i Beach Road, over an existing culvert until it intersects with Marine Camp Road. As the path approaches Kūhiō Highway it starts to run along the mauka border of the Wailuā Golf Course and continues on the golf course border until it turns down Leho Drive. The path then runs near an undeveloped parcel owned by the Department of Hawaiian Home Lands and down Nehe Road to adjoin the existing bike and pedestrian path.

The majority of the path traverses through undeveloped land and along the perimeter of developed parcels, namely the Wailuā Golf Course.

4.3 DESCRIPTION OF HOW THE PROPOSED PROJECT WILL AFFECT THE AREA INVOLVED AND SURROUNDING AREAS

i. Involves an irrevocable commitment to loss or destruction of any natural or cultural resources, including but not limited to, historic sites, Special Treatment Districts as established by the County of Kaua'i Comprehensive Zoning ordinance, view planes or scenic corridors as outlined in the Community Development Plans, and recreation areas and resources;

   a. The project does not involve an irrevocable commitment to loss or destruction of any natural or cultural resources. The proposed path will traverse three historical sites; State Inventory of Historic Places (SIHP) 50-30-08-1845 the Hanamā'ulu Railroad Bridge, SIHP 50-30-01846 a historic concrete box culvert associated with sugar cane production, and SIHP 50-30-08-103 a human remains reinternment site at Wailuā Golf Course. The Hanamā'ulu Bridge would undergo retrofitting and restoration, including widening of the deck and addition of a safety railing. Concrete planks would be added to the top and doweled into the existing structure to provide added stability. The concrete box culvert is one of two historic railroad bridges identified under Site 1846. The culvert would also be retrofitted with a new concrete deck and safety railings on each side. The reinternment site will not be directly affected, but the path alignment will cross within 30 feet of the site.

Minimal impact with no adverse effect is expected for the historic sites and consultation with the State Historic Preservation Division (SHPD) has been completed as part of the FEA process. Additionally, Section 106 consultation was completed, which resulted in the State Historic Preservation Officer's (SHPO) concurrence of the Federal Highway Administration's (FHWA) finding of no adverse effect to the historic sites. The existing parks near the proposed path will not be impacted and will be accessible from the path itself. The proposed path is not expected to have significant negative impacts on view planes or scenic corridors, but rather, it will provide greater opportunities for the public to experience and appreciate the natural surroundings.

ii. Curtails the range of beneficial uses of the environment;
   a. The alignment occurs within parks and park corridors that are dedicated to active and passive recreation. Currently, there is no restriction or direction given to people who walk, run, or jog within the parks or through the various habitats. The construction of the trail will restrict movements of users to the trail, which will protect the environment from unrestricted encroachment.

iii. Conflicts with the County's or the State's long-term environmental policies or goals;
   a. The proposed trail is consistent with the Environmental Policies established in HRS Chapter 344.

iv. Substantially affects the economics or social welfare and activities or the community, County or State;
   a. The project will provide a bike and pedestrian path that will serve as an alternate transportation route in addition to Kūhiō Highway. This alternative route would help bicyclist and pedestrians travel between the Airport, Ahukini Point and Lydgate Park along a pathway that is accessible to a diversity of users of varying ages and skill levels. It will provide the community with enhanced and improved recreational opportunities. The short-term impact on the economy would be positive as the path would provide a need for design and construction employment opportunities.

v. In itself has no significant adverse effect but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;
   a. The proposed path will make the county park system more accessible via non-motorized transportation, especially for those who cannot operate a motorized vehicle. It will also be sited away from environmentally sensitive areas and does not commit resources or energy for a larger action.

vi. Substantially affect a rare threatened, or endangered species of animal or plant, or its habitat;
   a. The path will not adversely affect endangered plant or animal species. To minimize the potential for disorienting listed seabirds and bats, shielded lighting on the shortest poles possible will be provided at the comfort stations and no outdoor lights will be installed along the path.. The County will work with the Department of Land

and Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW) on two interpretative and two regulatory seabird signs that uses DOFAW provided text and graphics. In order to minimize the effect of the proposed project on listed waterbirds, disturbance from construction and increased human activity along the proposed path will be kept to a minimum.

b. DPW and HDOT, along with contractor(s) shall strictly adhere to all of the BMPs provided in the project's Water Pollution, Dust, and Erosion Control Plan, listed below:
    i. Waste Management – concrete wastes, solid wastes, and any sanitary/septic wastes will be located away from and managed to assure no contamination to the critical habitat
    ii. Vehicle and Equipment Management – all vehicle and equipment cleaning, maintenance, and refueling will be located away from and managed to assure no contamination to the critical habitat.
    iii. Storm Water Management – Silt fences will be installed and maintained between the work areas and the critical habitat.
    iv. Erosion Control - Temporary or permanent grassing or permanent vegetation will be provided for any areas exposed over 30 calendar days.
    v. In addition, the DPW will be following the HDOT Standard Specifications for Road and Bridge Construction Section 209 Temporary Water Pollution, Dust, and Erosion Control, which is enclosed for your reference. The BMPs will be finalized in final design and in the National Pollutant Discharge Elimination System Permit.
    vi. DPW and HDOT, along with contractor(s) should use materials that are nontoxic to aquatic organisms, such as untreated wood, concrete, or steel (e.g. avoid pressure-treated lumber).
c. There are no endangered plant species along the proposed path, and it is not anticipated that there will be negative impact to the native vegetation along the path. If encountered, the following measures will be taken:
    i. Path will be routed around any major trees whenever possible, avoiding the drip line;
    ii. Trees that are one-foot or greater will be moved to a nearby location if they cannot be avoided;
    iii. New plants will be irrigated, at least until they are established;
    iv. Areas disturbed by construction will be re-vegetated as soon as possible after construction of each area; and
    v. Native plants will be used for new plantings where feasible.

vii. Detrimentally affects air or water quality or ambient noise levels; or

a. The project will not result in any increases in vehicular traffic volumes, vehicle mix, location of the existing facility, or any other factor that would cause an sustained increase in emission impacts, and as such the FHWA has determined the project will generate minimal air quality impacts for Clean Air Act criteria pollutants, and has not been linked with any special mobile source air toxin (MSAT) concerns.

b. Water quality will not be impacted as the existing Hanamā‘ulu Railroad Bridge and an existing concrete box culvert bridge (located at Marine Camp) will be used as bridges for the path.
c. Non-motorized transportation methods do not generally produce loud noise. Socializing by pedestrians along the path could impact the golfers and residents of the area, and nighttime use of the path could be disruptive to the Kaua‘i Beach Villas and/or Aqua Kaua‘i Beach Resort. Mitigation measures would be to install signs along the path in noise sensitive areas to remind users to keep noise at a respectful level.

viii. Affects an environmentally sensitive area, such as flood plain, shoreline, tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water or coastal water;
a. Most of the proposed path alignment is within the FEMA Flood Zone X areas, and the path will not encroach on the base flood plains as defined in 23 CFR Part 650, thus a majority of the path is not expected to obstruct floodwaters during extreme rain. Three areas of the path will be within Zone AE areas; at Ahukini Point, between Hanamā‘ulu Beach Park and Kapule Highway, and near the intersection of the path and Kailua Beach Road. The path in these areas will be elevated and/or built with construction techniques and materials that are floodable. The proposed comfort stations will be built above the flood zones.

ix. May have a major effect on the quality of the environment or affect the economic or social welfare of the area; and
a. The proposed project is not anticipated to have any negative long-term economic impacts. As stated in the FEA, there is widespread support for the project from the community and political leaders. Through public meetings, stakeholders were able to express their concerns and see their issues addressed throughout the progression of the project when alternative path alignments were created.
b. Three historical, archaeological, and cultural resources will be traversed within the proposed path; the Hanamā‘ulu Railroad Bridge, a historical concrete box culvert and an interment site in the Wailuā Golf Course parking lot. Minimal impact with no adverse effect is expected. To protect the historic character of the Hanamā‘ulu Railroad Bridge, any work to the bridge will be minimal and will only include minor structural repairs and addition of handrails and other features required for public safety, with sensitivity to the historic nature and aesthetic of the bridge. The historical concrete box culvert will be left intact; additions will be minimal, including deck pavement with concrete and safety railings. These additions will not change the historic integrity or character of the culvert.

x. Would possibly be contrary to the policies and guidelines of the Rules and Regulations, the County’s General Plan, Development Plans, and Zoning and Subdivision Ordinances;
a. The proposed path would be consistent with the County of Kaua‘i’s General Plan Policy #7 Build a Balance Multimodal Transportation System. The objective of the policy is to “reduce congestion conditions through strategic infrastructure improvements and increase multimodal transportation options.” Under Sector III. Land Transportation, the action is organized into six programs; two of which the proposed path would satisfy. The objective of the pedestrian program is “to provide

connected and convenient pedestrian facilities in communities." The proposed path is just one segment of the East Kaua'i Coastal Shared-Use Path, which starts at Līhu'e Airport and ends in Anahola. This coastal path would provide bicycle and pedestrian facilities connecting communities along the eastern coast of the island. The objective of the bicycle program is "to create connected and safe bicycle networks that accommodate all riders." This project would provide a protected shared use path that accommodates riders of all skill levels.

4.4 EVALUATION OF THE PROPOSED DEVELOPMENT RELATIVE TO THE OBJECTIVE AND POLICIES AS CONTAINED IN CHAPTER 205A, HRS; AND SECTION 3.0 OF THE SPECIAL MANAGEMENT AREA (SMA) RULES AND REGULATIONS:

4.4.1 RECREATIONAL RESOURCES

Objective: Provide coastal recreation opportunities accessible to the public.

i. Will the proposed development adversely affect coastal resources uniquely suited for recreational activities that cannot be provided in other areas?
   a. The proposed path is not expected to result in impacts to coastal resources uniquely suited for recreational activities. The path is setback from the coastline along elevated bluffs and mauka (landward) of Kaua'i Beach Resort, Marine Camp Beach and Wailuā Golf Course.

ii. Will the project require replacement of coastal resources having significant recreational value, including but not limited to surfing sites, sandy beaches and fishing areas, when such resources will be unavoidably damaged by the proposed development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable?

   The proposed path does not require replacement of coastal resources or is anticipatd to have negative impacts on these resources.

iii. Is the project site near a State or County Park?
   a. There are three (3) County parks and one State park recreational facility within the boundaries of this project. The first County park is Lydgate Park, which is located on the north end of the project site. The second County park is the Marine Camp, and the third is Hanamā'ulu Beach Park, which is located towards the south end of the project. Ahukini Point is a State Recreational Pier and is located at the south end. The path also runs along the Wailuā Golf Course property adjacent to Kūhiō Highway.

iv. Will the proposed development affect an existing public access to or along the shoreline?
   a. No existing public access to or along the shoreline will be negatively affected. The purpose of the proposed project is to provide an alternative transportation route for bicyclist and pedestrians to access Kaua'i's eastern shoreline areas. The popularity of these areas creates a need to improve existing pathways or create new pathways

to provide Kaua‘i residents and visitors (of all ages and mobility levels) with alternative transportation modes to access the shoreline.

v. Will the proposed development provide public access to and/or along the shoreline?
   a. Yes, this project presents opportunities to provide an improved pathway for walkers, joggers, bicyclists, and other non-motorized forms of transportation which need a safe thoroughfare to and along the coastline.

vi. Will the proposed development encourage expanded recreational use of County, State, or federally owned or controlled shoreline lands and waters having recreational value?
   a. Yes, this project presents opportunities for recreational use of Kaua‘i’s eastern shoreline. The proposed path will provide alternative transportation access to many of the popular coastline sites in the project area that are not easily accessible and do not have improved access ways. This alternative route would help bicyclist and pedestrians travel between the Airport, Ahukini Point and Lydgate Park along a pathway that is accessible to a variety of users of differing ages and skill levels. The paths for bicyclists would be consistent with State Department of Transportation (DOT) plans and County of Kaua‘i policies for promoting bicycling and pedestrian modes within the State by providing affordable recreation for persons of all ages and abilities; by providing a safe mode of transportation and recreation; and by providing a means for ecotourism. There is also need to provide supporting facilities for current coastal resources such as comfort stations and parking.

vii. Will the development generate point or non-point sources of pollution that will affect recreation value of coastal areas?
   a. Impacts from non-point source pollution will be minimal because of adjacent landscaping and vegetation and use of best management practices during construction.

4.4.2 HISTORICAL RESOURCES

Objective: Protect, preserve, and where desirable, restore those natural and man-made historic and pre-historic resources in the Special Management Area that are significant in Hawaiian and American history and culture.

i. Is the project site within a Federal, State and/or County designated historical/cultural district?
   a. No, the project site is not within a Federal, State and/or County designated historical/cultural district.

ii. Is the project site listed on or nominated to the Hawai‘i or National Register of Historic Places?
   a. Along the proposed project path are three (3) sites registered to the State Inventory of Historic Places. These sites include:
      i. SIHP 50-30-08-1845: Hanamā‘ulu Railroad Bridge

ii. SIHP 50-30-08-1846: Historic concrete box culvert associated with sugar cane production
iii. SIHP 50-30-08-103: Human remains reinternment site at Wailuā Golf Course

iii. Does the project site include land(s) which have not been previously surveyed by an archaeologist?
   a. It is possible that the proposed path contains land(s) that have not been previously surveyed by an archaeologist, however Scientific Consultant Services, Inc. (SCS) prepared an Archaeological Condition Report for the project in consultation with SHPD, as included in the FEA. The report identifies the known State Historic sites, and outlines tasks required for the project, per SHPD consultation.

iv. If an archaeological survey has been conducted for the project site, has the survey been submitted to the State Historic Preservation Office for review and recommendations?
   a. Section 106 Consultation was completed with SHPD. Historic properties were identified through consultation with agencies and native Hawaiians to identify sensitive places, sites and areas along the proposed path. The FHWA requested the SHPO concurrence with their Section 106 "No Adverse Effect" determination for the project, in which the SHPO concurred in a letter dated June 28, 2018.

v. Has any site survey revealed any information on historic or archaeological resources?
   a. The Archaeological Condition Report prepared by SCS identified known State Historic Sites, including sites 103, 1845 and 1846.

vi. Is the project site within or near a Hawaiian fishpond?
   a. The proposed project site does not traverse within or near a Hawaiian fishpond.

vii. Is the project located within or near a historic settlement area? (Cemeteries, burials, heiaus, etc.)
   a. A human remains reinternment site at Wailuā Golf Course (SIHP 50-30-08-103) is located near the proposed path. This is the site where remains are interred resulting from the construction of the Wailuā golf course. The proposed path is expected to traverse at least 30 feet from the internment site and will not have an adverse impact on it.

4.4.3 SCENIC & OPEN SPACE RESOURCES

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

i. Does the project site abut or affect a valued scenic resource or landmark within the SMA?
   a. The proposed path is not within any scenic corridors, open space acquisition priorities or preserves areas, as identified on the Līhu‘e Heritage Resource Map in the 2018 Kaua‘i County General Plan. The boundary between Kūhiō Highway and the Wailuā Golf Course is already separated by an abundance of trees, which reduce, if not eliminate, any view of the path and safety fence from the highway.

Views from the golf course to the path and safety fence will be partially mitigated through placement of the proposed amenity through existing vegetation and by planting shrubs and trees on the golf course side of the safety fence. The existing bridges will have safety railing additions to them that could only block minimal specific heights for views. However, safe, non-motorized access along the proposed path corridor and accessibility for persons with disabilities will extend access to the many scenic viewpoints along the corridor to more people that would regularly have access to such views if the path were not built.

ii. Does the proposed development affect existing shoreline open space and scenic resources?
    a. The proposed path is not expected to affect existing shoreline open space or scenic resources.

iii. Does the proposed development involve alteration to natural landforms and existing public views to and along the shoreline?
    a. The proposed path does not alter any existing natural landforms. The path is also not a coastal alignment, therefore existing public views to and along the shoreline will not be affected.

iv. Is the project compatible with the visual environment?
    a. According to the Līhu‘e Heritage Resource Map, the proposed path will traverse through areas identified as state and county parks (Ahukini State Recreational Pier, Hanamā‘ulu Beach Park and Wailuā Golf Course) and sand dunes (Wailuā Golf Course).
    The proposed path alignment is not expected to have significant negative impacts on the visual environment. The flat corridor will not intrude on the surroundings but will provide greater opportunities for the public to experience and appreciate the natural environment. In order to minimize any visual impact along the corridor, the path will be constructed with materials and colors that blend into the natural environment whenever possible.

v. Does the proposed action involve the construction of structures visible between the nearest coastal roadway and the shoreline?
    a. Safety rails will be placed along the proposed path at the two existing bridges, and safety fencing will be placed between the golf course fairways and the path. These vertical additions will provide minimal visual impairments compared to the safety elements they provide to the users. Views from the golf course to the path and safety fence will be partially mitigated by the placement of the path traversing through existing vegetation, and by planting shrubs and trees on the golf course side of the safety fence.

vi. Is the project site within the Shoreline Setback Area (20 or 40 feet inland from the shoreline)?
    a. The beginning of the proposed path at Ahukini Point, and a portion of the path that runs along the north side of Hanamā‘ulu Bay may be within the Shoreline Setback

Area. DPW will be submitting a Shoreline Setback Variance application for the project in compliance with the Kaua‘i County Code 1987 § 8-27.9.

4.4.4 COASTAL ECOSYSTEMS

Objective: Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.

i. Is the project site a habitat for endangered species of flora and fauna?
   a. The proposed path does not traverse through any endangered plant species' habitat.
   b. The proposed path is not a coastal alignment, therefore the Hawaiian Monk Seal's habitat will not be affected. Areas of concern regarding the nesting Wedge-tailed Shearwater's habitat will be surveyed, and if colonies are found, the path will be redirected along cane haul roads. To minimize the potential for disorienting listed seabirds and bats, shielded lighting on the shortest poles possible will be provided at the comfort stations. The County will work with the DLNR, DOFAW on two interpretative and two regulatory seabird signs that uses DOFAW provided text and graphics.

ii. Will the proposed development adversely affect valuable coastal ecosystems of significant biological or economic importance?
   a. The proposed path is not along the coast, and therefore will not affect coastal ecosystems.

iii. Will the proposed involve disruption or degradation of coastal water ecosystems through stream diversions, channelization, and similar land and water uses?
   a. The existing Hanamā‘ulu Railroad Bridge and an existing concrete boxc culvert will be used as bridges for the proposed path, and will not impede upon the hydrologic flow of water. The existing bridge over Hanamā‘ulu Stream will be used for the proposed path alignment, and will not impact its current condition.

iv. Will the proposed development include the construction of special waste treatment facilities, such as injection wells, discharge pipes, septic tank systems or cesspools?
   a. The proposed project will include three new comfort stations. The waste from these comfort stations will use septic tanks and leach fields.

v. Is there a wetland on the project site?
   a. The proposed path crosses through wetland areas near Hanamā‘ulu Beach and Kaua‘i Beach Road. Within the wetland area near Kaua‘i Beach Road, it is proposed that a culvert be replaced over a ditch which is adjacent to the road. In 2009 a letter was submitted requesting a Jurisdictional Determination (JD) from the Army Corps of Engineers (ACOE). According to the letter, the project will be required to get an approved Department of Army (DA) Permit under Section 404 of the Clean Water Act prior to construction.

vi. Is the project site situated in or abutting a Natural Area Reserve or Wildlife Refuge or Sanctuary?

a. The proposed path does not traverse through or abut a Natural Area Reserve or Wildlife Refuge or Sanctuary.

4.4.5 ECONOMIC USES

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

i. Does the project involve a harbor or port?
   a. The proposed path does not traverse any existing harbors or ports.

ii. Is the proposed development related to or near to an existing major hotel, multi-family, or condominium project?
   a. The proposed path will follow Kaua‘i Beach Road, which is directly adjacent to the Kaua‘i Beach Villas and the Aqua Kaua‘i Beach Resort hotels. It will provide visitors with access to alternative transportation routes and areas along the path.

iii. Does the project site include agricultural lands designated for such use?
   a. The proposed path traverses through land designated under the State Land Use Agricultural District located near the Kaua‘i Beach Resort and Kaua‘i Beach Villas hotels, and along Kūhiō Highway and the Wailuā Golf Course. The Kaua‘i Land Use Map in the 2018 Kaua‘i County General Plan identifies lands near the hotels, namely a portion of TMK (4) 3-7-003:001, as Agricultural lands.

iv. Does the proposed development relate to commercial fishing or seafood production?
   a. No, the project does not relate to commercial fishing or seafood production.

4.4.6 COASTAL HAZARDS

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

i. Is the project site within a potential tsunami inundated area as depicted on the National Flood Insurance Rate maps (FIRM)?
   a. A majority of the proposed path is within the tsunami inundation zone, except for the portion of the path that traverses the Wailuā Golf Course. Mitigation measures should include signage in hazardous areas, which would warn path users of potential coastal hazards such as tsunamis or flooding.

ii. Is the project site within a potential flood inundation area according to a FIRM?
   a. Most of the proposed path is outside of the .2% annual chance floodplain, or Zone X, as identified in the FIRM. The path crosses through areas designated as Zone AE near Hanamā‘ulu Beach and Kaua‘i Beach Road. Areas of the path that traverse through Zone AE will be elevated and built with construction techniques and materials that are floodable. The proposed comfort stations will be built above the flood zones.

iii. Does the project comply with the requirements of the Federal Flood Insurance Program?

a. Yes.

iv. Has the project site or nearby shoreline areas experienced shoreline erosion?
   a. The Kaua‘i Shoreline Study Erosion Maps indicate that the Nukolii study area experiences erosion at an average rate of -0.9 ft/yr., and the Lydgate study area experiences erosion at an average rate of -0.4 ft/yr.

v. Has any seawalls/revetments/etc. been constructed or exist in the immediate vicinity?
   a. Seawalls, revetments, etc. are not located in the immediate vicinity of the path.

4.5 EVALUATION OF THE IMPACTS WHICH CANNOT BE AVOIDED AND MITIGATING MEASURES PROPOSED TO MINIMIZE THAT IMPACT:

Probable impacts and mitigations measures are discussed in Section 4.0 of the FEA, included in Appendix B.

4.6 EVALUATION OF THE PROPOSED DEVELOPMENT RELATIVE TO SECTION 4.0 OF THE SMA RULES AND REGULATIONS IN ACCORDANCE WITH THE FOLLOWING ASPECTS:

i. Substantial adverse environmental or ecological effects;
   a. The project will not have any substantial adverse environmental or ecological effects, per the FONSI determination of the FEA, which is discussed in Section 6.0 of the FEA included in Appendix B.

ii. Consistency or compliance of the proposed development relative to the goals and objective of Chapter 205A, HRS; and Section 3.0 of the SMA Rules and Regulations; and
   a. The project’s relation and compliance with the goals and objective of Chapter 205A, HRS and Section 3.0 of the SMA Rules and Regulations is discussed in section 4.4 of this application.

iii. Consistency or compliance of the proposed development relative to the County General Plan, Development Plan, and Zoning Ordinances
   a. The project’s relation and compliance with the Kaua‘i County General Plan 2018, the Līhu‘e Community Plan (2015) and the CZO is discussed in sections 2.3, 2.4 and 2.5.

-end-