Appendix A Agency Correspondence



# United States Department of the Interior



FISH AND WILDLIFE SERVICE Pacific Islands Fish and Wildlife Office 300 Ala Moana Boulevard, Room 3-122 Honolulu, Hawaii 96850

In Reply Refer To: 2015-SL-0081

J. Michael Will U.S. Department of Transportation Federal Highway Administration Central Federal Lands Highway Division 12300 West Dakota Avenue, Suite 380 Lakewood, CO 80228 DEC 2 2 2014

Subject: Species List for Hawaii Bridges Program, Hawaii, Kauai, and Oahu

Dear Mr. J. Michael Will:

The U.S. Fish and Wildlife Service (Service) received your letter, dated November 21, 2014, requesting a list of federally threatened and endangered species, candidate species, plants and animals of special concern, and critical habitats in the vicinity of the proposed bridge projects. The Federal Highways Administration (FHWA), Central Federal Lands Highway Division (CFLHD), in cooperation with the State of Hawaii Department of Transportation (HDOT), is planning to conduct environmental studies for the proposed rehabilitation or replacement of 12 bridges at 10 locations on the islands of Hawaii, Kauai, and Oahu to improve the safety and reliability of the bridges.

On the island of Hawaii, the Ninole Bridge located along Mamalahoa Highway (Route 11) at mile post 56.7 would be rehabilitated or replaced, addressing bridge width, load capacity, railing, transitions, and approaches. The Hilea Bridge located on Mamalahoa Highway (Route 11) at mile post 57.7 would be rehabilitated or replaced, addressing bridge width, load capacity, railing, and transitions.

On the island of Kauai, Bridge 7E located along Kaumualii Highway (Route 50), approximately 800 feet west of Maluhia Road intersection, would be rehabilitated or replaced, addressing bridge width, load capacity, railing, and transitions. Hanapepe Bridge located on Kaumualii Highway (Route 50) in Hanapepe town would be rehabilitated or replaced, addressing bridge width, load capacity, railing, transitions, approaches, and effects of scour. Kapaa Stream Bridge located on Kuhio Highway (Route 56) near mile post 10 would be rehabilitated or replaced, addressing bridge width, load capacity, railing, transitions, and approaches. This project would also involve improvements to the highway intersection at Mailihuna Road, including roadway



widening, lighting, signing, pavement markings, drainage, and other improvements such as installation of traffic signals. The three Wainiha Stream bridges located on Kuhio Highway (Route 560) at mile post 6.4 and 6.7 would be replaced. Additionally, three load-restricted bridges which cross Waioli, Waipa, and Waikoko streams, located at mile posts 3.4, 3.9, and 4.2, will be studied to determine loads and alternatives such as temporary bridges or supports necessary to provide construction access to the Wainiha Stream bridges.

On the island of Oahu, the Halona Bridge located on Halona Street, which crosses Kapalama Canal, would be rehabilitated or replaced, addressing bridge width, load capacity, railing, transitions, approaches, and pedestrian traffic. The Kawela Bridge located on Kamehameha Highway (Route 83) at mile post 11.4 would be replaced, addressing bridge width, load capacity, railing, transitions, and approaches. The Nanahu Bridge located on Kamehameha Highway (Route 83) at mile post 13.4 would be rehabilitated or replaced, addressing bridge width, load capacity, railing, transitions, and approaches. The Roosevelt Bridge located on Kamehameha Highway (Route 99) at mile post 14.4 would be rehabilitated, addressing bridge located on capacity, railing, and transitions.

The Service offers the following comments to assist you in your planning process so that impacts to trust resources can be avoided through site preparation, construction, and operation. Our comments are provided under the authorities of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C 1531 *et seq.*).

Our databases, including data compiled by the Hawaii Biodiversity and Mapping Program (HBMP), indicate the following species are known to occur or transit through the vicinity of the proposed project areas at Ninole Bridge and Hilea Bridge on the island of Hawaii: the federally endangered Blackburn's sphinx moth (Manduca blackburni, BSM), Hawaiian goose (*Branta sandvicensis*), Hawaiian hawk (*Buteo solitarius*), Hawaiian hoary bat (*Lasiurus cinereus semotus*), and Hawaiian petrel (*Pterodroma sandwichensis*); and the threatened Newell's shearwater (*Puffinus auricularis newelli*). There is no designated critical habitat in the vicinity of the proposed project areas on the island of Hawaii.

Our databases, including data compiled by the HBMP, indicate the following species are known to occur or transit through the proposed project areas at Bridge 7E, Hanapepe Bridge, Kapaa Stream Bridge, and the Wainiha Stream bridges on the island of Kauai: the endangered Hawaiian black-necked stilt (*Himantopus mexicanus knudseni*), Hawaiian moorhen (*Gallinula chloropus sandvicensis*), Hawaiian coot (*Fulica alai*), Hawaiian duck (*Anas wyvilliana*), Hawaiian goose, Hawaiian hoary bat, and Hawaiian petrel; the threatened Newell's shearwater; and a candidate for listing band-rumped storm-petrel (*Oceanodroma castro*). Additionally, our databases indicate the threatened green sea turtle (*Chelonia mydas*) is known to occur in the vicinity of the proposed project areas at the Kapaa Stream Bridge and the Wainiha Stream bridges. There is no designated critical habitat in the vicinity of the proposed project areas on the island of Kauai.

The endangered Hawaiian monk seal (*Monachus schauinslandi*) may use beach habitat in the vicinity of the proposed project at the Kapaa Stream Bridge and the Wainiha Stream bridges. The National Marine Fisheries Service (NMFS) is the Federal agency that consults on potential impacts to monk seals, both in their on-shore and ocean habitats. Therefore, we did not review

#### Mr. Will

the proposed project for potential project impacts to monk seals. We recommend that you contact NMFS regarding the presence of monk seals in the area and potential impacts to the species from the project.

Our databases, including data compiled by the HBMP, indicate the following species are known to occur or transit through the proposed project areas at Kawela Bridge, Nanahu Bridge, and Roosevelt Bridge on the island of Oahu: the endangered Hawaiian black-necked stilt, Hawaiian moorhen, Hawaiian coot, Hawaiian duck, Hawaiian goose, Hawaiian hoary bat, and Hawaiian petrel; and the threatened Newell's shearwater. Hawaiian geese recently arrived on Oahu. A pair was first observed in early January 2014 at the First Wind Kawailoa wind farm facility. They have successfully nested, fledging two goslings at the James Campbell National Wildlife Refuge (NWR) near the town of Kahuku. The pair, originally from Kauai, was translocated to Hilo, Hawaii in February 2012, by the State of Hawaii Division of Forestry and Wildlife, and were apparently attempting to return to Kauai when they arrived on Oahu. As of December 2014 the four birds have been seen at the Mililani Agricultural Park, Mililani golf course, and James Campbell NWR.

Additionally, our databases indicate the endangered Hawaiian hoary bat is known to occur or transit through the proposed project area at Halona Bridge on the island of Oahu. There is no designated critical habitat in the vicinity of the proposed project areas on the island of Oahu.

The Service recommends the following measures to avoid and minimize project impacts to the above listed species.

#### Island of Hawaii

#### Blackburn's sphinx moth

Adult Blackburn's sphinx moths feed on nectar from native plants including beach morning glory (*Ipomoea pescaprae*), iliee (*Plumbago zeylanica*), and maiapilo (*Capparis sandwichiana*). BSM larvae feed upon native tree tobacco (*Nicotiana glauca*), which occupies disturbed areas such as open fields and roadway margins, and the native aiea (*Nothocestrum sp.*), which is found in dry to moist forests at elevations ranging from 1,500 to 5,000 feet. We recommend that a qualified biologist survey the project area for the presence of larval host plants. If larval host plants are detected and will be affected during project construction or operation, we recommend that the biologist document 1) general larval plant density; 2) proximity of larval plants to project sites; 3) average height of the larval plants; 4) signs of larval feeding damage on leaves; and 5) presence of BSM larvae on leaves. We recommend that surveys be conducted for BSM and potential host plants approximately four to eight weeks following significant rainfall and during the wettest portion of the year (usually November-April).

#### Hawaiian Goose

In order to avoid impacts to Hawaiian geese, we recommend a biologist familiar with the nesting behavior of the Hawaiian goose survey the area prior to the initiation of any work, or after any subsequent delay in work of three or more days (during which birds may attempt nesting). If a nest is discovered, work should cease immediately and our office should be contacted for further guidance. Furthermore, all on-site project personnel should be apprised that Hawaiian geese

may be in the vicinity of the project at any time during the year. If a Hawaiian goose (or geese) appears within 100 feet of ongoing work, all activity should be temporarily suspended until the Hawaiian goose (or geese) leaves the area of its own accord.

#### Hawaiian Hawk

Loud, irregular and unpredictable activities, such as using heavy equipment or building a structure, near an endangered Hawaiian hawk nest may cause nest failure. Harassment of Hawaiian hawk nesting sites can alter feeding and breeding patterns or result in nest or chick abandonment. Nest disturbance can also increase exposure of chicks and juveniles to inclement weather or predators. To avoid impacts to Hawaiian hawks, we recommend avoiding brush and tree clearing during their breeding season (March through September). If you must clear the property during the Hawaiian hawk breeding season, we recommend a nest search of the proposed construction site and surrounding area be conducted by a qualified ornithologist immediately prior to start of construction activities. Surveys should ensure that construction activity will not occur within 1,600 feet of any Hawaiian hawk nest.

#### Hawaiian Hoary Bat

The Hawaiian hoary bat roosts in both exotic and native woody vegetation and, while foraging, will leave young unattended in "nursery" trees and shrubs when they forage. If trees or shrubs suitable for bat roosting are cleared during the breeding season, there is a risk that young bats could inadvertently be harmed or killed. To minimize impacts to the endangered Hawaiian hoary bat, woody plants greater than 15 feet (4.6 meters) tall should not be disturbed, removed, or trimmed during the bat birthing and pup rearing season (June 1 through September 15). Site clearing should be timed to avoid disturbance to Hawaiian hoary bats in the project area.

#### Seabirds

Seabirds, including the Newell's shearwater, Hawaiian petrel and band-rumped storm petrel, fly at night and are attracted to artificially-lighted areas resulting in disorientation and subsequent fallout due to exhaustion. Seabirds are also susceptible to collision with objects that protrude above the vegetation layer, such as utility lines, guy-wires, and communication towers. Additionally, once grounded, they are vulnerable to predators and are often struck by vehicles along roadways. To reduce potential impacts to seabirds, we recommend the following minimization measures be incorporated into your project description:

- Construction activities should only occur during daylight hours. Any increase in the use of nighttime lighting, particularly during peak fallout period (September 15 through December 15), could result in additional seabird injury or mortality.
- If lights cannot be eliminated due to safety or security concerns, then they should be
  positioned low to the ground, be motion-triggered, and be shielded and/or full cut-off.
  Effective light shields should be completely opaque, sufficiently large, and positioned so
  that the bulb is only visible from below.

## Mr. Will

## Island of Kauai

Please refer to "Hawaiian goose", "Hawaiian hoary bat", and "Seabirds" under the Island of Hawaii (above) for recommended measures to avoid and minimize impacts to the Hawaiian goose, Hawaiian hoary bat, and Hawaiian petrel, Newell's shearwater, and band-rumped storm petrel.

## Hawaiian Waterbirds

The Hawaiian stilt, moorhen, coot, and duck are hereafter collectively referred to as "Hawaiian waterbirds." Our records indicate there is a high probability that Hawaiian waterbirds may occur in the vicinity of the proposed project. We recommend you incorporate the following measures into your project description to avoid and minimize impacts to Hawaiian waterbirds:

- A biological monitor should conduct Hawaiian waterbird and nest surveys at the proposed project site prior to project initiation.
- Any documented nests or broods within the project vicinity should be reported to the Service within 48 hours.
- A 100-foot buffer should be established and maintained around all active nests and/or broods until the chicks/ducklings have fledged. No potentially disruptive activities or habitat alteration should occur within this buffer.
- The Service should be notified immediately prior to project initiation and provided with the results of pre-construction Hawaiian waterbird surveys.
- A biological monitor(s) should be present on the project site during all construction or earth moving activities to ensure that Hawaiian waterbirds and nests are not adversely impacted.
- If a listed Hawaiian waterbird is observed within the project site, or flies into the site while activities are occurring, the biological monitor should halt all activities within 100 feet of the individual(s). Work should not resume until the Hawaiian waterbird(s) leave the area on their own accord.
- A post-construction report should be submitted to the Service with 30 days of the completion of the project. The report should include the results of Hawaiian waterbird surveys, the location and outcome of documented nests, and any other relevant information.

## Sea Turtles

Artificial lighting can disorient adult sea turtles and hatchlings by affecting their ability to find the ocean. To minimize potential impacts to sea turtles that may utilize beaches in the project vicinity, no light from the proposed project should be visible from the beach. We recommend installation of shielded lighting at construction sites near beaches and around shoreline developments. Shielded lights reduce the direct and ambient lighting of beach habitats within and adjacent to the project site. Effective light shields should be completely opaque, sufficiently large, and positioned so that light from the shielded source does not reach the beach. Projects should also be designed to minimize adverse impacts to basking or nesting sea turtles from offleash pets, mammalian predators, and human disturbance. Mr. Will

#### Island of Oahu

Please refer to "Hawaiian goose", "Hawaiian hoary bat", "Seabirds", and "Hawaiian waterbirds" (above) for recommended measures to avoid and minimize impacts to the Hawaiian goose, Hawaiian hoary bat, Hawaiian petrel, Newell's shearwater, Hawaiian black-necked stilt, Hawaiian moorhen, Hawaiian coot, and Hawaiian duck.

Because the proposed activities may cause soil erosion and sedimentation in sensitive aquatic habitats, we are attaching the Service's recommended Best Management Practices regarding sedimentation and erosion in aquatic environments. We encourage you to incorporate the relevant practices into your project design. In addition to the guidance provided in this letter, the Service anticipates responding to the U.S. Army Corps of Engineers inter-agency notification process and providing further recommendations pursuant to the Fish and Wildlife Coordination Act of 1934 (FWCA), as amended (16 U.S.C. 661 *et seq.*; 48 Stat. 401); and the Clean Water Act (CWA), as amended (33 U.S.C. 1251 *et seq.*; 62 Stat. 1155).

If additional information becomes available, or it is determined that the proposed project may affect federally listed species, we recommend you coordinate with our office early in the planning process so that we may further assist you with Endangered Species Act compliance. We appreciate your efforts to conserve endangered species. Please contact Adam Griesemer, Endangered Species Biologist (phone: 808-285-8261, email: adam\_griesemer@fws.gov) should you have any questions pertaining to this response.

Sincerely,

Joy Bring, Acthory

Aaron Nadig Assistant Field Supervisor: Oahu, Kauai, NWHI, Am.Samoa

Cc: Paul Luersen, CH2M HILL

PHONE (808) 594-1888

FAX (808) 594-1938



STATE OF HAWAI'I OFFICE OF HAWAIIAN AFFAIRS 560 N. NIMITZ HWY., SUITE 200 HONOLULU, HAWAI'I 96817

HRD15-7644B

November 5, 2015

J. Michael Will, P.E. Project Manager U.S. Department of Transportation – Central Federal Lands Highway Division 12300 West Dakota Avenue, Suite 380 Lakewood, CO 80228

Re: National Historic Preservation Act Section 106 Consultation
 Project to Replace Temporary Wainiha Bridges
 Wai'oli, Waikoko, Waipā, Lumaha'i, and Wainiha Ahupua'a; Halele'a Moku;
 Kaua'i Mokupuni
 Tax Map Key: Various

Aloha e J. Michael Will:

The Office of Hawaiian Affairs (OHA) is in receipt of your October 22, 2015 letter, initiating consultation pursuant to the National Historic Preservation Act for a proposed work project located in Wainiha, Kaua'i. The proposed project will replace the three temporary pre-fabricated bridges on Kūhiō Highway in Wainiha Valley, between mile posts 6.4 and 6.7, and cross over Wainiha Stream. The scope of work includes replacing three temporary ACROW bridges with new, one-lane bridges and installing three temporary one-lane bridges crossing over Wai'oli, Waipā, and Waikoko Streams.

At the Wainiha project site, the project plan includes shifting the existing temporary ACROW bridges makai to accommodate traffic and heavy construction loads. Upon completion of the project, all temporary bridges will be removed. Your letter mentions that staging may take place at two potential staging areas in the Lumaha'i ahupua'a or that staging may take place at each bridge location. The Area of Potential Effect includes all of the bridges, the area around the bridges, and the staging areas. It is our understanding that federal funding via the U.S. Department of Transportation, Federal Highways Administration will support the completion of

J. Michael Will, Project Manager November 5, 2015 Page 2

this undertaking. The federal nexus serves as the "trigger" for the applicable requirements of the NHPA.

As mentioned in the cultural impact assessment (CIA) consultation letter for this project dated October 29, 2015, our records confirm that one of the staging parcels contains a historic site, Ka'iliopaia Heiau (State Site 50-30-03-00147) located shoreward of Kūhiō Highway. The use of this parcel for staging should be carefully considered and impacts to the heiau should be avoided. In a previously issued letter, OHA provided consultation recommendations of knowledgeable individuals and community organizations for this project's CIA. Given other projects occurring in the Lumaha'i and Hā'ena areas, we suggest coordinating outreach with Auli'i Mitchell of Cultural Survey Hawai'i, Inc. to seek out community input, so as to minimize the burden on consulting parties from having duplicative consultations for the same project.

OHA does request assurances that should iwi kūpuna or Native Hawaiian cultural deposits be identified during ground altering activities, all work will immediately cease and the appropriate agencies, including OHA, will be contacted pursuant to applicable law.

OHA looks forward to reviewing the archaeological inventory survey that is being prepared for this project. Thank you for initiating consultation at this early stage. Should you have any questions, please contact Kathryn Keala at (808) 594-0272 or kathyk@oha.org.

'O wau iho no me ka 'oia 'i'o,

Kampono Crably

Kamana'opono M. Crabbe, Ph.D. Ka Pouhana, Chief Executive Officer

KC:kk

C: Kaliko Santos - Kaua'i Community Outreach Coordinator (via email)

\*Please address replies and similar, future correspondence to our agency: Dr. Kamana'opono Crabbe Attn: OHA Compliance Enforcement 560 N. Nimitz Hwy, Ste. 200 Honolulu, HI 96817



**Central Federal Lands Highway Division** 

October 21, 2015

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

## [INSERT ADDRESSEE HERE]

Subject: National Historic Preservation Act, Section 106 and Hawaii Revised Statutes, Chapter 6e Consultation for the Project to Replace Temporary Wainiha Bridges

Halele'a District, Kaua'i Island, Wai'oli, Waikoko, Waipā, Lumaha'i, and Wainiha Ahupua'a

Tax Map Key: Wainiha Bridge 1: [4] 5-8-002:002 por.; [4] 5-8-006:030, 031, 032, 033, 046, 060, and 999 por./ Wainiha Bridge 2-3: [4] 5-8-006:009, 011, 017, 018, 019, 030, 999 por.; [4] 5-8-007:023, 024, 031, 032, 999 por./ Waioli Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por.; [4] 5-5-006:014, 888 por.; [4] 5-6-002:002, 004, 999 por./ Waipā Bridge: [4] 5-6-004:014, 022, 023, 999 por./ Waikoko Bridge: [4] 5-6-003:002, 999 por./ Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.

Dear [INSERT ADDRESSEE HERE]:

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), in partnership with the State of Hawaii Department of Transportation (HDOT), is proposing to replace the three temporary pre-fabricated (ACROW) bridges on Kūhiō Highway (Route 560) in Wainiha Valley on the north side of the island of Kaua'i. The bridges are located between mile post 6.4 and 6.7 near the mouth of Wainiha Stream before it feeds into Wainiha Bay. The original bridges at these three locations were replaced with temporary ACROW bridges after Bridge #2 suffered permanent damage and Bridges #1 (the southern-most bridge) and #3 (the northern-most bridge) were determined to be structurally deficient). The ACROW bridges were installed as a temporary measure to keep the roadway open to residents and public traffic until environmental clearance and funding for the permanent structures could be secured. The three bridges are owned and maintained by HDOT. The location of the bridges is depicted in the enclosed Figure 1: Project Location Figure.

The proposed project is considered a federal action and undertaking, and will comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (2006), as well as Hawaii Revised Statutes (HRS) Chapter 6E. We would like to invite you to participate in the Section 106 consultation for the proposed project in accordance with Title 36 of the *Code of Federal Regulations*, Section 800.3, by providing information and/or by requesting to be a consulting party. This letter also initiates consultations in accordance with HRS Chapter 6E.

## **Overview of the Undertaking and Area of Potential Effects**

FHWA and HDOT propose the replacement of the temporary ACROW bridges with new onelane bridges that closely match the existing alignment. The width of the new bridges would be close to the existing bridge widths to maintain the existing roadway character. Also included as part of the proposed project is the placement of temporary one-lane bridges adjacent to or crossing over three historic one-lane bridges along Kūhiō Highway located at Wai'oli, Waipā, and Waikoko Streams that access the Wainiha Bridges project site. These historic bridges have low load capacities and temporary bridges would allow construction loads to access the Wainiha project site without affecting the historic integrity of these bridges. The existing temporary ACROW bridges at the Wainiha project site would be shifted *makai* to accommodate traffic during construction of the new bridges. All temporary bridges would be removed upon completion of the project. Two potential staging areas in Lumaha'i Ahupua'a are also included in the Area of Potential Effects (APE). Staging also may occur at each bridge location and is included in the APE. The APE for this project is shown on the enclosed Figures 2 through 7.

The archaeological and historic architectural APE illustrated in the enclosed map set includes both temporary and permanent impact areas. Tax Map Keys (TMK) and corresponding acreage included in the APE are listed below:

- Wainiha Bridge 1: [4] 5-8-002:002 por.; [4] 5-8-006:030, 031, 032, 033, 046, 060, and 999 por.; 0.669 acres
- Wainiha Bridge 2-3: [4] 5-8-006:009, 011, 017, 018, 019, 030, 999 por.; [4] 5-8-007:023, 024, 031, 032, 999 por.; 2.272 acres
- Wai'oli Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por.; [4] 5-5-006:014, 888 por.; [4] 5-6-002:002, 004, 999 por.; 0.913 acres
- Waipā Bridge: [4] 5-6-004:014, 022, 023, 999 por.; 0.916 acres
- Waikoko Bridge: [4] 5-6-003:002, 999 por.; 0.715 acres
- Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.; 0.517 acres

One previously identified historic property is known to exist within the APE. Kaua'i Belt Road, North Shore Section (also referred to as Kūhiō Highway and State Route 560) is listed in the National Register of Historic Places (NRHP). An Archaeological Inventory Survey (AIS) is currently being prepared to identify if any other historic properties occur within the APE. Database searches and field efforts conducted to this point have identified no new properties within the APE.

Your knowledge of the area is of great value. We seek your assistance in FHWA and HDOT's efforts to identify historic properties and evaluate the project's potential to affect properties. We would appreciate any information or concerns you may wish to share and, in particular, if there are any resources or places of traditional cultural or religious importance that might be affected by this undertaking. In addition, if you are acquainted with any person or organization that is knowledgeable about the proposed project area, or any descendants with ancestral, lineal, or

cultural ties to or cultural knowledge or concerns for, and cultural or religious attachment to the proposed project area, we would appreciate receiving their names and contact information. A response within 30 days would be appreciated, should you have concerns about this project and/or wish to be a consulting party. Please provide written response to me by email at <u>Michael.will@dot.gov</u> or by US Postal Service to 12300 West Dakota Avenue, Suite 380, Lakewood, CO 80228.

Please also feel free to contact Nicole Winterton, Environmental Protection Specialist, by telephone at (720) 963-3689, or email Nicole.Winterton@dot.gov, if you have any questions.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Enclosures:

- Figure 1: Project Location Figure with Area of Potential Effects
- Figures 2-7: Area of Potential Effects

cc (via electronic mail):

Christine Yamasaki, HDOT Donald Smith, HDOT Todd Nishioka, HDOT Jessica Puff, SHPD Dr. Susan Lebo, SHPD Mary Jane Naone, SHPD



**Central Federal Lands Highway Division** 

December 21, 2015

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

Historic Hawaii Foundation Ms. Kiersten Faulkner, Executive Director 680 Iwilei Road, Ste. 690 Honolulu, HI 96817

Subject: National Historic Preservation Act, Section 106 and Hawaii Revised Statutes, Chapter 6e Consultation for the Project to Replace Temporary Wainiha Bridges

Halele'a District, Kaua'i Island, Wai'oli, Waikoko, Waipā, Lumaha'i, and Wainiha Ahupua'a

Tax Map Key: Wainiha Bridge 1: [4] 5-8-002:002 por.; [4] 5-8-006:030, 031, 032, 033, 046, 060, and 999 por./ Wainiha Bridge 2-3: [4] 5-8-006:009, 011, 017, 018, 019, 030, 999 por.; [4] 5-8-007:023, 024, 031, 032, 999 por./ Waioli Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por.; [4] 5-5-006:014, 888 por.; [4] 5-6-002:002, 004, 999 por./ Waipā Bridge: [4] 5-6-004:014, 022, 023, 999 por./ Waikoko Bridge: [4] 5-6-003:002, 999 por./ Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.

Dear Ms. Faulkner:

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), in partnership with the State of Hawaii Department of Transportation (HDOT), is proposing to replace the three temporary pre-fabricated (ACROW) bridges on Kūhiō Highway (Route 560) in Wainiha Valley on the north side of the island of Kaua'i. The bridges are located between mile post 6.4 and 6.7 near the mouth of Wainiha Stream before it feeds into Wainiha Bay. The original bridges at these three locations were replaced with temporary ACROW bridges after Bridge #2 suffered permanent damage and Bridges #1 (the southern-most bridge) and #3 (the northern-most bridge) were determined to be structurally deficient). The ACROW bridges were installed as a temporary measure to keep the roadway open to residents and public traffic until environmental clearance and funding for the permanent structures could be secured. The three bridges are owned and maintained by HDOT. The location of the bridges is depicted in the enclosed Figure 1: Project Location Figure.

The proposed project is considered a federal action and undertaking, and will comply with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended (2006), as well as Hawaii Revised Statutes (HRS) Chapter 6E. We would like to invite you to participate in the Section 106 consultation for the proposed project in accordance with Title 36 of the *Code of* 

*Federal Regulations*, Section 800.3, by providing information and/or by requesting to be a consulting party. This letter also initiates consultations in accordance with HRS Chapter 6E.

## **Overview of the Undertaking and Area of Potential Effects**

FHWA and HDOT propose the replacement of the temporary ACROW bridges with new onelane bridges that closely match the existing alignment. The width of the new bridges would be close to the existing bridge widths to maintain the existing roadway character. The proposed typical section of the one-lane bridge would accommodate a total 14-foot roadway section from rail to rail, with an additional 1 to 1.5 feet on each side to support the bridge rails and for hanging utilities. It is anticipated that structural steel tube rails that are crash-tested would be installed. A rail type has been identified that offers visual similarities to the historic pre-ACROW bridges that existed prior to their emergency replacement. Attached to this letter is a visual rendering of the proposed bridges.

Also included as part of the proposed project is the placement of temporary one-lane bridges adjacent to or crossing over three historic one-lane bridges along Kūhiō Highway located at Wai'oli, Waipā, and Waikoko Streams that access the Wainiha Bridges project site. These historic bridges have low load capacities and temporary bridges would allow construction loads to access the Wainiha project site without affecting the historic integrity of these bridges. The existing temporary ACROW bridges at the Wainiha project site would be shifted *makai* to accommodate traffic during construction of the new bridges. All temporary bridges would be removed upon completion of the project. Two potential staging areas in Lumaha'i Ahupua'a are also included in the Area of Potential Effects (APE). Staging also may occur at each bridge location and is included in the APE. The APE for this project is shown on the enclosed Figures 2 through 7.

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- Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.; 0.517 acres

One previously identified historic property is known to exist within the APE. Kaua'i Belt Road, North Shore Section (also referred to as Kūhiō Highway and State Route 560) is listed in the National Register of Historic Places (NRHP). Wainiha Bridges 1, 2, and 3 are modern elements and as such are identified as non-contributing to the NRHP-listed Kaua'i Belt Road in the State Historic Bridge Inventory prepared by MKE Associates, LLC and Fung Associates, Inc. Wai'oli, Waipā, and Waikoko bridges are identified as contributing elements to the historic roadway. An Archaeological Inventory Survey (AIS) is currently being prepared to identify if any other historic properties occur within the APE. Database searches and field efforts conducted to this point have identified no new properties within the APE.

Your knowledge of the area and of the resources is of great value. We seek your assistance in FHWA and HDOT's efforts to identify historic properties and evaluate the project's potential to affect properties. We would appreciate any information or concerns you may wish to share and, in particular, if there are any resources or places of traditional cultural or religious importance that might be affected by this undertaking. In addition, if you are acquainted with any person or organization that is knowledgeable about the proposed project area, or any descendants with ancestral, lineal, or cultural ties to or cultural knowledge or concerns for, and cultural or religious attachment to the proposed project area, we would appreciate receiving their names and contact information.

A response within 30 days would be appreciated, should you have concerns about this project and/or wish to be a consulting party. Please provide written response to me by email at <u>Michael.will@dot.gov</u> or by US Postal Service to 12300 West Dakota Avenue, Suite 380, Lakewood, CO 80228.

Please also feel free to contact Nicole Winterton, Environmental Protection Specialist, by telephone at (720) 963-3689, or email Nicole.Winterton@dot.gov, if you have any questions.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Enclosures:

- Figure 1: Project Location Figure with Area of Potential Effects
- Figures 2-7: Area of Potential Effects
- Photograph of Existing Bridges 2 and 3 and Visual Rendering of Proposed New Bridges

cc (via electronic mail):

Christine Yamasaki, HDOT Donald Smith, HDOT Todd Nishioka, HDOT Jessica Puff, SHPD Dr. Susan Lebo, SHPD Mary Jane Naone, SHPD PHONE (808) 594-1888

FAX (808) 594-1938



STATE OF HAWAI'I OFFICE OF HAWAIIAN AFFAIRS 560 N. NIMITZ HWY., SUITE 200 HONOLULU, HAWAI'I 96817

HRD15-7644B

November 5, 2015

J. Michael Will, P.E. Project Manager U.S. Department of Transportation – Central Federal Lands Highway Division 12300 West Dakota Avenue, Suite 380 Lakewood, CO 80228

Re: National Historic Preservation Act Section 106 Consultation
 Project to Replace Temporary Wainiha Bridges
 Wai'oli, Waikoko, Waipā, Lumaha'i, and Wainiha Ahupua'a; Halele'a Moku;
 Kaua'i Mokupuni
 Tax Map Key: Various

Aloha e J. Michael Will:

The Office of Hawaiian Affairs (OHA) is in receipt of your October 22, 2015 letter, initiating consultation pursuant to the National Historic Preservation Act for a proposed work project located in Wainiha, Kaua'i. The proposed project will replace the three temporary pre-fabricated bridges on Kūhiō Highway in Wainiha Valley, between mile posts 6.4 and 6.7, and cross over Wainiha Stream. The scope of work includes replacing three temporary ACROW bridges with new, one-lane bridges and installing three temporary one-lane bridges crossing over Wai'oli, Waipā, and Waikoko Streams.

At the Wainiha project site, the project plan includes shifting the existing temporary ACROW bridges makai to accommodate traffic and heavy construction loads. Upon completion of the project, all temporary bridges will be removed. Your letter mentions that staging may take place at two potential staging areas in the Lumaha'i ahupua'a or that staging may take place at each bridge location. The Area of Potential Effect includes all of the bridges, the area around the bridges, and the staging areas. It is our understanding that federal funding via the U.S. Department of Transportation, Federal Highways Administration will support the completion of

J. Michael Will, Project Manager November 5, 2015 Page 2

this undertaking. The federal nexus serves as the "trigger" for the applicable requirements of the NHPA.

As mentioned in the cultural impact assessment (CIA) consultation letter for this project dated October 29, 2015, our records confirm that one of the staging parcels contains a historic site, Ka'iliopaia Heiau (State Site 50-30-03-00147) located shoreward of Kūhiō Highway. The use of this parcel for staging should be carefully considered and impacts to the heiau should be avoided. In a previously issued letter, OHA provided consultation recommendations of knowledgeable individuals and community organizations for this project's CIA. Given other projects occurring in the Lumaha'i and Hā'ena areas, we suggest coordinating outreach with Auli'i Mitchell of Cultural Survey Hawai'i, Inc. to seek out community input, so as to minimize the burden on consulting parties from having duplicative consultations for the same project.

OHA does request assurances that should iwi kūpuna or Native Hawaiian cultural deposits be identified during ground altering activities, all work will immediately cease and the appropriate agencies, including OHA, will be contacted pursuant to applicable law.

OHA looks forward to reviewing the archaeological inventory survey that is being prepared for this project. Thank you for initiating consultation at this early stage. Should you have any questions, please contact Kathryn Keala at (808) 594-0272 or kathyk@oha.org.

'O wau iho no me ka 'oia 'i'o,

Kampono Crably

Kamana'opono M. Crabbe, Ph.D. Ka Pouhana, Chief Executive Officer

KC:kk

C: Kaliko Santos - Kaua'i Community Outreach Coordinator (via email)

\*Please address replies and similar, future correspondence to our agency: Dr. Kamana'opono Crabbe Attn: OHA Compliance Enforcement 560 N. Nimitz Hwy, Ste. 200 Honolulu, HI 96817

## COUNTY OF KAUAI PLANNING DEPARTMENT 4444 RICE STREET, SUITE A473 LIHUE, KAUAI, HAWAII 96766-1326

## MEMORANDUM

DATE:	October 28, 2015
TO.	
10:	J. Michael Will, P.E.
	Program Engineering Manager
	Federal Highway Administration
	Central Federal Lands Highways Div.
	12300 West Dakota Avenue, Suite 380
	Lakewood, CO 80228
FROM: FO	Kauai Historic Preservation Review Commission
SUBJECT:	Letter (8/25/15) from J. Michael Will, P.E., Program Engineering Manager
	US Department of Transportation, Federal Highway Administration
	requesting to be placed on the Kaua'i Historic Preservation Review
	Commission agenda to discuss and review the Wainiba Bridges No. 1. 2. 3:
	Bridge 7 E: Kana'a Stream Bridge: and Hananānā Pivar Bridge

This is to inform you that the Kauai Historic Preservation Review Commission (KHPRC) met on October 1, 2015 to discuss and review the proposed bridge projects submitted in accordance with the Section 106 Consultation.

The KHPRC appreciated the opportunity to comment on the project and received the documentation on the subject bridges. The comments offered by the KHPRC are contained in the attached minutes of the KHPRC meeting of October 1. 2015. Please feel free to contact us should you have any questions regarding this matter.

Mahalo.

cc: State Historic Preservation Division

attachment

## KAUA'I COUNTY HISTORIC PRESERVATION REVIEW COMMISSION Līhu'e Civic Center, Mo'ikeha Building, Meeting Room 2A/2B

#### **MINUTES**

A regular meeting of the Kaua'i County Historic Preservation Commission (KHPRC) was held on October 1, 2015 in the Līhu'e Civic Center, Mo'ikeha Building, Meeting Room 2A/2B.

The following Commissioners were present: Chairperson Pat Griffin, Anne Schneider, Stephen Long, Charlotte Hoomanawanui, Victoria Wichman, and Larry Chaffin Jr.

The following Commissioners were absent: Althea Arinaga, David Helder, and Kuuleialoha Santos.

The following staff members were present: Planning Department – Kaaina Hull, Shanlee Jimenez; Deputy County Attorney Jodi Higuchi-Sayegusa; Office of Boards and Commissions – Administrator Jay Furfaro, Support Clerk Darcie Agaran.

## CALL TO ORDER

The meeting was called to order at 3:00 p.m.

## APPROVAL OF THE AGENDA

<u>Ms. Griffin:</u> If there are no objections as we move to approve the agenda, I would like to place Items C.2., C.3., and C.4. at the end of the business today, rather than where they appear now. With that, may I have a motion to approve the agenda?

Ms. Schneider: I make a motion that we approve the agenda.

Mr. Chaffin Jr.: Second.

<u>Ms. Griffin:</u> Thank you. Ms. Schneider moved and Mr. Chaffin seconded the motion. All in favor? (Unanimous voice vote) Opposed? Hearing none, the motion carries 6:0.

## APPROVAL OF THE AUGUST 6, 2015 MEETING MINUTES

Ms. Griffin: The Approval of the August 6, 2015 Meeting Minutes. Are there any corrections?

Hearing none. May I have a motion to approve?

Ms. Wichman: Move to approve.

FHWA-CFLHD Note: Wainiha Bridges Discussion Included Below for EA Purposes. All other non-project items from KHPRC meeting minutes excluded for brevity.

Mr. Chaffin Jr.: I think you have to consider that.

Ms. Griffin: Thank you. Other discussion? Hearing none.

<u>Mr. Hull:</u> If I could clarify for Commissioner Chaffin, too. Ultimately what goes on with review at the Historic Preservation Commission is the KHPRC serves in an advisory capacity, and would serve in an advisory capacity to either the Planning Director if we're reviewing a Class I or overthe-counter permit, or to the Planning Commission if we're reviewing a Use Permit or Class IV Zoning Permit. That analysis does get taken into place particularly with some reviews at the Planning Commission level where they do take into discretion, as long as it's not a variance that you're talking about, but as far as exactions or requirements made upon applicants and the potential over-exacting, if you will, on a particular application. So that type of review is done, but I'll also defer to what Chair Griffin pointed out is that the purview of this Commission is really to look at the historic qualities and the historical resources and whether or not things like preservation or adaptation can be utilized. So I wouldn't worry too much about the financial side of it being that there will be another review of it, be it at the Planning Commission level or be it at the Planning Director's level, that you don't necessary have to worry about at this point. Just to, somewhat, unlay that concern.

<u>Ms. Griffin:</u> Thank you for that explanation. Is there other discussion? Hearing none. All in favor? (Unanimous voice vote) Opposed? (None) The motion carries 6:0. Thank you, and we'll look forward to your report next month.

Re: Letter (8/25/15) from J. Michael Will, P.E., Program Engineering Manager, US Department of Transportation, Federal Highway Administration requesting to be placed on the Kaua'i Historic Preservation Review Commission agenda to discuss and review the Wainiha Bridges No. 1, 2, 3; Bridge 7 E; Kapa'a Stream Bridge; and Hanapēpē River Bridge.

<u>Ms. Griffin:</u> Okay. Item D.3., New Business, letter from Michael Will, P.E., Program Engineering Manager, US Department of Transportation, to discuss and review Wainiha Bridges No. 1, 2, and 3; Bridge 7 E; Kapa'a Stream Bridge; and Hanapēpē River Bridge.

Staff, is there any...?

<u>Mr. Hull:</u> We don't have a report on these particular ones. I think they are not actually coming for any zoning permits. This is disclosure before you for their 6E Review Process.

Ms. Griffin: Thank you. Applicants?

<u>Nicole Winterton:</u> Hi. I'm Nicole Winterton. I'm the Environmental Manager from Federal Highway Administration, Central Federal Lands. We planned to come before you last month, so we have had some updated project planning, so we did update some presentations for you. We figured you would appreciate the latest and greatest information, so we'll pass that out.

Ms. Griffin: Terrific.

Ms. Winterton: I'll just go ahead and get started, if that's okay, while he's handing that out.

## Ms. Griffin: Please.

<u>Ms. Winterton:</u> Like I said, I'm with the Federal Highway Administration, Central Federal Lands. We are a division of Federal Highways that does planning, environmental compliance, design, engineering, and construction management oversight of transportation projects. We typically work in the Federal lands, within or access to Federal lands, such as National Parks and National Fish and Wildlife Service Refuges. We've developed a partnership with the Hawai'i Department of Transportation. Over several years, we've partnered up on some infrastructure jobs here in Hawai'i, and have worked closely and developed a good relationship with HDOT; I'll abbreviate. We've developed into a five-year Memorandum of Agreement to deliver a program of projects with HDOT to help them deliver some critical infrastructure jobs, and also enter in a Peer-to-Peer Partnership with both agencies learning from one another the delivery, programming of jobs, and construction management of jobs. We have several projects on several different islands, but what we are here to talk about are the projects that we have here on this island.

So the project that I thought that I'd start with, if it's okay with you all, is the Wainiha Bridges Project. As part of this partnership, we have four (4) projects on this island. We've also partnered with an A&E, Architectural and Engineering firm, to support us on delivery on a lot of the projects. The Wainiha Bridges Project is a little bit unique, so I'll primarily talk about that project. CH2M Hill is helping support the engineering and compliance for the other bridges on the island, so I'll hand it over to Kathleen Chu, with CH2M Hill, after we talk about the Wainiha Bridges. We also have representatives from Mason Architects and Cultural Surveys Hawai'i, who are providing support from the historic architecture side of things and the archaeological side of things, so if questions come up, they are here to help (inaudible) their purview.

<u>Ms. Griffin:</u> Before you start, just so I'll know whether we can go through or not, is there anybody that's in the public that's going to want to testify on any of these bridges?

Okay, then we'll just go through one to the other. Thank you.

<u>Ms. Winterton:</u> Okay, great. So I think going through the Wainiha Bridges Project, if you want to just kind of run through the slides with me, I think I pretty much covered the role of FHWA in this project. I really wanted to talk about that because I think you probably seen or heard from projects that are federally funded and worked with the division where in those roles, traditionally, HDOT is more the delivery agent for that project and FHWA acts as a Federal agency for the 106. In this project, we are doing the actual design engineering, so we are the lead agency for Federal. These are federally funded jobs, so they are subject to Federal compliance, so Section 106. They are also State projects on the State route, so they're also, you know, with compliance for the State laws as well.

A little bit of project background for the Wainiha Bridges. They have a pretty long background; these are the bridges. We've actually been on this part of the island talking about it here tonight, so Wainiha Bridges 1, 2, and 3, which are the last one-lane bridges on your way to  $H\bar{a}$ 'ena on

Kūhiō Highway, the north shore section. The original Bridges 1 and 3 were constructed in 1904. The stream channel kind of carved a new path, and in 1931 we had a new bridge added. Tidal storms damaged the bridges in '46 and '47, so then we had a new period of significance with new bridges added in this timeframe between the 50's. Bridges 1 and 2 were replaced, and then we had...oh, I'm sorry, we had all of the bridges replaced, and then in '66 we had the east span of Bridge 3 replaced. So just a little bit of background. We have, kind of, two (2) periods of significance with these bridges that were in this location. In 2004, the Bridge 2...so they go in order, Bridge 1 is the eastern most bridge, and then 2 and 3 are two (2) bridges that operate essentially as one (1) single-lane bridge, so just a little bit of background on that. These bridges suffered damage from storms in 2004, and Bridge 2 was replaced. Under inspection in 2007, they were in a pretty bad state of disrepair, so there was an emergency proclamation for the Governor to replace the bridges. HABS (Historic American Buildings Survey)/HAER (Historic American Engineering Record) was done at that time, and new prefabricated modular steel structures that we refer to as Acrow bridges are in there now. That was placed as a temporary measure to secure funding for the permanent replacement, and also to get through the compliance and engineering of that.

If we go to the next slide, just a little bit of reference, this is Bridge 3. In the lower right-hand corner, that's the existing bridge that's there now; that's the Acrow Bridge that we refer to. In the upper left-hand corner, that's the 1950's structure, the historic bridge that was present before that removal in the 2000's.

Central Federal Lands came into this project and there was a lot of background on it. What we really tried to do is seek to understand. There's very strong interest in this project. We have a significant road; the north shore section of Kūhiō Highway is listed on the National Register, and also on the State Register. Also, we knew coming into this that it was important to come up with a context sensitive design, so Central Federal Lands really spent time meeting with the community on the north shore, as well as the Hanalei Roads Committee to really understand what was important, as far as the aesthetic, the natural, the cultural features, so that we could try and develop the goals for the project. Through that process, and I think in the old presentation from last month, I really kind of went through the issues that we've heard from the public. If you're interested, I'd be happy to expand. But we heard a lot of different feedback on how the bridges are operating, and developed a purpose and need for the project. The primary purpose is essentially to provide permanent replacement bridges for the temporary Acrow bridges that are out there. We also identified opportunities to improve operations, manage the maintenance requirements, and also to balance project improvements with the character of the historic roadway corridor. There are issues with sight distance and visibility crossing the bridges. We heard that the rail spacing of the steel bridges is difficult, and I've experienced it, too. It's difficult to see through and across. There are maintenance concerns with vegetation overgrowth affecting site distance. When they had to put those temporary bridges in, they also had to raise the grade of the road a little bit. So all different factors that we identified. We identified a lot of opportunities. One (1) other important thing that we also identified was the significance of the roadway, so it became a balancing act of evaluating what our project transportation goals were, with also the context of the roadway, but also just the aesthetic and natural values that are really important to the community. In kind of reviewing the historic significance and some of those project goals and improvements, we really tried to step

October 10, 2015 KHPRC Meeting Minutes Page 27

forward a process, and this is where we really would like the Commission's feedback, and this is what we presented. We had our most recent public meeting on September 15<sup>th</sup>. We've stepped through an alternative evaluation process, and we're preparing an environmental assessment for the project, and identified alternatives based on what we heard. We don't think that we are going to carry forward for analysis and we'd like the Commission's feedback on that. And also on the flip side, alternatives that we'd like to really move forward with analysis, so preliminary design feedback as we move forward with that process.

Moving forward, we identified a lot of opportunities for developing of the alternatives based really on the feedback that we heard and some of the engineering evaluation, which was the sight distance, traffic calming considerations. We heard interest in narrow bridges to help slow the traffic, accommodation of vehicle loads and navigation of emergency vehicles across and between the bridges; we heard feedback on that. Maintenance requirements, the aesthetics compared to historic roadway, historic alignment of the roadway, and then other design criteria and guidelines. Whenever we build new infrastructure or work on infrastructure, we have to document anything that we're doing that deviates from standards and guidelines.

Some of the opportunities, and this is through past coordination with HDOT before we were involved with the Hanalei Roads Committee, was replacement of those Acrow bridges, lowering of the roadway and bridge profiles to improve the sight distance to get it back to a little bit more like it was before, incorporating bridge rails that are shorter and more open than those on the temporary Acrow bridges to address some of that sight distance problem, and then a very minor alignment improvement between Bridges 2 and 3.

On the flip side, moving forward to the next slide, we did hear feedback on the challenges crossing those one-lane bridges, so there were recommendations on replacing the Acrow bridges with twolane bridges so that you don't have that stop controlled traffic situation. We also looked at this because this is the standard design recommendation that if you were coming at a project today somewhere else in the world, this would be the recommended alternative for the type of roadway we have and the traffic number. However, considering the historic context and the current roadway operating and safety conditions, we're able to apply design exception to eliminate having to create two-lane bridges. Currently, that's being evaluated as an alternative to dismiss from further analysis, so we would certainly like feedback on that.

Ms. Schneider left the meeting at 4:37 p.m.

<u>Ms. Winterton:</u> Another option considered, which is always a consideration on a bridge project because you're crossing a stream is to replace the bridges with one-lane bridges on a new alignment. So that allows you the opportunity to build your new bridge, maintain traffic on your existing bridge, and then switch the traffic and take out the bridge. Basically, it shortens your construction period. We looked at that and it might provide some cost savings and time savings, but it didn't really outweigh some of the other disadvantages from the alignment change, and it didn't really offer design advantages. It's not like it was the ultimate improvement to make everyone see across and between the bridges. At this point, we anticipate dismissing that alternative from further evaluation.

So really where we're left is replacing the Acrow bridges with new one-lane bridges on a similar alignment, so that's closely matching the historic alignment with just a slight minor improvement on the tweak and curve between Bridges 2 and 3. As I mentioned before, we will have to have a design exception because typically one-lane bridges are usually only considered on very low-volume roads, but based on the conditions, the engineering team felt that could be justified. And as I mentioned before, lowering the profile of the road and the bridges to get it back more to the historic conditions. Then, as part of the National Environmental Policy Act process, we do need to carry forward the no action and no build alternative.

A lot of the feedback from the community was interest in width and design considerations, so we looked at a lot of different factors, such as the Design Controlling Criteria; what recommendations are for lane width, shoulder width. We considered functionality; how vehicles can get across the bridges and between the bridges. Potential maintenance considerations for whichever bridges are out there. Pedestrian and bicycle safety; we heard was important. Driver perception and expectation; how they are able to operate on the roadway. And also the historic alignment considerations. They were all kind of factors, and advantages and disadvantages of different varying widths.

Ms. Schneider returned to the meeting at 4:39 p.m.

<u>Ms. Winterton:</u> What you see before you, and what I provided ahead of time with some of the layouts provided for each of the three (3) bridges is, where our team is looking at, as far as reviewing of DOT and Federal standards, what some of the conditions are out there, and that is essentially a 14-foot clear width. It's a precast concrete girder bridge. On the slide, I have some of the lengths. So essentially you have, similar to the historic conditions, a single-span bridge for Bridge 1, approximately 50 feet, single-span for Bridge 2, and then three-span approximately 178 feet for Bridge 3. There are the historic piers in the water, but they are not actually functioning right now. The Acrow Bridge actually spans them, so for permanent replacement bridges, we would need piers to support that length of bridge.

Ms. Griffin: So you'd leave the old pier, but construct new ones? Is that what you're...?

<u>Ms. Winterton:</u> Actually, the recommendation is to...because what we need to do is match the hydraulics and the hydraulic opening with lowering the bridge, so the recommendation is to have a three-span structure with two (2) piers in the water similar to how the historic bridges were, but to put the new piers in and to remove the historic piers. So where exactly they would line up is still being evaluated because obviously they can't put it right where the old ones are.

Ms. Schneider: What is the timeline for this? When would you be doing this?

<u>Ms. Winterton:</u> We aim to get through the environmental compliance process winter/early spring, and then move towards completion of the design and securing the permits. It depends a lot on funding priorities with the State, but we find that as soon as we get everything done and ready to go, the money tends to appear.

Ms. Schneider: What's the duration for doing this?

<u>Ms. Winterton:</u> Okay, so I include that a little bit later, but I should add that...and I didn't include...our memorandum agreement with all of these projects with HDOT is essentially to do the full delivery and construction, and turn the facility back over to HDOT by 2018. So our goal is to get all of the projects that we are working with completed in 2018. The construction approach is a challenge on these projects, and I'll talk a little bit about that later, but the anticipated timeframe, to be conservative, was two (2) years.

<u>Ms. Schneider:</u> And you're going to improve the sight lines for entry and exit of the bridge? Because that's really the problem now.

<u>Ms. Winterton:</u> Yes. So that's the goal, to improve that, but I clarified to the extent possible because there are constraints in this location, and that goes to that balancing act of improvements while maintaining consistency with historic. Are there any questions on that?

On the following two (2) slides, I have a photo of the existing Bridges 2 and 3, and a rendering of what we were thinking about for Bridges 2 and 3. Some of the feedback that we've heard, and I would love the Commission's feedback as well, you know, is really the community has grown to appreciate those 1950's bridges. From an engineering perspective, when you look at the type of the rail spacing and some of the challenges with the sight distance, it actually does provide opportunities for improvements with that type of rail design. With consideration of the design standards, we always like to have crash-tested rail when we do improvements. So we have identified a crash-tested rail that sort of plays off a little bit of the historic rail. It's a structural steel tube rail, and this rail here it's called the Wisconsin Type. We went back and forth on vehicle rail only versus vehicle combo rail, and landed on a vehicle rail, which is a little bit lower and part of that is opportunities for that improvement to the sight distance. It's top-mounted, and max post spacing is 6'-6'', which is that max amount that you would want to put it towards to still meet the crash-test standards. We'd probably seek to get close to that again because that visibility through the bridge is problematic.

Construction strategies. As I mentioned, the anticipated duration of construction is two (2) years, and it's depending on funding. Because these are bridges crossing the streams, it is a little bit hard, so we are talking about evaluating site conditions and how we can maintain traffic, and it's shifting the existing Acrow bridges, using them for construction, and shifting them makai to build the new bridges on alignment, and accommodating emergency access through construction. But there would have to be delays and very short-term closures for different milestones, such as moving the bridges. Another challenge for construction is leading up to these bridges, the three (3) original historic bridges crossing different streams, these are the Waioli, Waikoko, and Waipa Bridges, these are load restricted, and construction vehicles and equipment tend to be heavy. So we have evaluated this as a construction challenge, and the current recommendation is...because we do not want to affect the historic integrity of those original bridges.

I have here, the second to last slide here, Waioli...the approach is evaluating the site conditions, utilities, right-of-way, and opportunities of where these bridges could be placed under temporary conditions would be...Waioli, mauka of the existing; Waipa, makai of the existing; and Waikoko is a very short structure right on the coastline, and there we have an opportunity to actually go up and over the existing bridge, so building behind on each side and going up and over because we really don't want to negatively impact any historic structures.

The next steps are...we really want to get feedback, continue the design process, and refine engineering through different coordination with you all, the public, we're getting feedback from the public, SHPD, and other interested parties, and prepare the analyses and the reports, and prepare an Environmental Assessment.

Any questions? Comments?

<u>Mr. Chaffin Jr.</u>: Yes. I would appreciate getting this package in advance. You reviewing it in front of us is difficult for me.

<u>Ms. Winterton:</u> Okay. I apologize for that. I did provide a presentation in advance for the last meeting; a lot of the information is similar. And we provided the drawings for each of the bridges. So we actually...in preparation for the public meeting, really took an extra step. We've done a lot of coordination with HDOT to get to a comfort level. There is a pretty big deviation from what is typically the recommended design approach, and so we were seeking to get feedback from the public as well, and I just wanted to give the latest and greatest information. Feel free to absorb this information. We'll take comments through the process, really.

<u>Ms. Schneider:</u> I appreciate that you've taken into consideration what those bridges looked like originally.

<u>Ms. Griffin:</u> Other comments? Thank you. In a general way, it's for those of us who have dealt with roads and bridges for twenty (20) years or more. Having context sensitive solutions roll right off your tongue, you know, is music. To be talking about protecting the historic bridges, rather than all of the reasons why it's too expensive, it can't be done, the people are going to fall through, you know, height limitations, materials, but hearing the "can do" aspects is really a pleasure. I must say that with the Hanalei Roads Committee that they are consulting and in agreement is a really important component to this historical review. They know about the roads up there, and bridges. Thank you.

So moving along to Hanapēpē.

<u>Kathleen Chu:</u> Hello. Good evening, Madam Chair and Commissioners. I'm Kathleen Chu with CH2M Hill, and if you can switch to your next presentation packet. I'm going to talk about three (3) bridges this evening; the Hanapēpē River Bridge, the Kapa'a Stream Bridge, and Bridge No. 7E. I'll stop between each one so you guys can provide your comments on it.

Ms. Griffin: Thank you.

Respectfully Submitted,

an'ala ~

Darcie Agaran Commission Support Clerk

Date: 10 20 15

DAVID Y. IGE GOVERNOR OF HAWAII





SUZANNE D. CASE CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA

JEFFREY T. PEARSON DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES BOATING AND OCEAN RECREATION BUREAU OF CONVEYANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND RESOURCES ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAHOOLAWE ISLAND RESERVE COMMISSION LAND STATE PARKS

IN REPLY REFER TO: LOG: 2015.04243 DOC: 1512JLP23 "concur APE"

STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES

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

December 18, 2015

J. Michael Will and Nicole Winterton 12300 West Dakota Avenue, Suite 380 Lakewood, CO 80228

RE:	Section:	Chapter 6E-8 and Section 106 Cultural Resources Management
	Agency:	Federal Highways Administration (FHWA)
	Project Name:	Replacement of Wainiha Bridges, HFPM-16
	Location:	Waioli, Waikoko, Waipa, Lumahai and Wainiha Ahupua'a, Halele District, Kauai Island
	TMK:	(4) 5-5, 5-6, 5-7, 5-8 var

Dear Mr. Will and Ms. Winterton:

The State Historic Preservation Division (SHPD) received a request for concurrence from FHWA for the temporary replacement of three bridges with temporary pre-fabricated (ACROW) bridges on Kūhiō Highway (Route 560). The project has been determined to be is a federal action and undertaking triggering NHPA of 1966, as amended (2006), and as being subject to Hawaii Revised Statutes (HRS) Chapter 6E. The Area of Potential Effect (APE) and corresponding acreage is defined as:

- Wainiha Bridge 1: [4] 5-8-002:002 por.; 5-8-006:030-033, 046, 060, and 999 por; 0.669 acres;
- Wainiha Bridge 2-3: [4] 5-8-006:009, 011, 017-019, 030, 999 por; 5-8-007:023, 024, 031, 032, 999 por.; 2.272 acres;
- Wai'oli Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por.; 5-5-006:014, 888 por.; 5-6-002:002, 004, 999 por.; 0.913 acres;
- Waipā Bridge: [4] 5-6-004:014, 022, 023, 999 por.; 0916 acres;
- Waikiko Bridge: [4] 5-6-003:002, 999 por.; 0.715 acres; and
- Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.; 0.517 acres.

#### Based on the information provided, the State Historic Preservation Officer (SHPO) concurs with the APE.

The SHPD looks forward to continuing consultation on this undertaking, including the identification of historic properties (36 CFR Part 800.4), and the evaluation of potential adverse effects (36 CFR Part 800.5) and, if necessary, the mitigation process. **Please reference our LOG number and DOC number in all communication with this office regarding this undertaking.** The FWHA and HDOT 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 Jessica Puff, Architectural Historian, at (808) 692-8023 or at <u>Jessica.L.Puff@hawaii.gov</u> for any questions regarding architectural resources. Please contact Susan Lebo, Archaeology Branch Chief, at (808) 692-8019 or at <u>Susan.A.Lebo@hawaii.gov</u> regarding any changes to the scope of work or the APE, or for any questions regarding archaeological resources or this letter.

Aloha,

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



## **Central Federal Lands Highway Division**

December 9, 2015

12300 West Dakota Avenue Suite 380A Lakewood, CO 80228-2583 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

Shelly Lynch U.S. Army Corps of Engineers, Honolulu District, Regulatory Office CEPOH-RO Attn: Joy Anamizu Building 230 Fort Shafter, Hawaii 96858-5440

# Subject: Request for a Jurisdictional Determination, CFLHD/HDOT Wainiha Bridges Project

Dear Ms. Lynch:

As part of the Hawaii Bridge Program, the Federal Highway Administration, Central Federal Lands Highway Divisions (FHWA – CFLHD), in partnership with the Hawaii Department of Transportation (HDOT) is proposing to replace three temporary pre-fabricated (ACROW) bridges (Wainiha Bridges 1, 2, and 3) and place temporary one-lane bridges adjacent to or crossing over three additional one-lane bridges (Wai'oli, Waipā, and Waikoko) on Kūhiō Highway (Route 560) between Hanalei and Wainiha, on the north side of Kaua'i Island, Hawai'i (see Enclosure 1, Figure 1). CH2M HILL contracted SWCA Environmental Consultants (SWCA) on behalf of FHWA to complete a determination and delineation of potential Waters of the U.S. (WoUS) governed by the Clean Water Act (CWA) and the Rivers and Harbors Act (RHA). The enclosed delineation report summarizes the findings of the potential WoUS delineation and determination conducted at these locations between September 30 and October 2, 2014.

The survey area comprises five non-contiguous survey areas: Wai'oli, Waipā, Waikoko, Wainiha 1, and Wainiha 2 & 3. In all, the whole survey area covers approximately 9.24 acres (3.74 hectares [ha]). Twenty-four wetland sampling points were evaluated in the survey area to determine whether wetlands or other WoUS occur. A detailed field-based determination indicates that 11 of the 24 sampling points meet the three-criterion test for wetlands (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology) pursuant the 1987 Corps of Engineers Wetland Delineation Manual and the 2012 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawai'i and Pacific Islands Region. SWCA delineated approximately 3.88 acres (1.58 ha) of potential WoUS. This comprises 2.78 acres (1.13 ha) of non-wetland WoUS and 1.10 acres (0.45) of wetlands. This conclusion is subject to confirmation by the U.S. Army Corps of Engineers.

This project is currently within the planning and design phase, and impacts to potential jurisdictional waters of the U.S. have not been calculated, to date, but unavoidable impacts to these potentially jurisdictional waters of the U.S. are anticipated given the nature of the proposed action. Upon completion of the project design and the calculation of proposed impacts to potential jurisdictional waters of the U.S., the FHWA-CFLHD will prepare and submit a permit application package, with the inclusion of our National Environmental Policy Act (NEPA) and supporting documentation. In order to streamline the permitting process, FHWA-CFLHD is notifying the U.S. Army Corps of Engineers (USACE) that FHWA-CFLHD will be serving as the lead agency for this project for the National Environmental Policy Act (NEPA) and other relevant federal laws and regulations.

This letter serves as our request to initiate your review and approval of the March 2015 wetland delineation report for this project. At this time we are requesting a preliminary jurisdictional determination from your office. We are aware that your office may determine that an approved jurisdictional determination may be more appropriate for this project; following your review of the enclosure and based on the aquatic resources identified and/or the current CWA guidance/directives. Included for your review is the following item:

• Enclosure 1: Determination and Delineation of Wetlands and Other Waters of the U.S. for the Kapa'a Stream Bridge Project; Prepared by SWCA Environmental Consultants March 2015.

Should you have questions or concerns, please do not hesitate to call Thomas Parker, at (720) 963-3688 or email at thomas.w.parker@dot.gov. Thank you for your time and consideration with this project. We look forward to working with you.

Sincerely Yours,

Mike Will, Project Manager

Enclosures

Nicole –

This email is a follow up to our phone conversation on February 18 regarding your FPPA inquiry for a bridge project in Kauai.

Because the acreage of the permanent bridge footprint that occurs on prime farmland is a fraction of an acre, you do not need to file the AD-1006.

I am now the FPPA contact at NRCS, so please contact me directly with inquires for your future projects.

Best regards,

Amy Saunders Koch Assistant Director for Soil Science USDA NRCS - Pacific Islands Area 808-933-8351 amy.koch@hi.usda.gov

From: Nicole.Winterton@dot.gov [mailto:Nicole.Winterton@dot.gov]
Sent: Saturday, February 06, 2016 12:37 PM
To: Koch, Amy - NRCS, Hilo, HI <amy.koch@hi.usda.gov>
Subject: RE: Wainiha Bridge Replacement FPPA Compliance

Aloha Amy,

I'm working on other files right now and realized I sent you the polyline file. The attached polygon file will work better than the previous email I sent. Sorry about that!

Thanks!

Nicole

From: Winterton, Nicole (FHWA)
Sent: Friday, February 05, 2016 8:28 PM
To: 'Koch, Amy - NRCS, Hilo, HI'
Subject: RE: Wainiha Bridge Replacement FPPA Compliance

Aloha Amy. Thank you for the information. It's very helpful. There is a small area of new right-ofway and some is unimproved. I have attached a shapefile of approximate new permanent right-ofway that is outside existing HDOT rights. It is three small polygons.

## All other work is temporary.

Please let me know if you have any trouble bringing in the shapefiles.

Thanks again,

## Nicole

From: Koch, Amy - NRCS, Hilo, HI [mailto:amy.koch@hi.usda.gov] Sent: Friday, February 05, 2016 8:01 PM To: Winterton, Nicole (FHWA) Subject: RE: Wainiha Bridge Replacement FPPA Compliance

## Nicole –

A few quick answers –

- 1) FPPA does not apply to temporary actions, as long as the land affected could return to "farm land" after construction is completed.
- 2) FPPA does not apply to projects on land already in urban development or used for water storage
- 3) FPPA does not apply to construction within an existing right-of-way purchased on or before August 4, 1984

Additional information can be found on our FPPA website: <u>http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/fppa/</u>

Next steps -

If any of the items in #1-3 above apply to the entire area, then an AD-1006 is not needed. If you still aren't sure, please send me a shapefile containing the NEW PERMANENT right-of-way only. I will take a look and get back to you early next week.

Thanks!

Amy

From: <u>Nicole.Winterton@dot.gov</u> [mailto:Nicole.Winterton@dot.gov]
Sent: Thursday, February 04, 2016 2:18 PM
To: Koch, Amy - NRCS, Hilo, HI <<u>amy.koch@hi.usda.gov</u>>
Subject: Wainiha Bridge Replacement FPPA Compliance

Aloha Amy,

Mahalo for the return phone call. I am performing environmental studies and preparing an EA for a project to replace three temporary bridges on the North Shore of Kauai, west of Hanalei. The existing bridges were placed under state emergency action in 2007 as a temporary action until funding for new bridges could be secured and the environmental compliance and design could be completed. The majority of impacts are temporary, as we would provide a temporary bypass for traffic during construction. There would be some new right-of-way from both a slightly larger footprint and incorporating right-of-way that is existing transportation but is not currently captured

in existing HDOT right-of-way for one reason or another. Other temporary impacts would occur at three load-restricted bridges as well (Waioli, Waipa, and Waikoko Bridges). We would erect temporary bridges in these additional locations to accommodate construction loads. (The existing historic bridges wouldn't be able to handle the loads.)

The online soil mapper has some prime farmlands, and similarly the state provided data has mapped soils that differs from the NRCS web soil survey.

Attached is a map of the project location. I brought in a shapefile of temporary area that may be affected into the Web Soil Survey, as well as new permanent right-of-way. Those maps are attached.

What are your thoughts on proceeding with the Form AD1006? In the past, Tony Rolfe would ask me for a shapefile. Would you like that? If so, would you want new permanent right-of-way only, or the entire Area of Potential Effect which includes most temporarily impacted areas?

Thanks so much for your assistance!

Nicole

Nicole Winterton Environmental Protection Specialist Federal Highway Administration, Central Federal Lands Highway Division 12300 West Dakota Ave., Ste. 280 Lakewood, CO 80228 (720) 963-3689

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From:	Cory Simon
To:	Naone, MaryJane
Cc:	William Folk; Missy Kamai; DLNR.Intake.SHPD@hawaii.gov
Subject:	AIS for the Wainiha Bridges Project (WAINIHA 11)
Attachments:	WAINIHA 11 Draft Submittal Cover Letter to SHPD 25 April 2016.docx
	CFL Cover Letter for Wainiha AIS.pdf
	WAINIHA 11 SHPD Stamped Submittal Form 26 April 2016.pdf

Aloha Mary Jane,

We have completed a draft of our report titled; Archaeological Inventory Survey Report for the Wainiha Bridges Project, Wai'oli, Waipa, Waikoko, Lumaha'i, and Wainiha Ahupua'a, Halele'a District, Kaua'i, Federal Highway Administration/ Central Federal Lands Highway Division (FHWA/CFLHD) contract DTFH68-14-D-00012/0007 TMKs: [4] 5-5 (por.), [4] 5-6 (por.), [4] 5-7 (por.), and [4] 5-8 (por.) (Stark et al. 2016). A copy of our report is attached via the link below.

https://culturalsurveys.sharepoint.com/\_layouts/15/guestaccess.aspx? guestaccesstoken=mmFUcCAAU6BdbTXcYYPpRHECdHoxJ3nUI3aGmESAzio%3d&docid=027859a1b0cfd4140895ac5b1161bc752

We have sent a cardstock copy to the SHPD office in Kapolei in order for our report to be logged into the system. I have also attached a copy of the stamped submittal form and cover letter to this email. Please review our report and send us any revisions that need to be made.

We greatly appreciate all your hard work!

Mahalo, Cory Simon Cultural Surveys Hawaii, Inc. P.O. Box 1114 Kailua, HI, 96734 Ph: (808)262-9972 csimon@culturalsurveys.com



**Central Federal Lands Highway Division** 

April 22, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

Honorable Suzanne Case, Chairperson DLNR—State Historic Preservation Division Kākuhihewa Bldg., Suite 555 601 Kamōkila Boulevard Kapolei, Hawaiʻi 96707

Subject: Section 106 and 6E Continuing Consultation - *Draft Archaeological Inventory Survey Report for the Temporary Wainiha Bridges Replacement Project* submitted for review (Prior Reference Log No.2015.04243, Doc No. 1512JLP23)

Dear Ms. Case:

Please find attached a copy of our *Draft Archaeological Inventory Survey Report for the Temporary Wainiha Bridges Project* submitted for SHPD review, along with a submittal form and check. This *Draft Archaeological Inventory Survey Report* is being submitted in accordance with Title 36 of the *Code of Federal Regulations* (CFR), Section 800.3, and in accordance with HRS Chapter 6E-8.

Please feel free to contact Nicole Winterton, Environmental Protection Specialist, at (720) 963-3689 or by email at nicole.winterton@dot.gov, if you have any questions.

Sincerely yours,

J. Michael Will, P.E. Project Manager

DAVID Y. IGE GOVERNOR OF HAWAII





SUZANNE D. CASE CHARPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA

JEFFREY T. PEARSON DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES BOATING AND OCEAN RECREATION BUREAU OF CONVEYANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND RESOURCES ENFORCEMENT EXOINTEERNA FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAHOOLAWE ELAND RESERVE COMMISSION LAND STATE PARKS

#### STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES

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

June 14, 2016

Nicole Winterton Federal Highways Administration Central Lands Division <u>Nicole.Winterton@dot.gov</u>

Dear Ms. Winterton:

#### SUBJECT: Chapter 6E-8 and National Historic Preservation Act Section 106 Review – Draft Archaeological Inventory Survey Report for the Wainiha Bridges Project Contract DTFH68-14-D-00012/0007 Wai'oli, Waipā, Waikoko, Lumaha'i, Wainiha Ahupua'a, Ha'ena District, Island of Kaua'i TMK: (4) 5-5 por., (4) 5-6 por., (4) 5-7 por., and (4) 5-8 por.

Thank you for the opportunity to comment on the draft archaeological inventory survey report entitled "Draft Archaeological Inventory Survey Report for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a District, Kaua'i, Federal Highways Administration/Central Federal Lands Highway Division (FHWA/CFLHD) contract DTFH68-14-D-00012/0007 TMKs: (4) 5-5 (por.), (4) 5-6 (por.), (4) 5-7 (por.), and (4) 5-8 (por.)" R. Stark, M. Kamai, W.Folk, and H. Hammatt, April 2016. The State Historic Preservation Division (SHPD) received the submittal on April 26, 2016 in our Kapolei office.

The project is considered an undertaking in accordance with the National Historic Preservation Act (NHPA) Section 106 36CFR800.4 as it is a federal action receiving funding from the Federal Highways Administration Central Lands Division (FHWA/CFLHD). The project is also subject to Hawaii Revised Statute Chapter 6E-8 as it is being implemented by the Hawaii Department of Transportation (HDOT). In a letter dated December 18, 2015, the State Historic Preservation Officer (SHPO) responded to initiation of consultation for the project (*Log No. 2015.04243, Doc No. 1512JLP23*). The SHPO concurred with the Area of Potential Effect (APE), which includes the following:

- 1. Wainiha Bridge 1 (4) 5-8-002:002 por.; 5-8-006:030-033, 046, 060, and 999 por. totaling .669 acres
- 2. Wainiha Bridges 2-3 (4) 5-8-006:009, 011, 017-019, 030, 999 por; 5-8-007:023, 24, 031, 032, 999, totaling 2.272 acres.
- 3. Wai'oli Bridge (4) 5-5-005:005, 007, 021, 028, 999 por; 5-5-006:014, 888 por; 5-6-002:002, 004, 999 por.; totaling .913 acres
- 4. Waipā Bridge (4) 5-6-004:014, 022, 023, 999 por.; totaling .0916 acres
- 5. Waikiko Bridge (4) 5-6-003:002, 999 por.; totaling .715 acres; and
- 6. Potential staging areas 1 and 2: (4) 5-7-003:003, 999 por., totaling .0517 acres.

The total acreage for the APE is 9.006 acres.

At the request of CH2M Hill, Cultural Surveys Hawaii, Inc. (CSH) conducted a 100% pedestrian archaeological inventory survey (AIS) of the APE between October 6-9 2014 in advance of the replacement of three temporary prefabricated bridges on Kūhiō Highway (Route 560) on the north side of the island of Kaua'i. The original bridges at these locations were replaced with temporary bridges after they were determined to be damaged and/or structurally deficient. In addition to the replacement of the three Wainiha bridges, the placement of temporary, one-lane bridges adjacent to or crossing over three historic one-lane bridges that access the project site is necessary to allow

IN REPLY REFER TO: LOG NO: 2016.01007 DOC NO: 1606MN09 Archaeology Architecture Ms. Winterton June 14, 2016 Page 2

construction loads to access the project site without affecting the historic integrity of the bridges. The temporary bridges at these locations (Wai'oli, Waipā, and Waikoko) will be removed once the project is complete. The six bridges are located between mile posts 6.4 and 6.7 near the mouth of Wainiha Stream. The non-contiguous areas within the APE are publicly and privately owned.

Four historic properties were identified during the AIS, including the Wai'oli Bridge (State Inventory of Historic Places [SIHP] Site 50-30-03-2296), the Waipā Bridge (Site 2297), the Waikoko Bridge (Site 2298), and a reinforced pipe culvert and basalt and mortar revetments (Site 2299). All four of the sites are eligible for the National Register under criterion A and D, and assessed as significant for the Hawaii Register under a and c, in accordance with Hawaii Administrative Rule (HAR) §13-275-6 and HAR§13-198-8. The Kaua'i Belt Road, National Register of Historic Places (NRHP) Site 03001048 and SIHP Site 50-30-02-9396 also transects the APE as the trail that became an historic road and now, Kūhiō Highway. The six shovel tests were negative for cultural material.

CSH has proposed project specific recommendation of "No adverse effect" in accordance with 36CFR800.5, and "effect with proposed mitigation commitments" in accordance with HAR§13-275-7. In order to mitigate potential effects on previously unidentified subsurface cultural deposits or human burials during the installation of the temporary bridges, CSH recommends archaeological monitoring during ground disturbance associated with the project. The State Historic Preservation Division (SHPD) concurs with the eligibility and significance assessments for Sites 2296 through 2298, but requests reconsideration of Site 2299 as a feature of Site 9396. Of itself, the culvert and abutments do not possess the significance, but should be considered a contributing element to Site 9396. SHPD concurs with the project effect recommendation and proposed mitigations, in accordance with HAR§13-275-7.

Before the can be accepted by SHPD, the AIS must revised to meet the Secretary of the Interior's Standards for Archaeological Documentation, and the requirements of HAR§13-276. Please find attached a list of requested revisions. A revised copy may be submitted electronically to <u>dlnr.intake.shpd@hawaii.gov</u>. Please contact SHPD Kaua'i Lead Archaeologist, Mary Jane Naone at <u>Maryjane.naone@hawaii.gov</u> or at (808) 271-4940 if you have any questions regarding this letter. In reply, refer to Log No. 2016.01007, Doc. No. 1606MN09.

Aloha,

len ão

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

#### **Requests for Revisions and Clarification:**

"Draft Archaeological Inventory Survey Report for the Wainiha Bridges Project, Waiʻoli, Waipā, Waikoko, Lumahaʻi and Wainiha Ahupuaʻa, Haleleʻa District, Kauaʻi, Federal Highways Administration/Central Federal Lands Highway Division (FHWA/CFLHD) contract DTFH68-14-D-00012/0007 TMKs: (4) 5-5 (por.), (4) 5-6 (por.), (4) 5-7 (por.), and (4) 5-8 (por.)" R. Stark, M. Kamai, W.Folk, and H. Hammatt, April 2016

- 1. Please reconcile the TMKs for Waikoko bridge with the TMKs previously provided in the initiation of consultation letter (*Log No. 2015.04243, Doc No. 1512JLP23*), and indicate if the APE has expanded or changed.
- 2. Please identify what the acronym ACROW represents in the management summary (not temporary prefabricated bridges but the words represented by the acronym), and in the text, prior to using it throughout the document.
- 3. Site 2299 is a feature of Kaua'i Belt Road, and is not, individually eligible for inclusion in the Hawaii or National Registers, however, as a feature of Site 9396, it would be. Please assess whether the culverts were constructed at the same time of the road and should, therefore, be considered and treated as a feature of this eligible site.

- 4. In the management summary, the project effect and recommendation section states that CSH's project specific effect recommendation is "No adverse effect", then states "This AIS report plus future archaeological monitoring of the planned development within the project area is recommended as sufficient to satisfy the requirements to mitigate any adverse effect caused by the proposed development activities". Please reconcile/clarify these statements.
- 5. The total APE dimensions in the management summary and in the project background section differ.
- 6. On page 77, please provide additional context in your discussion of Kikuchi's catalog of fishponds in Wai'oli. How were the "name unknown" fishponds of unknown acreage assessed? (B1b, B1c).
- 7. On page 86, when discussing the comparison between the oral accounts of Makaihuawa'a Ridge (Wichman 1985) and the results of archaeological investigations, you may consider substituting "archaeological evidence" for archaeological reality". This is an interesting and thought provoking discussion.
- 8. Our records indicate three studies should be included in the Previous Archaeology section. Tom Dye conducted archaeological reconnaissance of (4) 5-8-006:065 (*An Archaeological Assessment of a Residential Property at Wainiha, Halele'a, Kaua'i*) in 2009. In this he cites a study by William Bareera (1984) entitled *Wainiha Valley, Kaua'i: Archaeological Studies*. The study by Chiniago, Inc. was contracted by Orion Engineering, Honolulu as part of an environmental study for a proposed hydroelectric power house and access road, and identified three sites: Site 50-30-02-1500, an agricultural system comprised of 20 terraces, Site 1501, a basalt flake scatter, and Site 1502, a collection of pit features and charcoal fragments. Another assessment by Dye was conducted in 2008 entitled "Archaeological Assessment for the Chew Residence, Wainiha, Halele'a, Kaua'i, Hawaii, TMK: (4) 5-8-006:024.
- 9. In the site description on page 105, Wai'oli Stream Bridge is also identified as Wai'ole Stream Bridge. Please note if these two spellings are interchangeable. If not, please identify the accurate spelling and use it consistently.
- 10. Please reconsider this variable in your mitigation recommendation: "If there is an unexpected impact to the reinforced concrete pipe culvert or its reinvestments (SIHP # 50-30-02-2299) during the project it is recommended that materials of the structure be recovered and the structure be reconstructed in the same style manner and workmanship, and of course location". If this is being discussed, it is not unexpected. If the plans call for destruction of Site 2299, the project will be an "adverse effect", and mitigations should be presented as such now. The mapping and photographs of the site is not sufficient for reconstructing it, and additional documentation would be needed. If the site will not be impacted, please include provisions in the archaeological monitoring plan that will address its protection.

Date:	10/6/2016	CS	RECEIVED H Job Code: HISTORIC PWARNIHA 11			
			NATURAL RESOURCES			
	Submittal Sheet for Historic Preservation Review Filing Fees					
		Department of Land and Nat	ural Resources			
Agency/Fin	rm (Requesting Review):	Cultural Surveys Hawaiʻi I	nc.			
Contact:	William Folk					
Phone: 80	08 262-9972	Fax:	808 262-4950			
Address:	P.O. Box 1114 Kailua, H	I 96734				
Email.		wfolk @culturalsurvey	/s.com			
Linun.						

Halele'a District, Kaua'i, Federal Highway Administration/ Central Federal Lands Highway Division (FHWA/CFLHD) contract DTFH68-14-D-00012/0007 TMKs: [4] 5-5 (por.), [4] 5-6 (por.), [4] 5-7 (por.), and [4] 5-8 (por.) (Stark et al. 2016)

Islanu	Kaua I	District	Halele a	Anupua a	vv allilla
TMK [4] 5-5 (por.), [4] 5-6 (por.), [4] 5-7 (por.), and [4] 5-8 (por.)					
Acreage Inv	rentoried			Number of Ne	w Sites Inventoried
	0.296				4

Submittal Plan/Report Fee & Type: (All reports or plans submitted to the SHPD for review shall be accompanied by the appropriate fee in accordance with HAR§13-275-4 and §284-4)

X		Check if Report is a Re-Submittal (no fee charged)
		Final Report (hard copy only)
	\$25	Literature Review & Field Check
	\$50	Archaeological Assessment
	\$150	Archaeological Inventory Survey Plan
	\$450	Archaeological, Architectural or Ethnographic Survey Report
	\$150	Preservation Plan
	\$25	Monitoring Plan
	\$150	Archaeological Data Recovery Plan
	\$250	Burial Treatment Plan
	\$100	Archaeological Monitoring Report, if resources reported
	\$0	Archaeological Monitoring Report, no finds
	\$450	Archaeological Data Recovery Report
	\$450	Ethnographic Documentation Report
	\$25	Burial Disinterment Report
	\$50	Osteological Analysis Report

Fee Total: \$ 0.00 (make checks payable to "Hawaii Historic Preservation Special Fund")

# For Office Use Only:

Date Received	Payment Method	
	Cash	\$
	Check	Check No:
Log No.	Receipt Issued:	



#### **Central Federal Lands Highway Division**

December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

Michael Tosatto, Administrator National Marine Fisheries Service 1845 Wasp Boulevard, Building 176 Honolulu, HI 96818

Re: Section 7 Consultation and Essential Fish Habitat (EFH) Assessment for Proposed Wainiha Bridges Replacement, Kuhio Highway (Route 560), Kauai Island, Hawaii

Dear Mr. Tosatto:

The Central Federal Lands Highway Division (CFLHD) of the Federal Highway Administration (FHWA), in cooperation with the State of Hawaii Department of Transportation (HDOT) is proposing to replace the Wainiha Stream Bridges along Kuhio Highway, in the Halelea District on Kauai, Hawaii. The purpose of the project is to improve the Wainiha Stream Bridges which are required to maintain a safe and functional regional transportation system for highway users.

The enclosed biological assessment (BA) addresses potential project impacts on federally listed threatened and endangered species, including the endangered Hawaiian monk seal (*Neomonachus schauinslandi*), the threatened Green sea turtle (*Chelonia mydas*), and the endangered Hawksbill sea turtle (*Eretmochelys imbricata*).

The BA concludes the following:

- The shoreline area near the project could provide suitable foraging habitat for the Hawaiian monk seal. Because conservation measures would be taken, direct and indirect impacts would be insignificant and the proposed project *may affect, but is not likely to adversely affect*, individuals or populations of the species. Recently designated monk seal terrestrial critical habitat occurs within the action area, with surrounding waters designated as marine critical habitat. All impacts on the Hawaiian monk seal critical habitat would be discountable or insignificant, therefore the proposed action is *not likely to destroy or adversely modify* critical habitat of the species.
- Sea turtle species could use marine and riverine habitats in the action area for foraging and hauling-out to rest or bask. Because impacts to the Green sea turtle and Hawksbill sea turtle would be discountable or insignificant, the proposed action *may affect, but is not likely to adversely affect,* individuals or populations of the species.

To comply with Section 7(a) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.) (ESA), FHWA is requesting informal consultation with National Marine Fisheries Service on the Hawaiian monk seal, the Green sea turtle, and the Hawksbill sea turtle.

In parallel, FHWA is also requesting consultation with U.S. Fish and Wildlife Service for these and several non-marine listed species. As detailed in the BA, these include three seabirds (the endangered Hawaiian petrel [*Pterodroma sandwichensis*], the threatened Newell's shearwater

[*Puffinus auricularis newelli*], and the proposed endangered band-rumped storm petrel [*Oceanodroma castro*]), four waterbirds (the endangered Hawaiian coot [*Fulica alai*], the endangered Hawaiian gallinule [*Gallinula chloropus sandvicensis*], the endangered Hawaiian stilt [*Himantopus mexicanus knudseni*], and the endangered Hawaiian duck [*Anas wyvilliana*]), the endangered Hawaiian goose (*Branta sandvicensis*), and the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*).

The enclosed essential fish habitat (EFH) assessment has been prepared to evaluate the potential effects of bridge replacement on Essential Fish Habitat (EFH) in the project area, in accordance with Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA). No activities would occur within EFH under the proposed action; however, indirect impacts may occur to EFH from increased siltation, turbidity, or release of pollutants associated with construction activities in, over, or adjacent to the streams. Wainiha Stream has a relatively continuous surface connection to Wainiha Bay. Waikoko, Wai'oli, and Waipā Streams have relatively continuous surface connections to Hanalei Bay. Based on the project design and implementation of BMPs, the project may result in temporary minimal impacts associated with the bridge reconstruction and improvements. The assessment concludes that the proposed replacement of Wainiha Bridges *May Affect, but is Not Likely to Adversely Affect* designated EFH for bottomfish and seamount groundfish, pelagics, crustaceans, or coral reef ecosystems. Any effects would be most likely contained only within the stream and occur only over a short duration with no long-term effects. In compliance with the consultation requirements under the MSA, FHWA is seeking your concurrence with this determination.

If you require further information or have questions, please contact Thomas Parker, Environmental Protection Specialist, by email at <u>thomas.w.parker@dot.gov</u> or by phone at (720) 963-3688.. We appreciate your assistance with this project.

Sincerely,

Michael Will Project Manager

Enclosure:

Biological Assessment and Essential Fish Habitat Assessment for the Proposed Wainiha Bridges Project, Kuhio Highway, Route 560, Kauai Island, Hawaii

cc:

Mary Abrams, U.S. Fish and Wildlife Service Lisa Hadway, State of Hawaii, Division of Forestry and Wildlife Frazer McGilvray, State of Hawaii, Divison of Aquatic Resources



Federal Highway Administration **Central Federal Lands Highway Division** 

December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

Mary Abrams, Field Supervisor U.S. Fish and Wildlife Service Pacific Islands Fish and Wildlife Office 300 Ala Moana Boulevard, Room 3-122 Honolulu, HI 96850

# Re: Section 7 Consultation and Essential Fish Habitat (EFH) Assessment for Proposed Wainiha Bridges Replacement, Kuhio Highway (Route 560), Kauai Island, Hawaii

Dear Ms. Abrams:

The Central Federal Lands Highway Division (CFLHD) of the Federal Highway Administration (FHWA), in cooperation with the State of Hawaii Department of Transportation (HDOT) is proposing to replace the Wainiha Stream Bridges along Kuhio Highway, in the Halelea District on Kauai, Hawaii. The purpose of the project is to improve the Wainiha Stream Bridges which are required to maintain a safe and functional regional transportation system for highway users.

The enclosed biological assessment (BA) addresses potential project impacts on federally listed threatened and endangered species, including three seabirds (the endangered Hawaiian petrel [*Pterodroma sandwichensis*], the threatened Newell's shearwater [*Puffinus auricularis newelli*], and the proposed endangered band-rumped storm petrel [*Oceanodroma castro*]), four waterbirds (the endangered Hawaiian coot [*Fulica alai*], the endangered Hawaiian gallinule [*Gallinula chloropus sandvicensis*], the endangered Hawaiian stilt [*Himantopus mexicanus knudseni*], and the endangered Hawaiian duck [*Anas wyvilliana*]), the endangered Hawaiian goose (*Branta sandvicensis*), the endangered Hawaiian hoary bat (*Lasiurus cinereus semotus*), the endangered Hawaiian monk seal (*Neomonachus schauinslandi*), and two sea turtles (the threatened Green sea turtle [*Chelonia mydas*] and endangered Hawksbill sea turtle [*Eretmochelys imbricata*]). The BA concludes the following:

- The Hawaiian petrel, Newell's shearwater and band-rumped storm-petrel are unlikely to occur in the action area because suitable habitat does not exist; however, these seabirds may be attracted to construction lights as they fly over the action area. The proposed project *would not likely adversely impact* the Hawaiian petrel and Newell's shearwater. And it is *not likely to jeopardize the continued existence* of the Band-rumped storm petrel.
- The Hawaiian coot, Hawaiian gallinule, Hawaiian stilt, and Hawaiian duck may occur in the action area, as there is suitable habitat in and around the action area. The possibility of adversely affecting water birds as a result of the proposed project is likely small and the effect determination for these species is *may affect, but is not likely to adversely affect*.
- The Hawaiian goose may occur in the action area, as there is suitable foraging habitat. However, impacts would be discountable, such that the project *may affect, but is not likely to adversely affect* the Hawaiian goose.

- The action area contains habitat that could support roosting and foraging for the Hawaiian hoary bat. However, the timing of construction and minimal construction footprint will preclude any major or long-term effects, such that the project *may affect, but is not likely to adversely affect* the Hawaiian hoary bat.
- The shoreline area near the project could provide suitable foraging habitat for the Hawaiian monk seal. Because conservation measures would be taken, direct and indirect impacts would be insignificant and the proposed project *may affect, but is not likely to adversely affect*, individuals or populations of the species. Recently designated monk seal terrestrial critical habitat occurs within the action area, with surrounding waters designated as marine critical habitat. All impacts on the Hawaiian monk seal critical habitat would be discountable or insignificant, therefore the proposed action is *not likely to destroy or adversely modify* critical habitat of the species.
- Sea turtle species could use marine and riverine habitats in the action area for foraging and hauling-out to rest or bask. Because impacts to the Green sea turtle and Hawksbill sea turtle would be discountable or insignificant, the proposed action *may affect, but is not likely to adversely affect,* individuals or populations of the species.

To comply with Section 7(a) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(ESA), FHWA is requesting informal consultation with the U.S. Fish and Wildlife Service on the Hawaiian petrel, Newell's shearwater, Hawaiian coot, Hawaiian gallinule, Hawaiian stilt, Hawaiian duck, Hawaiian goose, Hawaiian hoary bat, Hawaiian monk seal, Green sea turtle, and Hawksbill sea turtle, as well as the proposed endangered band-rumped storm petrel.

In parallel, FHWA is also requesting consultation with the National Marine Fisheries Service for the marine listed species and Essential Fish Habitat.

If you require further information or have questions, please contact Thomas Parker, Environmental Protection Specialist, by email at <u>thomas.w.parker@dot.gov</u> or by phone at (720) 963-3688.. We appreciate your assistance with this project.

Sincerely,

Michael Will Project Manager

Enclosure:

Biological Assessment and Essential Fish Habitat Assessment for the Proposed Wainiha Bridges Project, Kuhio Highway, Route 560, Kauai Island, Hawaii

cc:

Michael Tosatto, National Marine Fisheries Service Lisa Hadway, State of Hawaii, Division of Forestry and Wildlife Frazer McGilvray, State of Hawaii, Divison of Aquatic Resources



Federal Highway Administration

#### **Central Federal Lands Highway Division**

January 23, 2017

12300 West Dakota Avenue Suite 380A Lakewood, CO 80228-2583 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

# To: Honorable Suzanne Case, Chairperson Department Of Land And Natural Resources

- Attn: Suzanne Case State Historic Preservation Officer
- From: J. Michael Will, P.E. Project Manager

Subject: National Historic Preservation Act, Section 106 and Hawaii Revised Statutes, Chapter 6e Consultation for the Project to Replace Temporary Wainiha Bridges (Log No.2015.04243, Doc No. 1512JLP23)

Halele'a District, Kaua'i Island, Wai'oli, Waikoko, Waipā, Lumaha'i, and Wainiha Ahupua'a

Tax Map Key: Wainiha Bridge 1: [4] 5-8-002:002 por.; [4] 5-8-006:030, 031, 032, 033, 046, 060, and 999 por./ Wainiha Bridge 2-3: [4] 5-8-006:009, 011, 017, 018, 019, 030, 999 por.; [4] 5-8-007:023, 024, 031, 032, 999 por./ Waioli Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por.; [4] 5-5-006:014, 888 por.; [4] 5-6-002:002, 004, 999 por./ Waipā Bridge: [4] 5-6-004:014, 022, 023, 999 por./ Waikoko Bridge: [4] 5-6-003:002, 999 por./ Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.

Dear Ms. Case:

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), in partnership with the State of Hawaii Department of Transportation (HDOT), is proposing to replace the three temporary pre-fabricated (ACROW) bridges on Kūhiō Highway (Route 560) in Wainiha Valley on the north side of the island of Kaua'i. The bridges are located between mile post 6.4 and 6.7 near the mouth of Wainiha Stream before it feeds into Wainiha Bay. The original bridges at these three locations were replaced with temporary ACROW bridges after Bridge #2 suffered permanent damage and Bridges #1 (the southern-most bridge) and #3 (the northern-most bridge) were determined to be structurally deficient). The ACROW bridges were installed as a temporary measure to keep the roadway open to residents and public traffic until environmental clearance and funding for the permanent structures could be secured. The three bridges are owned and maintained by HDOT. The proposed project is considered a federal action and undertaking, and will comply with Section 106 of the National Historic Preservation

Act (NHPA) of 1966, as amended (2006), as well as Hawaii Revised Statutes (HRS) Chapter 6E. This letter is to submit for your review the Draft Archaeological Inventory Survey (AIS) in accordance with Title 36 of the *Code of Federal Regulations* (CFR), Section 800.3, and in accordance with HRS Chapter 6E-8. The Draft AIS for the subject project was submitted and received by your office with the appropriate filing fee on April 25, 2016. In a letter dated June 14, 2016 (Log No: 2016.01007; Doc No: 1606NM09), your office requested revisions to the Draft AIS report. A revised Draft AIS report dated July 18, 2016 was prepared addressing your comments and was resubmitted on October 6, 2016. This correspondence and the the stamped submittal form is enclosed for your reference. We are also providing eligibility and effects determination for your review and concurrence. In a letter dated December 18, 2015 (Log No.2015.04243, Doc No. 1512JLP23), SHPD concurred with the Area of Potential Effects (APE) for the project. The approved APE remains unchanged since your concurrence and is enclosed with this submittal.

# **Overview of the Undertaking**

FHWA and HDOT propose the replacement of the temporary ACROW bridges with new onelane bridges that closely match the existing alignment. The width of the new bridges would be close to the existing bridge widths to maintain the existing roadway character. The proposed typical section of the one-lane bridge would accommodate a total 14-foot roadway section from rail to rail, with an additional 1 to 1.5 feet on each side to support the bridge rails and for hanging utilities. Included in this design is a true timber deck which would be composed of 4 inch by 12 inch treated lumber planks installed longitudinally as was present on the 1957 historic Wainiha Bridges. Additionally, it is anticipated that structural steel tube rails that are crash-tested would be installed. A rail type has been identified that offers visual similarities to the historic pre-ACROW bridges that existed prior to their emergency replacement. The structural steel tube rails have similar rail picket spacing and are slightly shorter than the 1957 railings to improve sight distance on the bridges. Attached to this letter are the draft design exhibits for the proposed project showing the proposed bridge design details.

Also included as part of the proposed project is the placement of temporary one-lane bridges adjacent to or crossing over three historic one-lane bridges along Kūhiō Highway located at Wai'oli, Waipā, and Waikoko Streams that access the Wainiha Bridges project site. These historic bridges have low load capacities and temporary bridges would allow construction loads to access the Wainiha project site without affecting the historic integrity of these bridges. The existing temporary ACROW bridges at the Wainiha project site would be shifted *makai* to accommodate traffic during construction of the new bridges. All temporary bridges would be removed upon completion of the project, and the sites restored. Two potential staging areas in Lumaha'i Ahupua'a are also included in the Area of Potential Effects (APE). Staging also may occur at each bridge location and is included in the APE boundary.

#### **Area of Potential Effects**

The archaeological and historic architectural Areas of Potential Effects (APE) are illustrated in figures included in the enclosed AIS. The APE for the current project is defined as only the entire 3.65 hectares (9.006 acres) project area, including Wainiha Stream Bridge 1: 0.64 hectares (1.603 acres), Wainiha Stream Bridges 2 and 3: 1.40 hectares (3.466 acres), Wai'oli Stream Bridge: 0.51 hectares (1.256 acres), Waipā Stream Bridge: 0.59 hectares (1.449 acres), Waikoko Stream

Bridge: 0.29 hectares (0.715 acres), Potential Staging Area 1: 0.12 hectares (0.296 acres), Potential Staging Area 2: 0.09 hectares (0.221 acres).

The archaeological and historic architectural APE includes both temporary and permanent impact areas. Tax Map Keys (TMK) and corresponding acreage included in the APE are listed below:

- Wainiha Bridge 1: [4] 5-8-002:002 por.; [4] 5-8-006:030, 031, 032, 033, 046, 060, and 999 por.; 1.603 acres
- Wainiha Bridge 2-3: [4] 5-8-006:009, 011, 017, 018, 019, 030, 999 por.; [4] 5-8-007:023, 024, 031, 032, 999 por.; 3.466 acres
- Wai'oli Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por.; [4] 5-5-006:014, 888 por.; [4] 5-6-002:002, 004, 999 por.; 1.256 acres
- Waipā Bridge: [4] 5-6-004:014, 022, 023, 999 por.; 1.449 acres
- Waikoko Bridge: [4] 5-6-003:002, 999 por.; 0.715 acres
- Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.; 0.221 acres

As mentioned above, SHPD has previously concurred with the APE in a letter dated December 18, 2015.

### **Determination of Eligibility**

Pursuant to NHPA Section 106 and HRS Chapter 6E, a cultural resources investigation was performed within a field survey area that included the project's APE. The cultural resources investigation comprised an archival literature review and an archaeological inventory survey. The surveys identified the following historic properties within the APE:

The Kaua'i Belt Road, a National Register of Historic Places (NRHP) site (Reference # 03001048) and Hawai'i State Register of Historic Places site (State Inventory of Historic Places [SIHP] # 50-30-02-9396) within the APE boundary is comprised in part of the following:

- SIHP # 50-30-02-9396, the Kaua'i Belt Road
- SIHP # 50-30-03-2296, the Wai'oli Bridge,
- SIHP # 50-30-03-2297, the Waipā Bridge,
- SIHP # 50-30-03-2298, the Waikoko Bridge, and
- A reinforced-concrete pipe culvert and supporting basalt and mortar revetments beneath Kūhiō Highway approaching the middle Wainiha bridge, Haena-bound.

The surveys did not identify any archaeological resources within the APE. FHWA believes all historic properties with potential to be affected by the undertaking have been identified.

FHWA is in agreement with previous determinations of eligibility. Kaua'i Belt Road, North Shore Section (Reference # 03001048 and SIHP #50-30-02-9396) is significant as nominated as a historic district under Criteria A and C for its significance and contribution to engineering, social history, and transportation. FHWA also agrees that the Wai'oli Bridge, Waipā Bridge, and Waikoko Bridge are *contributing features* of the NRHP-listed Kaua'i Belt Road section and are also significant. However, Wainiha Bridges 1, 2, and 3 are modern structures and as such do not

contribute to the significance of the NRHP-listed Kaua'i Belt Road, North Shore Section, as discussed in the 2013 Hawaii Historic Bridge Inventory and Evaluation prepared by MKE Associates, LLC and Fung Associates, Inc. FHWA has therefore determined that Wainiha Bridges 1, 2, and 3 are *non-contributing features*.

The reinforced-concrete pipe culvert and supporting basalt and mortar revetments located beneath Kūhiō Highway approaching the middle Wainiha bridge (Wainiha Bridge 2) was also identified during surveys. This feature facilitates drainage of the roadway and has low visibility as much is covered by dense vegetation. While this feature lacks individual distinction, it contains materials and workmanship similar to other features along the Kaua'i Belt Road. It is therefore considered a *contributing feature* to the overall NRHP-listed Kaua'i Belt Road.

#### **Determination of Effects**

The undertaking involves replacement of the existing non-contributing temporary Wainiha Bridges with new one-lane bridges that are less obtrusive and more visually consistent with the NRHP-listed Kauai Belt Road's historic district. No measurable changes to the roadway's alignment would occur. The new bridges would closely match the existing horizontal alignment and lowering of the roadway grade would be more consistent with the historic conditions. The Wai'oli Bridge, Waipā Bridge, and Waikoko Bridge, contributing features to the roadway, would be preserved in place. No alterations or rehabilitations to these structures would occur.

Temporary structures would be installed adjacent to Wai'oli Bridge and Waipā Bridge and up and over Waikoko Bridge and this would be a temporary visual change to the site's setting. This temporary change would not be adverse as all temporary bridges would be removed upon completion of the project and the sites restored and revegetated.

A reinforced-concrete pipe culvert and revetment feature has been identified as a contributing feature to the roadway. This feature is located within the APE as the roadway approaches Bridge 2, Haena-bound. This feature would not be affected by the proposed permanent design at the project site; however, it is unknown if damage may be unavoidable from the construction access and delivery of equipment to Bridge 3. FHWA will strive to avoid this feature. However, if it is determined that potential damage is unavoidable, the feature would be documented with photographs, and materials would be salvaged and rebuilt in the same style, manner, workmanship, and location to mimic their original appearance. If some stone is damaged beyond re-use, materials would be used for repair that match the old in design, color, texture, and other visual qualities and, where possible, materials, consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

Based on the replacement of the existing bridges being non-contributing features and the future conditions being more visually consistent with the NRHP-listed site, and with consideration that the rehabilitation of a contributing feature (roadway culvert feature), if necessary, would be consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties and would not affect the overall integrity of the historic district, FHWA has determined that the undertaking would have *no adverse effect* on the NRHP-listed Kauai-Belt Road, North Shore section.

No eligible or listed archaeological resources are located within the APE; therefore, none would be affected. However, There is potential to encounter subsurface archaeological deposits or human burials during the installation of temporary bridges over Wailoi, Waipā, and Waikoko steams on the Kaua'i Belt Road, as well as during the installation of the three new permanent bridges in Wainiha. Based on these potential impacts, FHWA will provide on-site archaeological monitoring as a mitigation measure during all ground disturbing activities for the project.

FHWA has determined that the undertaking will result in a *No Adverse Effect* finding in accordance with Federal regulations (36 CFR 800.5) and in an *Effect, with Proposed Mitigation Commitments* with State regulations. FHWA and HDOT commit to the following as part of this undertaking:

- Preservation and protection of the existing historic Wai'oli Bridge, Waipā Bridge, and Waikoko Bridge;
- 2) Construction of the project consistent with the design described in this letter;
- Avoidance to the extent practicable of the roadway culvert feature and, if affected, documentation and rehabilitation/reconstruction of this features using salvaged materials consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties; and
- 4) Archaeological monitoring for all ground-disturbing activities.

FHWA would like to bring attention to the review of past project materials on the project. Through this review it was noted that past discussions with consulting parties have occurred where it was mentioned that SHPD and FHWA felt that modifications to the Wainiha Bridges would be considered an *adverse effect*. However, with the information available to us at this time, including an understanding of the significance of the NRHP-listed roadway and its character-defining features and with consideration of the proposed design elements, FHWA believes that a *No Adverse Effect* determination is appropriate for this undertaking. FHWA has reviewed the project record and has confirmed that the original emergency action to remove the historic bridges and place ACROW bridges was not federally funded and therefore not subject to Section 106. Historic American Engineering Record (HAER) documentation was completed at that time through the emergency state action. Therefore, this Section 106 undertaking consists of the replacement of the temporary Wainiha Bridges and associated construction activities and does not include the past actions of removal of the historic Wainiha bridges.

#### Consultations

Consultations have occurred and/or is ongoing with local historic resource organizations, including Hanalei Roads Committee and Historic Hawaii Foundation, the County of Kauai Historic Preservation Review Commission (HPRC), as well as Native Hawaiian organizations and Native Hawaiian descendants with ancestral, lineal, or cultural ties to, cultural knowledge or concerns for, and cultural or religious attachment to the proposed project area.

The following have been consulted regarding the proposed undertaking:

• Association of Hawaiian Civic Clubs

- Aha Moku Advisory Committee
- Au Puni O Hawaii
- Council for Native Hawaiian Advancement
- Hanalei Roads Committee
- Historic Hawaii Foundation
- Kamehameha Schools Community Relations and Communications Group, Government Relations
- Kanu o ka 'Āina Learning 'Ohana
- Order of Kamehameha I
- Ko'olau Foundation
- Na Koa Ikaika Ka Lahui Hawaii
- Nā Kuleana o Kānaka 'Ōiwi
- Office of Hawaiian Affairs
- Papa Ola Lokahi
- The I Mua Group
- Kauai-Niihau Island Burial Council

Cultural Surveys Hawaii (CSH), on behalf of FHWA, has also done additional outreach to an extensive list of persons who may be knowledgeable about cultural resources, practices, and beliefs relevant to the study area. A list of those consulted is available upon SHPD's request.

Lastly, in addition to the above, the public has also been engaged with the project development process through a series of public meetings.

The Kauai Historic Preservation Review Commission (HPRC) met on October 1, 2015 to discuss the project and provided comments (in form of meeting minutes) on October 28, 2015. No substantive new comments were received on this project. General questions were asked regarding the presence of archaeological sites, and Cultural Surveys Hawaii, Inc., the archaeological consultant for the projects, discussed the surveys performed and lack of resources identified in the project areas and the ongoing consultation with SHPD. The HPRC supported the context-sensitive design approach of this project.

We received communication from the Office of Hawaiian Affairs in a letter dated November 5, 2015 that indicated that the Ka'iliopaia Heiau (SIHP #: 50-30-03-0147) is located shoreward of Kuhio Highway near one identified Staging Area on the western portion of Makahoa Point. The OHA expressed concern over our staging area location and stated that impacts to the Heiau should be avoided. The Ka'iliopaia Heiau is located 500 meters from the proposed staging area and will not be impacted by the project. Copies of this correspondence are included in enclosure 2.

#### **Request for Concurrence**

We request your concurrence with the Determinations of Eligibility and Effects. We would appreciate a written response within 30 days from date of receipt, by email at Michael.will@dot.gov or by US Postal Service to 12300 West Dakota Avenue, Suite 380A, Lakewood, CO 80228-2583.

Please feel free to contact Thomas Parker, Environmental Protection Specialist, at (720) 963-3688, email: thomas.w.parker@dot.gov, if you have any questions. We look forward to working with the SHPO on these needed improvements.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Enclosures:

- 1. Area of Potential Effects (Map Set) and December 18, 2016 SHPD APE Concurrence Letter
- 2. Stakeholder Correspondence
  - a. Kauai HPRC Comments (October 28, 2015 meeting minutes of October 1, 2015 meeting),
  - b. OHA Comment Letter
  - c. HHF Comment Letter and Response
- 3. Wainiha Bridges Draft EA Comment Responses
- 4. Draft Archaeological Inventory Survey Report for the
- 5. Wainiha Bridge Plan Drawings

cc (with digital enclosures): Christine Yamasaki, HDOT Misako Mimura, HDOT Jessica Puff, SHPD Susan Lebo, SHPD



#### **Central Federal Lands Highway Division**

January 18, 2017

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

Dr. Kamana'opono Crabbe Attn: OHA Compliance Enforcement 560 N. Nimitz Highway, Ste. 200 Honolulu, HI 96817

Subject: National Historic Preservation Act, Section 106 and Hawaii Revised Statutes, Chapter 6e Consultation for the Project to Replace Temporary Wainiha Bridges

Halele'a District, Kaua'i Island, Wai'oli, Waikoko, Waipā, Lumaha'i, and Wainiha Ahupua'a

Tax Map Key: Wainiha Bridge 1: [4] 5-8-002:002 por.; [4] 5-8-006:030, 031, 032, 033, 046, 060, and 999 por./ Wainiha Bridge 2-3: [4] 5-8-006:009, 011, 017, 018, 019, 030, 999 por.; [4] 5-8-007:023, 024, 031, 032, 999 por./ Waioli Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por.; [4] 5-5-006:014, 888 por.; [4] 5-6-002:002, 004, 999 por./ Waipā Bridge: [4] 5-6-004:014, 022, 023, 999 por./ Waikoko Bridge: [4] 5-6-003:002, 999 por./ Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.

Dear Dr. Crabbe:

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), appreciates your correspondence dated November 5, 2015 regarding the subject project. The FHWA-CFLHD has assessed the location of the proposed staging areas located on Kuhio Highway in relation to the Ka'iliopaia Heiau (SIHP #: 50-30-03-0147). Enclosed with this letter is a figure showing this Heiau in relation to the proposed staging area. The Heiau is located 500 meters from the proposed staging area and has no potential for effect from our proposed staging off of Kuhio Highway.

Additionally, we have retained Cultural Survey Hawai'i, Inc. for the preparation of the Cultural Impact Assessment (CIA) and Archaeological Inventory Survey (AIS) prepared for this project. A copy of the CIA and AIS reports have been enclosed with this letter for your files.

Please also feel free to contact Thomas Parker, Environmental Protection Specialist, by telephone at (720) 963-3688, or email thomas.w.parker@dot.gov, if you have any further questions.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Enclosures:

- Enclosure 1: Ka'iliopaia Heiau (SIHP #: 50-30-03-0147) Figure
- Enclosure 2: Final CIA
- Enclosure 3: Draft AIS

cc (via electronic mail):

Christine Yamasaki, HDOT Jessica Puff, SHPD Dr. Susan Lebo, SHPD



Enclosure 1



# United States Department of the Interior



FISH AND WILDLIFE SERVICE Pacific Islands Fish and Wildlife Office 300 Ala Moana Boulevard, Room 3-122 Honolulu, Hawaii 96850

In Reply Refer To: 01EPIF00-2017-I-0080

FEB 1 6 2017

Mr. Michael Will U.S. Department of Transportation Federal Highway Administration Central Federal Lands Highway Division 12300 West Dakota Avenue, Suite 380 Lakewood, CO 80228

Subject: Informal ESA Section 7 Consultation and FWCA Recommendations for Wainiha Bridges Project, Kauai

Dear Mr. Will:

The U.S. Fish and Wildlife Service (Service) received your letter, dated December 12, 2016, requesting our concurrence that the proposed project may affect, but is not likely to adversely affect (NLAA) the following federally listed species: the endangered Hawaiian stilt (Himantopus mexicanus knudseni), Hawaiian gallinule (Gallinula chloropus sandvicensis), Hawaiian coot (Fulica alai), Hawaiian duck (Anas wyvilliana) (collectively referred to as Hawaiian waterbirds); the endangered Hawaiian goose (Branta sandvicensis); the endangered Hawaiian hoary bat (Lasiurus cinereus semotus); and the threatened green sea turtle (Chelonia mydas) and endangered Hawksbill sea turtle (Eretmochelys imbricata) (hereafter collectively referred to as sea turtles). On January 23, 2017, Thomas Parker, Environmental Protection Specialist, clarified via telephone that the Federal Highways Administration (FHWA) is also requesting our concurrence on NLAA determination for the endangered Hawaiian petrel (Pterodroma sandwichensis), band-rumped storm-petrel (Oceanodroma castro), and the threatened Newell's shearwater (Puffinus newelli) (hereafter collectively referred to as seabirds). This response is in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C 1531 et seq.), the Fish and Wildlife Coordination Act of 1934 (FWCA), as amended (16 U.S.C. 661 et seq.; 48 Stat. 401), the Clean Water Act (CWA), as amended (33 U.S.C. 1251 et seq.; 62 Stat. 1155), and the National Environmental Policy Act of 1969 (NEPA), as amended (42 U.S.C. 4321 et seq.).

The National Marine Fisheries Service (NMFS) is the Federal agency that consults on potential impacts to the endangered Hawaiian monk seal (*Monachus schauinslandi*), both in their on-shore and ocean habitats. Therefore, we did not review the proposed project for potential project impacts to monk seals. We acknowledge that your letter, dated December 12, 2016, states that FHWA is also requesting consultation with NMFS regarding the presence of monk seals in the area and potential impacts to the species from the project.

#### Mr. Michael Will

The FWCA provides a procedural framework for the consideration of fish and wildlife conservation measures to assist planning and implementation of Federal water resource development projects. The Service met with the FHWA, Central Federal Lands Highway Division (CFLHD), CH2M HILL (consultant for FHWA), SWCA (consultant for FHWA), the National Oceanic and Atmospheric Administration Fisheries, the State of Hawaii Division of Aquatic Resources (HDAR), the U.S. Environmental Protection Agency, and the U.S. Army Corps of Engineers (USACE) on December 8 and December 15, 2015 to discuss project descriptions and biological resource assessments for the Hawaii Bridges Program. In our December meetings, the Service expressed concerns regarding mobilization of bedded sediments due to construction activities. In a letter, dated April 26, 2016, we summarized these concerns and provided recommendations to incorporate into project planning. FHWA provided us a summary of measures, in a letter dated June 21, 2016, which will be implemented during construction to protect water quality and aquatic resources.

In addition to those measures, FHWA's Biological Assessment (attached to your letter) includes a list of best management practices that will be implemented to protect water quality during construction, including but not limited to, unimpeded flow around the isolated and confined inwater work area to allow aquatic fish passage through the duration of the proposed project. Additional information regarding the project description and clarifying avoidance and minimization measures for listed species was provided to the Service via telephone by FHWA staff on January 23, 2017 and February 8, 2017. Measures pertaining to nest searches and biological monitors for seabird nests were removed from the conservation measures of the project description because these seabirds are known to nest in the mountains and coastal cliffs (i.e., not within or near the project limits).

The findings and recommendations in this consultation are based on the following: (1) your consultation request; (2) FHWA's Biological Assessment; (3) site visit conducted by Service staff, Adam Griesemer, on March 9, 2015 during pre-consultation; and (4) other information available to us. Copies of pertinent materials and documentation are maintained in an administrative record in the Service's Pacific Islands Fish and Wildlife Office in Honolulu, Hawaii.

# **Project Description**

The FHWA proposes to replace three temporary bridges, Wainiha Bridges 1, 2, and 3, along Kuhio Highway (Route 560) between milepost (MP) 6.4 and 6.7 near the mouth of Wainiha Stream on the island of Kauai. The temporary bridges were installed in 2004 and 2007 under state emergency actions to keep the roadway open until design and environmental compliance could be completed for the new structures. Construction access to these bridges will be provided through roadways. The project requires placement of temporary structures adjacent to or crossing over three existing one lane bridges at Waioli (MP 3.93), Waipa (MP 3.90), and Waikoko Bridge (MP 4.22) to accommodate construction loads needed for project.

The temporary Wainiha Bridge 1 will be replaced with a single-span, approximately 50 feet long, concrete girder bridge with a width of approximately 17 feet. The bridge will include 2 to 3 feet in addition to the 14-foot roadway section to support rails and hanging utilities. Wainiha Bridge 2 will be replaced with a single-span, concrete girder bridge, approximately 87 feet long. The bridge will also accommodate a 14-foot roadway section with an additional 2 to 3 feet to support

#### Mr. Michael Will

bridge rails and hanging utilities. The existing bridge abutments of Wainiha Bridge 1 and 2 will be removed. The temporary Wainiha Bridge 3 will be replaced with a three-span, approximately 178 feet long, pre-stressed concrete girder bridge with a width of approximately 17 feet. The section of this bridge will also support a14-foot roadway section with an additional 2 to 3 feet to support bridge rails and hanging utilities. The two existing piers of Wainiha Bridge 3 will be replaced with two new piers. To allow the roadway to be open during construction, the existing temporary bridges will be relocated to the southwest of their current alignment. The relocation of these temporary bridges will require a 1 to 2 day closure for each bridge. The night work will be conducted separately over several months, outside of the peak seabird fallout period. No streetlights will be added to the three existing streetlights. The existing overhead powerlines and telecommunication lines will be relocated from their current position and seven new utility poles will be installed.

Piers are not anticipated for any of the temporary bridges at Waioli, Waipa, and Waikoko Bridges. Abutments at Waioli Stream and Waipa Stream may encroach into the stream channels on one or both sides due to length limitations. The setting and removing of the temporary structures will require a 1 to 2 road closure at each location.

Two staging and stockpile areas totaling 0.16 acre will be located in previously disturbed areas along Kuhio Highway near Lumahai Beach, on the southwest and east sides of the road. In general, construction equipment will include track-mounted dozers, loaders, excavators, cranes, compactors, pile drivers, concrete trucks, dump trucks, pickup trucks, chainsaws, and jackhammers. The installation of the foundations at Wainiha Bridge 1, 2, and 3 will require a truck or crane mounted drills. Best Management Practices (BMPs) will be implemented to protect water quality, as recommended by NMFS and the Service.

### ESA Conservation Measures

To avoid and minimize impacts to federally listed species, the following conservation measures are part of the project description:

- In areas where vegetated stream banks will be disturbed, waterbird nest searches will be conducted by a qualified biologist before any work is conducted and after any subsequent delay in work of 3 or more days (during which birds may attempt nesting). The results of the pre-construction survey will be submitted to the Service. If a waterbird nest with eggs or chicks/ducklings is discovered in the construction limits, work will not begin until the chicks/ducklings have fledged. Waterbird nests, chicks, or broods found in the project area before or during construction will be reported to the Service within 48 hours. A biological monitor will be present on the project site during all construction activities to ensure that Hawaiian waterbirds and nests are not adversely impacted.
- A qualified biologist will survey the area for nesting Hawaiian goose before construction, and after any subsequent delay in work of 3 or more days (during which birds may attempt nesting). The results of the pre-construction survey will be submitted to the Service. All regular on-site staff will be trained to identify Hawaiian goose, and they will know the appropriate steps to take if Hawaiian goose (geese) is present. Training will not be necessary if a biological monitor is present for the duration of the construction. If a Hawaiian goose (geese) is found in the area during ongoing activities, all activities within

100 feet of the bird will cease, and the bird will not be approached. If a nest is discovered, the Service will be contacted. If a nest is not discovered, work may continue after the bird leaves the area of its own accord. Temporary construction fencing will be erected around the Waoli and Waikoko Bridge construction zones to minimize the potential for Hawaiian goose to enter the project area.

- Construction activity will be restricted to daylight hours during the seabird peak fallout period (September 15-December 15). The limited temporary night time work outside of the peak seabird fallout period will be shielded to prevent upward radiation and directed away from any nearby beach habitats.
- Fences that are erected as part of the project will have barbless wire. No fences in the survey area were observed with barbed wire during the survey; however if fences are present and impacted by the project, the fence will be removed or replaced with barbless wire. No trees taller than 15 feet will be trimmed or removed as a result of this project between June 1 and September 15 to avoid impacts to Hawaiian hoary bats.
- All regular on-site staff will be trained to identify the sea turtles, and will be trained on appropriate steps to take if these species are present on-site. Construction activities will not occur if a sea turtle(s) is in the construction area or within 150 feet of the construction area. Biological monitors will monitor near river mouths to determine if a sea turtle has entered the riverine environment and will have direct contact with the work crews. Construction will only re-start after the animal voluntarily leaves the area.
- Shielded lighting will be used to reduce direct and ambient light to potential nearby beach habitat. Lighting will be directed away from the beach. In-water work at night will be avoided, unless emergency maintenance and repair of erosion and sediment controls are necessary to meet permit conditions.

In addition to the above conservation measures, the Service acknowledges that most of the utility poles and lines at Wainiha Bridges are shielded by dense vegetation. Based on our site visit, we understand that the vegetation will provide shielding for relocated and new utility poles and lines at existing heights for respective sections of the highway.

# Fish and Wildlife Coordination Act Comments

Important fish and wildlife resources occur throughout the proposed project area, including freshwater and brackish environments of Wainiha Stream and the nearshore marine areas of Wainiha Bay. The resources include endangered and threatened species, coral reefs, fisheries, non-coral invertebrates, marine plants and rare, native species. Federally listed species that occur or transit through the project area include Hawaiian waterbirds, Hawaiian goose, Hawaiian hoary bat, and seabirds. The endangered Hawksbill sea turtle and threatened green sea turtle are known to occur in nearshore waters around Wainiha Bay.

We appreciate your coordination with us to incorporate fish and wildlife conservation measures into your project description, including measures to avoid and minimize impacts to listed species. Our primary concern regarding the proposed project is the potential for project-related impacts to sensitive marine biological resources that may occur in the vicinity of the project site.

#### Mr. Michael Will

Construction activities to remove piers and construct foundations could result in the release of river sediments and contaminants, thus increasing turbidity levels within the aquatic environment. We are concerned that increased turbidity may alter water quality conditions and negatively impact three stages of coral reproduction, gamete fertilization, attainment of larval competence and metamorphosis/settlement (Richmond 1995, Richmond 1993, Hodgson 1990 and Babcock and Davies 1991). We are concerned that altered water quality, such as increased sedimentation, turbidity and exposure to contaminated sediments could reduce adult coral fecundity and interfere with reproductive timing and egg-sperm interations (Jokiel 1985). Furthermore, moderate changes in turbidity may significantly altering photosynthesis/respiration ratios for corals (Telesniki and Goldberg, 1995).

The Service supports incorporation of primary isolation and confinement BMPs that are incorporated into the project description to avoid or minimize project-related degradation of water quality conditions that may impact fish and wildlife resources. We acknowledge that FHWA will install secondary BMPs (i.e., turbidity curtains) prior to the installation and removal of the primary isolation and confinement BMPs to capture sediment that could be suspended during project activities. The Service also acknowledges that turbidity and pH monitors will be installed upstream and downstream of the project area to provide live time data for these variables. We acknowledge that if during construction a visible plume is observed or monitoring data indicates that primary and secondary BMPs are not performing adequately, FHWA will cease work and the BMP will be updated or replaced to ensure proper function. Based on the Biological Assessment, FHWA will ensure that the permitted activity will not result in non-compliance or violations to the applicable State water quality standards specified in Hawaii Administrative Rules (HAR), Section 11-54-4.

Therefore, the Service recommends construction of foundations be scheduled to avoid the spawning period for most corals, which in Hawaii is April through August. Additionally, we recommend the following best management practices for the effective use of silt curtains where silt curtains are appropriate for use:

- 1) Full depth silt curtains should be used in all practical situations for this project.
- 2) The placement of silt curtains should remain as close as possible to the project boundary to minimize the secondary effects from increased sedimentation.
- 3) The curtains should be left in place (not moved or shifted) until the water turbidity has returned to ambient conditions.
- 4) Silt curtains should be secured properly to minimize them from breaking free and causing additional impact.

At the project location, visual monitoring of sediment control devices should be conducted prior to daily construction and hourly while construction activities are in progress. During construction periods, we recommend having a dedicated turbidity monitoring person that will take periodic turbidity measurements immediately surrounding the turbidity containment devices and along the nearby shoreline (considering the path in which water may flow). If the turbidity exceeds 1 NTU of the backgrounds levels (as determined daily prior to work as well as areas significantly outside the influence of the construction), then work should be suspended until the turbidity returns to baseline.

#### Mr. Michael Will

# Endangered Species Act Comments

Your letter indicates that FHWA has determined that the proposed project may affect, but is not likely to adversely affect the Hawaiian coot, the Hawaiian duck, the Hawaiian gallinule, the Hawaiian stilt, the Hawaiian goose, the Hawaiian hoary bat, the Newell's shearwater, the Hawaiian petrel, the band-rumped storm petrel, the green sea turtle, and the Hawksbill sea turtle. The Service acknowledges that the above conservation measures to avoid and minimize impacts to federally listed species are considered part of the project description. The conservation measures will be implemented at the project site. Any changes to, modifications of, or failure to implement these conservation measures may result in the need to reinitiate this consultation.

#### Summary

The Service encourages FHWA to incorporate our FWCA recommendations into project planning and design. Based on the above information and that measures will be implemented to avoid and minimize impacts to listed species, we concur with your determination that the proposed project may affect, but is not likely to adversely affect the Hawaiian coot, the Hawaiian duck, the Hawaiian moorhen, the Hawaiian stilt, the Hawaiian goose, the Hawaiian hoary bat, the Newell's shearwater, the Hawaiian petrel, the band-rumped storm petrel, the green sea turtle, and the Hawksbill sea turtle. Unless the project description changes or new information reveals that the action may affect listed species in a manner or to an extent not considered, no further action pursuant to section 7 of the ESA is necessary.

We appreciate your efforts to conserve protected species. If you have questions regarding this letter, please contact Adam Griesemer, Endangered Species Biologist (phone: 808-285-8261).

Sincerely,

Aaron Nadig Island Team Manager Oahu, Kauai, Northwestern Hawaiian Islands, and American Samoa

cc: Paul Luersen, CH2M HILL

Michael Tosatto, National Marine Fisheries Service David Smith, State of Hawaii Division of Forestry and Wildlife Bruce Anderson, State of Hawaii Division of Aquatic Resources

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From:	Stuart Goldberg - NOAA Affiliate
To:	Will, Michael (FHWA)
Cc:	Parker, Thomas W (FHWA); Ian Lundgren - NOAA Affiliate; Gerry Davis - NOAA Federal; Arlene Pangelinan -
	NOAA Federal; Randy McIntosh - NOAA Federal
Subject:	NMFS EFHA Comments: Wainiha Bridges Project EFH Assessment
Date:	Wednesday, February 22, 2017 3:35:22 PM

Dear Mr. Will,

The National Marine Fisheries Service (NMFS) Habitat Conservation Division at the Pacific Islands Regional Office (PIRO) has reviewed the Federal Highway Administration Central Federal Lands Highway Division's (FHWA-CFLHD) September 2016 *Biological Assessment and Essential Fish Habitat Assessment for the Proposed Wainiha Bridges Project, Kuhio Highway, Route 560, Kauai Island, Hawaii* (referred to here as the *BA and EFH Assessment*). NMFS has also reviewed the *Wainiha Best Management Practices Addendum* received by NMFS on February 2, 2017. NMFS provides the following comments pursuant to the Essential Fish Habitat (EFH) provision §305(b) of the Magnuson Stevens Fishery Conservation and Management Act (MSA;16 U.S.C. 1855(b)).

The FHWA-CFLHD is proposing to replace three bridges (referred to as Wainiha Bridges One, Two, and Three here and in the *BA and EFH Assessment*) that span Wainiha Stream, and also to install three temporary bridges across Waioli, Waipa, and Waikoko Streams on Kuhio Highway (Route 560) on the north shore of the Island of Kauai. Waikoko, Waipa, and Waioli Streams discharge into Hanalei Bay, whereas Wainiha Stream discharges into Wainiha Bay. Steady streamflow occurs in all of these streams.

The proposed action would remove the existing temporary prefabricated Acrow® bridges, abutments, and piers at Wainiha Bridges One, Two, and Three and replace them with new one-lane, concrete girder bridges that closely match the existing alignment. The existing Acrow® bridges would be temporarily relocated seaward for the duration of the project to maintain traffic during construction activities.

Existing bridge structures at Waioli, Waipa, and Waikoko Streams require installation of temporary bypass bridge structures capable of handling increased loads and construction vehicle traffic for the Wainiha Bridges replacement. Installation of new piers is not anticipated for any of these temporary bridges; however, length limitations may require an abutment to encroach minimally into the stream channel on one or both sides of Waioli and Waipa Streams. No in-water work is anticipated at Waikoko Stream. Excavation would be necessary for construction of abutments, and vegetation clearing and limited grubbing would be necessary to launch the bridges across the stream as well as to accommodate construction vehicle access to and across the bridges. The temporary one-lane bridges and abutments would be removed once construction is complete, and temporarily impacted areas would be revegetated. Construction is expected to last approximately 2 years.

Personnel and equipment would be staged within each bridge project area (a total of 0.16 acre), and demolition debris would require disposal at an approved landfill. Where in-water work is necessary, the existing flow capacity of the stream would be maintained. Diversion and isolation of the project area will occur, and all work conducted within the wetted channels will be isolated by a dewatering structure such as a cofferdam. All work conducted below the ordinary high water mark and above the mean higher high water will occur in the dry. Dewatering and treatment of dewatering effluent would conform to federal, state, and local

regulations.

The project will use standard construction equipment including track-mounted dozers, loaders, excavators, cranes, compactors, concrete trucks, dump trucks, pickup trucks, chainsaws, and jackhammers. In addition, the installation of foundations at Wainiha Bridges One, Two, and Three would likely require truck- or crane-mounted drilling machines. Additional equipment may be placed on barges within the active channel. If barges are utilized, they would be surrounded by a boom. Vibratory hammering will be used as much as practical to minimize sound impacts during pile driving.

The water column and bottom of Wainiha Bay and Hanalei Bay and their submerged lands are designated as EFH and support eggs, larvae, juveniles and adults of Coral Reef Ecosystem Management Unit Species (CRE-MUS), Bottomfish MUS (BMUS), Crustacean MUS (CMUS); and juveniles and adults of Pelagic MUS (PMUS).

NMFS is concerned that enhanced sedimentation and turbidity due to the disturbance of fine sediments during in-water construction activities, including the installation and removal of bridges, cofferdams, and sheet piles, barge use, and the dewatering of coffer dams, may have adverse effects on EFH and MUS in Wainiha and Hanalei Bay, and MUS in the mouths of Wainiha, Waioli, Waipa, and Waikoko Streams. NMFS determines, however, that such adverse effects to EFH and MUS are likely to be temporary and minimal, and can be further minimized given the implementation of the following conservation measures:

1. The Applicant and their chosen contractor(s) should strictly adhere to all of the conservation measures and BMPs provided in the *BA and EFH Assessment* and the *Wainhia Best Management Practices Addendum*.

2. The Applicant and their chosen contractor(s) should schedule work to be conducted in the dry season.

3. Project activities should minimize in-water work to the greatest extent practicable. If inwater work employing barges is required, the Applicant and their chosen contractor(s) should develop, specify and implement appropriate conservation measures and mechanisms to minimize the potential for increased sedimentation from these activities (e.g. install silt curtains to minimize sedimentation and booms to prevent dispersal of trash and debris).

4. If BMPs and conservation measures do not provide protection to EFH and MUS as expected, the FHWA-CFLHD should have a plan to offset those losses of ecological function. NMFS is willing to provide assistance in determining appropriate offsets for unexpected impacts to sensitive EFH resources.

Thank you for the opportunity to provide comments. Please don't hesitate to contact me with any questions or concerns.

Best, Stu Stuart Goldberg, PhD Natural Scientist IV Contractor - Lynker Technologies

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U.S. DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration NATIONAL MARINE FISHERIES SERVICE Pacific Islands Regional Office 1845 Wasp Blvd., Bldg 176 Honolulu, Hawaii 96818 (808) 725-5000 • Fax: (808) 725-5215

# APR 0 3 2017

Michael Will Project Manager Federal Highway Administration Central Federal Lands Highway Division 12300 West Dakota Avenue, Suite 380 Lakewood, CO 80228

RE: Informal consultation for the proposed FHWA Wainiha bridges replacement project on Kauai, Hawaii (HFPM-16; I-PI-17-1463-AG; PIR-2016-10090)

Dear Mr. Will:

This letter responds to your December 12, 2016 letter requesting consultation under Section 7(a)(2) of the Endangered Species Act (ESA) for the proposed Federal Highway Administration's (FHWA) action, in cooperation with the State of Hawaii Department of Transportation (HDOT), to replace the Wainiha bridges on the Kuhio Highway (Route 560) in the Halelea District on Kauai, Hawaii.

In your request letter you determined that the proposed bridge replacement projects are not likely to adversely affect (NLAA) endangered or threatened species under our jurisdiction, and requested our concurrence under section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. §1531 *et seq.*), with that determination. Your request for consultation determined that the proposed action is NLAA listed marine resources under NMFS' jurisdiction.

# Proposed Action

The proposed action is described in your above referenced letter and in your September, 2016, Biological Assessment (BA). In summary, the FHWA proposes to replace three temporary prefabricated bridges along the Kuhio Highway on the north side of Kauai between mile post (MP) 6.4 and 6.7 near the mouth of Wainiha Stream and Wainiha Bay (Figure 1). The previous bridges at these locations were replaced under state emergency actions in 2004 and 2007 to keep the roadway open until design and environmental compliance for new structures could be completed.

The three bridges are owned and maintained by HDOT. The FHWA and HDOT propose to remove the three existing temporary bridges, abutments and piers and replace them with new one-lane concrete girder bridges that closely match the existing alignment. The width of the new bridges would be close to those of the existing ones. The temporary bridges would be shifted waterward from their current position to accommodate traffic during permanent bridge construction and removed from the site after completion.

Wainiha Bridge 1 is located at MP 6.44 and is a 40 foot long prefabricated modular steel structure approximately 21.5 feet wide and is a single-span structure. The proposed replacement bridge would be



a 50 foot long single-span pre-stressed concrete girder structure. The bridge deck would be cast in place. The total proposed width would be approximately 16 feet 8 inches. New bridge rails and approach guardrails would be installed and the existing bridge abutments removed.

Wainiha Bridge 2, located at MP 6.7, is a 100-foot-long prefabricated modular steel structure, approximately 18 feet 6 inches wide. The existing bridge is a single-span structure while the proposed replacement bridge would be an approximately 87-foot-long, single-span, concrete girder bridge. The typical section of the bridge would accommodate a 14-foot roadway section from rail to rail and an additional 2 to 3 feet to support the bridge rails and for hanging utilities. The bridge deck would be cast in place. The total proposed bridge width would be approximately 16 feet 8 inches. New bridge rails and approach guardrails on each side would also be installed, and the existing bridge abutments would be removed.

Wainiha Bridge 3, located at MP 6.73, is a 185-foot-long prefabricated modular steel structure, approximately 21 feet 6 inches wide. The existing bridge is a single-span structure; however, two non-functioning piers of the three-span historic bridge still exist in the stream channel. The proposed replacement bridge would be about 178-foot-long, and would be a three-span, concrete girder bridge. The bridge deck would be cast in place. The total proposed bridge width would be approximately 16 feet 8 inches. New bridge rails and approach guardrails on each side would also be installed. Two new concrete piers would be installed in the stream, and the historic piers would be removed.

Because the Kuhio Highway dead-ends near Haena on the Na Pali Coast, construction materials can only be brought in one way, and three additional historic one-lane bridges (Figure 1) that have low load capacities would be temporarily augmented by placing an additional temporary bridge adjacent to or over the existing bridges so materials can be brought in from the east and local traffic can flow at a reasonable rate. These bridges would also be removed when the project is completed.

Temporary and permanent bridge piers to be placed or removed will require isolation from stream flows and sheet pile will likely be used. Steel-sheet piles would be driven with a vibratory hammer into the sandy silts of the freshwater streambeds. All abutments would be installed outside of the streams.

Two separate staging and stockpile areas are proposed along Kuhio Highway near Lauahai Beach, and some staging will be required at each bridge location.

# Action Area

The action area for the proposed project is based on potential noise, short-term disturbance and turbidity to the water column in streams, and near the shore and intertidal areas. It is estimated to extend upstream 300 feet from each bridge site and downstream to the extent of river flow, to include the marine shoreline 300 feet in either direction up and down the beach. The proposed project locations are pictured in Figure 1.



Figure 1. Map of the proposed action area.

# Listed Species

The FHWA has determined that the proposed action is NLAA all species listed in Table 1. No other ESA-listed marine species are expected to be affected by the proposed action. Detailed information about the biology, habitat, and conservation status of sea turtles and marine mammals can be found in

their status reviews, critical habitat designations, recovery plans, and other sources at <u>http://www.nmfs.noaa.gov/pr/species/esa/</u>.

Table 1.	Scientific name, ESA status, listing date, and Federal Register reference for listed spec	cies
	considered in this consultation.	

Species	Scientific Name	ESA Status	Listing Date	Federal Register Reference
Hawaiian Monk Seal <sup>1</sup>	Neomonachus schauinslandi	Endangered	11/23/1976	41 FR 51612
Green Sea Turtle North Central Pacific DPS	Chelonia mydas	Threatened	5/6/2016	81 FR 20057
Hawksbill Sea Turtle	Eretmochelys imbricata	Endangered	7/28/1978	43 FR 32800

<sup>1</sup>Critical Habitat was designated for Hawaiian Monk Seals on 5/26/1988 (53 FR 18990) and revised on 8/21/2015 (80 FR 50925)

# Critical Habitat

In designated areas of the Main Hawaiian Islands (MHI), CH for monk seals includes the marine environment with a seaward boundary that extends from the 200-meter depth contour line (relative to mean lower low water), including the seafloor and all subsurface waters and marine habitat within 10 meters of the seafloor, through the water's edge 5 meters into the terrestrial environment. Detailed information on Hawaiian monk seal critical habitat can be found at

<u>http://www.fpir.noaa.gov/PRD/prd\_critical\_habitat.html</u>. There is no CH designated for any other species listed in Table 1 in the action area.

# Analysis of Effects

In order to determine that a proposed action is NLAA listed species, NMFS must find that the effects of the proposed action are expected to be insignificant, discountable, or beneficial as defined in the joint USFWS-NMFS Endangered Species Consultation Handbook: (1) insignificant effects relate to the size of the impact and should never reach the scale where take occurs; (2) discountable effects are those that are extremely unlikely to occur; and (3) beneficial effects are positive effects without any adverse effects (USFWS & NMFS 1998). This standard, as well as consideration of the probable duration, frequency, and severity of potential interactions, was applied during the analysis of effects of the proposed action on ESA-listed marine species, as described in the consultation request and BA.

The proposed bridge replacement actions have the potential to interact directly and indirectly with ESAlisted species through the following stressors:

- Exposure to underwater noise from pile driving
- Disturbance from human activity and heavy equipment operation
- Exposure to construction wastes and discharges
- Exposure to elevated turbidity

The FHWA determined that with strict adherence to comprehensive site-specific Best Management Practices (BMPs, attached) and species-specific Conservation Measures (CMs, attached), all projectrelated effects to listed sea turtles or monk seals resulting from underwater noise would be insignificant; disturbance would be insignificant; potential effects from exposure to wastes and discharges would be insignificant; and, there would be insignificant temporary effects from elevated turbidity. They also concluded that potential impacts to designated CH would be insignificant. The FHWA will ensure all employees or workers on site will be informed of all BMPs and requirements to avoid and minimize exposure and project-related effects to listed species and their habitat.

# Exposure to underwater noise from pile driving

The FHWA may affect listed species exposed to construction related noises, both above-water and underwater. Man-made sounds can affect animals exposed to them in three ways: non-auditory damage to gas-filled organs, hearing loss expressed in permanent threshold shift (PTS) or temporary threshold shift (TTS), and behavioral responses or changes. All underwater noises generated by construction in this project will be too low to cause non-auditory injury. The sounds generated during construction include intense sounds from pile driving that can carry for long distances, to common construction noises from hand tools that are less intense.

Potential effects from underwater noise from vibratory driving of sheet pile are expected to be minimal because with implementation of all BMPs, working when the berm at the mouth keeps listed species from entering the river (where this occurs), keeping a constant lookout for the presence of listed species and stopping work when they are in the vicinity, exposure of listed marine species is unlikely to occur. While underwater noise from steel sheet pile driven by a vibratory hammer in shallow water can average 160 dB<sub>RMS</sub> (Thalheimer, 2014), this noise level will not be experienced by any listed marine species because following all BMPs will prevent exposure. Potential effects from underwater noise from pile driving are therefore expected to be discountable.

# Disturbance from human activity and heavy equipment operation

Above-ground noise from sheet pile driving and other construction activities may affect monk seals or sea turtles on beaches some distance away from construction sites. The noise may disturb listed species and may cause reactions such as startle responses, flight, or avoidance of the construction area. Because ambient noise of traffic and other activities is high during the day when construction will take place, and this additional noise will be attenuated to some degree by distance, it is not expected to occur at a level to cause harm to listed species.

We concur that potential effects from disturbance and heavy equipment use near water would be insignificant because the FHWA will ensure that contractors follow all applicable BMPs, which includes scanning the area for sea turtles and Hawaiian monk seals and delaying or halting construction if they are within sight of the construction sites to avoid exposure. The FHWA will also ensure construction is limited to daylight hours to avoid exposing sea turtles to lights at night which could disorient them. Should exposure occur, NMFS does not anticipate potential effects to listed turtles or seals from this stressor that would rise to the level of take.

# Exposure to construction wastes and discharges

NMFS also concurs that the effects of exposure to construction wastes and discharges will be insignificant because the FHWA will ensure the contractor implements all proposed BMPs to prevent or minimize potential exposure and effects from spills to listed marine species. This includes: working exclusively with properly maintained equipment; having contingency plans, on-site equipment and material for immediate recovery of chemicals; proper disposal of associated waste, and; measures to ensure roadway surfacing material does not enter the water. Even if exposure should occur, we expect the limited spatial and temporal effects to be insignificant.

# Exposure to elevated turbidity

We concur that the effects of temporarily elevated turbidity will be insignificant because the FHWA will ensure the contractor implement all BMPs such as using silt containment devices and curtailing work

during adverse tidal or weather conditions. Other BMPs such as halting construction when listed sea turtles or marine mammals are in the action area would further avoid exposure. Some turbidity is expected to leave the work site but not at levels, duration, or distribution that would harm listed species. Potential effects to designated Hawaiian monk seal CH were determined to be insignificant, and we concur with that determination. Neither sea turtles nor monk seals are known to frequent the areas or use the adjacent beaches as nesting, haul out or basking sites (J. Thompton, pers. comm.). Potential pupping and nursing areas and seal haul-out areas would therefore not likely be directly impacted by project activities. Implementation of all proposed BMPs will ensure potential temporary indirect effects such as elevated turbidity, pollutants, noise and increased light remain at insignificant levels.

Critical habitat is designated in portions of the action area for the Hawaiian monk seal. None of the potential stressors is expected to affect essential features of designated CH in any significant way.

# Conservation Recommendations

Section 7(a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Specifically, conservation recommendations are suggestions regarding discretionary measures to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information (50 CFR 402.02).

NMFS recommends the FHWA factor climate change and sea level rise into engineering of all new transportation projects occurring near marine waters. A major factor affecting the status and recovery of the listed marine species and habitat considered in this consultation is climate change. Sea surface height is anticipated to rise by 2.5 to 6.8 feet over the next 100 years (NOAA, 2012), which would significantly affect existing infrastructure, including roads and bridges such as those proposed, near marine waters.

NMFS also recommends that a thorough consideration of stormwater treatment options be undertaken as part of this and future FHWA projects in the Pacific Islands Region. Increased impervious surface resulting from more concrete and asphalt required for more and larger bridges and intersections will increase runoff of pollutants into streams and the nearshore and we recommend infiltration/treatment of surface runoff and use of all Low Impact Development (LID) techniques to control pollutants entering surface waters.

# Conclusion

NMFS concurs with your determination that the proposed Waihiha bridges replacement project is NLAA ESA-listed green and hawksbill sea turtles, Hawaiian monk seals, and designated monk seal CH. Our concurrence is based on the finding that potential effects of the proposed action are expected to be insignificant or discountable. This concludes your consultation responsibilities under the ESA for species under NMFS's jurisdiction. However, this consultation focused solely on compliance with the ESA. Any additional compliance review that may be required of NMFS for this action (such as assessing impacts on Essential Fish Habitat) would be completed by NMFS Habitat Conservation Division in separate communication, if applicable.

ESA Consultation must be reinitiated if: 1) take occurs; 2) new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the identified action is subsequently modified in a manner causing effects to listed species or designated critical habitat not previously considered; or 4) a new species is listed or critical habitat designated that may be affected by the identified action.
If you have further questions please contact Randy McIntosh on my staff at (808) 725-5154 or randy.mcintosh@noaa.gov. Thank you for working with NMFS to protect our nation's living marine resources.

Sincerely, ľ

Ann M. Garrett Assistant Regional Administrator

cc: Thomas Parker, FHWA

NMFS File No. (PCTS): PIR-2017-10090 PIRO Reference No.: I-PI-16-1463-AG

#### Literature Cited

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# Species-specific Conservation Measures for the Hawaiian Monk Seal (*Neomonachus schauinslandi*) and the green sea turtle [*Chelonia mydas*] and Hawksbill sea turtle [*Eretmochelys imbricata*])

• All work conducted within the wetted channels will be isolated by a dewatering structure such as a cofferdam. All work conducted below the ordinary high water mark and above the mean higher high water will occur in the dry. This measure will eliminate the potential for underwater noise to enter marine waters as a result of project construction. Cofferdams will be removed following in-water or in-channel work.

• All piles will be installed using a vibratory hammer (or quieter equipment if identified) to reduce the noise produced in the underwater environment. Cushion blocks may also be used to further reduce produced noise when pile driving.

• All regular on-site staff will be trained to identify the Hawaiian monk seal and sea turtles, and will be trained on appropriate steps to take if these species are present on-site.

• Construction activities will not take place if a Hawaiian monk seal or sea turtle is in the construction area or within 150 feet (46 m) of the construction area. Biological monitors will be placed near river mouths to determine if a monk seal or sea turtle has entered the riverine environment and will have direct contact with the work crews. Construction will only re-start after the animal voluntarily leaves the area. If a monk seal/pup pair is present, a minimum 300-foot (91-m) buffer will be observed. If a Hawaiian monk seal or sea turtle is noticed after work has already begun, that work may continue only if, in the best judgment of the project's qualified biological monitor, there is no way for the activity to adversely affect the animal(s).

• Any construction-related debris that may pose an entanglement threat to Hawaiian monk seals and sea turtles will be removed from the construction area at the end of each day and at the conclusion of the construction project.

• Workers will not attempt to feed, touch, ride, or otherwise intentionally interact with any listed species.

• Shielded lighting will be used to reduce direct and ambient light to potential nearby beach habitat. Lighting will be directed away from the beach. FHWA would ensure relocated streetlights are appropriately shielded and in conformance with current USFWS guidance.

• In-water work at night would be avoided, unless emergency maintenance and repair of erosion and sediment controls are necessary to meet permit conditions. The CO would be notified prior to any such work.

#### **Invasive Species**

To prevent the introduction and/or spread of invasive species, the following measures will be implemented:

• Temporarily disturbed areas will be revegetated with non-invasive plant species appropriate for the project area.

• To avoid the unintentional introduction or transport of new terrestrial invasive species, all construction equipment and vehicles arriving from outside Kauai will be washed and inspected before they enter the project area. In addition, construction materials arriving from outside Kauai will also be washed and/or visually inspected (as appropriate) for excessive debris, plant materials, and invasive or harmful non-native species (plants, amphibians, reptiles, and insects). When possible, raw materials (gravel, rock, and soil) will be purchased from a local supplier on Kauai to avoid introducing non-native species not present on the island. Inspection and cleaning activities will be conducted at a designated location.

#### **Best Management Practices**

In addition to the conservation measures, the following BMPs would be implemented to protect water quality, as recommended by the NMFS Protected Resources Division (NOAA NMFS 2015a) and USFWS (USFWS 2014a). The applicability of these measures to the proposed project would depend on the site-specific construction means and methods chosen. BMPs would be detailed in full in the Clean Water Act Section 404 and 401 permit applications, and the project would also adhere to the requirements of all other applicable federal, state, and county permits and regulations (e.g., National Pollutant Discharge Elimination System, stream channel alteration permit).

• Erosion and sediment control measures will be in place before earth-moving activities begin. Functionality will be maintained throughout the construction period.

• Turbidity and siltation from project-related work will be minimized and contained through the appropriate use of erosion-control practices, effective silt containment devices, and the curtailment of work during adverse weather and tidal/flow conditions.

• Appropriate materials to contain and clean potential spills will be stored at the work site and be readily available.

• All project-related materials and equipment placed in the water will be free of pollutants (including waste material, heavy metals, organic materials, debris, and any water pollutants at toxic or potentially hazardous concentrations to aquatic life).

• The contractor will completely isolate and confine all in-water work areas throughout the entire water column (surface to bottom) so that all potential water pollutants will not leave or enter the work area. The entire volume of water in the in-water work area needs to be isolated and confined.

• Water pollutants (airborne particulate, dust, concrete slurry, concrete chips, concrete surface preparation washing effluent, construction debris, etc.) will be collected from localized work areas and will not be allowed to enter or re-enter state waters, including the in-water work area.

• Concrete surfaces will be cured for seven (7) days prior to contact with any flowing or open water.

• The project manager and heavy equipment operators will perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations will be postponed or halted should a leak be detected, and they will not proceed until the leak is repaired and the equipment is cleaned.

• Fueling of land-based vehicles and equipment will take place at least 50 feet (15.24 m) away from the water, preferably over an impervious surface. Fueling of vessels will be done at approved fueling facilities. Fueling areas or fuel storage areas will be contained properly to ensure that spilled fluids or stored materials do not enter any stream or wetland. A plan will be developed to prevent debris and other wastes from entering or remaining in the marine environment during the project.

• No project-related materials (fill, revetment rock, pipe, etc.) will be stockpiled in the water (intertidal zones, reef flats, stream channels, wetlands, etc.) or on beach habitats.

• No contamination (trash or debris disposal, invasive species introductions, attraction of nonnative pests, etc.) of adjacent habitats (reef flats, channels, open ocean, stream channels, wetlands, beaches, forests, etc.) will result from project-related activities.

• Any soil exposed near water as part of the project will be protected from erosion (with plastic sheeting, filter fabric, etc.) after exposure and stabilized as soon as practicable (with native or non-invasive vegetation matting, hydroseeding, etc.).

• All debris removed from the marine/aquatic environment will be disposed of at an approved upland or ocean dumping site.

• Project construction activity will halt if water quality monitoring or daily inspection or observation results indicate that work is not in compliance with Hawaii Administrative Rules (HAR) 11-54-4(a) or 1-54-4(b). Construction activity will not resume until adequate measures are implemented, appropriate corrective actions are

taken, and water quality monitoring demonstrates that the non-compliance has ceased. *Note*: These actions will not preclude the Hawaii Department of Health Clean Water Branch from taking enforcement action authorized by law.

• Temporary soil stabilization will be applied on areas that remain unfinished for more than 14 calendar days. Vegetated areas temporarily impacted will be revegetated by planting and seeding with non-invasive trees, shrubs, and/or herbaceous perennials and annuals.

• Certified weed-free permanent and temporary erosion-control measures will be put in place to minimize erosion and sedimentation during and after construction, according to the contract erosion-control plan, contract permits, and regulations.

• Revegetation success will be monitored to ensure sufficient vegetation cover has established, consistent with the National Pollutant Discharge Elimination System permit for the project. Relevant erosion- and sediment-control BMPs will not be removed until sufficient vegetative cover is re-established. If vegetation fails to establish, corrective actions will be taken where necessary.

• The contractor will be required to prepare a spill prevention, control, and countermeasure (SPCC) plan before beginning work. The SPCC will describe preventative measures, including the location of refueling and storage facilities and the handling of hazardous material. The SPCC will describe actions to be taken in case of a spill.

• Absorbent materials manufactured for containment and cleanup of hazardous materials will be stored at the work site and be readily available.

• Clearing and grubbing will be held to the minimum necessary for grading, access, and equipment operation.

• Soil stockpiles will be located at least 50 feet away from concentrated runoff and water features, covered with plastic or other waterproof material when practicable, and surrounded by silt fences or other erosion-control BMPs.

• Concrete wash-outs will be located 50 feet from storm drain inlets, open drainage areas, and waterbodies, and will be maintained as needed.

- Solid waste and construction and demolition debris will be properly managed.
- Hazardous materials will be properly stored and managed.

• Spill kits will be available on-site at locations where hazardous materials are used. Spill kits will be inspected regularly and supplies replaced as needed. Staff will be trained on spill prevention and cleanup.

• Construction will be sequenced to minimize the exposure time of the cleared surface area

• Control measures (i.e., silt fences, sand bag barriers, sediment traps, geotextile mats, and other measures intended for soil/sediment trapping) will be inspected and repaired as needed within 24 hours after a rainfall event of 0.25 inch or greater over a 24-hour period. During periods of prolonged rainfall, a daily inspection will occur, unless extended heavy rainfall makes access impossible or hazardous.

• Inspection will be documented, and records for all inspections and repairs will be maintained onsite. When a device proves inadequate, it will be immediately redesigned or replaced until it is effective.

• Permanent soil stabilization measures (i.e., graveling or re-planting of vegetation) will be applied as soon as practical after final grading.

• Portable toilets for sanitary waste management will be serviced regularly.

• All in-water work areas will be isolated and confined from open water habitats through the use of approved isolation techniques such as filter fabrics, turbidity curtains, K-rails, cofferdams, sheet piles, gravel/rock berms, gravel/sandbag berms, and stream diversions (pumped, pipe/flume, or excavated). Frequent inspections of these BMPs will be conducted to determine if devices are operating effectively. When a device proves inadequate, work will cease and the device will be immediately redesigned or replaced until it is effective.

• Flow around the isolated and confined in-water work area will be unimpeded to allow for aquatic animal migration and/or to prevent downstream flooding situations. The unimpeded flow will be equivalent to a 2-year, 24-hour storm event and/or the existing flow capacity of the stream, ditch, or gulch.

• When it is not possible to schedule work to avoid times of the year when high rainfall is expected, the capacity of existing controls will be enhanced, additional control measures will be added, or contingency measures will be installed.

• In addition to diversion and isolation of the project area, work zones will be dewatered. Dewatering will follow the procedures outlined in SM-17 of the *Construction Best Management Practices Field Manual* (HDOT 2008) and Section 208 of the *Standard Specifications For Construction Of Roads And Bridges On Federal Highway Projects FP-14* (FHWA 2014).

• Treatment of dewatering effluent will conform to federal, state, and local regulations.

• The effectiveness of sediment-control devices will depend on an adequate inspection, maintenance, and cleaning program. Frequent inspections, especially during and after storm events, will be conducted to determine if devices are operating effectively. When a device proves inadequate, it will be immediately redesigned or replaced until it is effective.



**Central Federal Lands Highway Division** 

May 23, 2017

12300 West Dakota Avenue Suite 280 Lakewood, CO 80228 Office: 720-963-3688 Fax: 720-963-3596 Thomas.W.Parker@dot.gov

> In Reply Refer To: HFPM-16

Mr. Leonard Rapozo Director Department of Parks and Recreation County of Kauai 4444 Rice Street, Suite 105 Lihue, HI 96766

Subject: Wainiha Bridges Project Section 4(f) Temporary Occupancy Concurrence Request

Halele'a District, Kaua'i Island, Wai'oli, Waikoko, Waipā, Lumaha'i, and Wainiha Ahupua'a

Tax Map Key: Wainiha Bridge 1: [4] 5-8-002:002 por.; [4] 5-8-006:030, 031, 032, 033, 046, 060, and 999 por./ Wainiha Bridge 2-3: [4] 5-8-006:009, 011, 017, 018, 019, 030, 999 por.; [4] 5-8-007:023, 024, 031, 032, 999 por./ Waioli Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por.; [4] 5-5-006:014, 888 por.; [4] 5-6-002:002, 004, 999 por./ Waipā Bridge: [4] 5-6-004:014, 022, 023, 999 por./ Waikoko Bridge: [4] 5-6-003:002, 999 por./ Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.

Dear Mr. Rapozo:

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD), in partnership with the State of Hawaii Department of Transportation (HDOT), is proposing to replace three temporary pre-fabricated (ACROW) bridges on Kūhiō Highway (Route 560) on the north side of the island of Kaua'i. The bridges are located between mile post 6.4 and 6.7 near the mouth of Wainiha Stream before it feeds into Wainiha Bay. The original bridges at these three locations were replaced with temporary ACROW bridges after Bridge #2 suffered permanent damage and Bridges #1 (the southern-most bridge) and #3 (the northern-most bridge) were determined to be structurally deficient). The ACROW bridges were installed as a temporary measure to keep the roadway open to residents and public traffic until environmental clearance and funding for the permanent structures could be secured. The three bridges are owned and maintained by HDOT. The location of the bridges is depicted in the figures enclosed with this letter.

FHWA, as lead Federal agency, takes responsibility for obtaining and complying with all permits through construction until project completion. Additional project information is provided in the Draft Environmental Assessment and is available upon request.

The project will have a short duration and temporary impacts to Wainiha Bay Bach Park during the construction period. This park, and recreational resource, is protected under Section 4(f) of the U.S. Department of Transportation Act.

Wainiha Bay Beach Park (TMK (4) 4-5-8-006: 030) is a 23.6-acre County of Kauai park located *makai* of the project area. The beach has no reef to shelter from large ocean swells and is typically closed to swimming activities due to the dangerous conditions. Wainiha Bay Beach Park was not acquired or developed with Land and Water Conservation Funds.

#### Section 4(f) Requirements

Section 4(f) declares that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

Congress amended Section 4(f) in 2005 when it enacted SAFETEA-LU (Public Law 109-59, enacted August 10, 2005). Section 6009 of SAFETEA-LU added a new subsection to Section 4(f), which authorizes the FHWA to approve a project that result in a *de minimis* impact to a section 4(f) resource without the evaluation of avoidance alternatives typically required in Section 4(f) Evaluation. Section 6009 amended Title 23 USC Section 138 states:

"The Secretary shall not approve any program or project (other than any project for a park road or parkway under Section 204 of this title) which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge or national, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of national, State, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use."

It further states, "The requirements of this section shall be considered to be satisfied and an alternatives analysis not required if the Secretary determines that a transportation program or project will have a *de minimis* impact on the historic site, parks, recreation areas, and wildlife or waterfowl refuges. In making any determination, the Secretary shall consider to be a part of a transportation program or project any avoidance, minimization, mitigation, or enhancement measures that are required to be implemented as a condition of approval of the transportation program or project."

As part of the effects evaluation for our projects, Central Federal Lands evaluates potential impacts to properties protected under Section 4(f) of the U.S. Department of Transportation Act. Section 4(f) dates to 1966 and the creation of the US Department of Transportation (USDOT). Initially codified in 49 United States Code (USC) 1653(f) (Section 4(f) of the USDOT Act of 1966), it was recodified in 1983 in 49 USC 303, though the provision is still commonly referred to as "Section 4(f)." All USDOT agencies must comply with its requirements. The Section 4(f) regulations can be found in 23 CFR 774.

While Section 4(f) expressly prohibits USDOT agencies from using land from significant publicly owned parks, recreation areas, wildlife & waterfowl refuges or any significant historic site, certain exceptions such as temporary occupancy, apply. Per 23 CFR 774.13 (d), Section 4(f) does not apply to temporary occupancies of land if certain specific conditions are met

#### Impacts on Section 4(f) Property

Wainiha Bay Beach Park is a 23.6-acre County of Kauai park located makai of the project area. The temporary bypass roads both cross into the western portions of the Wainiha Bay Beach Park. However, the temporary bypass roads would not impact beach use or access. This area consists primarily of an area adjacent to the Wainiha Stream and upscale private residences. Once the bridge replacement is complete, the temporary bypasses would be removed and the area would be restored to preconstruction status. Construction related activities are not anticipated to impact use of Wainiha Bay Beach Park located makai of the replacement bridge. There would be no long-term impacts to park and recreation facilities.

#### **Temporary Access Conditions Being Met**

The finding of a temporary access exemption condition can be made when:

(1) Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;

The total timeline for construction of the proposed action is estimated at approximately 24 months. The temporary impacts to the park (bypass road and construction access) are anticipated to be in place for 22 months.

(2) Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal;

The temporary and minor impacts at Wainiha Bridge 1 equal 0.096 acre and 0.539 acre at Wainiha Bridges 2 and 3. This equates to less than 2.3 percent of the total park property. There will be no operational impacts to the park and users will not see any permanent significant changes in the user experiences when visiting the park. Minimal impacts to access on Kuhio Highway would occur during temporary bypass installation and removal. No permanent features of the park will be impacted or modified. Due to the undeveloped nature of this park, impacts from the temporary bypass is considered to be minor.

(3) There are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis;

No permanent adverse physical impacts will occur. No interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis will occur. A segment of the temporary bypass road during construction activities would be located on the western-most corner of the Wainiha Bay Beach Park. The bypass road would exist only temporarily during construction activities and would not affect access to coastal recreation opportunities except for minor delays needed during temporary bypass construction.

(4) The land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project;

The bypass road that is temporally impacting the Wainiha Bay Beach Park will be removed and the area restored to pre-project conditions. The site will be regraded and restored to conditions that are as good as those prior to the project starting.

(5) There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.

This letter, once signed, will serve as documented agreement that the official with jurisdiction over the park is in agreement with the above conditions.

As a landowner of the area where construction will occur, FHWA requests that the Department of Parks and Recreation consent to FHWA meeting the conditions of the temporary occupancy exception to this section 4 (f) resource. If you consent to our justification to the 5 stated criteria above, FHWA requests that you sign and date this letter in the spaces below

As the official with authority over that portion of the Wainiha Bridge Project area identified as Wainiha Bay Beach Park (TMK (4) 4-5-8-006: 030), I acknowledge that the FHWA is seeking concurrence as the official with jurisdiction that FHWA has meet the conditions of the temporary occupancy exception.

Signature:

Print Name:

Date:

After signing and dating this letter, please return a copy within 15 days of the date of this letter to Thomas Parker at the address listed on the letter head. If you have questions or need additional information, please don't hesitate to contact me.

Sincerely yours.

Thomas Parker Environmental Protection Specialist

Enclosures:

Wainiha Bridges Location and Temporary Bypass Figures



U.S. Department of Transportation Federal Highway Administration **Central Federal Lands Highway Division** 

May 23, 2017

12300 West Dakota Avenue Suite 280 Lakewood, CO 80228 Office: 720-963-3688 Fax: 720-963-3596 Thomas.W.Parker@dot.gov

> In Reply Refer To: HFPM-16

Mr. Leonard Rapozo Director Department of Parks and Recreation County of Kauai 4444 Rice Street, Suite 105 Lihue, HI 96766

Subject: Wainiha Bridges Project Section 4(f) Temporary Occupancy Concurrence Request

Halele'a District, Kaua'i Island, Wai'oli, Waikoko, Waipā, Lumaha'i, and Wainiha Ahupua'a

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FHWA, as lead Federal agency, takes responsibility for obtaining and complying with all permits through construction until project completion. Additional project information is provided in the Draft Environmental Assessment and is available upon request.

The project will have a short duration and temporary impacts to Wainiha Bay Bach Park during the construction period. This park, and recreational resource, is protected under Section 4(f) of the U.S. Department of Transportation Act.

Wainiha Bay Beach Park (TMK (4) 4-5-8-006: 030) is a 23.6-acre County of Kauai park located *makai* of the project area. The beach has no reef to shelter from large ocean swells and is typically closed to swimming activities due to the dangerous conditions. Wainiha Bay Beach Park was not acquired or developed with Land and Water Conservation Funds.

#### Section 4(f) Requirements

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"The Secretary shall not approve any program or project (other than any project for a park road or parkway under Section 204 of this title) which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge or national, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from an historic site of national, State, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use."

It further states, "The requirements of this section shall be considered to be satisfied and an alternatives analysis not required if the Secretary determines that a transportation program or project will have a *de minimis* impact on the historic site, parks, recreation areas, and wildlife or waterfowl refuges. In making any determination, the Secretary shall consider to be a part of a transportation program or project any avoidance, minimization, mitigation, or enhancement measures that are required to be implemented as a condition of approval of the transportation program or project."

As part of the effects evaluation for our projects, Central Federal Lands evaluates potential impacts to properties protected under Section 4(f) of the U.S. Department of Transportation Act. Section 4(f) dates to 1966 and the creation of the US Department of Transportation (USDOT). Initially codified in 49 United States Code (USC) 1653(f) (Section 4(f) of the USDOT Act of 1966), it was recodified in 1983 in 49 USC 303, though the provision is still commonly referred to as "Section 4(f)." All USDOT agencies must comply with its requirements. The Section 4(f) regulations can be found in 23 CFR 774.

While Section 4(f) expressly prohibits USDOT agencies from using land from significant publicly owned parks, recreation areas, wildlife & waterfowl refuges or any significant historic site, certain exceptions such as temporary occupancy, apply. Per 23 CFR 774.13 (d), Section 4(f) does not apply to temporary occupancies of land if certain specific conditions are met

#### Impacts on Section 4(f) Property

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Wainiha Bay Beach Park is a 23.6-acre County of Kauai park located makai of the project area. The temporary bypass roads both cross into the western portions of the Wainiha Bay Beach Park. However, the temporary bypass roads would not impact beach use or access. This area consists primarily of an area adjacent to the Wainiha Stream and upscale private residences. Once the bridge replacement is complete, the temporary bypasses would be removed and the area would be restored to preconstruction status. Construction related activities are not anticipated to impact use of Wainiha Bay Beach Park located makai of the replacement bridge. There would be no long-term impacts to park and recreation facilities.

#### **Temporary Access Conditions Being Met**

The finding of a temporary access exemption condition can be made when:

(1) Duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land;

The total timeline for construction of the proposed action is estimated at approximately 24 months. The temporary impacts to the park (bypass road and construction access) are anticipated to be in place for 22 months.

(2) Scope of the work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal;

The temporary and minor impacts at Wainiha Bridge 1 equal 0.096 acre and 0.539 acre at Wainiha Bridges 2 and 3. This equates to less than 2.3 percent of the total park property. There will be no operational impacts to the park and users will not see any permanent significant changes in the user experiences when visiting the park. Minimal impacts to access on Kuhio Highway would occur during temporary bypass installation and removal. No permanent features of the park will be impacted or modified. Due to the undeveloped nature of this park, impacts from the temporary bypass is considered to be minor.

(3) There are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis;

No permanent adverse physical impacts will occur. No interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis will occur. A segment of the temporary bypass road during construction activities would be located on the western-most corner of the Wainiha Bay Beach Park. The bypass road would exist only temporarily during construction activities and would not affect access to coastal recreation opportunities except for minor delays needed during temporary bypass construction.

(4) The land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project;

The bypass road that is temporally impacting the Wainiha Bay Beach Park will be removed and the area restored to pre-project conditions. The site will be regraded and restored to conditions that are as good as those prior to the project starting.

(5) There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.

This letter, once signed, will serve as documented agreement that the official with jurisdiction over the park is in agreement with the above conditions.

As a landowner of the area where construction will occur, FHWA requests that the Department of Parks and Recreation consent to FHWA meeting the conditions of the temporary occupancy exception to this section 4 (f) resource. If you consent to our justification to the 5 stated criteria above, FHWA requests that you sign and date this letter in the spaces below

As the official with authority over that portion of the Wainiha Bridge Project area identified as Wainiha Bay Beach Park (TMK (4) 4-5-8-006: 030), I acknowledge that the FHWA is seeking concurrence as the official with jurisdiction that FHWA has meet the conditions of the temporary occupancy exception.

Print Name: LEONARZ A. RADOZO JR Signature: 08.01.17 Date:

After signing and dating this letter, please return a copy within 15 days of the date of this letter to Thomas Parker at the address listed on the letter head. If you have questions or need additional information, please don't hesitate to contact me.

Sincerely yours.

Thomas Parker Environmental Protection Specialist

Enclosures:

Wainiha Bridges Location and Temporary Bypass Figures

Thomas,

Confirming receipt of the CZMA federal consistency determination for the Wainiha Bridges replacement project. The start date for the CZM review timeframe is September 28, 2017. The public notice for the CZM review will be published in the State OEQC bulletin on October 23, 2017, with the public review and comment period running through November 6, 2017. You will be identified in the public notice as the informational point of contact for the project, along with your business phone and email. If any comments or questions are received, these will be referred to you for responses.

Please contact me if you have any questions.

John Nakagawa Hawaii Coastal Zone Management (CZM) Program Email: john.d.nakagawa@hawaii.gov Phone: (808) 587-2878

From: Parker, Thomas W (FHWA) [mailto:Thomas.W.Parker@dot.gov]
Sent: Thursday, September 28, 2017 2:49 AM
To: Nakagawa, John D <john.d.nakagawa@hawaii.gov>
Subject: RE: Wainiha Bridges Coastal Zone Consistency Review

John,

Sorry about that. Must have mixed up the files when I was renaming them. Attached is the correct file.

Regards, Thomas W. Parker Environmental Protection Specialist Federal Highway Administration Central Federal Lands Highway Division 12300 W. Dakota Ave., Suite 280 Lakewood, CO 80228 Work: (720) 963-3688 Mobile: (970) 509-0858

set please consider the environment before printing this email

## E malama 'aina

From: Nakagawa, John D [mailto:john.d.nakagawa@hawaii.gov]
Sent: Wednesday, September 27, 2017 2:58 PM
To: Parker, Thomas W (FHWA) <<u>Thomas.W.Parker@dot.gov</u>>
Subject: RE: Wainiha Bridges Coastal Zone Consistency Review

Thomas,

FYI – The attachment titled "1\_CZM\_FC\_Application\_Form" is actually the same project description that was also attached. The signed CZM application form (required) was not included.

John Nakagawa Hawaii Coastal Zone Management (CZM) Program Email: <u>john.d.nakagawa@hawaii.gov</u> Phone: (808) 587-2878

From: Parker, Thomas W (FHWA) [mailto:Thomas.W.Parker@dot.gov]
Sent: Wednesday, September 27, 2017 10:13 AM
To: Nakagawa, John D <john.d.nakagawa@hawaii.gov>
Subject: Wainiha Bridges Coastal Zone Consistency Review

John,

Good morning. Attached you will find our coastal zone consistency review application and assessment form for the Project to Replace the Temporary Wainiha Bridges. The Wainiha Project is located on the North Shore of Kauai. The Draft EA was published in the April 23, 2016 Environmental Notice. We anticipate publishing the Final EA once we conclude the Section 106 / 6e process for historic properties. Please note, FHWA will be the applicant for all necessary permits.

http://oeqc.doh.hawaii.gov/Shared%20Documents/Environmental\_Notice/Archives/2010s/2016-04-23.pdf

I am also dropping a hard copy of this package in the mail. Please let me know if you have any questions or require any additional information.

Regards, Thomas W. Parker Environmental Protection Specialist Federal Highway Administration Central Federal Lands Highway Division 12300 W. Dakota Ave., Suite 280 Lakewood, CO 80228 Work: (720) 963-3688 Mobile: (970) 509-0858

please consider the environment before printing this email



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DAVID Y. IGE GOVERNOR OF HAWAII





SUZANNE D. CASE CHARPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

ROBERT K. MASUDA

JEFFREY T. PEARSON DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES BOATING AND OCEAN RECREATION BUREAU OF CONVEY ANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND RESOURCES ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAHOOLAWE ISLAND RESERVE COMMISSION LAND STATE PARKS

STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES

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

December 15, 2017

Thomas W. Parker Environmental Protection Specialist Federal Highway Administration Central Federal Lands Highway Division 12300 W. Dakota Ave., Suite 280 Lakewood, CO 80228 Email: Thomas W. Parker@dot.gov IN REPLY REFER TO: Log No. 2017.02551 Doc. No. 1712SL02 Archaeology

Dear Mr. Parker:

SUBJECT:Chapter 6E-8 and National Historic Preservation Act Section 106 Review –<br/>Archaeological Inventory Survey Report for the Wainiha Bridges Project<br/>Federal Highway Administration/Central Federal Lands Highway Division<br/>Contract DTFH68-14-D-00012/0007<br/>Wai'oli, Waipā, Waikoko, Lumaha'i, Wainiha Ahupua'a, Ha'ena District, Island of Kaua'i<br/>TMK: (4) 5-5 por.; (4) 5-6 por.; (4) 5-7 por.; and (4) 5-8 por.

This letter provides SHPD's review of the revised report titled, *Draft Archaeological Inventory Survey Report for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a District, Kaua'i, Federal Highways Administration/Central Federal Lands Highway Division (FHWA/CFLHD) contract DTFH68-14-D-00012/0007 TMKs: (4) 5-5 (por.), (4) 5-6 (por.), (4) 5-7 (por.), and (4) 5-8 (por.) (Stark et al.,* November 2017). The SHPD requested revisions of the initial draft (June 14, 2016; Log No. 2016.01007, Doc. No. 1606MN09), and received a revised draft on October 10, 2016 (Log No. 2016.02412). Subsequently, the SHPD reviewed additional revised versions received on November 16 and December 4, 2017 (Log No. 2017.02551).

The project is considered an undertaking in accordance with the National Historic Preservation Act (NHPA) Section 106 36CFR800.4 as it is a federal action receiving funding from the Federal Highways Administration Central Lands Division (FHWA/CFLHD). The project is also subject to Hawaii Revised Statutes (HRS) Chapter 6E-8 as it is being implemented by the Hawaii Department of Transportation (HDOT). The State Historic Preservation Officer (SHPO) previously concurred with the area of potential effect (APE), which is synonymous with the project area (December 18, 2015; Log No. 2015.04243, Doc. No. 1512JLP23).

The AIS report (Stark et al., November 2107; Log No. 2017.02551) and the FHWA/CFLHD submittal (Log No. 2017.01778) identify the project area/APE as following:

- 1. Wainiha Stream Bridge 1, TMK: (4) 5-8-002:002 por.; 5-8-006:030-033, 046, 060, and 999 por., totaling 1.603 acres;
- 2. Wainiha River Bridges 2 and 3, TMK: (4) 5-8-006:009, 011, 017-019, 030, 999 por.; (4) 5-8-007:023, 24, 031, 032, and 999 por., totaling 3.466 acres;
- 3. Wai'oli Stream Bridge, TMK: (4) 5-5-005:005, 007, 021, 028, 999 por.; (4) 5-5-006:014, 888 por.; (4) 5-6-002:002, 004, 999 por., totaling 1.256 acres;
- 4. Waipā Stream Bridge, TMK: (4) 5-6-004:014, 022, 023, 999 por., totaling 1.449 acres;
- 5. Waikoko Stream Bridge, TMK: (4) 5-6-003:002, 999 por., totaling 0.715 acres; and

6. Potential Staging Areas 1 and 2: TMK: (4) 5-7-003:003, 999 por., totaling 0.296 and 0.221 acres, respectively.

The total acreage for the project area/APE is 9.006 acres.

Cultural Surveys Hawaii, Inc. (CSH) conducted a 100% pedestrian survey of the project area/APE and excavated six shovel tests, each negative for cultural material. The AIS was completed in advance of the replacement of three temporary pre-fabricated, ACROW bridges on Kūhiō Highway (Route 560) on the north side of Kaua'i. The original bridges at these locations were replaced with temporary bridges after they were determined to be damaged and/or structurally deficient. In addition to the replacement of the three Wainiha bridges (Wainiha Stream Bridge 1, Wainiha River Bridge 2, and Wainiha River Bridge 3), the project includes the placement of temporary, one-lane bridges adjacent to or crossing over three historic one-lane bridges that access the project site to allow construction loads to access the project site without affecting the historic integrity of the bridges. The temporary bridges at these locations (Wai'oli, Waipā, and Waikoko) will be removed once the project is complete. The six bridges are located between mile posts 6.4 and 6.7 near the mouth of Wainiha Stream. The non-contiguous areas within the APE included both publicly- and privately-owned land.

The AIS identified that the Kaua'i Belt Road (Site 50-30-02-9396) extends into the project area/APE, and that four contributing components of the road occur within the project area/APE. The Kaua'i Belt Road is listed on the National Register of Historic Places (NRHP) as Site 03001048. It is identified as a traditional trail that became the route of an historic road, and is today known as Kūhiō Highway. Of the aforementioned contributing components, three are bridges that have been assigned State Inventory of Historic Places (SIHP) site numbers: the Wai'oli Stream Bridge (Site 50-30-03-2296), the Waipā Stream Bridge (Site 50-30-03-2297), and the Waikoko Stream Bridge (Site 50-30-03-2298). The fourth component is identified as a reinforced pipe culvert and associated basalt and mortar revetments beneath Kūhiō Highway, approaching the Wainiha River Bridge 2; formerly designated as Site 50-30-02-2299. The Kaua'i Belt Road (Site 9396) was listed on the NRHP as significant under Criteria A and C, and each of the three bridges (Sites 2296, 2297, and 2298) and the culvert/revetments (formerly Site 2299) were assessed as significant under Criteria a and c in accordance with Hawaii Administrative Rule (HAR) §13-275-6 and eligible for the NRHP under Criteria A and C.

The AIS provides a project effect recommendation of "effect, with proposed mitigation commitments", pursuant to HAR 13-275-7, and an effect recommendation of "no adverse effect", pursuant to 36 CFR 800.5. The three bridges comprising components of Kaua'i Belt Road (Site 50-30-02-9396) will be avoided: Wai'oli Stream Bridge (Site 50-30-03-2296), the Waipā Stream Bridge (Site 50-30-03-2297), and the Waikoko Stream Bridge (Site 50-30-03-2298). Avoidance will be accomplished by installation and subsequent removal at project completion of temporary bypass structures. Current plans include avoidance of the reinforced pipe culvert and associated basalt and mortar revetments documented as contributing features to Kaua'i Belt Road. However, should the project impact these features they shall be further documented to facilitate reconstruction in accordance with SOI standards. Additionally, archaeological monitoring will be conducted during all ground disturbing activities to identify, document, assess, and mitigate any subsurface archaeological resources that may be encountered during construction.

Based on the findings summarized in the current AIS report, including findings from related architectural surveys, the FHWA's HRS 6E determination is "effect, with proposed mitigation commitments" (FHWA CFLHD letters dated January 23, 2017 [Log No. 2017.00150] and August 8, 2017 [Log No. 2017.01778]). **SHPD concurs** with the site significance assessments, the determinations of eligibility, the HRS 6E project effect determination, and proposed mitigations, in accordance with HAR§13-275-7.

The revisions to the AIS report adequately address the issues and concerns raised in our earlier correspondence. It now meets the requirements of HAR §13-276-5 and the Secretary of the Interior's Standards for Archaeological Documentation. **The AIS report is accepted**. Please send two hardcopies of the document, clearly marked FINAL, along with a copy of this review letter and a text-searchable PDF version, to the Kapolei Office, attention SHPD Library.

With acceptance of the AIS, the State Historic Preservation Officer (SHPO) has responded to the FHWA's request for concurrence with a determination of no adverse effect pursuant to 36 CFR 800.5 SHPO's concurrence on the

Thomas W. Parker December 15, 2017 Page 3

FHWA's 36 CFR 800 effect determination. Please maintain a copy of this letter with your environmental review record.

Please contact Dr. Susan A. Lebo, Archaeology Branch Chief, at <u>Susan.A.Lebo@hawaii.gov</u> for any questions regarding this letter.

Aloha,

- õ

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

Appendix B Public Involvement Documentation

	U.S. DEPARTMENT OF TRANSPORTATION	· · · · · · · · · · · · · · · · · · ·
	FEDERAL HIGHWAY ADMINISTRATION	
	<b>RECORD OF PUBLIC MEETING</b>	
DATE:	MEETING HELD ON: Project to Replace	DIVISION:
December 9, 2014	Wainiha Temporary Bridges	CFLHD
6:00 pm to 8:00 pm		
LOCATION:	MEETING HELD BY:	<b>PROJECT NO.:</b>
Hanalei	FHWA-CFLHD and HDOT	HI STP
Elementary School		SR560(1)
IN COMPANY WI	ГН:	
See Below		

# ATTENDEES

## Federal Highway Administration (FHWA), Central Federal Lands Division (CFLHD)

Ed Hammontree, Hawaii Program Director Mike Will, Hawaii Program Engineering Manager Nicole Winterton, Environmental Lead

#### Hawaii Department of Transportation (HDOT) Highways Division, Kauai District

Ray McCormick, District Engineer Fred Reyes, District Civil Engineer Donald Smith, District Design Engineer

## Ku'iwalu Consulting

Dawn N.S. Chang, Facilitator Jessica Kaui Fu

#### Public/Agency Attendees

See attached sign-in sheet.

## **MEETING MINUTES**

#### **A. Introductions**

- Dawn Chang introduced herself as the facilitator and the purpose of the meeting. The meeting purpose is to introduce FHWA-CFLHD as a new partner in the project as well as to solicit input from the public on key issues and factors that are important to be considered in the project. Ms. Chang also reviewed meeting logistics with the group.
- Ms. Chang introduced Ray McCormick of HDOT and Ed Hammontree, Mike Will, and Nicole Winterton of FHWA-CFLHD. She also introduced Jessica Kaui Fu who assisted with note taking.

## **B.** Presentation (see attached)

- 1) An introduction to the CFLHD partnership and project was provided by Ray McCormick, HDOT Kauai District Engineer.
- 2) An introduction to the CFLHD Program of Projects and partnership with HDOT was

provided by Ed Hammontree, FHWA-CFLHD Program Director.

- 3) An overview of CFLHD and the agency's role in the project was provided by Mike Will, FHWA-CFLHD Program and Project Manager.
- 4) An overview of the environmental process, as well as a description of the input from the public the project team is seeking, was provided by Nicole Winterton, FHWA-CFLHD Environmental Lead.

# C. Public Input Shared Verbally at the Meeting

- Polly Phillips- Is there already an engineering company working for the state? Are we starting the process all over again? She thought that there would already be a proposed bridge at this point and is concerned that the progress made thus was not going to be taken into consideration. Would like to see an easy access to a proposal where community to directly comment on and give feedback.
  - a) The project team clarified that an Engineering Design Report was prepared and will be incorporated into the project. The project isn't starting over, rather building off of the past work done.
  - b) A follow-up question was posed if the report could be posted on the website. HDOT indicated that it could be; therefore CFLHD and HDOT stated they would post it so it is available for viewing.
- 2) Barbara Robeson- Shared background information on the Hanalei Roads Committee (HRC) and their efforts to preserve the unique one-lane bridges from Hanalei to Ha'ena. A Historic Roadway Corridor Plan was developed that stated the one-lane bridges should be preserved. The HRC developed the nomination so the road is now listed on the National Register of Historic Places. The Engineering Design Report was developed over a period of 7 years. Feedback in this process was that the 1) Railings should have a historical design and be shorter than the ones on the current temporary bridge; 2) timber decking should be considered; the part of the bridge that people drive on/over should be wooden or designed so that you hear the thumping sound; 3) Bridge 2 and 3 should be just slightly straightened to slightly improve alignment; 4) Width is a big issue. Width has been discussed and compromised, discussed and compromised. 5) Is there a height requirement for the rails of the bridges? Height of rail affects visibility from view of driver's seat.
- Unidentified speaker Visibility Oncoming cars cannot be seen or are very hard to see. Visibility- Height. Color is an important consideration – short and white on the old bridges vs. tall and silver for temporary bridges.
- 4) Louise Sausen- Wants the bridges to look the way it used to (even if you cut it and paint it white). The residents of Ha'ena, those who drive to and from daily or frequently are experiencing stress on the roads because of tourists. The amount of them that are driving to Ha'ena and crossing the bridges has dramatically increased. Tourists need to understand one lane bridges and how to cross them respectfully. Suggests a no visitor crossing day. The closure when the temporary bridges were placed was a welcomed change.
- 5) Robin Drapkin- Visibility due to plant growth inhibiting drivers from seeing oncoming traffic. Even when foliage is trimmed it's hard to see. Signaling options should be considered because common courtesy doesn't always happen. Concerned about safety. Signaling should be considered so you don't guess who or what is on the other side.

- 6) Louise Sausen- Scott Robeson donates his time and services and cleans bridge corridors from Hanalei to Ha'ena. Maintenance of the bridges themselves and surrounding areas doesn't seem to be done very well by DOT. Overgrown plants block views of traffic.
- 7) Stephanie Tombrello- Has been caught in between the Wainiha double bridges more often than before. The danger of having to squeeze on the side to let opposing cars pass because cars from opposite ends of the bridge are trying to cross at the same time. Safety. Locals respect crossing protocol and tourists are unaware of them. Visibility - There seems to be more conflict with the temporary bridges, perhaps the height and color. Old bridges were lower and rails were lower.
- 8) Sam Lee, Kaua'i Fire Fighter- A lot of travelers drive the road and don't attend meetings. Concern about how decisions on width will be made. Possibility of 2-lanes, a bike lane, widening. A survey was done with State Parks and on a summer day 10,000 plus people are crossing daily. Many safety concerns. Ingress and egress are a major problem. Possibilities of hardening the structure to withstand tsunami (evacuation in emergency). Impact of amount of users. Safety in emergencies (rescues, fires, natural disasters) is a concern. Weight constraints in particular for emergency vehicles, for large scale disasters the largest emergency vehicles designed to fight large fire cannot cross the bridges. Design- can't see people walking. Awful fighting and road rage occurs between drivers. Volumes of traffic need to be considered. Limits of the area, and how much the bridges can hold needs to be considered. Suggests an emergency response plan be developed and included with bridge development plans.
- 9) Frank Rothschild Concerned that the history of efforts to preserve the one lane bridges of the north shore will repeat. Will we have to fight again the same battles that the bridge committee has been for the past 30-40 years?
- 10) Polly Phillips- Residents are frustrated with the number of tourists in the area. The North Shore of Kaua'i is very special. People love to visit this unique place because of its beauty and the experience they get going there. We don't want that to change. Ha'ena is a simple place, that's why it's special.
- 11) Louise Sausen "He moku he wa'a, he wa'a he moku." -Literally the island is a canoe and the canoe is an island. Moku means island and is also a Hawaiian term for land division. A figurative comparison of a canoes carrying capacity and sea faring abilities to an islands capacity of inhabitants with proper use of natural resources available. The size of this place is not going to change just like the size of the canoe is going to stay the same, its capacity does not change. Impacts felt by residents, my heart is broken because her lifestyle has been forced to change. Others should change to fit this lifestyle.
- 12) Carl Imparato- Maintain the character of the bridge and character of the community, its historic nature. Visual impacts need to be minimized. Railings on the side, bridge width of 10-11 feet. Honolulu office has been coming up with inconsistent excuses to widen the bridge like an increase to 16 feet wide because it must be able to fit two wheelchairs side by side, widening should be based on legitimate functionality. Plans should take into account the Ha'ena State Park Master Plan, the proposal to shuttle tourists in and out of Ha'ena. Consider the efforts of the Ha'ena Based Community Subsistence Area designation. Be open to many solutions and alternatives.

- 13) Brian Hennessy- Pace- Keep cars moving slowly. The more open the bridge and roadway, the faster people tend to drive. Wants people to go slow to be safe. Keeping things narrow creates restriction for speed.
- 14) Evelyn de Buhr- Have lived in Ha'ena for 18 years and the one lane bridges are important entry points; the way they make people stop and be aware of others is a ritual that you get to experience. It is deeply a part of what Ha'ena is.
- 15) Scott Robeson- Beauty, culture, life style... The one lane bridges are a big part of that. We don't want things to become big or multilane. Recognizes the fact that the bridges need to accommodate safety vehicles but suggests that the county buy safety vehicles that fit the bridge and that no high rises be built. Bridge should accommodate 100 year flood. Wainiha means wild water. The trees and debris that are washed down and get stuck under the bridge are a concern. Flow of the river should be considered. The bridges need to be safe for general use. Visibility is an issue- the sides of the bridges affect visibility. The bridges should also be lower. Strength for safety. Wide enough for a car and a pedestrian. "If you don't want to slow down, why did you come to the north shore?" Maintain historic size, people come here for the small rural size. A two lane bridge will change the character of the North Shore. Visibility- the transition between 2 and 3 creates an artificial visibility problem so you have conflict in the middles. The North Shore has ambiance; bridges shouldn't be jarring. Maintain the historic lanes, sound. You can't see oncoming traffic and how many other cars are waiting on the other side, only who comes first. Make sure traffic remains slow and calm.
- 16) Chris Tombrello This area should be a UNESCO world heritage site.
- 17) Beau Abbot(?) Safety on the sides of the road is a concern. There is a national plan with people figuring out how to slow and calm traffic.
- 18) Nicole Winterton (CFL) In response to a question on whether Waioli, Waipa, and Waikoko were included in the project, Nicole responded that we are also studying those locations for environmental resources for temporary impacts related to needing to temporarily accommodate construction equipment.
- 19) Louise Sausen Temporary bridges are wider that the originals. Because of width, the bridges don't align and makes the "S" turn worse.
- 20) Unidentified comment Sign that says "Courtesy 5-7 cars" isn't always in agreement with common courtesy practice. The number often confuses tourists and they are wondering if they are the eighth car or get hostile when then see more than 7 cross as they expect it is there turn. Suggesting to change sign, that the sign say "common courtesy" only or something that encourages local protocol like "no rush, live aloha".
- 21) Unidentified speaker When will bridges be constructed? 15, 10, 5 years? Concerns about traffic and construction. Liked that the team shared their experiences and previous projects because they would like this project be treated similarly, with the respect that would be given constructing a bridge in a national park.
- 22) Billy Kinney- Concerned about the Wainiha River and the Wainiha estuary. The river mouth is famous in Hawaiian history because of the way it changes the shores of Wainiha and the wildlife that depend on the estuary to survive. An example are all the native species of 'o'opu who travel to the very tops of the waterfalls in the back of Wainiha valley and travel

all the way to the ocean by getting carried down with the big heavy rains to spawn/reproduce. The river under these bridges are the reason for the place name WAI NIHA – the unique characteristics of the place, the land, the waters, the culture all need to be protected. Most importantly clarification to us with effects on river and all of its resources needs to be addressed.

# **APPROVED FOR DISTRIBUTION**

J. Michael Will Project Manager

2-23-15

Date

# **DISTRIBUTION:**

<u>Federal Highway Administration, CFLHD</u> Ed Hammontree, Hawaii Program Director Mike Will, Hawaii Program Engineering Manager Nicole Winterton, Environmental Lead Jill Mathewson, Design Engineer Bonnie Klamerus, Structural Engineer

Hawaii Department of Transportation Ray McCormick, District Engineer Fred Reyes, District Civil Engineer Donald Smith, District Design Engineer

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# SIGN-IN SHEET

Name (nlease nrint)			
Annie Hashimoto	Proganization (if applicable) Hun makaat nane O makana, Hacna Fauai	Name (please print)	Organization (if applicable)
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	U.S. DEPARTMENT OF TRANSPORTATION	
	FEDERAL HIGHWAY ADMINISTRATION	
	<b>RECORD OF PUBLIC MEETING</b>	
DATE:	MEETING HELD ON: Project to Replace	<b>DIVISION:</b>
March 9, 2015 6:00	Wainiha Temporary Bridges	CFLHD
pm to 8:00 pm		
LOCATION:	MEETING HELD BY:	<b>PROJECT NO.:</b>
Hanalei	FHWA-CFLHD and HDOT	HI STP
Elementary School		SR560(1)
IN COMPANY WI	ГН:	
See Below		

# ATTENDEES

# Federal Highway Administration (FHWA), Central Federal Lands Division (CFLHD)

Ed Hammontree, Hawaii Program Director Bonnie Klamerus, Bridge Engineer Jill Locken, Lead Roadway Designer Mike Will, Hawaii Program Engineering Manager Nicole Winterton, Environmental Lead

## Hawaii Department of Transportation (HDOT) Highways Division, Kauai District

Ray McCormick, District Engineer Fred Reyes, District Civil Engineer Donald Smith, District Design Engineer

#### Ku'iwalu Consulting

Dawn N.S. Chang, Facilitator Jessica Kaui Fu

# Public/Agency Attendees

See attached sign-in sheet.

#### **MEETING MINUTES**

## A. Introductions

Dawn Chang introduced herself as the facilitator and the purpose of the meeting. The meeting purpose is to: 1) Update the public on where we are in the process, 2) Present the purpose and need developed based on past public engagement and get feedback, and 3) Present alternatives and design elements being considered and get feedback. Specific design considerations include bridge type, rail types and sizes, deck considerations, and bridge width.

## **B.** Presentation (see attached)

A presentation was provided that provided the background of the project, issues and

considerations we have heard through past public engagement, purpose and need that had been developed for the project, and bridge design considerations. After each element of the presentation, public feedback was provided verbally and through written notes on the poster boards. Public input provided through written notes on poster boards are presented below in Section C. Notes taken based on verbal input is provided in Section D, below.

# C. Public Input on Design Factors Shared Via Written Notes on Meeting Boards

# Vehicle Bridge Rails

# CA Type 115

- No bridge rail for bikes, what keeps us from being sued in the event of someone falls off. Liability?
- This seems more historic with mounts on bottom.
- Preferred 115.
- 115 Looks more like historical design.
- 115 preferred.
- 115 yes on 2' 6'' rail height.
- Bridge CA 115, Low rail good, shallow under side, 2 rails, Best Bridge.
- 15 MPH limit between #1 and #2 in Wainiha village!
- 115
- Very good in line with historic bridge.

## <u>OR BR206</u>

- BR206 No
- Sticks down too far.
- OR BR206 most visibility.
- OR BR206 or WI Type M (preferred)

## WI Type M

- WI Type M 2<sup>nd</sup> option to 115.
- Post 2 close.
- Better than 115 allows pedestrian refuge with side of rail.
- Hanalei Road is not a road for a leisurely bicycle ride. Don't fit a bridge for bicycles in the middle of a road which doesn't accommodate bikes.

## Vehicle/Bicycle Bridge Rails

## CA Type 116

- 116, no on height of 3' 8'', Bikes can walk across.
- Sticks down too far.
- No- too many rails.
- No too busy.

#### <u>OR BR208</u>

- BR 208, No
- Rail, OR BR 208.
- Just because the bridge isn't currently bike friendly, does not mean it won't be in 20 years. I think we should plan for this option in the future.

- There are a lot of children that travel this bridge and I prefer the higher rails for this reason.
- 208 No.

# WI Type M(Comb)

- NO WI  $\overline{M}$ .
- Too close.
- WI M No.

# **Bridge Deck Considerations**

- I want what is sustainable and would need least maintenance.
- Save the trees...use concrete. Could make concrete look like wood for aesthetics. I could go without the sound. Don't care so much about sound, safety more important.
- Wood for aesthetic purpose is not reasonable or prudent.
- No wood extra cost and maintenance, safety issue.
- No wood.
- Consideration of durable wood for bridge deck: (i.e) Ipay (sp.?).
- Timber on top of concrete is preferred. This is historic for timber.
- Save the trees.
- Best choice that give sound. Sound is CHARACTERISTIC.
- Wood is good. Historic.
- Sound not too big an issue, but wood over concrete or concrete looking like wood.
- I vote for timber on top of concrete! Concrete made to look like timber will look cheap and cheesy.
- No wood.
- (Note takers note- there is an arrow pointing to the end of deck and railing of bridge on this comment) Wood rub rail/curb similar to Hanalei Bridge.
- Texture deck- for sound not imitation wood.
- Wood.
- Concrete is fine with me. Could look like wood.
- Wood is slippery over time, can hydroplane with big rains. Dangerous and concrete is fine.

# **Bridge Width – 11-foot Considerations**

- Mixed. I both want it to be historical yet also want the emergency vehicles to pass. Doug
- Want it historical yet want emergency vehicles to pass. Darci
- Per phone call with Carl Imparato- this is his preferred BR/HRC.
- Narrow bridges keep traffic slowed down. 11' is better than 16'.
- 11ft!!! This is a road that is slow, friendly, and wonderful, and HISTORIC!
- Narrow width deters larger buses carrying more tourists to area.
- Narrow width is aligned with historical bridge.
- Narrow width means less overall footprint of bridge.
- Narrower width is better aligned with how road also becomes narrower from Hanalei to Ha'ena.
- Narrower width = slower cars
- Low speed. Forces car to go slow. Safer.
- Safer for all users.
4 of 7

- 16'- people will speed. Especially if the roads grade is more level. GO 11'.
  11' is historic. 16' not historic. Traffic goes faster on 16'. Faster traffic is less safe for pedestrians.
- 11' is not wide (enough) for equipment that is needed to maintain the road. 14' is minimum I would need to get equipment in.
- Lifestyle, small changes add up to Big changes. Keep Historic.

## Bridge Width – 16-foot Considerations

- 16' does not account for pedestrians unless shoulder width is on one side.
- Too large of a width. 16' invites potential for cars to "think" they can pass each other
- Marry the historical aesthetic with today's needs and future needs. What worked in 1905 will not work for today or future generations.
- I prefer 16' width, safer for kids and families with increased traffic.
- Better for trailers and larger vehicles.
- Allows cars to go too fast over the bridge.
- Higher speed. Limit lane width with wood curb.

## **Other Alternative Considerations?**

- Work with the county and state to mandate shuttle service during bridge construction, local traffic only.
- There are several businesses in Haena that serve the community and feed families. They need to remain accessible and uninterrupted.

## Considerations with Advancing Two-Lane Bridge

- NO 2-lane bridges.
- NO Two lane bridge!
- Two Lanes:

-Less wait time, we have more traffic now, modern road meet modern needs. -Too fast, we are developing shuttle buses, changed to modern bridge = change the North Shore culture and lifestyle.

- NO 2 lane respect the historic road and bridge.
- No 2 lane.
- No way to make a slow wide bridge.
- Need to change not the road!
- Ha'ena State Park Master Plans EIS could potentially reduce vpd over the bridges.
- Non-Historic. Costly. Although traffic has increased people behavior and driving habits.

## Construction Approach and Alignment Considerations:

- I like the idea of keeping acrow bridge up during construction of new bridges.
- Recommend: move acrow makai(toward the ocean), construct/rehab in historic corridor.
- Lower roadway. Better line of sight. Safety should be #1. Build temporary bridge please!!
- Leave enough room between 2 & 3 for at least 2 cars for drivers to correct errors in judgement.
- 2 lanes, thumbs down.
- The original road width and one lane bridges generated an environment, a culture, a lifestyle, and a way of living that we all came here for. If you change these things you LOSE some of that.

- Alignment should be straightened, safer, efficient.
- Align bridge #1 better!!

Waikoko, Waioli, Waipa Temporary Access Considerations:

• Barge into Wainiha, clean out county park for staging.

#### **Bridge Width- No Action Alternative**

Advantages and Disadvantages:

- No-Build alt. NOT preferred because of current issues with acrow.
- Isn't this being considered only because "no build altern." Is an EIS requirement?
- NOT ACCEPTABLE! Acrow bridges have created numerous problems.
- Caused community to dislike one way bridges.

## **Bridge Width – Any Other Consideration?**

Other Bridge Width Recommendations and Potential Benefits?

- Consider separate pedestrian bridge mauka of new bridge.
- Wider = Faster = Lifestyle Change

## D. Public Input Shared Verbally at the Meeting

#### Purpose & Need Feedback:

- I think that you guys did a good job at capturing the communities concerns and feedback. I care greatly about the impacts to the estuary, stream life, and environment but also have concerns for neighbors/those living right near the bridges. I live on Alaeke rd., the road right between bridges 2 & 3. During the construction of the ACROW bridges, the default staging area on Alaeke rd. was right where the school bus stop is. The machinery was staged right there and was a convienient stop but also a spot where kids ride their bikes, catch the bus, etc. Please be mindful of those kinds of impacts when planning.
- Cost for residents building homes, please consider weight capacity of bridge and rebuild the bridges capable for vehicles carrying large/heavy loads with items like construction materials.
- Restore the white bridges that were once there. Alignment and maintainence and control of vegetation is very important. Feedback from previous meetings was good and well captured.
- Problems of the ACROW bridges are temporary, therefore the problems with them are temporary as well. The question is how will we design the bridges to be as they were before and address all these other functional issues while fitting with historical road requirements. What the ACROW bridges are or not able to do is irrelevant. What was there before is the project! Comparing it to what the 1904 bridge was to now.
- Keep it how it was and address the operational issues.
- Under Alternate Considerations (during presentation), "Replacement of the ACROW bridges" is an unclear statement.
- Water area under the bridge in as issue. The height of opening? What does that mean? Increased hydraulic opening?
- Timeline for these bridges requested. When??

## **Bridge Type Feedback:**

- Box beam? Big concrete? Can we build the long beams here?
- Can that design hold two lanes?
- River clearance 2ft. deep. 21/2 ft. total depth.
- Water passage an issue. X design versus II
- The stream that passes under bridge 2 is much shallower than bridge 3. It raises higher and quicker and traps more debris. Is river on under bridge 2 is shallow most of the time and I am much more concerned with flow under bridge 2 than 3.
- What is the difference between the low corridor of the old bridge to the proposed bridge?
- What is no bridge/no action?
- Historical hydraulic capacity versus that of the proposed plan?
- Bridge height compromise for hydraulic opening, money/cost spent to build, visibility being a big issue because you can't see the oncoming traffic.
- Ala Eke Rd. that connects bridges 2 and 3 that area is the high point of that road and where residents of the road park their cars during floods.
- The solid cement beams will divert water to the sides of the bridge and cause flooding to the residents who live around the bridge.
- What is no rise??

## **Bridge Rails Feedback:**

- Visibility!
- Why design bridges that accommodate bicyclists when the roads around the bridges do not? Building a bridge with a bike lane is not necessary because the roads on both sides they connect to do not have bike lanes and are very narrow.
- What are the chances of getting the money for this project?

## **Bridge Width Feedback:**

- Historic designation is of the utmost importance, to return it back to what is was when we asked for the designation.
- Will the community's comments from 2012 be represented? Diminished? Unconsidered?
- Why do we want the historical design of the bridge? Is like asking a blind man to describe an elephant? The road and bridge design is an essential ingredient to our community, culture, and lifestyle. If we make them wider it is a little thing that changes a lot of aspects of our lifestyle. It is the characteristics of the north shore and if you don't like it don't live down here or disrupt the lifestyle of this place.
- The narrower the slower people go. There should be no discussion of two lanes! To discuss two lanes is going backwards for me. Our community has made it clear that two lanes is unacceptable.
- Signs are important.
- Keep it narrow so the bikes don't go with the cars at the same time.
- Blind spot, line of sight, are there any considerations to alignment? The amount of traffic recommends a more straight line of sight.
- I am concerned about the removal of vegetation, especially the hau on the Ha'ena side of bridge 3, the land that the hau is on is county land and they need to do their part to clean it to increase visibility.
- How can we restrict driving to residents only during construction? What sorts of construction notice will be sent out? How will people know about construction plans and be aware of when and how things are happening? How will the problems of construction of the bridges be addressed? What about the use of Ha'ena/Wainiha resources? And how will traffic be controlled?

- Consider businesses that will be affected during construction.
- Respect historical status, address functionality and the need for emergency vehicles to cross bridges.
- Consider Ha'ena State Park planning process and changes that will bring about on the north shore.
- Short term vs. long term impacts
- Elevate the Ha'ena end of Bridge 3 so you can see better.
- Raise bridge 2 to be equal with 3 so you can see and widen the gap and round off the turn in between the bridges so you can see oncoming traffic and large vehicles or vehicles towing trailers have an easier time crossing the bridges and increased visibility.

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	FEDERAL HIGHWAY ADMINISTRATION	
	<b>RECORD OF PUBLIC MEETING</b>	
DATE:	MEETING HELD ON: Project to Replace	<b>DIVISION:</b>
September 15,	Wainiha Temporary Bridges	CFLHD
2015 6:00 pm to		
8:00 pm		
LOCATION:	MEETING HELD BY:	<b>PROJECT NO.:</b>
Hanalei	FHWA-CFLHD and HDOT	HI STP
Elementary School		SR560(1)
IN COMPANY WI	TH:	
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## ATTENDEES

## Federal Highway Administration (FHWA), Central Federal Lands Division (CFLHD)

Bonnie Klamerus, Bridge Engineer Mike Will, Hawaii Program Engineering Manager Nicole Winterton, Environmental Lead

#### Hawaii Department of Transportation (HDOT) Highways Division, Kauai District

Ray McCormick, District Engineer Fred Reyes, District Civil Engineer Donald Smith, District Design Engineer

#### Ku'iwalu Consulting

Dawn N.S. Chang, Facilitator Emmaleah Stauber

#### **Public/Agency Attendees**

See attached sign-in sheet.

## **MEETING MINUTES**

#### A. Introduction

Dawn started the meeting discussing the purpose which is to let the public know that FHWA is continuing its commitment in a proactive way on the Wainiha bridge replacement project. They are once again coming to the community for feedback on critical issues with the project in response to community interest and asking the government to come in early. The goal of the process is to engage the community in discussions before the EIS is prepared. FHWA will share responses to the public meetings and discussions with HDOT and proposed actions on decisions so want to capture comments.

## **B.** Presentation (see attached)

A presentation was provided that provided the background of the project, issues and considerations we have heard through past public engagement, purpose and need that had been developed for the project, and alternatives and alternatives dismissed from further consideration.

#### C. Discussion Items during Presentation

Mike Will, Project Manager, FHWA-CFLHD: Discussed Central Federal Lands Division is a cradle to grave organization and therefore Mike will continue his role throughout the design and construction of the project. There have been several years of engagement so far with the community on the development of the Kuhio Highway report. Got input from the locals to define purpose and need. Must marry the project goals from the public with standard engineering design.

Decking: proposing a concrete deck that is stamped to look like timber. Timber has high maintenance and gets slippery.

Fred Reyes, HDOT, question: Can you color the deck concrete to look like timber? Answer: Yes

Mike Will: Detours are planned at the Waioli, Waipa, Waikoko bridges during construction and the goal is to minimize ROW and utility impacts and bridge length. Anticipate 24 hour road closures for installation and demolition of each of the detour bridges. Waikoko may need a closure to build abutments and then another to launch the bridge in place to bridge over the existing bridge.

Nicole: Need feedback on construction approach, proposed design, what would be impacted.

## D. Facilitated Discussion with Public Questions and Input (facilitated by Dawn Chang)

Notes from questions asked by meeting attendees, as well as input, are included below. Public questions and input is in black text, and agency and facilitator responses are in *red text and italicized*.

- Johnny Whitman, HRC: Clarify whether the three approach briges need to be replaced prior to the Wainiha Bridges. Mike Will: No, just need to create access for the construction and to get materials into Wainiha. What will the timing be on the road closures with the construction of the 3 temporary bridges (Waioli, Waipa, Waikoko [WWW])? It is anticipated that sporadic 24 hours road closures will be necessary to construct each of the three approach birdges (Waioli, Waipa, Waikoko). The Wainiha Stream Bridges will also necessitate complete 24 hour closures. Felt that 24 hour closures would be acceptable if there was advanced notice because the community dealt with it during the construction of the Wainiha ACROW bridges. A public Information program is planned to be implemented alerting the road users of impending travel impacts during construction. Timing of the notification will allow for the road users to plan accordingly.
- 2. Question: Is first phase getting temp bridges in so that you can build the permanent Wainiha Bridgges. *Mike Will: yes that will be first phase of work.* Question: What is the timing of the detour bridges in place? *Mike Will: Design and permitting complete in 2016-17 but funding may cause delays.*

- 3. Unidentified Speaker: Are the 24 hour closures for construction of all the bridges? Just the 3 WWW bridges or for Wainiha too? *The sporadic 24 hour closure will be necessary to construct the temporary bridges at (Wainiha, Waioli, Waipa, Waikoko)*. What is the projected timeframe for the construction of the 3 WWW bridges? *The timeframe will be dependent on the contractors sequencing of operations, but we anticipate 1-24 hour period for construction of the temporary abutments and 1-24 hour period for placement of the bridge deck, on each bridge.*
- 4. Unidentified Speaker: What is the official designation of the historic road area? Are there specific rules that are involved in the construction? How much say does the public have in what occurs in the area? *NW: That segment of roadway is on the National Register. Anything on the NR of Historic properties goes thru the Section 106 Fed and State process. Requires consultation with SHPO and other agencies/groups Identify effects and ways to mitigate. Agency makes the decision with SHPO and consulting party input. Dawn: public comments are considered and when public documents come out, the public will have the chance to comment.*
- 5. Tin-Tin Pu'ulei: What's the plan? How will this construction affect the community and disturb our lives? The construction of the ACROW Bridge caused a great disruption and hardship to the families and communities in the area and I am against any further construction. Building a new bridge will cause too much inconvenience for the families that live in the area. Hawaiians who are from that area and call it home should have the ultimate say in how/if this new bridge is constructed. We don't want a two-lane bridge or any new bridge that will allow for bigger trucks and tour buses and more traffic and tourism. We don't want to encourage any further development of the area. How will construction affect our lives? The construction crew took too long with the construction of the ACROW Bridge. How long will this really take? You said 24 hours can you stick to that timeline?

What about the environmental impacts? I witnessed construction crews dumping concrete into the Wainiha River during the ACROW construction. I am convinced that this led to fish die offs and a distinct decline in the presence of O'opu Nakea. I am against any further construction.

We do not want changes, but if there has to be change, we want it to be for the better, which means we don't want wider bridges.

Thank you for your comments. We will consider and document your concerns.

6. Julie Mai: Are you replacing the bridges at WWW? The three bridges approaching the project are not scheduled for replacement or rehabilitation as part of the Wainiha bridge replacement project. Can we build at night? How long will the temporary bridges be at WWW? We estimate the bridges would be needed to support construction traffic associated with the Wainiha Bridge replacement project for a period of approximately 1.5 to 2 years. Can we bring the material for the Wainiha Bridge in on barges rather than build the WWW temporary bridges? This can be considered. Do we have to build a new bridge at Wainiha? The existing ACROW bridges are considered temporary and are not designed for long term use. For long term access, new bridges will need to be constructed. The plan is for the existing temporary bridges. Can't we just improve the existing ACROW? See prior response. Tourists are already confused on how to navigate the existing bridges. We need to limit confusion somehow and make things really clear so tourists aren't backing up traffic. Maybe we can pass something out at

hotels that tells the tourists how to drive on the bridges and around construction and where they can and can't park. *Thank you for your comment. We will consider and document your concerns.* 

- 7. Geraldine (last name unknown): The difference in height between the road and the bridge is an impediment to visibility will that be resolved? There are problems with vegetation along the road also. *The new Wainiha #2 and #3 bridges are planned to be lowered by approximately 2' 4'. The lower bridge elevation along with the new bridge railing will provide better visibility for the road users.* Will the middle section of road between the bridges be maintained and landscaped?
- 8. Blake Covett: What is the timeline for completion? *Completion is dependent on when funding is available for construction. With funding secured, the bridges are estimated to take approximately 1.5 to 2 years to construct.*
- 9. Frank Rothschild: If the Wainiha Bridge cannot be constructed until the WWW bridges are done, then how much more time is the project really going to take? *The three WWW bridges do not need to be improved prior construction of the Wainiha Bridges, however, temporary access for construction traffic at the three bridges does need to be completed prior to work on the Wainiha bridges. This includes placement of temporary bridges which will be completed as part of the Wainiha Bridge project.* Where is the funding coming from? *Federal / State Transportation Program Funding.* How will funding delays affect the projected timeline? Will the same contractor be used for the temporary bridges as the permanent bridges? *MW: may have 2 contractors so that can get temp bridges in place in advance of the Wainiha bridges. With all the same funding.*
- 10. Unidentified Speaker: Will the WWW bridges be similar to the existing Wainiha ACROW Bridge? *The contract will not specify the types of temporary bridges that will be required giving more flexibility to manage costs.* Can the panels be lower than the ones they have in Wainiha so that we avoid the visibility issues? *This is dependent on the length and type of bridge selected. Management of sight distance will be an element considered during the design of the temporary bridges.*
- 11. Comment: There is concern that the temporary bridges at the WWW bridges will not come out. *HDOT answer: The old bridges will stay in place and temp bridges will be taken out. MW: contract will require that the bridges be taken out.*
- 12. Beau Blair: What is the difference in the spans of bridges 2 & 3? How will the center be configured? *Answer: The Wainiha #1 and #2 bridges will be single span bridges. The Wainiha #3 bridge will be 3 spans similar to the original bridges.*

During the Wainiha ACROW construction there were shuttles and barges to assist in getting residents where they needed to go during bridge closures. We need to consider transportation accommodations with these constructions as well. What is the width of the current ACROW Bridge?

There must be a plan for preferential parking for north shore residents at all public parking areas and beaches throughout the construction period. Tourists take up all the parking spots that will be critical for residents dealing with shuttling and other transportation inconveniences during construction. *These ideas will be considered.* 

13. Unidentified Speaker: Will the public have access to the temporary WWW bridges so we can have 2 way traffic lanes during construction? *The Waioli and Waipa temporary* 

bridges will be single lane bridges, paralleling the existing bridges, with use for construction traffic only. The Waikoko temporary bridge also be a single lane bridge that will span over the top of the existing bridge. This bridge will be used for both construction and local traffic.

- 14. Unidentified Speaker: The community demands that there must be funding for building of all the bridges the 3 temporary at WWW and Wainiha 1,2, and 3 prior to any construction begins. We do not want a long, drawn out construction process. We do not want the WWW bridges to be constructed and then we still have to wait around for funding of the Wainiha Bridge. Instead of 24 hour closures, can we just do night closures? We will consider your comment. How many 24 hour closures will there be? It is anticipated that there will be 2-24 hours closures for each of the bridges constructed. We have worked with the ACROW bridge company who estimates 24-hour closures as was experienced when installing the current temporary bridges. We need to ensure there will be adequate, widespread notification before the 24 hour closures occur. A public Information program is planned to be implemented alerting the road users of impending travel impacts during construction. Timing of the notification will allow for the road users to plan accordingly.
- 15. Evelyn (last name unknown): We like the sound that it makes when you drive over the wooden bridge can we replicate that somehow when you build the new bridge? *We will consider your comment.*
- 16. Unidentified Speaker: Everyone wants the bridge to be 11' wide like the old bridge. It is the original width and we like the feel of it and the community wants it. We are not comfortable with the wider width. Let's keep it historic. *We will consider your comment.*
- 17. Danielle Candelaria: There are already existing traffic issues because of tourist traffic in the area. This will be compounded exponentially by the construction. Can we cap tourist traffic during construction? *We will consider your comment.* Or can we make very specific designated locations for tourist parking only and resident parking only? *We will consider your comment.* Residents need to commute to work and should have priority access. Tourist delays are disruptive as is. Residents don't have the same parking access that was available during the previous closures. *Thank you for the valuable input. We will consider your comment.*

#### E. Meeting Closeout

Dawn closed the meeting by letting everyone know that there will be additional comment opportunity during the EA review period and that the presentation and boards from this meeting will be on the website. Take a handout.

# SIGN-IN SHEET

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Office of Environmental Quality Control



# THE ENVIRONMENTAL NOTICE

A Semi-Monthly Bulletin published pursuant to Section 343-3, Hawai'i Revised Statutes

David Y. Ige, Governor Scott Glenn, Director 235 South Beretania Street, Suite 702 • Honolulu, Hawai'i 96813 Telephone: (808) 586-4185 • Fax: (808) 586-4186 Toll Free: Kaua'i (800) 274-3141, ext. 64185 Moloka'i/Lanai (800) 974-4000, ext. 64185 Hawai'i (800) 987-2400, ext. 64185 Maui (800) 987-2400, ext. 64185 Email: oeqchawaii@doh.hawaii.gov Website: http://health.hawaii.gov/oeqc

# April 23, 2016

The Environmental Notice provides public notice for projects undergoing environmental review in Hawai'i. This is mandated under <u>Section 343-3</u>, <u>Hawai'i Revised Statutes</u> (HRS), the Environmental Impact Statement Law. Along with publishing Environmental Assessments (EAs) and Environmental Impact Statements (EISs) for projects in Hawai'i, The Environmental Notice also covers other items related to the shoreline, coastal zone, and federal actions

## HAPPY EARTH DAY!

## **EISPN Scoping Meeting for Haleiwa Improvement District**

The City and County of Honolulu is holding a scoping meeting on Wednesday, May 4 from 6:30-8:30 pm at the Waialua Elementary School Cafeteria (67-020 Waialua Beach Road, Waialua, HI 96791). The purpose of the meeting is to gain community feedback on conceptual design alternatives, complete streets features, and relevant environmental, social, and technical issues for the EIS to analyze.

#### **Environmental Council**

The Environmental Council is meeting on Tuesday, May 10 from 1:00-3:30 PM at the Leiopapa A Kamehameha Building, 235 S. Beretania Street, 15th Floor Conference Room. Please check <u>http://calendar.ehawaii.gov</u> for the finalized time and meeting agenda, as well as for any of the committees. For anyone using an RSS feed, click <u>this link</u> to add the calendar to your RSS feed so you can receive automatic updates when any Environmental Council activities are scheduled.

## Mahalo Nui and Aloha to Meg DeLisle

Meg DeLisle will be leaving the OEQC on April 29, 2016. She first joined us as a volunteer in 2014. She supported both the OEQC and the Environmental Council with policy research and development. During the OEQC's transition over the past year she has filled in as planning staff for the Office, and has helped publish issue after issue of The Environmental Notice. We look forward to following Meg's career in environment and conservation. Mahalo nui for all your help!



# TABLE OF CONTENTS

FRONT PAGE	1
TABLE OF CONTENTS	2
STATEWIDE MAP OF NEW HRS CHAPTER 343 PROJECTS	3
<ul> <li>HAWAI'I</li> <li>1. <u>Waiākea Timber Management Area Sustainable Commercial Timber Harvest DEA (AFNSI)</u></li> <li>2. <u>Church Single Family Residence DEA (AFNSI)</u></li> </ul>	3 4
MAUI 3. <u>Hoku Nui Maui Community DEA (AFNSI)</u>	4
<ul> <li>O'AHU</li> <li>Agriculture Infrastructure Development DEA (ANFSI)</li> <li>Block M Queen Street Improvements DEA (AFNSI)</li> <li>Mālaekahana State Recreation Area Improvements DEA (AFNSI)</li> <li>Na Pua Makani Wind Project 2nd DEIS and Appendices 1, 2, and 3</li> </ul>	5 5 6 7
KAUA'I 8. <u>Wainiha Temporary Bridges Replacement DEA (AFNSI)</u>	8
OPEN HRS CHAPTER 343 DOCUMENTS	9
NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) <u>Redevelopment of Marine 7cfdgForces, Pacific HQ/OPS Center</u>	9
COASTAL ZONE MANAGEMENT NOTICES Federal Consistency Review	0
SHORELINE NOTICES Shoreline Certification Applications	2 3
FEDERAL NOTICES	4
SECTION 106 CONSULTATION Waimea Wastewater Treatment Plant	4
GLOSSARY	5



## **STATEWIDE MAP OF NEW HRS CHAPTER 343 PROJECTS**

## Wainiha Bridge

Malaekahana Park (Na Pua Makani

Ag Infrastructure Block M



#### LEGEND

New document count in this issue: 8 Total HRS Chapter 343-5(b) Agency Action: 3 HRS Chapter 343-5(e) Applicant Action: 5 Church Family Residence

Waiakea Mgmt Area

## **HAWAI'I**

## 1. Waiākea Timber Management Area Sustainable Commercial Harvest of Timber DEA (AFNSI)

HRS §343-5	
Trigger(s)	Use of State lands
District:	South Hilo and Puna
TMK:	(3) 1-8-012:001; (3) 2-4-008:001; (3) 2-4-008:006;
	(3) 2-4-008:010; (3) 2-4-008:022
Permits:	BLNR approval; potential NPDES
Proposing/ Determining	
Agency:	Department of Land and Natural Resources
	1151 Punchbowl St, Room 325, Honolulu, HI 96813
	Sheri Mann, sheri.s.mann@hawaii.gov (808)-587-4172
Consultant:	N/A
Status:	Finding of No Significant Impact (FONSI) Determination; comments a not taken on this action.

The Division of Forestry and Wildlife (DOFAW) proposes to commercially harvest timber from the Waiākea Timber Management Area (WTMA) through a Request for Proposal process and subsequent issuance of a timber land



license. An environmental assessment was previously prepared in 1999 for similar activities, resulting in a finding of no significant impact.

The project area is located in the Upper Waiākea, Waiākea and 'Ōla'a Forest Reserves. The WTMA was established to create a forest resource base that could provide a consistent wood and forest products supply to

stimulate the forest product industry in Hawai'i. Major planting efforts began in 1959; timber inventory data indicates that the WTMA in its current configuration contains approximately 16,000,000 cubic feet of gross merchantable timber, primarily composed of the non-native timber species Queensland maple (Flindersia brayleyana) and Eucalyptus saligna and grandis.

Project activities will include road maintenance, timber harvesting, site preparation, reforestation and other forest management practices for timber stand improvement. Primary anticipated impacts of project activities include the potential spread of invasive species, temporary disruption of existing recreational activities within the WTMA, and impacts on local traffic.

#### 2. Church Single Family Residence DEA (AFNSI)

HRS §343-5	
Trigger(s):	Use of land in a Conservation District, Use within a shoreline area, Use within any historic site
District:	South Hilo
TMK:	(3) 2-9-003:029 and 060
Permits:	Conservation District Use Permit, County grading permit, SMA exemption or permit, Building permit including related permits ie. electrical, plumbing, Septic tank and leeching field permit
Approving Agency:	Department of Land and Natural Resources 1151 Punchbowl St, Rm 131, Honolulu, HI 96813 Lauren Yasaka, lauren.e.yasaka@hawaii.gov (808) 587-0386
Applicant:	Ken Church, dockline3@yahoo.ca
Consultant:	N/A
Status:	Statutory 30-day public review and comment period starts; comment are due by May 23, 2016. Please send comments to the approving agency, and copy the consultant and applicant.



A 4,649 square foot single family residence (SFR) is being proposed. The SFR site and access road is currently maintained as lawn. The proposed SFR is slab on grade construction and consists of two bedrooms, two and a half baths, a laundry room, a living room, and a covered deck area. There will also be an attached bale/hot tub area with an associated mechanical room, a swimming pool, a carport, and a detached outdoor cooking structure.

This action will also include restoration of an access road section from an existing paved driveway and utilities supply point to the property. The proposed restored road area was once part of the former historic railroad that ran through the property which was also historically used as a field road. The residence will serve as the applicant's primary residence and is necessary in order to better maintain the property and dynamic management of the applicant's current legal agricultural uses of the property.

# MAUI

## Hoku Nui Maui Community DEA (AFNSI)

HRS <b>8343-5</b>	and the second se
Trigger(s):	Use of county lands
District:	Makawao
TMK:	(2) 2-4-012:005, and 039 through 046
Permits:	HRS§201H-38 Affordable Housing Project
Approving Agency:	County of Maui, Department of Housing and Human Concerns 2200 Main Street, Suite 546, Wailuku, HI 96793 Buddy Almeida, Buddy.Almeida@co.maui.hi.us (808) 270-7351
Applicant:	Joshua Chavez, chavezmaui@hotmail.com (808) 268-9726
Consultant:	Munekiyo Hiraga, 305 High Street, Suite 104, Wailuku, HI 96793
Status:	Charlene Shibuya, planning@munekiyohiraga.com (808) 244-2015 Statutory 30-day public review and comment period starts; comments are due by May 23, 2016. Please send comments to the approving agency, and copy the consultant and applicant.



Applicant proposes the development of a comprehensively planned 258-acre sustainable agricultural community in Pi'iholo, Makawao District, Maui, utilizing the provisions of Section 201H-38, Hawai'i Revised (HRS), to support the inclusion of affordable housing for the project. Twenty-one (21) market homes and twenty-two (22) affordable homes are proposed. Majority of the housing units are clustered within 20-acres of the project area with the remaining 238-acres farm lot primarily dedicated to agriculture with support facilities such as a Farm Market and Commercial Kitchen to sell and process agricultural products. Other elements of the project are to incorporate a native habitat restoration area and integrate a hula halau facility to perpetuate Hawaiian cultural practices.

Related site improvements are to develop a drainage system to capture and retain stormwater runoff in a series of onsite retention ponds for irrigation. Also, subdivision road connections to Pi'iholo Road will provide vehicular access for the homes, agricultural activities, native habitat restoration, and hula halau facility use.

# **O'AHU**

#### 4. Agriculture Infrastructure Development DEA (AFNSI)

HRS 8343-5	
Trigger(s):	Use of State land
District:	'Ewa
TMK:	9-4-012:002
Permits:	Water Allocation from DLNR/CWRM
Approving Agency:	Hawaii Department of Agriculture
J y	1428 S. King St. Honolulu HI 96814
	Linda Murai, linda.h.murai@hawaii.gov (808) 973-9741
Applicant:	Waikele Farms Inc, P.O. Box 27, Kunia, HI 96759
••	Larry Jefts, ljefts@aloha.net (808) 688-2892
Consultant:	North Shore Consultants, LLC, 2091 Round Top Dr.
	Honolulu, HI 96822; David Robichaux,
	robichaud001@hawaii.rr.com (808) 368-5352
Status:	Statutory 30-day public review and comment period starts; commen
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s are due by May 23, 2016. Please send comments to the approving agency, and copy the consultant and applicant.

Waikele Farms Inc. has leased 487 acres of agricultural land from the State of Hawai'i and intends to place the land in service for production of crops for local consumption. The lessee has determined that the water infrastructure is inadequate and at risk and plans to improve the land by 1) drilling a new source well for agricultural water, 2) installing up to three reservoirs for water storage, and 3) construction of accessory buildings including, but not limited to, two tractor sheds and miscellaneous greenhouses to support farming operations. The proposed action will require a Water Allocation permit, Soil Conservation Plan and building permits. Pending receipt of comments, the proponent and approving agency anticipate a finding of no significant impact.

#### **Block M Queen Street Improvements DEA (AFNSI)** 5.

<u>HRS §343-5</u>		
Trigger(s):	Use of State lands and funds	
District:	Honolulu	
TMK:	[1] 2-3-003:087	
Permits:	Grading Permit, Authorization to construct street improvements	- A MAN
	on HCDA land. National Pollutant Discharge Elimination System	
	Permit for Construction Stormwater Discharges, Chapter 6E.	J. J. C.
	HRS State Historic Preservation Law	
Approving		
Agency:	Hawai'i Community Development Authority (HCDA)	
	547 Queen Street, Honolulu, HI 96813	Block
	Deepak Neupane, deepak.neupane@hawaii.gov (808) 594-0300	and the second s
Applicant:	Howard Hughes Corporation, 1240 Ala Moana Blvd, Ste. 200,	CHIP Comments
••	Honolulu, HI 96814	Allen person
	Lee Cranmer, lee cranmer@howardhughes.com (808) 426-7683	
Consultant:	Wilson Okamoto Corporation 1907 South Beretania St. Suite 400	Honolulu HI 96826
e en e un un u	Farl Matskawa ematsukawa@wilsonokamoto.com (808) 946-227	7
Ctatura	Ctatutary 20 day public review and commant period startey commo	r
Status:	Statutory so-day public review and comment period starts; comme	ents are due by May 23, 2016.



Please send comments to the approving agency, and copy the consultant and applicant.

The Howard Hughes Corporation's proposed improvements along the Queen Street frontage of its Block "M" project are intended to realign the sidewalk to lie mostly within that property. This is in anticipation of street widening that will occur when the Honolulu Rail Transit project constructs its elevated guideway along this section of Queen Street. In conjunction with the realignment of the sidewalk, the proposed improvements in the project area will do the following:

- Demolish the existing sidewalk, curb and railing, and a chain link fence/gate at the aforementioned private driveway;
- Realign and extend the existing curb and street drainage gutters, the result of which will lengthen the existing
  makai lane on Queen Street by an additional 230 feet in the 'Ewa direction, although most of this extension
  will be beyond the project site;
- Relocate three HECO utility poles and a municipal fire hydrant behind (makai of) the new curb;
- Extend portions of two new driveways and a paved equipment maintenance access from the Block M project to the new curb;
- Pave/repave, then re-stripe portions of the street following construction;
- Fill most of the area between the new curb and realigned sidewalk with gravel as a temporary finish since the improvements within the project site are slated for demolition or relocation when the Honolulu Rail Transit's elevated guideway is built.

In addition to the street and sidewalk improvements, the following two underground utility lines will be constructed in the project site to serve the Block M project. These will not be subsequently affected by the rail project:

- A new sewer line crossing beneath Queen Street and extending a short distance mauka on Kamakee Street;
- A new electrical conduit for HECO crossing beneath Queen Street on the Diamond Head side of the Kamakee Street intersection.

#### 6. Mālaekahana State Recreation Area Improvements DEA (AFNSI)

HRS §343-5 Trigger(s): District:	Use of State lands and funds Koʻolauloa	
TMK: Permits:	(1) 5-6-001: 024, 025, 045 to 047, 049, 051, and 053 to 065 State of Hawai'i National Pollutant Discharge Elimination System Permit, Community Noise Permit and Variance, Non-Covered and/or Covered Source Permit (Air Quality), Lane Use Permit for Construction Work, Oversized and Overweight Vehicles on State Highways Permit; City and County of Honolulu Building Permits, Grubbing/Grading/ Stockpiling Permits, Special Management Area Use Permit (Major)	Malaekah
Proposing/ Determining Agency:	Department of Land and Natural Resources, Division of State Parks, 1151 Punchbowl Street, Room 310, Honolulu, HI 96813; Lauren Tanaka, Lauren.A.Tanaka@hawaii.gov (808) 587-0293	
Consultant:	The Limtiaco Consulting Group, 1622 Kanakanui Street, Hono Joe Kwan, joe@tlcghawaii.com (808) 596-7790,	olulu, HI 96817
Status:	Statutory 30-day public review and comment period starts; co	mments are du



Status:Statutory 30-day public review and comment period starts; comments are due by May 23, 2016.Please send comments to the Proposing/Determining Agency and copy the consultant.

The Department of Land and Natural Resources (DLNR) proposes to improve the Mālaekahana State Recreation Area - Kahuku Section for continued recreational use including camping, lodging and day use activities. On-site infrastructure that was installed prior to the acquisition of the property in 1980 warrants replacement due to wear, obsolescence and more stringent standards for regulatory compliance. The current lessee was awarded a short-term lease to manage the project site and has sited temporary lodging structures and restrooms pursuant to the terms and conditions of its lease.

There is no municipal sewer system in the immediate project area. DLNR's project includes the replacement of the administration office, a security office and seven (7) cabins along with related improvements intended to help

#### April 23, 2016

maintain user capacity at levels no greater than what had previously existed. Improvements will include the installation of new infrastructure and construction of a comfort station and satellite restroom facilities. The structures and associated infrastructure would be sited to optimize the functionality and spatial aesthetics within the project site. State Parks may be authorized to proceed in phases based on the availability of funds such that a long-term lessee may complete the park improvements described in the EA.

#### 7. Na Pua Makani Wind Project 2nd DEIS and Appendices 1, 2, and 3

HRS §343-5	
Trigger(s):	Use of State lands
DISTRICT:	KO Olauloa
	TMK (1)5-6-005:018 (portion); (1)5-6-006:018, 47, 51,
Dennelten	55; and (1)5-6-008:006 (portion)
Permits:	various, please see document for full list
Agency:	Department of Land and Natural Resources, 1151
0,	Punchbowl St. Honolulu, HI 96813; Suzanne Case,
	Chairperson, dlnr@hawaii.gov (808) 587-0400
Applicant:	Champlin Oahu Wind Holdings, LLC; 2020 Alameda
	Padre Serra, Suite 105, Santa Barbara, CA 93103
	Mike Cutbirth, mcutbirth@champlinwind.com
	(805) 568-0300
Consultant:	Tetra Tech, Inc., 737 Bishop St., Suite 2340, Honolulu,
	HI 96813; Brita Woeck, brita.woeck@tetratech.com
	(808) 441-6600
Status:	Statutory 45-day public review and comment period starts:



Status: Statutory 45-day public review and comment period starts; comments are due by June 7, 2016. Please send comments to the approving agency, and copy the consultant and applicant.

Na Pua Makani Power Partners, LLC (NPMPP) has prepared a Second Draft Environmental Impact Statement (EIS) for the proposed 25-megawatt Na Pua Makani Wind Project near Kahuku, HI. The purpose of the proposed Project is to provide clean, renewable wind energy for the island of Oahu. The energy delivered by the proposed Project would help HECO meet its Renewable Portfolio Standard (RPS), established in HRS § 269-92 and the state of Hawai'i goal of increasing energy independence through the development of additional sources of renewable energy. The original Draft EIS for the Project was published on June 8, 2015. In response to public comments related to visual impacts and consideration of fewer turbines with larger generating capacities (to reduce the total number of turbines), NPMPP reevaluated the proposed turbine locations and turbine models considered in the original Draft EIS. Through this effort, NPMPP was able to reduce the maximum number of turbines with greater generating capacity for the Project from 10 to 9 wind turbines through consideration of larger turbines with greater generating capacity. This Second Draft EIS is intended to inform stakeholders of modifications to the proposed Project since the publication of the original Draft EIS.



Wainiha Bridge

## **KAUA'I**

#### 8. Wainiha Temporary Bridges Replacement DEA (AFNSI)

HRS §343-5 Trigger(s):	Use of State lands and funds; Use within a conservation	
District: TMK: Permits:	Hanalei Various, see document for full list Department of the Army Permit (Clean Water Act Section 404), Section 401 Water Quality Certification, Stream Channel Alteration Permit, National Historic Preservation Act Section 106/HRS 6E Consultation, Endangered Species Act Section 7 Consultation, Coastal Zone Management Act Consistency Review, Conservation District Use Permit, Special Management Area Permit, Shoreline Setback Determination, National Pollutant Discharge Elimination System Permit, State of Hawai'i Department of Transportation Occupancy and Use of State Highway Right of Way Permit, Community Noise Permit/Variance, Grading/Grubbing/Stockpiling F	Permit
Proposing/ Determining		
Agency:	Department of Transportation, Highways Division, 869 Punchbowl S Christine Yamasaki, christine.yamasaki@hawaii.gov (808) 692-757	Street, Honolulu, Hawaii 96813 ′2
Consultant:	Federal Highway Administration, Central Federal Lands Highway D Suite 380 Lakewood, CO 80228 Michael Will michael will@dot.go	vivision, 12300 West Dakota Ave., by (720) 963-3647
Status:	Statutory 30-day public review and comment period starts; commer Please send comments to the Proposing/Determining Agency, and	nts are due by May 23, 2016. copy the consultant.

The proposed project includes the replacement of three temporary "ACROW Panel" modular steel bridges on Kūhiō Highway (Route 560) near the mouth of the Wainiha Stream on the island of Kaua'i. These bridges were installed as a temporary emergency measure until permanent bridges could be installed. The existing Wainiha temporary ACROW structures would be replaced with new one-lane bridges that closely match the existing horizontal alignment. A slight curve improvement between Bridges 2 and 3 would be provided, and the elevation of the road and bridges would be lowered closer to pre-ACROW conditions. The new bridges would be more visually consistent with the surrounding roadway corridor. Traffic during construction would be maintained makai of the Wainiha bridges. The project also involves the placement of temporary structures adjacent to or over Wai'oli, Waipā, and Waikoko streams to accommodate construction loads. All temporary structures would be removed upon completion of the project, and the sites restored. Scour protection, approach road re-paving, utility relocations, and temporary staging areas are also included in the project. Short-term construction related impacts (noise, dust, erosion, vegetation removal, and traffic) would occur, but the implementation of best management practices would minimize the effects to the environment.



## **OPEN HRS CHAPTER 343 DOCUMENTS**

- **Status:** Statutory public review and comment period for these projects began April 8, 2016; comments are due May 9, 2016. Please send comments to the relevant agency, and copy any relevant applicant or consultant.
- Former Kealakehe Metal Salvage Facility Remediation and Closure DEA
- Hawai'i Electric Light Easement Modification at Pu'uwa'awa'a DEA
- Hana Affordable Housing Development DEA
- Princess Nahi'ena'ena Elementary School Classroom Building DEA
- <u>Wai'anae Elementary School Administration/Student Support Center DEA</u>

# NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

As a courtesy, listed below are documents submitted for publication that have been prepared pursuant to NEPA rather than Chapter 343, HRS; accordingly, these entries may have unique comment periods. Occasionally, actions are subject to both NEPA and Chapter 343, HRS, in those cases, a separate entry would be published in a relevant section of The Environmental Notice.

#### Redevelopment of Marine Corps Forces, Pacific HQ/OPS Center

Island: District: TMK: Permits:	Oʻahu 'Ewa 9-9-010: 007 N/A
Proposing/ Approving Agency:	Commanding Officer, Marine Corps Base Hawai'i, P.O. Box 63002 Kaneohe Bay, HI 96863-3002
Contact:	MARFORPAC HQ/OPS Center Project Manager, Code EV21 Naval Facilities Engineering Command Pacific 258 Makalapa Drive, Suite 100 Pearl Harbor, HI 96860-3134
Consultant:	HHF Planners Glenn Tadaki Pacific Guardian Center, Makai Tower 733 Bishop Street, Suite 2590 Honolulu, HI 96813, (808) 457-3179
Status:	Comment Period: April 23, 2016 – May 23, 2016. Written comments on the Draft FONSI may be provided by e-mail to: NFPACReceive@navy.mil or by mail to: Naval Facilities Engineering Command Pacific, 258 Makalapa Drive, Suite 100, JBPHH, HI 96860-3134, Attention: MARFORPAC HQ/OPS Center Project Manager. Code EV21

Pursuant to the National Environmental Policy Act, Marine Corps Base Hawai'i has prepared a Draft Finding of No Significant Impact (FONSI) based on an Environmental Assessment for the redevelopment of the existing Marine Forces, Pacific (MARFORPAC) headquarters and operations center (HQ/OPS) known as the Building 1 Complex. Located at Camp H.M. Smith, Hālawa Heights, O'ahu, the redevelopment project will have a footprint of 367,500 gross square feet (GSF) and be about 15,000 GSF less than the existing facility. The project will take approximately ten years to complete with new construction occurring first to minimize operational impacts, followed by renovation, and then demolition. The Draft FONSI also considers findings from the formal Section 106 consultation process regarding potential impacts to cultural resources. Because of its age, condition, and World War II-era use (Aiea Heights Naval Hospital), the Building 1 Complex is functionally obsolete, has building and infrastructure deficiencies, and lacks sufficient usable space to have a secure, consolidated, functionally-adequate facility. When completed, the new HQ/OPS Center will result in a more compact and secure facility that will provide MARFORPAC and other commands with a functional, efficiently-configured command and control facility that will effectively support their mission-critical activities and provide opportunities for co-location and spatial proximity.

# COASTAL ZONE MANAGEMENT NOTICES

## **Federal Consistency Review**

The Hawai'i Coastal Zone Management (CZM) Program has received the following federal actions to review for consistency with the CZM objectives and policies in Chapter 205A, HRS. This public notice is being provided in accordance with section 306(d) (14) of the National Coastal Zone Management Act of 1972, as amended. For general information about CZM federal consistency please call John Nakagawa with the Hawai'i CZM Program at 587-2878. For neighboring islands use the following toll free numbers: Lāna'i & Moloka'i: 468-4644 x72878, Kaua'i: 274-3141 x72878, Maui: 984-2400 x72878 or Hawai'i: 974-4000 x72878. For specific information or questions about an action listed below please contact the CZM staff person identified for each action. Federally mandated deadlines require that comments be received by the date specified for each CZM consistency review. Comments may be submitted by mail, electronic mail or fax.

#### Mail: Office of Planning

- Department of Business, Economic Development and Tourism P.O. Box 2359 Honolulu, HI 96804
- Email: john.d.nakagawa@hawaii.gov
- Fax: (808) 587-2899

#### Interim Final Rule under the Marine Mammal Protection Act (MMPA) to Implement Approach Regulations for Humpback Whales in Ocean Waters Surrounding State of Hawai'i

**Proposed Action**: National Marine Fisheries Service (NMFS) is proposing an interim final rule that is intended to provide protections for humpback whales in Hawai'i from human activities that cause "take" or disturbance under the MMPA. Measures taken under this interim final rule will provide protections for Hawai'i's humpback whales similar to approach regulations established under the Endangered Species Act (ESA), which would be subject to removal if Hawai'i's population is no longer listed under the ESA. If implemented, this rule would apply in the waters within 200 nautical miles from shore of the islands of the State of Hawai'i and would make it unlawful to: 1) operate an aircraft within 1,00 feet of a humpback whale; 2) approach, by any means, within 100 yards of a humpback whale; 3) cause vessel, person, or any other object to approach within 100 yards of a humpback whale; 4) approach a humpback whale by interception (i.e., placing an aircraft, vessel, person, or other object in the path of a humpback whale so that the whale surfaces within 1,000 feet of the aircraft or 100 yards of the vessel, person, or object, a.k.a. "leapfrogging"); and 5) disrupt the normal behavior or prior activity of a whale by any other act or omission. The proposed rule would include the following exceptions: 1) federal, state, or local government vessels or persons operating in the course of their official duties such as law enforcement, search and rescue, or public safety; 2) vessel operations necessary to avoid an imminent and serious threat to a person, vessel, or the environment; 3) vessels restricted in their ability to maneuver which, because of this restriction, are not able to comply with approach restrictions; 4) vessels or persons authorized under permit or authorization issued by NMFS to conduct scientific research that may result in taking of humpback whales.

Location: Federal Action: Federal Agency: Informational Contact: CZM Contact: CM Contact:



# **Special Management Area Permits**

The SMA Minor permits below have been approved (per HRS 205A-30). For more information, contact the relevant county/State planning agency. Honolulu (768-8014); Hawai'i (East 961-8288, West 323-4770); Kaua'i (241-4050); Maui (270-7735); Kaka'ako or Kalaeloa Community Development District (587-2841).

Location (TMK)	Description (File No.)	Applicant/Agent
Hawaiʻi: South Hilo (2-1-014: 043)	Additions to the Residential Duplex (SMM 14-322)	Christopher Michael Ow- ens
Hawaiʻi: South Hilo (2-6-001: 024, 025 & 026)	Tree Removal and Routine Maintenance (SMM 16-347)	Hymin and Lisa Zucker
Maui: Makawao (2-8-003: 075)	Various Farm Improvements (SM2 20160029)	Lew & Maria Abrams
Maui: Kahului (3-7-011: 002)	Parking Lot Improvements (SM2 20160030)	Terry Mcbarnet
Oʻahu:Kakaʻako (2-1-059: 003)	To Widen the Existing Driveway Entrance (SMA/16-2)	Cutter Mazda of Honolulu
Oʻahu: Kalaeloa Barbers Point Harbor (9-1-014: 024 and 039)	Kalaeloa Barbers Point Harbor Stockpile Removal (2016/SMA- 10)	Kapiolani Hawaii Property Company LLC / Belt Col- lins

# **SHORELINE NOTICES**

# **Shoreline Applications**

The shoreline certification applications below are available for review at the Department of Land and Natural Resources Offices on Kaua'i, Hawai'i, Maui, and Honolulu, 1151 Punchbowl Street, Room 220 (HRS 205A-42 and HAR 13-222-12). All comments shall be submitted in writing to the State Land Surveyor, 1151 Punchbowl Street, Room 210, Honolulu, Hawai'i 96813 and postmarked no later than 15 calendar days from the date of the public notice of the application. For more information, call lan Hirokawa at (808) 587-0420.

File No.	Date	Location	Applicant/Owner	ТМК
OA- 1697	2/29/16	Lot 167-A (Map 99) Land Court Application 323 situate at Kailua, Koʻolaupoko, Oʻahu Address:396 Dune Circle Purpose: Determine building setback	Leaps & Boundaries, Inc./ Jason L. Pahl, Trust	(1) 4-3-017:033
MA- 635	3/7/16	A Portion of Lot 13-A-5 of the Mailepai Hui Land situate at Kaʻanapali, Lāhainā, Maui Address:5295 Lower Honoapliʻilani Road, Unit no. C460 Purpose: Permitting purpose	Fukumoto Engineering, Inc./ Napili Point 1 AOAO	(2)4-3-002:021
HA-529	3/1/16	Unit "A" of Puako Sands Ekahi C.P.R. Map No. 2557 of Lot A of Puako Beach Lots being a Portion of Grant S-13670 to Arthur C.W. Ireton, Jr. situate at Lālamilo, S.Kohala, Hawai'i Address:69-1644 Puako Beach Drive Purpose: Obtain County permits	Wes Thomas Associates/ Nann Hylton c/o Nanea Studios, Inc.	(3)6-9-003:016
KA-408	2/29/16	Allotment 9-A Moloaa Hui Land situate at Moloa Hui Lots, Kawaihau, Kaua'i Address:6610 Moloaa Road Purpose: Shoreline setback	Esaki Surveying & Mapping, Inc./Bill Campbell	(4)4-9-014:007
KA-409	2/29/16	Portion of Allotment 10-AMoloaaHui Land situate at Moloaa Hui Lots, Kawaihau, Kauai Address: Moloaa Road Purpose: Shoreline setback	Esaki Surveying & Mapping, Inc./Bill Campbell	(4)4-9-014:006



# **SHORELINE NOTICES**

# **Shoreline Certifications and Rejections**

The shoreline notices below have been proposed for certification or rejection by the Department of Land and Natural Resources (HRS 205A-42 and HAR 13-222-26). Any person or agency who wants to appeal shall file a notice of appeal in writing with DLNR no later than 20 calendar days from the date of this public notice. Send the appeal to the Board of Land and Natural Resources, 1151 Punchbowl Street, Room 220, Honolulu, Hawai'i 96813.

File No.	Proposed/ Rejected	Location	Applicant/Owner	тмк
OA- 1688	Proposed Shoreline Certification	Dwelling Area 12 Ewa Oceanside Condominium Project Lot 785 Land Court Application 242 situate at Pu'uloa Beach, Ewa, O'ahu Address: 91-69 Fort Weaver Road Purpose: Property Sale	Walter P. Thompson, Inc./ Randall Chew Num Chun & Valerie Kam Hung Chun	(1) 9-1-005:Por. 011
OA- 1690	Proposed Shoreline Certification	Lot 604 Land Court Application 1089 as shown on Map 64 situate at Kamananui, Waialua, Oʻahu Address: 67-011 Kaimanu Place Purpose: Building setback	Wesley T. Tengan/ John Borsa Jr.	(1) 6-7-014:028
OA- 1691	Proposed Shoreline Certification	Lot 11-G Land Court Application 242 as shown on Map 10 situate at Pu'uloa Beach, 'Ewa, O'ahu Address: 91-319 'Ewa Beach Road Purpose: Building setback	Wesley T. Tengan/ Ronald R. Nagamine	(1) 9-1-024:005
OA- 1693	Proposed Shoreline Certification	Lot 273 Land Court Application 505 situate at Kailua, Koʻolaupoko, Oʻahu Address: 974 Mokulua Drive Purpose: Building permit	Walter P. Thompson, Inc./ James Yang c/o Geminis Group	(1) 4-3-007:066
MA- 634	Proposed Shoreline Certification	Portion of Lot 2 of the Paukūkalo Beach Access Subdivision situate at Wailuku, Maui Address: 0 Lilihua Place Purpose: Determine shoreline setback	Akamai Land Surveying, Inc./ O Lilihua LLC	(2) 3-4-029:036
KA- 406	Proposed Shoreline Certification	Lot 3, Land Court Application 889 situate at Waipouli, Kawaihau, Kauaʻi Addresses: 650 Aleka Loop Purpose: Setback for proposed structure	Esaki Surveying & Map- ping, Inc./ Kauai Coconut Beach, LLC	(4) 4-3-007:028
OA- 1694	Withdrawal	Lot 9 Section C, Kawailoa Beach Lots situate at Kawailoa, Waialua, Oʻahu Address: 61-459 Kamehameha Highway Purpose: Building permit	Walter P. Thompson, Inc./ James Eichler	(1) 6-1-008:014

## **FEDERAL NOTICES**

As a courtesy, listed below are relevant entries from the Federal Register, gleaned from a search of Hawai'i-based entries published since the last issue of The Environmental Notice. For the PDF file click on the title link, also available at <u>http://www.gpo.gov/fdsys/</u>

#### 1. Notice of Inventory Completion: Pu'uhonua o Honaunau National Historical Park

The U.S. Department of the Interior, National Park Service has completed an inventory of human remains, in consultation with the appropriate Native Hawaiian organizations, and has determined that there is a cultural affiliation between the human remains and present-day Native Hawaiian organizations. Lineal descendants or representatives of any Native Hawaiian organization not identified in this notice that wish to request transfer of control of these human remains should submit a written request to Pu'uhonua o Hōnaunau National Historical Park. If no additional requestors come forward, transfer of control of the human remains to the lineal descendants or Native Hawaiian organizations stated in this notice may proceed.

**DATES:** Written requests for transfer of remains must be submitted by May 20, 2016.

Click here for more information (See 81 FR 23327 April 20, 2016)

# SECTION 106 CONSULTATION

#### Waimea Wastewater Treatment Plant, R-1 Recycled Water Distribution System

Island:	Kaua'i
District:	Waimea
TMK:	(4) 1-2-006: 036, 009 (por.)
Permits:	N/A
Applicant/ Proposing Agency:	State of Hawai'i Department of Health, Environmental Division, Wastewater Branch 919 Ala Moana Blvd
/ gonoy.	Room 309 Honolulu, HI, 96814, Ms, Sue Liu, (808) 586-4294
Approving	
Agency:	State of Hawai'i, Department of Health, Environmental Division, Wastewater Branch Contact, Ms. Sue Liu, (808) 586-4294
Consultant:	N/A
Status:	Comments due no later than May 22, 2016 to: 919 Ala Moana Boulevard, Room 309 Honolulu, HI, 96814 Attn: Ms. Sue Liu, Email: wwb@doh.hawaii.gov

The Department of Health (DOH) initiated Section 106 of the NHPA consultation with the State Historic Preservation Division (SHPD) in accordance with 36 CFR Part 800. In 1990, the U.S. Environmental Protection Agency (EPA) designated the DOH to act on EPA's behalf, pursuant to 36 CFR §800.2 (c) (4), when initiating Section 106 of the NHPA process in connection with projects funded under the Hawai'i Clean Water State Revolving Fund (CWSRF). The DOH is providing funding under the CWSRF to the County of Kaua'i Department of Public Works (DPW) for the Waimea Wastewater Treatment Plant, R-1 Recycled Water Distribution System Project. The proposed project will utilize federal funding and is considered an undertaking, as defined by Section 106 of the NHPA, 54 U.S.C. §306101 et seq., and 36 CFR Part 800. The County of Kaua'i DPW proposes to construct an above ground 400,000 gallon recycled water storage tank on the southeast corner of the Waimea WWTP property. In addition to the storage tank, on-site improvements will include a new recycled water pump station located adjacent to the tank and would be a maximum of 44 inches by 44 inches and 60 inches in height. The pump will regulate water pressure on the distribution system to a setpoint that is 10 pounds per square inch (psi) lower than the potable water distribution system. Based on a review of previously conducted archaeological studies/surveys of the area it is not anticipated that any sites of historic importance are present in the vicinity of the project. However, the DOH has engaged SHPD to determine the presence of potential sites of historic importance within the vicinity of the project area as well as the potential impact of the project on such sites, if present.

# **GLOSSARY OF TERMS AND DEFINITIONS**

#### **Agency Actions**

Any department, office, board, or commission of the state or county government which is part of the executive branch of that government per <u>HRS 343-2</u>.

#### **Applicant Actions**

Any person who, pursuant to statute, ordinance, or rule, requests approval for a proposed action per <u>HRS 343-2</u>.

#### **Draft Environmental Assessment**

When an Agency or Applicant proposes an action that triggers HRS 343, an Environmental Assessment shall be prepared at the earliest practicable time to determine whether the actions' environmental impact will be significant, and thus whether an environmental impact statement shall be required per <u>HRS 343-5(b)</u>, for Agency actions and <u>HRS 343-5(e)</u>, for Applicant actions. For actions for which the proposing or approving agency anticipates a Finding of No Significant Impact (AFNSI), a Draft EA (DEA) shall be made available for public review and comment for 30 days and public notice is published in this periodic bulletin.

#### Final Environmental Assessment and Finding of No Significant Impact

The Agency shall respond in writing to comments on a DEA received during the 30-day review period and prepare a Final EA (FEA) that includes those responses to determine whether an environmental impact statement shall be required. If there are no significant impacts, then the Agency will issue a Finding of No Significant Impact (FONSI). An Environmental Impact Statement (EIS) will not be required and the project has cleared HRS 343 requirements. The public has 30 days from the notice of a FONSI in this bulletin to ask a court to require the preparation of an EIS.

#### Final Environmental Assessment and Environmental Impact Statement Preparation Notice

An EIS shall be required if the Agency finds that the proposed action may have a significant effect on the environment. The Agency shall file notice of such determination with OEQC, called an EIS Preparation Notice (EISPN) along with the supporting Final EA. After the notice of the FEA-EISPN is published in this bulletin, the public has 30 days to request to become a consulted party and make written comments. The public (including the Applicant) has 60 days from the notice of the EISPN in this bulletin to ask a court to not require the preparation of an EIS.

#### Act 172-2012, Direct-to-EIS, Environmental Impact Statement Preparation Notice (with no EA)

Act 172 in 2012 amended HRS 343 by providing for an agency to bypass the preparation of an environmental assessment for various actions that in the experience of the agency would clearly require the preparation of an EIS. Until administrative rules have been drafted, the agency must submit its determination that an EIS is required for an action (Act 172-2012, EISPN) with a completed OEQC publication form detailing the specifics of the action to enable the public a 30-day period to request to be consulted parties in the preparation of the Draft EIS. Comments and responses on the EISPN must be incorporated into the subsequent Draft EIS.

# Act 312-2012, Secondary Actions in the Highway or Public Right Of Way

Act 312-2012, amended HRS 343, by adding a new section (HRS 343-5.5., entitled "Exception to applicability of chapter.") HEPA now allows for a statutory exception for "secondary actions" (those that involve infrastructure in the highway or public right-ofway) provided that the permit or approval of the related "primary action" (those outside of the highway or public-right-of-way and on private property) is not subject to discretionary consent and further provided that the applicant for the primary action submits documentation from the appropriate agency confirming that no further discretional approvals are required. An aid to understanding this is to visualize residential driveway improvements in the public rightof-way, versus, retail outlet driveway improvements in the public right-of-way.

# Draft Environmental Impact Statement

After receiving the comments on the EISPN, the Agency or Applicant must prepare a Draft Environmental Impact Statement (DEIS). The <u>content requirements</u> of the DEIS shall contain an explanation of the environmental consequences of the proposed action including the direct, indirect and cumulative impacts and their mitigative measures. The public has 45 days from the first publication date in this bulletin to comment on a DEIS. The DEIS must respond to comments received during the EISPN comment period in a point-by-point manner.

# Final Environmental Impact Statement

After considering all public comments filed during the DEIS stage, the Agency or Applicant must prepare a Final EIS (FEIS). The FEIS must respond in a pointby-point manner to all comments from the draft and must be included in the FEIS. See here for <u>style</u> concerns. For Applicant projects, the Approving Agency is authorized to accept the FEIS and must do so within 30-days or the FEIS is accepted as a matter of law. For an Agency project, the Governor or the Mayor (or their designated representative) is the Accepting Authority, and unlike applicant actions, there is no time limit on the accepting authority reviewing the FEIS. Only after the FEIS is accepted may the project be implemented.

#### Acceptability

If the FEIS is accepted, notice of this action is published in this bulletin. The public has 60 days from the date of notice of acceptance to ask a court to vacate the acceptance of a FEIS. For Applicant actions, non-acceptance by the Approving Agency is cause for the Applicant to administratively appeal to the Environmental Council. For Agency actions, there is no such administrative appeal. In both instances, the Applicant or the proposing Agency can prepare a revised DEIS after a non-acceptance determination.



#### **National Environmental Policy Act**

The National Environmental Policy Act (NEPA) requires federal projects to prepare an EA or EIS. In many ways it is similar to Hawai'i's law. Some projects require both a State and Federal EIS and the public comment procedure should be <u>coordinated</u>. OEQC publishes NEPA notices in this bulletin to help keep the public informed of important federal actions.

#### **Conservation District**

Any use of land in the State Conservation District requires a Conservation District Use Application (CDUA). These applications are reviewed and approved by the Board of Land and Natural Resources. Members of the public may intervene in the permit process. Notices of permit applications are published in this bulletin.

# Special Management Area and Shoreline Setback Area

The Special Management Area (SMA) is along the coastline of all islands and development in this area is generally regulated by <u>HRS 205A</u>, and county ordinance. A special subset of the SMA that is regulated by HRS 343, is the <u>Shoreline Setback Area</u>. Most development in this area requires a Special Management Permit. This bulletin posts notice of these SMA applications to encourage public input.

#### **Shoreline Certifications**

State law requires that Hawai'i shorelines be surveyed and certified when necessary to clearly establish the shoreline setback from the certified shoreline. The public may participate in the process to help assure accurate regulatory boundaries. Private land owners often petition to have their shoreline certified by the State surveyor prior to construction. This bulletin publishes notice from the Department of Land and Natural Resources of shoreline certification applicants and final certifications or rejections.

#### **Environmental Council**

The <u>Environmental Council</u> is a 15-member citizen board appointed by the Governor. They serve as a liaison between the Director of OEQC and the general public concerning ecology and environmental quality. The Council makes the rules that govern the Environmental Impact Statement process (HRS 343). <u>Agendas</u> of their regular meetings are posted on the Internet and the public is invited to attend.

#### **Administrative Exemption Lists**

Government agencies must keep a list describing the minor activities they regularly perform that are <u>exempt</u> from the environmental review process. These lists and any amendments shall be submitted to the Council for review and concurrence (HAR <u>11-200-8(d)</u>). This bulletin will publish an agency's draft exemption list for public comment prior to Council decision making, as well as notice of the Council's decision on the list.

#### **Endangered Species**

This bulletin is required by <u>HRS 343-3(c)</u>, to publish notice of public comment periods or public hearings for Habitat Conservation Plans (HCP), Safe Harbor Agreements (SHA), or Incidental Take Licenses (ITL) under the federal Endangered Species Act, as well as availability for public inspection of a proposed HCP or SHA, or a proposed ITL (as a part of an HCP or SHA).

1	DEPARTMENT OF TRANSPORTATION
2	UNITED STATES OF AMERICA
3	STATE OF HAWAII
4	PUBLIC MEETING
5	
6	Re: Draft Environmental Assessment
7	For Wainiha Bridges
8	
9	Tuesday, May 17, 2016
10	7:34 to 7:52 p.m.
11	Hanalei Elementary School Cafeteria
12	5-5415 Kuhio Highway
13	Hanalei, Kauai, Hawaii 96714
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20	MODERATOR:
21	DAWN CHANG
22	
23	REPORTED BY:
24	TERRI R. HANSON, CSR 482
25	Registered Professional Reporter

1	I N D E X	
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3	COMMENTS BY	
4	Carl Imparato 3	
5	John Wichman 7	
6	Johanna Ventura 11	
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10	EXHIBIT	
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12	May 17, 2016, Maka'ala Ka'aumoana. 16	
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PUBLIC MEETING 1 MS. CHANG: Can I get a -- okay. 2 We need some order here. I really appreciate it. I know you 3 4 quys have got a lot of emotions here. If you've got a 5 written statement, you can give it to her. Maka'ala's got a written statement, and she's going to speak. 6 7 She's going to give a written statement to Terri, so Terri doesn't have to take it. Okay. So Maka'ala. 8 9 (Maka'ala Ka'aumoana chose to speak outside the reasonable hearing distance of the 10 court reporter. A written statement is 11 attached.) 12 13 MS. CHANG: Mahalo. The next person who signed up is Carl. 14 CARL IMPARATO: 15 Aloha. My name is Carl That's Carl with a C, I-m-p-a-r-a-t-o. Imparato. 16 And I'm sorry to say that I feel like we've lost ground 17 since 2012. Both the proposed design of the bridges and 18 the draft EA are very disappointing. 19 First of all, as Maka'ala has already 20 mentioned, the draft EA mischaracterizes the project. 21 22 This project is supposed to be and always has been about 23 the rehabilitation of the historic bridges, not the replacement of the temporary bridges. 24 This mischaracterization sweeps under the rug the very 25

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RALPH ROSENBERG COURT REPORTERS, INC. Honolulu, Hawaii (808)524-2090 significant ways in which the proposed project violates the requirements of historic preservation because one needs to compare the proposed bridges to the historic bridges and justify significant changes, which apparently is something that people don't want to see.

In to particulars, the bridge railings -- the 6 7 proposed bridge railings are a big problem. Until a few years ago we had agreement that the new bridges would 8 have railings that were identical in appearance to the 9 old ones. Now the proposal about the bridge railings is 10 that they would, quote, somewhat echo, unquote, the 11 character of the historic bridges railings and that they 12 would mimic the railings of the 1904 bridges, not the 13 historic bridges from the 1950s. 14

That's wrong because it's not preservation of our historic bridges, and it's wrong because there are no pictures in the EA where you can see where the proposed railings look -- looked like, and I wonder why. And it's wrong because it throws away our old agreement about the railings. So that's a big problem.

Moving on to the proposed decking of the bridge. The proposed decking of the bridge is now concrete. Until a few years ago we had agreement that the decking would be wood or wood facsimile because that's the only way to replicate the look, the sound and

> RALPH ROSENBERG COURT REPORTERS, INC. Honolulu, Hawaii (808)524-2090
the feel of the historic bridges. 1 But now the deck designed for painted concrete. 2 That's not historic rehabilitation. 3 Equally wrong, the draft EA glosses this over. 4 5 Even though timber decking is essential, the draft EA says, No, concrete decking isn't a significant change, 6 7 so there's no problem with deck of no significant impact. 8 9 Next on to the proposed bridge widths which people have already talked about. They're inconsistent 10 with the historic bridges, but you wouldn't know that 11 from the draft EA because the draft EA doesn't tell 12 anybody that the old bridge decks were 10 to 10 and a 13 14 half feet wide. It only compares the proposed 14-foot-wide decks which are 40 percent wider than our 15 historic bridges to the width of the Acrow bridges. 16 17 That's deceptive. Even the old consultants, AECOM, in their 2012 18 report acknowledged that the disagreement about the deck 19 widths, the historic widths, which is all the public 20 wanted in 2012, that the disagreement about the historic 21 22 widths versus the 14-feet was a major issue and that 23 there needed to be work on getting to a consensus solution. 24 The draft EA glosses that over. It doesn't 25

acknowledge that the draft narrower bridges were safer, 1 traffic calming bridges, than what the EA proposes. 2 Ιt doesn't show any data to say why 14-foot bridges are 3 going to be safer than historic bridge widths. 4 It doesn't acknowledge any work on coming to an 5 agreement of consensus. It's just basically that the 6 7 federal highways folks unilaterally decided that wider is better. But there's no justification in there. And 8 9 so if there's no justification, how you can make a finding of no significant impact? 10 So in conclusion, let's stand back and compare 11 to where we were four years ago. We have a bridge 12 designed that's substantially worse, unlike the historic 13 bridges; the deck unlike the historic bridges, width and 14 massiveness half again as big as the historic bridges. 15 But the draft EA says, No significant impact. 16 That's simply not true, certainly in regards to historic 17 preservation. 18 So, number one, the design needs to be revised 19 so the historic rehabilitation means historic 20 rehabilitation and you can legally and legitimately 21 22 issue a FONSI. 23 And, number two, in addition to fixing up the design, the EA then needs to be revamped and made 24 honest. 25

6

If we're not going to preserve the design integrity of the historic bridges, then the EA should acknowledge that proposed bridges are not like the historic bridges; they're very different; instead of trying to create a lie about them being consistent with historic preservation.

7 I hope that we'll be able to work together on 8 fixing these things up. I know I'm a little strident on 9 this when I'm speaking because I was very upset reading 10 this draft EA. I think of the ground we've lost, but I 11 honestly hope that we can move forward and solve these 12 problems. Thank you.

MS. CHANG: Thank you, Carl. The next person that I have that signed up is John Wichman.

Hi, Johnny Wichman. 15 JOHN WICHMAN: I'd like to speak on behalf on myself and also the Hanalei 16 Roads Committee. And I have comments that I'm going to 17 submit via email to Mike. And also the roads committee, 18 we have extensive comments. So a lot of those are going 19 to mimic what you've heard from Carl and Maka'ala. 20 So I'll save those for writing. 21

But I want to say on behalf of the roads committee that it's always been our feeling that this is a very special -- a very special roadway, you know, from the Princeville Shopping Center to Kee, that 10-mile

stretch is -- it's the most historic roadway left in Hawaii. And for that reason, it's on the state and national registry.

And we feel that, you know, the lifestyle, the rural lifestyle that we have here on the North Shore is inherently tied to this roadway. And the historic elements, each historic element, each one-lane bridge and each narrow culvert are integral to this historic nature and integral to your lives.

I remember when it was probably, what, Barbara? 10 Maybe 10 years ago when we went to see Cayetano. There 11 was a project that the state was doing where they were 12 13 going to take out the culvert. When you come into Hanalei just past the trader building, there's a 14 You might not even notice it, but there's a 15 culvert. little, narrow culvert just this side of Hanalei 16 17 Dolphin. And they were going to take that out. And we realized that, you know, each culvert, each narrow area 18 is a traffic calmer, you know. 19

And so to us, historic means -- these historic 20 elements mean traffic calming, means they slow cars 21 And slower traffic is safer. 22 down. So we've made the connection that, you know, historic -- a historic 23 roadway kept with its integrity is a safer roadway. 24 Ιt keeps people going slow. 25 So we went to see the

1	governor, and we go into his office. We finally get to
2	go into his office. And he's like, Okay, well, what do
3	you guys got? And we showed him the pictures of the
4	culvert. He's like, You came all the way for that? He
5	couldn't it's nothing, right? It's only about eight
6	feet long. And he just goes and we go, Yeah, because
7	this is important to us. You know, this is important to
8	our community. Each little element of this roadway is
9	important. Each element of this roadway keeps our
10	roadway safe, keeps are roadway historic, and it's tied
11	to our lifestyle.
12	So, you know, where we're at today, I mean,
13	we've been involved in this project since the very
14	beginning. How many years? Ten, 12 years now. And
15	we've come a long way. You know, we've come a long way.
16	When you go back to 1976 at the rendering of
17	the they were going to replace the Hanalei Bridge.
18	We're still making the community effort to save our
19	bridges.
20	So we come from the point of view that this
21	project is about replicating the 1957, '58 Wainiha
22	bridges. And we feel like the project is gone askew a
23	little bit. When I see this PowerPoint presentation
24	that the purpose of the project is to replace the Acrow
25	bridges. We feel the purpose of the project is to

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1	rehabilitate and replace the historic 1957 Wainiha
2	bridges.
3	And we're getting there. I mean, we got one
4	lane. They're wider than we want. They're getting
5	there. They have the look, the alignment, the elevation
6	is good. But we're still not quite there. And we
7	really want DOT and federal highways to just go that
8	extra you know, we're 70 percent there. We just want
9	them to go that extra 30 percent and incorporate the
10	historic width, historic railings, and wooden decking.
11	And I really want to emphasize the wooden
12	decking because I have a picture that I'll leave I
13	was going to leave with Mike that was an artist took
14	this picture of the Wainiha bridges, and you can see the
15	wooden decking going down it. The wooden decking is the
16	soul of the bridge. There's no way to replicate the
17	feel, the sound, the experience of those bridges with
18	concrete. There's just no way. They're going to be
19	completely different, and traffic is going to go faster
20	on concrete.
21	One of the advantages of wood is that you
22	inherently go slower. You just naturally go slower on
23	wood. And engineers might think, well, wood's dangerous
24	because it get slippery, but actually cars go slower on
25	wood. So to us wood decking is safer, and it also is

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1	what is mandated by the historic nature of our roadway.
2	Thank you.
3	MS. CHANG: The next person I have who
4	wanted to make a comment was Johanna.
5	JOHANNA VENTURA: These are my kids if you
6	can see them. My daughter was in sixth grade when they
7	took out the Acrows, and she's now 22.
8	MS. CHANG: Can you state your name.
9	JOHANNA VENTURA: Yes. My name is Johanna
10	Ventura. I'm a resident of Wainiha. I live on Ala Eke
11	Road, which the road between Wainiha bridges 2 and 3. I
12	have several concerns which center mostly around the
13	construction.
14	The first concern is that I would like to see
15	it really clearly stated that the temporarily bridges
16	that are going to be built at Waipa and Waikoko and
17	Waioli will be only used for construction and will be
18	removed. Because I agree with the comments that Johnny
19	made that our one-lane bridges calm our community and
20	they limit the amount of people that can come into the
21	community, which protects us. And the temporary bridges
22	that you're going to be putting in will allow
23	significantly higher weight loads. So I'm going to be
24	really looking to you to have that be super clear.
25	The other stuff that I'm worried about have to

1	do with the construction process. Although I'm speaking
2	tonight on my own behalf and my family's behalf, I will
3	tell you that I intend to get to poll my neighbors
4	and have them sign on to a statement that states our
5	complete opposition to using the staging of using Ala
6	Eke Road as a staging area for any equipment or
7	materials except of a temporary nature, perhaps over
8	night as needed.

9 When the actual replacement happens, it is my 10 recollection that we were told that the Acrow 11 replacement would be over night. And, in fact, the 12 construction of the actual structures may have been over 13 night, but the preparation work before and after took 14 quite a while longer.

And we as residents were not prepared for the impact that it would have on our access to our homes and also the protection of our property, specifically the area abutting -- off of Ala Eke Road that abuts the highway is the one safe zone that we as residents can park our cars when our road is flash flooding.

21 Wainiha means angry or fierce water. And as 22 you might understand from the name, our river does flash 23 flood fairly regularly. It's something we live, and we 24 live at happily. But if we lose the one safe place to 25 park our cars, it is going to cause us egregious harm

1	and inconvenience. And I can guarantee you that we will
2	fight that. And so I'd like to see it stated also very
3	firmly that that staging area has been eliminated. I
4	was a little concerned when said that it was being
5	considered.
6	I do believe that there are other staging areas
7	and perhaps even state-owned properties in the general
8	vicinity that you may want to look at instead.
9	The other concerns that I have with regard to
10	construction have to do with safe passage for the
11	children of the road especially during school bus pickup
12	and drop-off. But not only that, because Wainiha is
13	this very special place where the kids actually ride
14	their bikes on the highway. And that's because the cars
15	do tend to go slow through there.
16	But if there is traffic backed up, you know, we
17	see already that that bridge rage causes people to do
18	things that they wouldn't normally do. And so I'm very
19	concerned about the impact that the traffic that that
20	construction traffic and the construction holdups will
21	have on traffic local in Wainiha.
22	And by that, I don't necessarily mean cars.
23	I'm talking about pedestrians and bicycle riders,
24	primarily children, as much as I am cars trying to get
25	from Ala Eke to Wainiha Store, for example.

The other thing is that I would imagine that 1 Wainiha Store tenants, which includes three businesses, 2 are also going to be very concerned about the 3 construction backed up because their customers' access 4 5 to their businesses is going to be impacted. And so I'm going to be looking for assurances written into the RP 6 7 that address those things during working hours and daylight hours primarily. 8 9 The other concerns I have is that the area is, as I stated, a flood zone. And it is a flood zone not 10 just on Ala Eke Road but actually also on the highway 11 makai of Wainiha 2. It's significant, really prone to 12 flooding during flooding events that don't even hit Ale 13 14 Eke. So you should be really cognizant of that when 15 you're planning because the area, if I understand you 16 17 correctly, where you're going to put the makai temporary bridge is in that zone where it floods really quickly 18 and easily. 19 And also I guess I just want it back up and say 20 that I was at the meeting where the 14-foot was 21 22 discussed by the prior consultant, which I think AECOM, and there was a vote. A vote was asked of the people. 23 Would you like to vote? And everyone said, Yes. 24 And it I counted every hand that went up. 25 was unanimous. Ι

1	was looking for anyone who didn't have their hand up.
2	And I didn't see anyone. So I remember that really
3	clearly. And I just want to back up other commenters
4	who made a comment during the Q and A, and I hope that
5	they will come up and reiterate. And I think I'm done.
6	MS. CHANG: Thank you so much. Remember,
7	comments are going to be taken until May 23rd, so if you
8	were going to get your numbers, get it in before then.
9	JOHANNA VENTURA: Okay.
10	MS. CHANG: Thank you. So those are the
11	ones who signed up. Is there anybody else who didn't
12	sign up who would like to make a comment for the record?
13	Don't be shy.
14	And we should also make a comment, there's
15	forms in the back. You can fill those out. You can
16	send those in. You can take them home with you and you
17	can also fill them out.
18	Anybody else want to make a formal comment
19	tonight? Anybody?
20	Okay. I think at this point in time the next
21	steps are May 23rd is at this point the deadline for
22	comments. So even though you made a comment tonight,
23	Carl, Maka'ala, you are free to submit additional
24	comments for the record.
25	So I would urge you, there are many of you who

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have been participating in this for years, please get 1 your comments in. I think you can put them in email, 2 you can -- can you fax them? I think if you take one of 3 the back forms, there's different ways to comment. 4 5 I really want to thank you all. I appreciate that you spent your evening here to provide us your 6 7 comments. Take home -- there's some snacks in the back. 8 Thank you so very much for your participation. Ι 9 appreciate it. Thank you. (Exhibit No. 1 was marked.) 10 (Concluded at approximately 7:52 p.m., May 11 17, 2016.) 12 \* \* \* \* \* 13 14 15 16 17 18 19 20 21 22 23 24 25

STATE OF HAWAII ) 1 SS. ) COUNTY OF KAUAI ) 2 I, TERRI R. HANSON, RPR, CSR 482, do hereby 3 certify: 4 That on Tuesday, May 17, 2016, at 7:34 p.m.; that 5 the foregoing Public Meeting, Re:Draft Environmental Assessment for Wainiha Bridges, was held; 6 7 That the foregoing proceedings were taken down by me in machine shorthand and were thereafter reduced to typewritten form under my supervision; that the 8 foregoing 17-page transcript represents to the best of my ability, a true and correct transcript of the 9 proceedings had in the foregoing matter. 10 I certify that I am not an attorney for any of the parties hereto, nor in any way concerned with the 11 cause. 12 DATED this 27th day of May, 2016, in Lihue, Hawaii. 13 14 15 TERRI R. HANSON, CSR 482 Registered Professional Reporter 16 17 18 19 20 21 22 23 24 25

DAVID Y. IGE GOVERNOR OF HAWAII



VIRGINIA PRESSLER, M.D. DIRECTOR OF HEALTH

STATE OF HAWAII DEPARTMENT OF HEALTH P. O. BOX 3378 HONOLULU, HI 96801-3378

In reply, please refer to: File:

EPO 16-147

April 28, 2016

Mr. Michael Will Central Federal Lands Highway Division Federal Highway Administration 12300 West Dakota Avenue, Suite 380A Lakewood, Colorado 80228-2583 Email: Michael.Will@dot.gov

Dear Mr. Will:

SUBJECT: Draft Environmental Assessment (DEA) for Wainiha Temporary Bridges Replacement, Halelea District, Kauai TMK: Various TMKS in Zone 5, Sections 5, 6, 7 and 8; Kuhio Highway and Ala Eke Road Rights-of-Way

The Department of Health (DOH), Environmental Planning Office (EPO), acknowledges receipt of your DEA to our office via the OEQC link:

http://oeqc.doh.hawaii.gov/Shared%20Documents/EA\_and\_EIS\_Online\_Library/Kauai/2010s/2016-04-23-KA-5B-DEA-Wainiha-Bridge-Replacement.pdf

EPO strongly recommends that you review the standard comments and available strategies to support sustainable and healthy design provided at: <u>http://health.hawaii.gov/epo/landuse</u>. Projects are required to adhere to all applicable standard comments. EPO has recently updated the environmental Geographic Information System (GIS) website page. It now compiles various maps and viewers from our environmental health programs. The eGIS website page will be continually updated so please visit it regularly at: <u>http://health.hawaii.gov/epo/egis</u>.

EPO also encourages you to examine and utilize the Hawaii Environmental Health Portal at: <u>https://eha-cloud.doh.hawaii.gov</u>. This site provides links to our e-Permitting Portal, Environmental Health Warehouse, Groundwater Contamination Viewer, Hawaii Emergency Response Exchange, Hawaii State and Local Emission Inventory System, Water Pollution Control Viewer, Water Quality Data, Warnings, Advisories and Postings.

We suggest you review the requirements for the National Pollutant Discharge Elimination System (NPDES) permit. We recommend contacting the Clean Water Branch at (808) 586-4309 or <u>cleanwaterbranch@doh.hawaii.gov</u> after relevant information is reviewed at:

- 1. <u>http://health.hawaii.gov/cwb</u>
- 2. <u>http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/standard-npdes-permit-conditions</u>
- 3. <u>http://health.hawaii.gov/cwb/site-map/clean-water-branch-home-page/forms</u>

If noise created during the construction phase of the project may exceed the maximum allowable levels as set forth in Hawaii Administrative Rules, Chapter 11-46, "Community Noise Control". A noise permit may be required and should be obtained before the commencement of work. Please call the Indoor and Radiological Health Branch at (808) 586-4700 and review relevant information online at: <u>http://health.hawaii.gov/irhb/noise</u>.

Mr. Michael Will Page 2 April 28, 2016

You may also wish to review the draft Office of Environmental Quality Control (OEQC) viewer at: <u>http://eha-web.doh.hawaii.gov/oeqc-viewer</u>. This viewer geographically shows where some previous Hawaii Environmental Policy Act (HEPA) {Hawaii Revised Statutes, Chapter 343} documents have been prepared.

In order to better protect public health and the environment, the U.S. Environmental Protection Agency (EPA) has developed a new environmental justice (EJ) mapping and screening tool called EJSCREEN. It is based on nationally consistent data and combines environmental and demographic indicators in maps and reports. EPO encourages you to explore, launch and utilize this powerful tool in planning your project. The EPA EJSCREEN tool is available at: http://www.epa.gov/ejscreen.

We request that you utilize all of this information on your proposed project to increase sustainable, innovative, inspirational, transparent and healthy design. Thank you for the opportunity to comment.

Mahalo nui loa,

Laura Leialoha Phillips McIntýre, AICP Program Manager, Environmental Planning Office

LM:nn

Attachment 1: EPO Draft Environmental Health Management Map - Kauai

Attachment 2: Clean Water Branch: Water Quality Standards Map - Kauai

Attachment 3: Wastewater Branch: Recycled Water Use Map of Project Area

Attachment 4: OEQC Viewer Map of Project Area

Attachment 5: U.S. EPA EJSCREEN Report for Project Area

c: Christine Yamasaki, DOT, Highways Division and Federal Highway {via email: Christine.Yamasaki@hawaii.gov} DOH: DHO Kauai, CWB and IRHB {via email only}



MAP INTENDED FOR ILLUTTRATIVE NURPOSES ONLY. STE LOCATIONS ARE APPROXIMATE.









#### 1 mile Ring Centered at 22.215094,-159.533453 HAWAII, EPA Region 9 Approximate Population: 139



Selected Variables	Percentile in State	Percentile in EPA Region	Percentile in USA		
EJ Indexes					
EJ Index for Particulate Matter (PM 2.5)	N/A	N/A	N/A		
EJ Index for Ozone	N/A	N/A	N/A		
EJ Index for NATA Diesel PM*	N/A	N/A	N/A		
EJ Index for NATA Air Toxics Cancer Risk*	N/A	N/A	N/A		
EJ Index for NATA Respiratory Hazard Index*	N/A	N/A.	N/A		
EJ Index for NATA Neurological Hazard Index*	N/A	N/A	N/A		
EJ Index for Traffic Proximity and Volume	8	35	59		
EJ Index for Lead Paint Indicator	21	43	63		
EJ Index for NPL Proximity	8	35	59		
EJ Index for RMP Proximity	8	35	59		
EJ Index for TSDF Proximity	8	35	59		
EJ Index for Water Discharger Proximity	8	35	59		



This report shows environmental, demographic, and EJ indicator values. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

EJ Index for the Selected Area Compared to All People's Block Groups in the State/Region/US



+ Digitized Point

1:18,056 1:18,056 0:00 03 05 05 14m 0 025 05 14m 0 025 05 14m 0 025 05 05 000 14m

Selected Variables	Raw data	State Average	%ile in State	EPA Region Average	%ile in EPA Region	U SA Average	%ile in USA
Environmental Indicators			and set to the	and the second			
Particulate Matter (PM 2.5 in µg/m²)	N/A	N/A	N/A	9.95	N/A	9.78	N/A
Ozone (ppb)	N/A	N/A	N/A	49.7	N/A	46.1	N/A
NATA Diesel PM (µg/m²)*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Air Toxics Cancer Risk (risk per MM)*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Respiratory Hazard Index*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NATA Neurological Hazard Index*	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Traffic Proximity and Volume (daily traffic count/distance to road)	1.7	280	1	190	2	110	4
Lead Paint Indicator (% pre-1960s housing)	0.029	0.17	26	0.25	28	0.3	19
NPL Proximity (site count/km distance)	0.0053	0.092	17	0.11	5	0.096	1
RMP Proximity (facility count/km distance)	0.029	0.18	7	0.41	3	0.31	4
TSDF Proximity (facility count/km distance)	0.0052	0.092	14	0.12	1	0.054	10
Water Discharger Proximity (count/km)	0.033	0.33	8	0.19	6	0.25	5
Demographic Indicators							
Demographic Index	35%	51%	8	48%	36	35%	59
Minority Population	22%	77%	0	57%	13	36%	44
Low Income Population	49%	25%	88	35%	72	34%	78
Linguistically Isolated Population	0%	6%	25	9%	20	5%	45
Population with Less Than High School Education	1%	10%	4	18%	4	14%	4
Population under Age 5	5%	6%	43	7%	39	7%	43
Population over Age 64	6%	14%	13	12%	28	13%	18

"The National-Scale Air Toxics Assessment (NATA) environmental indicators and EJ indexes, which include cancer risk, respiratory hazard, neurodevelopment hazard, and diesel particulate matter will be added into EJSCREEN during the first full public update after the scon-to-be-released 2011 dataset is made available. The National-Scale Air Toxics Assessment (NATA) is EPA's origoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-loxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN is a screening tool for pre-decisional use only. It can help identity areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decisionmaking, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substaritial uncertainty in their demographic and environmental data, particularly when locking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJSCREEN outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.



**Central Federal Lands Highway Division** 

December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

TO: LAURA LEIALOHA PHILLIPS McINTYRE, AICP PROGRAM MANAGER, ENVIRONMENTAL PLANNING OFFICE DEPARTMENT OF HEALTH P.O. BOX 3378 HONOLULU, HI 96801

FROM: J. MICHAEL WILL, P.E. PROJECT MANAGER

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) WAINIHA TEMPORYARY BRIDGES REPLACEMENT, PROJECT NO. STP SR560 (1) KUHIO HIGHWAY, HALELEA DISTRICT, KAUAI ISLAND TMK: VARIOUS TMKS IN ZONE 5, SECTION 5, 6, 7 AND 8; KUHIO HIGHWAY AND ALA EKE ROAD RIGHTS OF WAY

Dear Ms. McIntyre:

Thank you for sending comments on the Draft EA by letter dated May 28, 2016.

We acknowledge and have reviewed the information provided on the Environmental Health Management Maps, NPDES requirements, the Hawaii Environmental Health Portal, OEQC viewer, and EPA EISCREEN tool. These resources are helpful and we are using them in project planning and permitting.

We appreciate your participation in the environmental review process. If you have any questions, please contact me at (720) 963-3647, or by email at <u>Michael.will@dot.gov</u>.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Cc:

Christine Yamasaki, HDOT Thomas Parker, CFLHD Kathleen Chu, CH2M HILL DAVID Y. IGE GOVERNOR OF HAWAI



VIRGINIA PRESSLER, M.D. DIRECTOR OF HEALTH

STATE OF HAWAII DEPARTMENT OF HEALTH P. O. BOX 3378 HONOLULU, HI 96801-3378

In reply, please refer to: EMD/CWB

05004PNN.16

May 2, 2016

Mr. J. Michael Will, P.E. Project Manager Central Federal Lands Highway Division Federal Highway Administration 12300 West Dakota Avenue, Suite 380A Lakewood, Colorado 80228-2583

Dear Mr. Will:

# SUBJECT: Comments on the Draft Environmental Assessment for the Project to Replace Temporary Wainiha Bridges, Project No. HI STP SR560(1) Kuhio Highway, Halelea District, Island of Kauai, Hawaii

The Department of Health (DOH), Clean Water Branch (CWB), acknowledges receipt of your transmittal, dated April 20, 2016, requesting comments on the subject project. The DOH-CWB has reviewed the subject document and offers these comments. Please note that our review is based solely on the information provided in the subject document and its compliance with the Hawaii Administrative Rules (HAR), Chapters 11-54 and 11-55. You may be responsible for fulfilling additional requirements related to our program. We recommend that you also read our standard comments on our website at: <u>http://health.hawaii.gov/epo/files/2013/05/Clean-Water-Branch-Std-Comments.pdf</u>.

- 1. Any project and its potential impacts to State waters must meet the following criteria:
  - a. Antidegradation policy (HAR, Section 11-54-1.1), which requires that the existing uses and the level of water quality necessary to protect the existing uses of the receiving State water be maintained and protected.
  - b. Designated uses (HAR, Section 11-54-3), as determined by the classification of the receiving State waters.
  - c. Water quality criteria (HAR, Sections 11-54-4 through 11-54-8).
- 2. You may be required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for discharges of wastewater, including storm water runoff, into State surface waters (HAR, Chapter 11-55).

Mr. J. Michael Will, P.E. May 2, 2016 Page 2

> For NPDES general permit coverage, a Notice of Intent (NOI) form must be submitted at least 30 calendar days before the commencement of the discharge. An application for an NPDES individual permit must be submitted at least 180 calendar days before the commencement of the discharge. To request NPDES permit coverage, you must submit the applicable form ("CWB Individual NPDES Form" or "CWB NOI Form") through the e-Permitting Portal and the hard copy certification statement with the respective filing fee (\$1,000 for an individual NPDES permit or \$500 for a Notice of General Permit Coverage). Please open the e-Permitting Portal website located at: <u>https://eha-cloud.doh.hawaii.gov/epermit/</u>. You will be asked to do a one-time registration to obtain your login and password. After you register, click on the Application Finder tool and locate the appropriate form. Follow the instructions to complete and submit the form.

3. If your project involves work in, over, or under waters of the United States, it is highly recommended that you contact the Army Corp of Engineers, Regulatory Branch (Tel: 835-4303) regarding their permitting requirements.

Pursuant to Federal Water Pollution Control Act [commonly known as the "Clean Water Act" (CWA)], Paragraph 401(a)(1), a Section 401 Water Quality Certification (WQC) is required for "[a]ny applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may <u>result</u> in any discharge into the navigable waters..." (emphasis added). The term "discharge" is defined in CWA, Subsections 502(16), 502(12), and 502(6); Title 40 of the Code of Federal Regulations, Section 122.2; and HAR, Chapter 11-54.

- 4. Please note that all discharges related to the project construction or operation activities, whether or not NPDES permit coverage and/or Section 401 WQC are required, must comply with the State's Water Quality Standards. Noncompliance with water quality requirements contained in HAR, Chapter 11-54, and/or permitting requirements, specified in HAR, Chapter 11-55, may be subject to penalties of \$25,000 per day per violation.
- 5. It is the State's position that all projects must reduce, reuse, and recycle to protect, restore, and sustain water quality and beneficial uses of State waters. Project planning should:
  - a. Treat storm water as a resource to be protected by integrating it into project planning and permitting. Storm water has long been recognized as a source of irrigation that will not deplete potable water resources. What is often overlooked is that storm water recharges ground water supplies and feeds streams and estuaries; to ensure that these water cycles are not disrupted, storm water cannot be relegated as a waste product of impervious surfaces. Any project

Mr. J. Michael Will, P.E. May 2, 2016 Page 3

> planning must recognize storm water as an asset that sustains and protects natural ecosystems and traditional beneficial uses of State waters, like community beautification, beach going, swimming, and fishing. The approaches necessary to do so, including low impact development methods or ecological bio-engineering of drainage ways must be identified in the planning stages to allow designers opportunity to include those approaches up front, prior to seeking zoning, construction, or building permits.

- b. Clearly articulate the State's position on water quality and the beneficial uses of State waters. The plan should include statements regarding the implementation of methods to conserve natural resources (e.g., minimizing potable water for irrigation, gray water re-use options, energy conservation through smart design) and improve water quality.
- c. Consider storm water Best Management Practice (BMP) approaches that minimize the use of potable water for irrigation through storm water storage and reuse, percolate storm water to recharge groundwater to revitalize natural hydrology, and treat storm water which is to be discharged.
- d. Consider the use of green building practices, such as pervious pavement and landscaping with native vegetation, to improve water quality by reducing excessive runoff and the need for excessive fertilization, respectively.
- e. Identify opportunities for retrofitting or bio-engineering existing storm water infrastructure to restore ecological function while maintaining, or even enhancing, hydraulic capacity. Particular consideration should be given to areas prone to flooding, or where the infrastructure is aged and will need to be rehabilitated.

If you have any questions, please visit our website at: <u>http://health.hawaii.gov/cwb</u>, or contact the Engineering Section, CWB, at (808) 586-4309.

Sincerely,

ALEC WONG, P.E., CHIEF Clean Water Branch

NN:ak

c: DOH-EPO [via e-mail <u>Noella.Narimatsu@doh.hawaii.gov</u> only]



### **Central Federal Lands Highway Division**

December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

TO: ALEC WONG, P.E. CHIEF, CLEAN WATER BRANCH DEPARTMENT OF HEALTH P.O. BOX 3378 HONOLULU, HI 96801

FROM: J. MICHAEL WILL, P.E. PROJECT MANAGER

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) WAINIHA TEMPORYARY BRIDGES REPLACEMENT, PROJECT NO. STP SR560 (1) KUHIO HIGHWAY, HALELEA DISTRICT, KAUAI ISLAND TMK: VARIOUS TMKS IN ZONE 5, SECTION 5, 6, 7 AND 8; KUHIO HIGHWAY AND ALA EKE ROAD RIGHTS OF WAY

Dear Mr. Wong:

Thank you for sending comments on the Draft EA by letter dated May 2, 2016.

We note that you have no comments on the environmental assessment at this time. Our project team will continue to work with your staff as we submit a request for Section 401 Water Quality Certification and National Pollutant Discharge Elimination System Construction General Permit coverage.

We appreciate your participation in the environmental review process. If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Cc: Christine Yamasaki, HDOT Thomas Parker, CFLHD Kathleen Chu, CH2M HILL DAVID Y. IGE GOVERNOR STATE OF HAWAII

SHAN S. TSUTSUL LT. GOVERNOR STATE OF HAWAII



JOBIE M. K. MASAGATANI CHAIRMAN HAWAIIAN HOMES COMMISSION

WILLIAM J. AILA, JR. DEPUTY TO THE CHAIRMAN

## STATE OF HAWAII DEPARTMENT OF HAWAIIAN HOME LANDS

P. O. BOX 1879 HONOLULU, HAWAII 96805

May 11, 2016

U.S. Department of Transportation Central Federal Lands Highway Division 12300 West Dakota Avenue, Suite 380A Lakewood, CO 80228-2583

> Subject: Draft Environmental Assessment Project to Replace Temporary Wainiha Bridges Project No. HI STP SR560(1) Location: Kuhio Highway, Halelea District, Kauai Island

Aloha J. Michael Will:

The Department of Hawaiian Home Lands acknowledges receipt of your proposed project. Upon review of the materials submitted, and due to its lack of proximity to Hawaiian Home Lands, we do not anticipate any impacts to our lands or beneficiaries for the Draft Environmental Assessment Project to Replace Temporary Wainiha Bridges

However, we highly encourage all agencies to consult with Hawaiian homestead community associations and other (N) native Hawaiian organizations when preparing environmental assessments in order to better assess potential impacts to cultural and natural resources, access, and other traditional and customary practices of Native Hawaiians.

Mahalo for the opportunity to provide comments. If you have any questions, please call the Planning Office at 620-9517 or contact us via email at <u>dhhl.planning@hawaii.gov</u>.

Mahalo,

Marvin Kaleo Manuel Acting Planning Program Manager



**Central Federal Lands Highway Division** 

December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

TO: MARVIN KALEO MANUEL, PLANNING PROGRAM MANAGER, PLANNING OFFICE DEPARTMENT OF HAWAIIAN HOME LANDS P.O. BOX 1879 HONOLULU, HI 96805

FROM: J. MICHAEL WILL, P.E. PROJECT MANAGER

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) WAINIHA TEMPORYARY BRIDGES REPLACEMENT, PROJECT NO. STP SR560 (1) KUHIO HIGHWAY, HALELEA DISTRICT, KAUAI ISLAND TMK: VARIOUS TMKS IN ZONE 5, SECTION 5, 6, 7 AND 8; KUHIO HIGHWAY AND ALA EKE ROAD RIGHTS OF WAY

Dear Mr. Manuel:

Thank you for sending comments on the Draft EA by letter dated May 11, 2016.

We acknowledge and have reviewed the information provided on consulting with Hawaiian homestead community associations and other native Hawaiian organizations. We will continue to ensure a broad outreach to interested parties during project development.

We appreciate your participation in the environmental review process. If you have any questions, please contact me at (720) 963-3647, or by email at <u>Michael.will@dot.gov</u>.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Cc: Christine Yamasaki, HDOT Thomas Parker, CFLHD Kathleen Chu, CH2M HILL DAVID Y. IGE GOVERNOR



DOUGLAS MURDOCK COMPTROLLER

AUDREY HIDANO Deputy Comptroller

# STATE OF HAWAII DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES P.O. BOX 119, HONOLULU, HAWAII 96810-0119

(P)1120.6

MAY 5 2016

Mr. J. Michael Will Central Federal Highways Land Division Federal Highway Administration 12300 West Dakota Avenue, Suite 380A Lakewood, CO 80228-2583

Dear Mr. Will:

Subject: Draft Environmental Assessment, Project to Replace Temporary Wainiha Bridges Project No. HI STP SR560(1), Kuhio Highway Halele'a District, Kauai Island TMK: [4]5 (portion), 7 (portion) and 8 (portion)

Thank you for the opportunity to provide comments for the subject project. The project does not impact any Department of Accounting and General Services' projects or existing facilities on Kauai and we have no comments to offer at this time.

If you have any questions, your staff may call Mr. Myles Nakamura of the Public Works Division at 586-0491.

Sincerely,

Jul ... / hato

FOP DOUGLAS MURDOCK Comptroller

c: Mr. Eric Agena, DAGS Kauai District Office



#### **Central Federal Lands Highway Division**

December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

TO: DOUGLAS MURDOCK COMPTROLLER DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES P.O. Box 119 HONOLULU, HI 96810

FROM: J. MICHAEL WILL, P.E. PROJECT MANAGER

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) WAINIHA TEMPORYARY BRIDGES REPLACEMENT, PROJECT NO. STP SR560 (1) KUHIO HIGHWAY, HALELEA DISTRICT, KAUAI ISLAND TMK: VARIOUS TMKS IN ZONE 5, SECTION 5, 6, 7 AND 8; KUHIO HIGHWAY AND ALA EKE ROAD RIGHTS OF WAY

Dear Mr. Murdock:

Thank you for your letter on the Draft EA dated June 9, 2016.

We note that you have no comments for the Draft EA at this time and that the project as proposed does not impact any Department of Accounting and General Services projects or existing facilities.

We appreciate your participation in the environmental review process. If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Cc: Christine Yamasaki, HDOT Thomas Parker, CFLHD Kathleen Chu, CH2M HILL



# OFFICE OF PLANNING STATE OF HAWAII

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813 Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804 DAVID Y. IGE GOVERNOR

LEO R. ASUNCION DIRECTOR OFFICE OF PLANNING

Telephone: (808) 587-2846 Fax: (808) 587-2824 Web: http://planning.hawaii.gov/

Ref. No. P-15159

May 18, 2016

Mr. J. Michael Will, P.E. Project Manager Central Federal Lands Highways Division Federal Highways Administration 12300 West Dakota Avenue, Suite 380A Lakewood, Colorado 80228-2583

Dear Mr. Will:

Subject: Draft Environmental Assessment - Project to Replace Temporary Wainiha Bridges, Kuhio Highway, Project No. HI STP SR560(1), Halelea District, Kauai Island, Hawaii;

Tax Map Key: (4) 5-8-002:002 (por); (4) 5-8-006:030, 031, 032, 033, 046, 060, and 999 (por); (4) 5-8-006:009, 011, 017, 018, 019, 030, 999 (por); (4) 5-8-007:023, 024, 031, 032, 999 (por); (4) 5-5-005:005, 007, 021, 028, 999 por.; (4) 5-5-006:014, 888 (por); (4) 5-6-002:002, 004, 999 (por); (4) 5-6-004:014, 022, 023, 999 (por); (4) 5-6-003:002, 999 (por); and (4) 5-7-003:003, 999 (por)

Thank you for the opportunity to provide comments on the Draft Environmental Assessment (Draft EA) for the Wainiha temporary bridges replacement project. The notification memo was transmitted to our office in letter format dated April 20, 2016.

It is our understanding that the Federal Highways Administration, Central Federal Lands Highway Division, in partnership with the Hawaii Department of Transportation (HDOT) proposes the replacement of three temporary "ACROW Panel" modular steel bridges along Kuhio Highway near the mouth of the Wainiha Stream, Kauai. The existing Wainiha temporary ACROW structures will be replaced with new one-lane bridges that closely match the existing bridge alignment and elevation. The new bridges would be more visually consistent with the surrounding roadway corridor.

The project also involves the placement of temporary structures adjacent to and over Waioli, Waipa, and Waikoko Streams to accommodate construction. All temporary structures will be removed upon completion of the project, and the sites restored. Scour protection, approach road re-paving, utility relocations, and temporary staging areas are also included in the project. Mr. J. Michael Will, P.E. Project Manager Central Federal Lands Highways Division Federal Highways Administration May 18, 2016 Page 2

The Office of Planning (OP) has reviewed the transmitted material and has the following comments to offer:

- 1. Section 1.6, page 1-8 of the Draft EA lists the need for a Special Management Area permit and a shoreline setback determination. OP acknowledges the need for these approvals. The Federal Highways Administration and HDOT should contact the County of Kauai, Department of Planning on the procedures for obtaining these approvals.
- Section 3.3.1.4, pages 3-8 and 3-9 of the Draft EA acknowledges that the project must adhere to the National Pollutant Discharge Elimination System program, HRS Chapter 342D (Water Pollution), Chapter 342E (Non-point source pollution management and control), as well as a Municipal Separate Storm Sewer Systems approval.

Furthermore this project must obtain a U.S. Department of the Army, Clean Water Act Section 404 permit, as well as a Water Quality Certification permit, Section 401.

- 3. Section 3.3.3.1 (Action Alternatives, Surface Waters), pages 3-23 to 3-26 and Section 3.3.4 (Avoidance, Minimization, and Minimization Measures), pages 3-27 to 3-32 of the Draft EA discuss water quality, storm water impacts, and best management practices that will be employed during construction and upon bridge completion to prevent pollution impact (e.g., sediment loss, erosion, and roadway chemicals) for all of the streams and nearshore areas along the bridges involved in this project (Wainiha Bridges 1, 2, and 3; and Waikoko, Waioli, and Waipa Bridges).
- 4. Section 3.4, pages 3-32 to 3-34 of the Draft EA lists the regulatory setting of the Hawaii Coastal Zone Management (CZM) program, and Section 3.4.3.2, pages 3-36 to 3-38 adequately examines the project's adherence to the objectives and policies listed in Hawaii Revised Statutes (HRS) § 205A-2.
- 5. Section 3.4, page 3-33 acknowledges that the project is within the CZM area of the State of Hawaii and lists the need for a Federal Consistency Certification. This is a project conducted by the Federal Highways Administration, thus a Federal Consistency review is necessary. OP is the State agency which performs Federal Consistency evaluations. Please contact our office on the process for obtaining this certification.
- 6. Section 4.2.1, pages 4-5 and 4-6 of the Draft EA addresses the project's consistency with the objectives and policies of the Hawaii State Plan as listed in HRS Chapter 226. As

Mr. J. Michael Will, P.E. Project Manager Central Federal Lands Highways Division Federal Highways Administration May 18, 2016 Page 3

stated in the Draft EA, the objectives and policies applicable to this project include:

- HRS § 226-14 facility systems in general; and
- HRS § 226-17 facility systems transportation.

The analysis on the Hawaii State Plan should include a discussion on the project's ability to meet all of the objectives, policies, and priority guidelines or clarifies where it is in conflict with them. If any of the themes listed in HRS Chapter 226 are not applicable to this project, then the Final Environmental Assessment should list them as "not applicable." Itemizing these themes in tabular form is often the most efficient way to address this matter.

7. Section 4.2.2, page 4-6 addresses the project's consistency with the State Transportation Functional Plan, Objective I.A, policies I.A.1 and I.A.2.

We have no further comments at this time. If you have any questions regarding this comment letter, please contact Joshua Hekekia of our office at (808) 587-2845.

Sincerely,

Leo R. Asuncion Director



of Transportation Federal Highway Administration **Central Federal Lands Highway Division** 

December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

TO: LEO R. ASUNCION, DIRECTOR OFFICE OF PLANNING P.O. BOX 2359 HONOLULU, HI 96804

FROM: J. MICHAEL WILL, P.E. PROJECT MANAGER

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) WAINIHA TEMPORYARY BRIDGES REPLACEMENT, PROJECT NO. STP SR560 (1) KUHIO HIGHWAY, HALELEA DISTRICT, KAUAI ISLAND TMK: VARIOUS TMKS IN ZONE 5, SECTION 5, 6, 7 AND 8; KUHIO HIGHWAY AND ALA EKE ROAD RIGHTS OF WAY

Dear Mr. Asuncion:

Thank you for sending comments on the Draft EA by letter dated June 20, 2016.

As the project moves forward, we will coordinate with your office on consistency with the objectives and policies of the Hawaii Coastal Zone Management Act, as listed in Hawaii Revised Statutes §205A-2. We will contact and continue coordination with the Department of Planning for the procedures for obtaining all necessary permits and approvals. Our project team will also continue to work with the United States Army Corps of Engineers and the Department of Health, Clean Water Branch as we submit a request for Section 404 Clean Water Act Permit Coverage, Section 401 Water Quality Certification and National Pollutant Discharge Elimination System Construction General Permit coverage for the subject project.

A table addressing the project's conformance with the Hawaii State Plan is attached, and is also included in Section 4.2.1 of the Final EA.

We appreciate your participation in the environmental review process. If you have any questions, please contact me at (720) 963-3647, or by email at <u>Michael.will@dot.gov</u>.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Cc: Christine Yamasaki, HDOT Thomas Parker, CFLHD Kathleen Chu, CH2M HILL Updated Hawaii State Plan Discussion for Wainiha Bridges EA.

Objective	Compliance with Specific Objectives and Policies				
Population	This theme is not applicable to the project.				
Economyin general	The project would be in compliance with this theme, particularly the following objectives and policies:				
	(a)(1) Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawaii's people, while at the same time stimulating the development and expansion of economic activities capitalizing on defense, dual-use, and science and technology assets, particularly on the neighbor islands where employment opportunities may be limited.				
	As described in Section 3, the proposed project is anticipated to provide economic benefits by supporting a number of construction workers for the duration of the project (approximately 24 months for all bridges).				
Economyagriculture	This theme is not applicable to the project.				
Economy—visitor industry	This theme is not applicable to the project.				
Economy—federal expenditures	The project would be in compliance with this theme, particularly the following objectives and policies:				
	(b)(3) Promote the development of federally supported activities in Hawaii that respect statewide economic concerns, are sensitive to community needs, and minimize adverse impacts on Hawaii's environment.				
	(b)(6) Strengthen federal-state-county communication and coordination in all federal activities that affect Hawaii.				
	This project involves the use of federal funds as needed to replace the Wainiha bridges such that they remain safe and functional components of the regional transportation system for highway users. It is being implemented through a partnership between HDOT and FHWA-CFLHD.				
Economypotential growth and innovative activities	This theme is not applicable to the project.				
Economyinformation industry	This theme is not applicable to the project.				
Physical environment land-based, shoreline,	The project would be in compliance with this theme, particularly				
and marine resources	the following objectives and policies:				
---	---				
	(b)(3) Take into account the physical attributes of areas when planning and designing activities and facilities.				
	(b)(6) Encourage the protection of rare or endangered plant and animal species and habitats native to Hawaii.				
	The project would provide replacement bridges that substantially coincide with the footprint of the existing bridges, and is not expected to have a significant adverse effect on important natural resources. BMPs would be implemented to avoid and minimize contact with special-status species that could potentially occur in the project area.				
Physical environment scenic, natural beauty, and historic resources	The project would be in compliance with this theme, particularly the following objectives and policies:				
	(a)(1) Promote the preservation and restoration of significant natural and historic resources.				
	(a)(3) Promote the preservation of views and vistas to enhance the visual and aesthetic enjoyment of mountains, ocean, scenic landscapes, and other natural features.				
	(a)(4) Protect those special areas, structures, and elements that are an integral and functional part of Hawaii's ethnic and cultural heritage.				
	Although the proposed project would result in visual changes to the site as a result of replacing the existing bridges, the visual changes are considered minimal and would not affect the quality of views toward the bridge. The project would not result in a substantial change to the existing landscape or in a noticeable change to the project viewshed.				
	The existing bridges are replacement bridges for three previously eligible bridges for listing in the National and State Registers of Historic Places that were removed under emergency conditions. The project would not adversely affect bridges, but mitigation as agreed upon with SHPD would be implemented to minimize the potential impacts to historic properties.				
Physical environment land, air, and water quality	The project would be in compliance with this theme, particularly the following objectives and policies:				
	(a)(1) Maintenance and pursuit of improved quality in Hawaii's land, air, and water resources.				
	(b)(3) Promote effective measures to achieve desired quality in Hawaii's surface, ground, and coastal waters.				
	(b)(5) Reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters.				
	The project would result in short-term, construction-related impacts				

	(noise, dust, and erosion), but implementation of BMPs would minimize the effects to the environment.
Facility systemsin general	The project would be in compliance with this theme, particularly the following objectives and policies:
	(a) Planning for the State's facility systems in general shall be directed towards achievement of the objective of water, transportation, waste disposal, and energy and telecommunication systems that support statewide social, economic, and physical objectives.
	(b)(1) Accommodate the needs of Hawaii's people through coordination of facility systems and capital improvement priorities in consonance with state and county plans.
	HDOT's mission to provide a safe, efficient, and accessible transportation system for the public. HDOT recognizes the need for replacement of the existing temporary Wainiha bridges. The replacement bridges will be designed using current AASHTO guidelines that have been adopted by HDOT for planning and engineering for highway projects in Hawaii.
Facility systemssolid and liquid wastes	This theme is not applicable to the project.
Facility systemswater	This theme is not applicable to the project.
Facility systems transportation	The project would be in compliance with this theme, particularly the following objectives and policies:
	(a)(1) An integrated multi-modal transportation system that services statewide needs and promotes the efficient, economical, safe, and convenient movement of people and goods.
	(a)(2) A statewide transportation system that is consistent with and will accommodate planned growth objectives throughout the State.
	(b)(2) Coordinate state, county, federal, and private transportation activities and programs toward the achievement of statewide objectives.
	(b)(3) Encourage a reasonable distribution of financial responsibilities for transportation among participating governmental and private parties.
	(b)(6) Encourage transportation systems that serve to accommodate present and future development needs of communities.
	(b)(10) Encourage the design and the development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment.
	The project is a partnership between HDOT and FHWA-CFLHD, and would replace the Wainiha bridges and their approaches such

	that they remain safe and functional components of the regional transportation system for highway users. The replacement bridges will be designed using current AASHTO guidelines that have been adopted by HDOT for planning and engineering for highway projects in Hawaii.
Facility systemsenergy	This theme is not applicable to the project.
Facility systems telecommunications	This theme is not applicable to the project.
Socio-cultural advancement (housing, health, education, social services, leisure, individual rights and personal well-being, culture, public safety, and government)	These themes are not applicable to the project.

DAVID Y. IGE GOVERNOR OF HAWAII





SUZANNE D. CASE CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

#### STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES LAND DIVISION

POST OFFICE BOX 621 HONOLULU. HAWAII 96809

May 20, 2016

Central Federal Lands Highway Division Federal Highway Administration Attention: Mr. Michael Will 12300 West Dakota Avenue, Suite 380A Lakewood, CO 80228-2583

via email: Michael.Will@dot.gov

Dear Mr. Will:

SUBJECT: Draft Environmental Assessment to Replace Temporary Wainiha Bridges Project No. HI STP SR560 (1)

Thank you for the opportunity to review and comment on the subject matter. The Department of Land and Natural Resources' (DLNR) Land Division distributed or made available a copy of your report pertaining to the subject matter to DLNR Divisions for their review and comments.

At this time, enclosed are comments from the (a) Engineering Division, (b) Land Division – Kauai District, and (c) Office of Conservation & Coastal Lands on the subject matter. Should you have any questions, please feel free to call Lydia Morikawa at 587-0410. Thank you.

Sincerely,

Russell Y. Tsuji Land Administrator

Enclosure(s) cc: Central Files

DAVID Y. IGE GOVERNOR OF HAWAII





SUZANNE D. CASE CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

2016 MAY 19 AM

#### STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES LAND DIVISION

POST OFFICE BOX 621 HONOLULU, HAWAII 96809

April 27, 2016

#### **MEMORANDUM**

TØ:	DLNR Agencies:	2
/ 7K.	Div. of Aquatic Resources	11
	Div. of Boating & Ocean Recreation	R
	X Engineering Division	え
	Div. of Forestry & Wildlife	3
	Div. of State Parks	1
	X Commission on Water Resource Management	8
	X Office of Conservation & Coastal Lands	B
	X Land Division – Kauai District	ET.
0	X Historic Preservation	田
, TV:		N
FROM:	Russell Y. Tsuji, Land Administrator	
SUBJECT:	Draft Environmental Assessment to Replace Temporary Wainiha Bridges	
	Project No. HI STP SR560 (1)	
LOCATION:	Kuhio Highway, Halele'a District; Island of Kauai; TMK: (4) 5 (por.), 7 (por.),	
	and 8 (por.)	
APPLICANT:	Federal Highway Administration, Central Federal Lands Highway Division	

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by May 19, 2016.

The DEA can be found on-line at: http://health.hawaii.gov/oeqc/ (Click on the Current Environmental Notice under Quick Links on the right.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Lydia Morikawa at 587-0410. Thank you.

Attachments

We have no objections.

We have no comments.

Comments are attached.

Signed:

Carty S. Chang, Chief Engineer Print Name: Date:

**Central Files** cc:

#### DEPARTMENT OF LAND AND NATURAL RESOURCES ENGINEERING DIVISION

#### To: Land Division Ref: DEA Replace Temporary Wainiha Bridges, Kauai

#### **COMMENTS**

The rules and regulations of the National Flood Insurance Program (NFIP), Title 44 of the Code of Federal Regulations (44CFR), are in effect when development falls within a designated Flood Hazard.

The owner or the project property and/or their representative is responsible to research the Flood Hazard Zone designation for the project. Flood Hazard Zone designations can be found using the Flood Insurance Rate Map (FIRM), which can be accessed through the Flood Hazard Assessment Tool (FHAT) (http://gis.hawaiinfip.org/FHAT).

National Flood Insurance Program establishes the rules and regulations of the NFIP - Title 44 of the Code of Federal Regulations (44CFR). The NFIP Zone X is a designation where there is no perceived flood impact. Therefore, the NFIP does not regulate any development within a Zone X designation.

Be advised that 44CFR reflects the minimum standards as set forth by the NFIP. Local community flood ordinances may take precedence over the NFIP standards as local designations prove to be more restrictive. If there are questions regarding the local flood ordinances, please contact the applicable County NFIP Coordinators below:

- <u>Oahu</u>: City and County of Honolulu, Department of Planning and Permitting (808) 768-8098.
- o Hawaii Island: County of Hawaii, Department of Public Works (808) 961-8327.
- o Maui/Molokai/Lanai County of Maui, Department of Planning (808) 270-7253.
- o Kauai: County of Kauai, Department of Public Works (808) 241-4846.

Signed:

S. CHANG, CHIEF ENGINEER

Date:

DAVID Y. IGE GOVERNOR OF HAWAII





SUZANNE D. CASE CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES LAND DIVISION

> POST OFFICE BOX 621 HONOLULU HAWAII 96809

> > April 27, 2016

#### MEMORANDUM

XO: FROM

PM1:42:40

APR 28'16

DLNR KOLO ROVO

X Engineering Division

Div. of Forestry & Wildlife

Div. of Aquatic Resources

\_\_\_\_Div. of State Parks

**DLNR Agencies:** 

X Commission on Water Resource Management

X Office of Conservation & Coastal Lands

Div. of Boating & Ocean Recreation

X Land Division – Kauai District

X Historic Preservation

FROM:
FROM:
SUBJECT:
LOCATION:
APPLICANT:
Russell Y. Tsuji, Land Administrator
Draft Environmental Assessment to Replace Temporary Wainiha Bridges
Project No. HI STP SR560 (1)
Kuhio Highway, Halele'a District; Island of Kauai; TMK: (4) 5 (por.), 7 (por.), and 8 (por.)
Federal Highway Administration, Central Federal Lands Highway Division

Transmitted for your review and comment is information on the above-referenced project. We would appreciate your comments on this project. Please submit any comments by May 19, 2016.

The DEA can be found on-line at: <u>http://health.hawaii.gov/oeqc/</u> (Click on the Current Environmental Notice under Quick Links on the right.)

If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Lydia Morikawa at 587-0410. Thank you.

Attachments

( ) We have no objections.
( ×) We have no comments.
( ) Comments are attached.
Signed: Man. Man.

Print Name: Date:

cc: Central Files

Cne KA

SUZANNE D. CASH

DAVID Y. IGE GOVERNOR OF HAWAII

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2016 MAY 19 AM 11: 10

DEPT. OF LAND &

RECEIVED LAND DIVISION



CHAIRPERSON ECEIVED BOARD OF LAND AND NATURAL RESOURCES OFFICE OF CONSERVATEOMMISSION ON WATER RESOURCE AND COASTAL LANDS

## 2016 APR 27 P 12: 10

NATURAL RESOURCES STATE OF HAWAII STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES E SOURCES STATE OF MAWAII

> POST OFFICE BOX 621 HONOLULU, HAWAII 96809

## April 27, 2016

#### MEMORANDUM

TO:

**DLNR Agencies:** 

\_Div. of Aquatic Resources

Div. of Boating & Ocean Recreation

X Engineering Division

\_\_\_\_Div. of Forestry & Wildlife

Div. of State Parks

X Commission on Water Resource Management

X Office of Conservation & Coastal Lands

X Land Division - Kauai District

X Historic Preservation

FROM:	Russell Y. Tsuji, Land Administrator
SUBJECT:	Draft Environmental Assessment to Replace Temporary Wainiha Bridges
	Project No. HI STP SR560 (1)
LOCATION:	Kuhio Highway, Halele'a District; Island of Kauai; TMK; (4) 5 (por.), 7 (por.).
	and 8 (por.)
APPLICANT:	Federal Highway Administration, Central Federal Lands Highway Division

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If no response is received by this date, we will assume your agency has no comments. If you have any questions about this request, please contact Lydia Morikawa at 587-0410. Thank you.

Attachments

We have no objections. We have no comments. 1) Comments are attached.

Signed:

Print Name: Date:

**Central Files** cc:

-

DAVID Y. IGE GOVERNOR OF HAWAI'I





**STATE OF HAWAI'I** 

DEPARTMENT OF LAND AND NATURAL RESOURCES

OFFICE OF CONSERVATION AND COASTAL LANDS POST OFFICE BOX 621 HONOLULU, HAWAI'1 96809 SUZANNE D. CASE CHAIRFERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT

> KEKOA KALUHIWA FIRST DEPUTY

JEFFREY T. PEARSON P.E. DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES BOATING AND OCEAN RECERATION BUIDEAU OF CONVEYANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND RESOURCES ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HINTORIC PRESERVATION KAHOOLAWE ISLAND RESERVE COMMISSION LAND STATE PARKS

Correspondence: KA 16-215

REF:OCCL:TM

**MEMORANDUM** 

TO: Russ Tsuji, Administrator Land Division

Sam Lemmo, Administrator R. F. Aller FROM: Office of Conservation and Coastal Lands

SUBJECT: Draft Environmental Assessment to Replace Temporary Wainiha Bridges Project No. HI STP SR560 (1) Located at Halele'a, Kaua'i, Various TMKs: (4) 5-Sections 5, 6, 7, 8 (portions)

The Office of Conservation and Coastal Lands (OCCL) has reviewed the subject document and note bridges proposed to be replaced and the proposed staging areas appear to be located within the Conservation District. We have attached a portion of the island of Kaua'i Conservation District subzone map for information (Exhibit 1).

For land uses outside of the Right of Way, within the Conservation District, the filing of a Conservation District Use Application is required pursuant to the Hawai'i Administrative Rules (HAR), §13-5-22, P-6 PUBLIC PURPOSE USES (D-1) Not for profit land uses undertaken in support of a public service by an agency of the county, state, or federal government, or by an independent non-governmental entity, except that an independent non-governmental regulated public utility may be considered to be engaged in a public purpose use. To allow, modify or deny the proposed land use would be at the Board of Land and Natural Resources discretion.

The OCCL suggests under section **4.2.3 State Land Use Law** that the State Land Use Conservation District be include and discussed. Also a Conservation District Use Permit is a discretionary permit. At this time it is not certain if *"The proposed improvements are* [an] *allowable uses"* within the Conservation District, as stated in this section, until the Board of Land and Natural Resources makes that determination.

Should you have any questions regarding this memorandum, contact Tiger Mills of the OCCL at (808) 587-0382.

MAY 1 8 2016





December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

TO: CARTY S. CHANG CHIEF ENGINEER ENGINEERING DIVISION, DLNR P.O. BOX 621 HONOLULU, HI 96809

FROM: J. MICHAEL WILL, P.E. PROJECT MANAGER

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) WAINIHA TEMPORYARY BRIDGES REPLACEMENT, PROJECT NO. STP SR560 (1) KUHIO HIGHWAY, HALELEA DISTRICT, KAUAI ISLAND TMK: VARIOUS TMKS IN ZONE 5, SECTION 5, 6, 7 AND 8; KUHIO HIGHWAY AND ALA EKE ROAD RIGHTS OF WAY

Dear Mr. Chang:

Thank you for sending comments on the Draft EA by memorandum dated May 20, 2016.

As reported in Section 3.5.1.1 of the EA, the project area is located with the Federal Emergency Management Agency regulated floodway of the Special Flood Hazard Area (Zone AE) as shown in Flood Insurance Rate Map, Community Panel No. 150002035E, dated September 16, 2005. The project is being designed to meet applicable National Flood Insurance Program requirements. The new structures would not adversely affect flood conditions in Wainiha River.

We appreciate your participation in the environmental review process. If you have any questions, please contact me at (720) 963-3647, or by email at <u>Michael.will@dot.gov</u>.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Cc: Christine Yamasaki, HDOT Thomas Parker, CFLHD Kathleen Chu, CH2M HILL



December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

TO: MARVIN KALEO MANUEL, PLANNING PROGRAM MANAGER, PLANNING OFFICE DEPARTMENT OF HAWAIIAN HOME LANDS P.O. BOX 1879 HONOLULU, HI 96805

FROM: J. MICHAEL WILL, P.E. PROJECT MANAGER

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) WAINIHA TEMPORYARY BRIDGES REPLACEMENT, PROJECT NO. STP SR560 (1) KUHIO HIGHWAY, HALELEA DISTRICT, KAUAI ISLAND TMK: VARIOUS TMKS IN ZONE 5, SECTION 5, 6, 7 AND 8; KUHIO HIGHWAY AND ALA EKE ROAD RIGHTS OF WAY

Dear Mr. Manuel:

Thank you for sending comments on the Draft EA by letter dated May 11, 2016.

We acknowledge and have reviewed the information provided on consulting with Hawaiian homestead community associations and other native Hawaiian organizations. We will continue to ensure a broad outreach to interested parties during project development.

We appreciate your participation in the environmental review process. If you have any questions, please contact me at (720) 963-3647, or by email at <u>Michael.will@dot.gov</u>.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Cc: Christine Yamasaki, HDOT Thomas Parker, CFLHD Kathleen Chu, CH2M HILL



December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

TO: SAM LEMMO, ADMINISTRATOR OFFICE OF CONSERVATION AND COASTAL LANDS DEPARTMENT OF LAND AND NATURAL RESOURCES P.O. Box 621 HONOLULU, HI 96809

FROM: J. MICHAEL WILL, P.E. PROJECT MANAGER

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) WAINIHA TEMPORYARY BRIDGES REPLACEMENT, PROJECT NO. STP SR560 (1) KUHIO HIGHWAY, HALELEA DISTRICT, KAUAI ISLAND TMK: VARIOUS TMKS IN ZONE 5, SECTION 5, 6, 7 AND 8; KUHIO HIGHWAY AND ALA EKE ROAD RIGHTS OF WAY

Dear Mr. Lemmo:

Thank you for your letter on the Draft EA dated June 20, 2016.

We have identified that the project would impact conservation lands and as such requires a Conservation District Use Permit. We understand this is a discretionary permit and that we must document our proposed uses during the permitting process. We will contact and continue coordination with the Office of Conservation and Coastal Lands for the procedures for obtaining all necessary permits and approvals for this project.

We appreciate your participation in the environmental review process. If you have any questions, please contact me at (720) 963-3647, or by email at <u>Michael.will@dot.gov</u>.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Cc:

Christine Yamasaki, HDOT Thomas Parker, CFLHD Kathleen Chu, CH2M HILL



May 17, 2016 Mr. Michael Will Federal Highway Administration, Central Federal Lands Highway Division (FHWA-CFLHD

### Testimony: Re: Wainiha Bridges Rehabilitation Project

Wainiha bridge number 3 broke because a movie company abused a privileged permit for exceeding the weight limit. They were never held accountable and now the taxpayers are paying for it. Wainiha # 2 broke because an overloaded truck got away with the same illegal behavior. And we are all paying for it. As long as we are, we want the work done right.

The community and the Hanalei Roads Committee have been working to assure repairs return our bridges to their historic status. The community, not the government, designated the Route #560 corridor as historic on both the State and National register of Historic Places. We did that for situations just like this. We care.

To protect our place. To protect the pace and scale of our lives. To control growth and to preserve our neighborhoods and the cultures of our homeland. This is our community and these bridges moderate our lives. We care.

From day one, over a decade ago, 2004 to be exact, this community made it clear that rehabilitation of these bridges was the primary objective. The EA we are here tonight to comment on doesn't even have that fact in the title. This is not a project about the comparison of the acrow bridges to a draft design. This project is about the rehabilitation of our historic bridges to as close to what they were as possible. This EA is wrong. If the Title is wrong, the EA is wrong. Did you think we wouldn't notice? We did. We care.

Did you think you could slip a 40% increase in road width past us? Did you think we wouldn't notice the change in materials for the railings and the road bed? Did you think we would let it go just to get rid of the ugly and dangerous acrows? We will not. We are committed to our place and those precious things in it. We care.

Did you think we don't care about the impacts of stockpiling construction materials in a place that floods regularly? The waters of this place feed our families. We care.

We understand that Federal Highways folks were called in to resolve the issues related to the AECOM report. How is it this EA is worse? Three years later and we are no better off. Three years later and we have an EA that doesn't address the main issues, doesn't speak to community priorities and doesn't even have a correct title?

Hui Ho'omalu i ka 'Āina is a taro root organization founded in the early 1980's by traditional practitioners of moku Halele'a to address threats and impacts to the natural and cultural resources of Kaua'i. Founded by farmers and fishermen, weavers and hunters, we seek to provide context for issues related to the ecology of our ahupua'a. The organization is an active advocate for those native things and ways that are disappearing. We are not a nonprofit, we are an activist organization. We do not whine and wait, we act.

#### POB 1045, Hanalei, Hawaii 96714



Do you care? Show it, correct this EA from the front cover on. Reengage and recommit to the historic values of our places. It is your kuleana, it is your job.

We will work with you to repair, hah, to rehabilitate this EA. We are committed and we care.

We want our bridges back, we want them to be safe, we want them the right size, we want them the right color, we want them made of the right stuff and we don't want our place and river to be damaged in the process. We care.

Mahalo,

Maka'ala Ka'aumoana Vice Chair

Hui Ho'omalu i ka 'Āina is a taro root organization founded in the early 1980's by traditional practitioners of moku Halele'a to address threats and impacts to the natural and cultural resources of Kaua'i. Founded by farmers and fishermen, weavers and hunters, we seek to provide context for issues related to the ecology of our ahupua'a. The organization is an active advocate for those native things and ways that are disappearing. We are not a nonprofit, we are an activist organization. We do not whine and wait, we act.

POB 1045, Hanalei, Hawaii 96714



December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

TO: MAKA'ALA KA'AUMOANA VICE CHAIR HUI HO'OMALU I KA 'AINA P.O. BOX 1045 HANALEI , HI 96714

FROM: J. MICHAEL WILL, P.E. PROJECT MANAGER

SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) WAINIHA TEMPORYARY BRIDGES REPLACEMENT, PROJECT NO. STP SR560 (1) KUHIO HIGHWAY, HALELEA DISTRICT, KAUAI ISLAND TMK: VARIOUS TMKS IN ZONE 5, SECTION 5, 6, 7 AND 8; KUHIO HIGHWAY AND ALA EKE ROAD RIGHTS OF WAY

Dear Mrs. Ka'aumoana:

Thank you for sending comments on the Draft EA by letter dated May 17, 2016. Enclosed you will find a response summary to public comments including a design summary and additional supporting documentation for design criteria utilized on this project. This enclosure has also been uploaded to our project website located at: <u>https://flh.fhwa.dot.gov/projects/hi/hi-stp-sr-560-1-wainiha-stream-bri-12396/</u>

If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Cc: Christine Yamasaki, HDOT Thomas Parker, CFLHD

#### FYI

J. Michael Will, P.E.: Project Manager / Construction Operations Engineer Federal Highway Administration Central Federal Lands Highway Division: 12300 W. Dakota Avenue, Suite 380; Lakewood CO 80228 office: 720.963.3647 : cell: 303-956-5054 : fax: 720.963.3596 : email: michael.will@dot.gov : web: http://www.cflhd.gov

-----Original Message-----From: rbterao@aol.com [mailto:rbterao@aol.com] Sent: Monday, May 23, 2016 9:09 AM To: Will, Michael (FHWA) Subject: Wainiha Bridges

With the three bridges being considered replaced, how about making the new ones two lanes? According to the article in the Garden Island newspaper there is enough traffic on a daily average to upgrade them. Not only will it make it safer to cross but it will speed up the traffic flow crossing the bridges. Bob Terao - Kapaa

Sent from my iPad

From:	Parker, Thomas W (FHWA)
To:	<u>"rbterao@aol.com"</u>
Subject:	Wainiha Bridges EA Comment 5-23-2016 Response
Date:	Tuesday, December 13, 2016 1:39:00 PM
Attachments:	2016-5-23 DEA Bob Terao Comments.pdf
	2016-12-9 Wainiha Petition Comments Response FINAL.pdf

Good morning Mr. Terao:

Thank you for sending comments on the Draft EA by email dated May 23, 2016. Enclosed you will find a response summary to public comments including a design summary and additional supporting documentation for design criteria utilized on this project. This enclosure has also been uploaded to our project website located at: <u>https://flh.fhwa.dot.gov/projects/hi/hi-stp-sr-560-1-wainiha-stream-bri-12396/</u> (should be posted by end of this week)

If you have any questions, please contact myself or the project manager, Mike Will at (720) 963-3647, or by email at <u>Michael.will@dot.gov</u>

Regards, Thomas W. Parker Environmental Protection Specialist Federal Highway Administration Central Federal Lands Highway Division 12300 W. Dakota Ave., Suite 280 Lakewood, CO 80228 Work: (720) 963-3688 Mobile: (970) 509-0858

please consider the environment before printing this email

May 23, 2016

Mr. Michael Will FHWA-CFLHD 123 W. Dakota Avenue, Suite 380 Lakewood, CO 80228

Re: HFPM-16: Comments on Draft Environmental Assessment for Rehabilitation of Wainiha Stream Bridges #1, #2, #3

These comments supplement the oral comments that I provided at the May 17, 2016 public hearing on the Draft EA (DEA) for the Wainiha Bridges Rehabilitation project.

- 1. The Draft EA micharacterizes the project. The project is the rehabilitation of the three historic Wainiha bridges, of which the replacement of the temporary Acrow bridges is but one component. This mischaracterization disguises the many ways in which the proposed project would have very significant adverse impacts (in areas that include safety, historic architectural resources, scenic and open space resources, visual and aesthetic resources, and the character of Route 560 from Wainiha to Ke'e), would be contrary to some of the important objectives of HRS 205A, and would not meet federal historic preservation standards. The DEA needs to compare the proposed project to the historic bridges, and must assess all aspects of the environment associated with the historic bridges. In not doing so, the DEA is entirely inadequate to inform reasoned decision-making and it can not justify a FONSI.
- 2. The proposed "Action Alternative" constitutes a major retreat from the proposal that HDOT had on the table in 2012, prior to the involvement of FHWA-CFLHD. In 2012, the proposal under discussion was for bridges that incorporated railing and fascia design that would have been largely identical to that of the historic bridges; decking made of wood or wood facsimile that would have mimicked the look, sound and feel of the historic bridges; and a Wainiha #1 bridge curb-to-curb width that was only slightly greater (by 1 foot) than the historic Wainiha #1 bridge width. The only point of contention was the proposed width of bridges #2 and #3: but even here, the HDOT consultants stated that "[t]he community's reasoning for the narrower bridge width is for traffic calming, and to adhere to the historic nature of the roadway. The parties have agreed to continue working out a solution as we work through the Section 106 Process and the Environmental Assessment."

In contrast, the current "Action Alternative" proposes that the bridge railings would "<u>somewhat echo</u>" the character of the historic bridges' railings; the decking would be concrete; the new Wainiha #1 bridge would be 40% wider than the historic Wainiha #1 bridge; and the new Wainiha #2 and #3 bridges would arbitrarily be 40% wider than the historic bridges, there having been no attempt by FHWA-CFLHD to "*work out a solution*" based on substantive issues, such as traffic calming, community safety, the impacts of wider bridges on the nature of the vehicles able to cross the bridges, or historic preservation.

This retreat is truly disappointing from both historic resource rehabilitation and community safety perspectives. It is also a clear indictment of the inadequacy of the Draft EA, which "*anticipates*" a FONSI despite the lack of any justification of the significant deviations of the "Action Alternative" from the parameters of the historic bridges.

3. The very significant departures of the proposed bridges from the historical dimensions and materials of the historic bridges might arguably be justified if there was truly no other way to meet requirements for public safety. In that case, the logical question would be whether there is any remaining reason to spend taxpayers' money to create the proposed Disneylandesque mockeries of the historic bridges, instead of modern single-lane bridges. But the fact is, the radical redesigns would be completely unnecessary, <u>but for</u> the FHWA designers' *preferences* to deviate as little as possible from contemporary bridge design standards, which would actually *speed* the flow of traffic rather than retain the inherent safety characteristics of the historic 15 mph bridges.

Disingenuously, the DEA claims that the 14 foot rail-to-rail bridge width is proposed based on "*best engineering judgement*" related to

- 1. Design Controlling Criteria, including lane width, shoulder width, and bridge width
- 2. Functionality, including design vehicle maneuverability, shy distance, and level of service
- 3. Potential maintenance considerations
- 4. Roadway use
- 5. Driver perception and expectation
- 6. Historic roadway considerations."

But the words above are merely "hand-waving." With the possible exception of "maintenance considerations" (minor costs for periodic railing repairs at the ends of the bridges, which would certainly be very small in comparison to the cost accommodations that are made to accommodate historic preservation needs), none of these factors justify bridge widths that are nominally greater than the historic bridge widths, <u>unless one discards the important assumption that the bridges should also be designed to limit the size, weight and speed of vehicles to only the size, weight and speed that were allowed by the historic bridges. What, indeed, was the assumption that was made by the consultants in regard to this issue?</u>

On the other hand, there are compelling substantive reasons that argue for retaining bridge widths similar to the historic bridge widths:

- There is no history of accidents or safety issues to support a conclusion that any of the above considerations justifies increasing the curb-to-curb widths beyond the historical widths. 50 years of actual history that has proven that the historical bridges were safe.
- The narrow historic bridges have served as a very important mechanism to slow traffic at the entries to the Wainiha residential community. It is common sense that narrower width acts as a traffic-calming, safety feature for the residents of Wainiha and the drivers along the road.
- Widened bridges would allow larger and heavier vehicles to use the bridges than could use the historic bridges, both decreasing safety and changing the character of the entire historic rural road from Hanalei to Ha'ena.
- Increasing the bridges' width-to-length profile by 40% would have major visual impacts that would be clearly contrary to the goals of historic preservation.

In short, there are no valid reasons for widening the bridges more-than-nominally beyond their historical widths. The DEA presents no valid justification for the assertion that bridges that are wider than the historic bridges are necessary. To the contrary,

the wider bridges would decrease community safety, have significant adverse impacts, and significantly deviate from the historical preservation guidelines and the rehabilitation objectives that are the *raison d'être* of the entire project.

## In conclusion:

- 1. The proposed design of the "Action Alternative" meets neither the objectives of HRS 205A nor the objectives and requirements of federal historic preservation statutes. The design would have significant adverse impacts on community safety, on the nature of the Wainiha community, on the nature of Route 560, on historic architectural resources, on scenic and open space resources, and on visual and aesthetic resources. All of these adverse impacts are reasonably foreseeable, and all of these adverse impacts could be avoided by redesigning the "Action Alternative" to deviate no more than is absolutely necessary from the historic bridge railings, historic bridge decking and historic bridge widths.
- 2. Section 6 of the DEA (on page 6-1) states: "Based on the information presented and examined in this document, the proposed project is not expected to produce significant adverse social, economic, cultural, or environmental impacts." That may be arguably correct, as the "information presented and examined in this document" is utterly inadequate and legally deficient. But:
  - The DEA does not meet its legal obligation to describe the project correctly;
  - The DEA does not meet its legal obligation to describe the project's impacts compared to the *status quo ante* (i.e., the historic bridges and the characteristics and limitations that the bridges imposed on vehicle sizes and speeds on all of Route 560 from Wainiha to Ke'e); and
  - The DEA presents no justifications for design parameters (such as bridge widths) that would significantly deviate from historic design, nor does it consider how the design parameters of the historic bridges acted to further public safety and to define the fundamental look-and-feel of both Route 560 and the communities along the road.

So the statement (on page 6-1 of the DEA) that "[c]onsequently, a finding of no significant impact is anticipated, pursuant to HRS Chapter 343 and the provisions of HAR Subchapter 6 of Chapter 200, Title 11" has no justification and would most-certainly not be supported were the true facts and impacts properly included in the DEA.

For the reasons above, I believe that the only reasonable course of action is to:

- 1. Revise the design of the "Action Alternative" in regard to railings, decking and bridge widths, to meet the public safety, community character and historic rehabilitation goals that should be the key drivers of this project; and
- 2. Revise and reissue the DEA as outlined above, so that it provides a complete and honest assessment of the proposed project.

Carl F. Imparato

Carl Imparato P.O. Box 1102 Hanalei, HI 96714



U.S. Department of Transportation

Federal Highway Administration **Central Federal Lands Highway Division** 

December 13, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

- TO: CARL IMPARATO P.O. BOX 1102 HANALEI , HI 96714
- FROM: J. MICHAEL WILL, P.E. PROJECT MANAGER
- SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) WAINIHA TEMPORYARY BRIDGES REPLACEMENT, PROJECT NO. STP SR560 (1) KUHIO HIGHWAY, HALELEA DISTRICT, KAUAI ISLAND TMK: VARIOUS TMKS IN ZONE 5, SECTION 5, 6, 7 AND 8; KUHIO HIGHWAY AND ALA EKE ROAD RIGHTS OF WAY

Dear Mr. Imparato:

Thank you for sending comments on the Draft EA by email dated May 23, 2016. Enclosed you will find a response summary to public comments including a design summary and additional supporting documentation for design criteria utilized on this project. This enclosure has also been uploaded to our project website located at: <u>https://flh.fhwa.dot.gov/projects/hi/hi-stp-sr-560-1-wainiha-stream-bri-12396/</u>

If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Cc: Christine Yamasaki, HDOT Thomas Parker, CFLHD



May 23, 2016

Via email: michael.will@dot.gov

Mr. Michael Will FHWA-CFLHD 123 W. Dakota Avenue, Suite 380 Lakewood, CO 80228

Re: Project No. HI STP SR560(1): Hanalei Roads Committee Comments on Draft Environmental Assessment for Rehabilitation of Wainiha Bridges #1, #2, and #3

Aloha Mr. Will,

On behalf of the Hanalei Roads Committee (HRC), we thank you for the many years of effort that your group and the Kauai District of the Hawaii Department of Transportation Highways Division have contributed to this very special project for the rehabilitation of our three historic Wainiha Bridges. The HRC also very much appreciates your community outreach to the HRC and other members of our community as we pursue the shared goal of maintaining the rural and historical character of Route 560, which is on both the State and National Register of Historic Places.

Attached are our comments on the Draft Environmental Assessment. We have significant concerns on the overall viability of the design proposed in the EA. Although many of its features proposed are cognizant of the historic bridge(s) and is reflected in the design, we are concerned that the proposal with its requirement of the installation of six temporary bridges to build and numerous other construction challenges will result in a solution that will ultimately be beyond the budget of the HDOT resulting in further delay of the project.

The HRC wishes to affirm that we are grateful that the project to rehabilitate the historic Wainiha Bridges is moving forward, and we desire to work constructively and productively with HDOT and CFLHD to have rehabilitated Wainiha Bridges constructed for generations to come.

Mahalo, Brian Hennessy HRC Co-Chair

Barbara Robeson HRC Co-Chair

cc: KDOT- Larry Dill and Ray McCormick FHWA - Nicole Winterman

# Hanalei Roads Committee Comments on the DEA

The following are the HRC's comments on the Draft Environmental Assessment (DEA) for the Wainiha Bridges Rehabilitation Project.

# 1. Amend the title of the DEA ("Project to Replace Temporary Wainiha Bridges") to reflect rehabilitation of the historic Wainiha Bridges<sup>1</sup>.

For over a decade, this has been a project to "*rehabilitate*" the historic Wainiha bridges. The proposed rehabilitation of the Wainiha Bridges will retain the property's historic character.<sup>2</sup>

The title of the DEA is extremely important, as it defines the historic preservation baseline against which the proposed work must be evaluated in order to determine whether or not the proposed work complies with federal and state historic preservation statutes and standards, and whether or not the proposed work can be found to have "no significant impact." For example, the Hawaii DOT's April 2016 STIP continues to define the project as the rehabilitation of the historic Wainiha bridges, not the "Project to Replace Temporary Wainiha Bridges".

The proposed project outline<sup>3</sup> is also important because as deviations in appearance between the proposed structures and the historic bridges must be justified and consistent with historic preservation standards.

As the DEA's primary description of the project (as a project to replace the temporary ACROW bridges), there are many parts within the DEA in which the proposed new structures are incorrectly compared to the temporary ACROW bridges rather than the design and replication of the historic bridges. The following are a few examples.

• Table 2-1 (Page 2-2) could provide, for comparison purposes, the lane widths (inside rail dimension) of the three <u>historic</u> bridges, rather than the lane widths of the three Acrow bridges. The historic bridges are the baseline against which the proposed new rehabilitated bridges must be evaluated. In addition, the lane widths of the historic bridges (10 feet, 10 feet, and 10.5 feet for bridges #1, #2 and #3, respectively) are not found in the DEA.

HRC believes that to evaluate the proposed project, correct information is required.

- On page 3-33 of the DEA are outlines of the policy objectives of HRS Chapter 205A which include:
  - (2A) Protect, preserve, and, where desirable, restore those natural and manmade historic and prehistoric resources in the coastal zone management area that are significant in Hawaiian and American history and culture; and

<sup>&</sup>lt;sup>1</sup> Our concern is that the current title focuses on the temporary ACROW bridges, not focusing on the rehabilitation and construction of the new bridges. For the general public, the current title could be confusing.

<sup>&</sup>lt;sup>2</sup> Definition based on Secretary of the Interior's Standards for Rehabilitation.

<sup>&</sup>lt;sup>3</sup> <u>See</u> DEA Project Summary, page xi.

• (3A) Protect, preserve, and, where desirable, restore or improve the quality of coastal scenic and open space resources;

The DEA then states that:

"The proposed design would offer similar aesthetics and character of the historic pre-ACROW structures and therefore be an improvement to the visual setting of the NRHP-listed roadway." (Page 3-36), and

"CFLHD anticipates that the proposed project would not have an "adverse effect" on historic resources. See section 3.9 for additional discussion on historic properties within the project area." (Pages 3-36, 3-37).

We believe that the recommendations of the proposed project should be reached when sufficient information is provided about the different characteristics (e.g., bridge widths and massiveness, bridge decking, possibly bridge railings, etc.) of the proposed structures vis-à-vis the historic bridges.

• Regarding Scenic and Open Space Resources ("To protect, preserve, and where desirable, restore or improve the quality of coastal scenic and open space resources."): The DEA states (Page 3-37) that "[t]he bridge design elements including the bridge railing have been designed to mimic the original 1904<sup>4</sup> Wainiha bridges that existed prior to their replacement with temporary ACROW bridges."

There is no mention of the visual impacts associated with the differences between the historic bridges' widths and the proposed bridges' widths. (Note: re the railings, the standard should be the 1957/1966 design on the historic register, not the 1904 design.)

• Regarding Historic Architectural Resources (Section 3.9.1.2): the statement is made (on Page 3-70) that: "[c]onstruction of new Wainiha bridges would not result in adverse effects because the existing bridges to be replaced do not contribute to the road's eligibility." Again, "existing bridges" appears to reference the existing ACROW bridges.

The standard for comparison should not be the existing temporary Acrow bridges, but the historic bridges; so the conclusion (Page 3-71) that *"[t]he Action Alternative would have "no adverse effect"* is not unclear.

• Similarly, in regard to Visual and Aesthetic Resources (Section 3.13), the statement is made (on Page 3-89) that "[o]ther project features, such as lane-width alterations, would be even less noticeable when compared to existing conditions."

Again, the comparison should not be to "existing conditions" but to the conditions associated with the historic bridges.

The above are a few examples of the possibly incorrect conclusions that result from the descriptions of the project. The historic roadway and bridges have earned the right and protections associated with their designations as historic.

<sup>&</sup>lt;sup>4</sup> Incorrect date?

We therefore request that the <u>title</u> of the project be corrected (to rehabilitation of the historic Wainiha Bridges) and that the changes resulting from that correction be made throughout the DEA.

# 2. Timber decking<sup>5</sup> in the DEA

The preferred alternative ("Action Alternative") for the Hanalei Roads Committee is timber decking. It is our position that the DEA should be amended regarding this issue. Section 2.3.2.3 *Bridge Deck* which states,

"The aesthetics of the bridge deck was also considered in preliminary design, and will continue to be considered through final design and construction. Through public engagement, a connection and favorability to the timber desks of the historic pre-ACROW bridges was shared, including both the sound and appearance of timber."

Again, HRC strongly supports timber decking on the Wainiha Bridges.

As stated in the DEA, "[T]he Action Alternative proposes concrete decks but designed and finished (through color and surface application and treatment) to offer an appearance of timber." (Page 2-9)

The proposal to use concrete decking rather than timber decking on the bridges would constitute a very significant change to one of the most-fundamental characteristics of the historic *wooden* bridges.

- The sound-and-feel of a concrete deck can in no way be compared to the sound-and-feel of wood plank decking. This project has always been intended to be a *rehabilitation* of National Registerlisted historic resources, in recognition of the fact that the original historic bridges would still be in use today, had proper and timely maintenance and weight-limit enforcement been conducted prior to the emergency installation of the temporary ACROW bridges. It is questionable that a legitimate determination of "no significant impact" could be made if one of the most-fundamental characteristics and design elements of the historic bridges was altered.
- In addition to conforming to the historic bridges, which is also the decking currently in use on the Hanalei Bridge, it is an important component to keeping vehicle speeds low on the bridge. The texture, sound, and low friction nature of wood act as significant deterrent to speeding on the bridge. Keeping vehicle speeds low on the bridges should be a key component of the bridge design which we feel is best addressed by maintaining the wood decking in the design.
- In addition, as noted in the October 2012 *Engineering Design Report for the Rehabilitation of Wainiha Bridges*:

"Bridge decking will be designed to mimic the placement of the timber planking on the previous bridges. Replacement design will incorporate timber or timber facsimile for the traveled way surface. This type of decking is in response to public input received during various meetings." (Page 42) "Deck planks shall be constructed of timber or timber facsimile." (Recommendations, Page 52)

<sup>&</sup>lt;sup>5</sup> Also referred to as "wooden decking" or "wood plank decking".

As timber decking is clearly both an essential design element for historic rehabilitation as well the strongly preferred alternative, timber decking should be a part of the Action Alternative, if there is to be any possibility that the Action Alternative be found to have "no significant impact."



Figure 1: Wainiha Bridge #3, Photo 13 from AECOM report

Figure 2: Wainiha Bridge #2, Photo 8 from AECOM report



## 3. Description of the <u>bridge railings</u> (See Figure 2-1 & p. 2.3 in DEA).

Related to the historic bridges' railings, HRC recommends that the description of the bridge railings could be more clearly described in the DEA. The DEA states the following:

- "The new railing design would <u>somewhat echo</u> the character of the historic pre-ACROW bridges' railings." (Page 3-88)
- "The bridge design elements including the bridge railing have been designed to mimic the <u>original</u> <u>1904<sup>6</sup></u> Wainiha bridges that existed prior to their replacement with temporary ACROW bridges. (Page 3-37)

These statements are unclear and inconsistent with the statement (on page 42 of the October 2012 *Engineering Design Report for the Rehabilitation of Wainiha Bridges*) that "*[r]ailing picket spacing will mimic the original spacing*," and the commitment that the railings would be identical in appearance to those of the historic bridges. Photos of the historical railings can be seen in Figures 1 and 2 above.

The DEA does not clearly illustrate what the proposed bridge railings would look like. This information needs to be addressed, in order to determine whether or not the "anticipated determination" of "no significant impact" is justified.

## 4. Width of proposed bridges in the DEA.

## Wainiha Bridge #1

Table 2-1 in the DEA shows the proposed Wainiha #1 bridge curb-to-curb width as 14'0". The Recommendation in the October 2012 *Engineering Design Report for the Rehabilitation of Wainiha Bridges* (Page 52) is for a maximum of **11-feet lane width**.

The DEA Table 2-1 should be corrected to reflect the 11-foot width lane width.

## Wainiha Bridges #2 and #3

The following information outlines previous background information, discussion, comments, etc. related to the width of the rehabilitated Wainiha #2 and #3 bridges.

On January 26, 2012, a public meeting was held by the DOT to present the proposed AECOM report. The HCA made a PowerPoint presentation which outlined the history of HRC and the preservation of Route 560, the historic roadway. Included in the presentation was the below Table illustrating the various historical and proposed widths of the Wainiha Bridges:

The October 2012 *Engineering Design Report for the Rehabilitation of Wainiha Bridges* noted (Page 53) that:

"The primary point of disagreement involves the bridge width for Bridges #2 and #3. HRC prefers to have a width less than 14-feet wide, while HDOT, FHWA, and AASHTO standards require a 16-foot clear width, as set forth in the KHRCP. At the January 26, 2012 Public Meeting conducted in accordance with Section 106 Procedures of the National Historic Preservation Act and the National

<sup>&</sup>lt;sup>6</sup> Is "1904" an incorrect date?

Environment Policy Act (NEPA), the local community insisted upon 11-feet wide bridges as they existed before removal in 2004 and 2007. The community's reasoning for the narrower bridge width is for traffic calming, and to adhere to the historic nature of the roadway. The parties have agreed to continue working out a solution as we work through the Section 106 Process and the Environmental Assessment."

The *Engineering Design Report* refers to the January 2012 public meeting when the public participants were given the opportunity to vote on the three alternatives of 11-foot, 14-foot and 16-foot bridge widths, the *unanimous* vote of the 30 participants was for the 11-foot alternative. At the public meeting that was conducted by CFLHD on March 9, 2015, the community once again stated its desire for the 11-foot bridge lane width alternative, citing traffic calming, increased safety, and historic integrity. (DEA, Pages 209-210)

HRC believes that the DEA should document the benefits associated with the wider design that is proposed for the "Action Alternative". The only discussion of this design parameter in the DEA is as follows (Page 2-8):

"[B]est engineering judgement was applied to identify the recommended typical section for one-lane bridges appropriate for this specific project. As described above in section 2.2.2, a rail-to-rail width of 14 feet was identified as part of the Action Alternative and is being proposed for this project. In applying best engineering judgement, the following factors and their advantages and disadvantages were considered and led to the identification of the proposed bridge width:

- Design Controlling Criteria, including lane width, shoulder width, and bridge width
- Functionality, including design vehicle maneuverability, shy distance, and level of service
- Potential maintenance considerations
- Roadway use
- Driver perception and expectation
- Historic roadway considerations."

In addition, the DEA has mischaracterized (Page 3-80) the proposed 14-foot bridge width by comparing it to the width of the ACROW bridges **only** rather than also comparing it to the width of the historic bridges: "*The rail-to-rail width of the proposed new bridges (14 feet) is very similar to the existing ACROW bridges (ranging from 12 to 14 feet).*" Even the Proposed Project Description (on Page 2) misrepresents the project: "[t]he width of the new bridges would be close to the existing bridge widths to maintain the existing roadway character".

HCA believes that to meet the standards for an environmental assessment a full disclosure and description of why an 11 foot lane width would is not being recommended for Wainiha Bridges #2 and #3. Again, the primary impact of the narrow lane width on the bridge is that it requires drivers to traverse the bridges at a lower speed, especially when combined with wood decking. Keeping vehicle speeds low on these bridges should be key component of the design to maintain their safe operation within this portion of the historic roadway that has a posted speed limit of 25 mph while passing through the community of Wainiha.

## 5. Section 2.4 Preliminary Costs and Schedule

We question the preliminary cost estimate of \$20 to \$25 million for this project. The nearest historic bridge replacement occurred in Kilauea for the County of Kauai in 2008. Like Wainiha, it was a replacement for a bridge constructed in 1913 that was part of the original Kauai Belt Road. This site had excellent accessibility, an alternate access to allow for road closure, and was a single span. It had a contracted cost of \$12.8 million in 2008 and was completed in a little over a year. This project is much more complex with numerous construction challenges that will very likely result in a much higher construction cost and time period for construction than estimated in the EA.

The HRC has advocated since the beginning of the design process in 2007 that innovative solutions be found to address this project specifically – just like any project in this area – it has to be constructed given the constraints of the historic roadway. Yet, what is proposed are thoroughly modern concrete bridges that have some relation to the historic bridges they replace but will require construction equipment that can't access the work area without first building 3 temporary stream crossings, each with their own challenges, resulting in substantial increases in cost and time to complete the project. There will also likely be significant impacts to the historic roadway itself as construction equipment and heavy vehicles have not traveled this roadway **ever** in the number required for this work to be completed as planned.

## 6. Anticipated Determination revisions

Unless the corrections and changes proposed above are made within the DEA, the Anticipated Determination is based on incorrect information.

Section 6 of the DEA (Anticipated Determination) states:

"Based on the information presented and examined in this document, the proposed project is not expected to produce significant adverse social, economic, cultural, or environmental impacts. Consequently, a finding of no significant impact is anticipated, pursuant to HRS Chapter 343 and the provisions of HAR Subchapter 6 of Chapter 200, Title 11." (Page 6-1)

As noted in our comments, the HRC believes that the mischaracterization of the project and the insufficiency of justification of necessity for the proposed significant deviations from the historic bridges would not support a determination of "no significant impact."

From:	Parker, Thomas W (FHWA)
To:	Brian Hennessy (brian@honuaengineering.com)
Subject:	HRC Wainiha Bridges EA Comment 5-23-2016 Response
Date:	Tuesday, December 13, 2016 1:40:00 PM
Attachments:	2016-5-23 DEA HRC Comments.pdf
	2016-12-9 Wainiha Petition Comments Response FINAL pdf

Good morning Mr. Hennessy and Mrs. Robeson:

Thank you for sending comments on the Draft EA by email dated May 23, 2016. Enclosed you will find a response summary to public comments including a design summary and additional supporting documentation for design criteria utilized on this project. This enclosure has also been uploaded to our project website located at: <u>https://flh.fhwa.dot.gov/projects/hi/hi-stp-sr-560-1-wainiha-stream-bri-12396/</u> (should be posted by the end of this week)

If you have any questions, please contact myself or the project manager, Mike Will at (720) 963-3647, or by email at <u>Michael.will@dot.gov</u>

Regards, Thomas W. Parker Environmental Protection Specialist Federal Highway Administration Central Federal Lands Highway Division 12300 W. Dakota Ave., Suite 280 Lakewood, CO 80228 Work: (720) 963-3688 Mobile: (970) 509-0858

please consider the environment before printing this email

May 23, 2016

michael.will@dot.gov

Mr. Michael Will FHWA-CFLHD

Comments on Draft Environmental Assessment for Rehabilitation of Wainiha Stream Bridges #1, #2, #3

These comments are in addition to the verbal comments that I made at the May 17, 2016 public hearing.

1. The title of the DEA and description of the project within the DEA mischaracterizes the project. For the last 10 years this project has been called the project to <u>rehabilitate the historic Wainiha bridges</u>. HDOT's October 2012 report was titled *Engineering Design Report for the Rehabilitation of Wainiha Bridges* and even today HDOT's April 2016 STIP schedule continues to correctly characterize the project as the *rehabilitation of the historic Wainiha bridges*, not the replacement of the temporary Wainiha bridges. This mischaracterization completely changes the intent of the project and disregards the historic significance of the bridges and their inclusion on the National Historic Register. As Route 560's National Register nomination states, "The Kaua'i Belt Road between Princeville and Ha'ena (Route 560) retains historic significance and character in its location, alignment, design, setting, and association."

In 2004 when the first ACROW Bridge was installed in Wainiha during the DOT's 'emergency' replacement project, the community had been stressing the need for preventative maintenance and rehabilitation of the three Wainiha bridges for many years. The community loved those bridges. Visitors loved those bridges. It is a tragedy that we lost those bridges to neglect. They were classic icons of rural north shore Kauai. They were the most photographed bridges in the state, and along with the Historic Hanalei Bridge, centerpieces of our historic roadway. Tragically they were allowed to deteriorate to the point where they were literally falling in the river. Now they are gone.

The DEA needs to recognize and honor the fact that this project is about rehabilitating the historic Wainiha bridges. Throughout the DEA the proposed new bridges are erroneously compared to the existing ACROW bridges. The comparison that needs to be made is between the proposed new rehabilitated bridges and the 1957 wooden bridges that have earned the rights and protections associated with their listing on the Historic Register. <u>Until the title and content reflect this,</u> <u>the DEA is flawed and its conclusions are erroneous.</u> 2. Railing design for the proposed bridges needs to replicate the historic railing design. Incorporating the historic railing design is important to the safety, aesthetics and historic significance of the proposed bridges.

Safety on the bridges is largely due on two factors: slow vehicle speed and good visibility of vehicles on the bridges. The historic railing design allows clear visibility both of vehicles crossing the bridges and from vehicles on the bridges. It allows drivers approaching the bridges to quickly determine whether or not it is their turn to cross.

In the October 2012 Engineering Design Report for the Rehabilitation of Wainiha Bridges) it states that "railing picket spacing will mimic the original spacing,". The DEA states that "The new railing design would <u>somewhat echo</u> the character of the historic pre-ACROW bridges' railings." Why this departure from the 2012 report's recommendation?

The DEA needs to be specific on the issue of the railing design and include the historic railing design in the Action Alternative.

3. Timber decking must be included in the Action Alternative. Timber decking is <u>critical</u> to replicate the historic significance, feel, sound and experience of crossing the old <u>wooden</u> bridges. Of all the design features, timber decking might be the most important to replicate the experience of crossing the old bridges. They were called <u>wooden bridges</u> for a reason – crossing them was a visceral experience, one that endeared locals and visitors alike to our historic roadway.

An added benefit is that timber decking slows vehicle speeds and is a natural traffic calmer and in the community's mind, a safer deck material than concrete. This might be counterintuitive, but the old bridges stood for 50 years with stellar safety records and very few bridge accidents of any kind.

Recognizing the significance and importance of timber decking, the October 2012 Engineering Design Report for the Rehabilitation of Wainiha Bridges states: "Bridge decking will be designed to mimic the placement of the timber planking on the previous bridges. Replacement design will incorporate timber or timber facsimile for the traveled way surface". And, "Deck planks shall be constructed of timber or timber facsimile."

The proposal to use concrete decking rather than timber decking on the bridges would be a very significant change to one of the most fundamental characteristics of the historic <u>wooden bridges</u>. It is impossible that a legitimate determination of "no significant impact" can be made if one of the most-fundamental characteristics and design elements of the historic bridges, their timber decking, is not included in the Action Alternative.

4. Bridge Width The width of the proposed rehabilitated Wainiha bridges needs to be as narrow as possible for historic as well as safety reasons. At a January 2012 public meeting sponsored by HDOT, when the community was given the opportunity to vote on three alternatives of 11-foot, 14-foot and 16-foot bridge widths, the <u>unanimous</u> vote of the 30 participants was for the 11-foot alternative. The community who lives here and drive across these bridges daily knows that narrower means slower and slower means safer. The reason this historic roadway remains a relatively safe route is that even today with more vehicle traffic, vehicle speeds remain slow thanks to all the narrow, traffic calming features, including our narrow bridges, narrow culverts and narrow lane widths.

The DEA needs to reference the historic bridge widths and recognize the many attributes of narrow travel lanes. Because of the above stated reasons, I urge that the 11-foot historic bridge width be included in the Action Alternative.

5. **Anticipated Determination revisions** I feel that due to the mischaracterization of the project and the exclusion of critical historic design elements, including the historic bridge railings, historic bridge decking and historic bridge widths, a determination of "no significant impact" cannot be justified. I therefore urge that the DEA be revised as proposed above and include these critical historic design elements in the Action Alternative.

Sincerely,

Jonathan G. Wuhn

Jonny Wichman PO Box 512 Hanalei, HI 96714

cc: KDOT – Larry Dill and Ray McCormick Nicole Winterman, FHWA



December 12, 2016

12300 West Dakota Avenue Suite 380 Lakewood, CO 80228 Office: 720-963-3647 Fax: 720-963-3596 Michael.Will@dot.gov

> In Reply Refer To: HFPM-16

- TO: JONNY WICHMAN P.O. BOX 512 HANALEI , HI 96714
- FROM: J. MICHAEL WILL, P.E. PROJECT MANAGER
- SUBJECT: DRAFT ENVIRONMENTAL ASSESSMENT (EA) WAINIHA TEMPORYARY BRIDGES REPLACEMENT, PROJECT NO. STP SR560 (1) KUHIO HIGHWAY, HALELEA DISTRICT, KAUAI ISLAND TMK: VARIOUS TMKS IN ZONE 5, SECTION 5, 6, 7 AND 8; KUHIO HIGHWAY AND ALA EKE ROAD RIGHTS OF WAY

Dear Mr. Wichman:

Thank you for sending comments on the Draft EA by letter dated May 23, 2016. Enclosed you will find a response summary to public comments including a design summary and additional supporting documentation for design criteria utilized on this project. This enclosure has also been uploaded to our project website located at: <u>https://flh.fhwa.dot.gov/projects/hi/hi-stp-sr-560-1-wainiha-stream-bri-12396/</u>

If you have any questions, please contact me at (720) 963-3647, or by email at Michael.will@dot.gov.

Sincerely yours,

J. Michael Will, P.E. Project Manager

Cc: Christine Yamasaki, HDOT Thomas Parker, CFLHD -----Original Message-----From: mikeinkona@gmail.com [mailto:mikeinkona@gmail.com] Sent: Monday, May 23, 2016 1:16 PM To: Will, Michael (FHWA) Subject: Wainiha bridge consideration

Aloha Michael,

My name is Mike Dennis. I'm a resident of Wainiha, a longtime property owner in Hawaii, a business owner in Hawaii since 1994.

My friend, Suzy Conklin and myself are very concerned that the comment period for the bridge project in Wainiha will close before the community is informed properly.

We are asking for a couple of things:

1. We are asking for the comment period to be extended for another 3 months. We feel this will allow for a couple of well publicized and advertised public meetings. We feel the community has not been adequately informed. We have come to this conclusion from speaking about this project with community residents, property owners and business owners.

2. We have initiated a Petition to circulate this past weekend. The Petition asks that HDOT consider the voice of the Hanalei/Wainiha community about the projects scope, size and authenticity. We feel that the Wainiha bridges are a historical aspect of our community. In initiating this Petition, we ask that HDOT listen to our concerns and act accordingly.

As you may be aware, the Garden Isle newspaper featured a front page article in today's edition. There is no mention of a comment period, nor does it indicate any sense of urgency about public Input.

I have well over 100 signatures on the Petition as of now, with more to come today.

Do you want me to photograph the Petition pages and send via email the pages? We can also scan, and fax them later today. We can also mail hard copies of our Petition.

We sincerely are concerned with the integrity of the look and feel of our small community. Our activism is based on a love for this place we call home. Aloha, Mike Dennis 808-896-4780
As residents of Hanalei we are interested in preserving and protecting our home. We live in Hanalei because of its country lifestyle and a way of life that is rapidly disappearing in other parts of Hawaii. Kauai is being squeezed by pressures to develop our area by the tourism industry and other developers. We feel it is our duty to protect the Hanalei lifestyle for future generations.

7.

The Hawaii Department of Transportation has decided to replace the three bridges in Wainiha. Currently these three bridges are 11 feet wide. The HDOT proposes to increase the width of these three bridges to 14 feet wide. This is unacceptable for the following reasons: If we allow HDOT to make the 3 Wainiha bridges 14 feet wide it will allow tour buses to access our beaches and parks in Haena and Kee. This will forever change the peaceful tranquility and country feel of this area. It will allow massive development in Kee. It will change the area from rural use to a tourist Mecca . We are strongly opposed to widening the 3 bridges. We want them kept as is. If the bridges need to be upgraded for safety, we ask that the community's wishes be obeyed, and the historical nature of the 3 bridges remain. The community wants 11 foot wide bridges. (Contact:Mike Dennis <u>808-896-4780</u>) \*this needs to be submitted , <u>Monday 23</u> 2016 to Michael will@dot.nov

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3 BTILLY GROUT	er poutt	39/1 AttoNUT PL, 96722	808 639-4401
	Billight	5128 A'AWA RD. 96714	808-635-3965
4 Laura Stiles	Jaura M Sail	4933 Powerhouse Rd, 910711	1 (562)544-2563
5 Ev.n Wascher	En Winch	4770 Pepelani Loop Pulle 96	122 (808)-989-51.02
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\*as residence of the north shore Kauai.

As residents of Hanalei we are interested in preserving and protecting our home. We live in Hanalei because of its country lifestyle and a way of life that is rapidly disappearing in other parts of Hawaii. Kauai is being squeezed by pressures to develop our area by the tourism industry and other developers. We feel it is our duty to protect the Hanalei lifestyle for future generations.

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Name. Signature Address. Email/phone 5-7.308a munio hul 1 Junny Harris enbesostarilard, 808 2 Streeha Olandlan 57813 sol on Dlan E 3 Aamion Goodwin 7120 Alami 4 Stephen Micarthy shalles aamon gegmail.com 7130 Kahio HNY Stevie wild yehro. Com 5 UZ Nicolodense. 7210 Luhio Hu nicolodemos/Qu 6 Kalalan Puntei - Chant Jaho.com (505)631-2348 30×22-3402 7 Buchoov DO OCENUE 808-826- UCC3 8 Matu Punter Chandlese 7070 Alamini Rd 808 634 -53211 9 Freralding nycowa ("amailian Jalalan 10 Chandler 5-7070 Manch, Rd (SDK) 212/2181 ancia mae chandler 5-7070 Alamnika. 828) 984) 6842 5- 7070 Mamih-Rel 12 Kanimoku Chandler PO Bex 1142 Hanales 13 Kuanajekalan: Puntei - Chanller 629.6062 DuzeGordwin POBOZE Jamelio POBex 11/2 Handle 96714 634-0194 15 Mananalu Leasedand \*as residence of the north shore Kauai.

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Name. Signature Address. Email/phone 1CARRIE Knutson COND PO BOY 334 HANalei rebelthino 10 smallow 2 Ryan Hand 950 Sanderest Dr. RJHQ603 egmail-com 3 charlie Spilley 3114 Woodiew Fidgebr, charliespillersegmailium 4 Simmone Yu prigue yu 567 N. Holliston Ave, #1 Rippypippy Cychos.com 5 Khalil Abuttlaj OR III Anin' Beach Khalil.abolhaj@gmail.com THEFY SHAHBOZIAN PO BOX 1543 HANALEI Taffy Shahbozian 541-840-5053 Sherri Gibson 3061 Kalinimai Rd. Bgibsonerussellysmithing Raole Pl. Proceedle chakman 1000 mail com 8 - Chevie 4129 Italman. 9 10 11 12 13 14 15 \*as residence of the north shore Kauai.

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Name. Signature Address Email/ phone 1 Cari Bivona Moloce blessedy oga tealing @gmail.com tropizmelon@yahoo.com pearlibomb@gm&l.com 2 Thomas Kelleher 7483 Koolan Kikner Pasel Lettle am Sealthing 4111 Amin: Rdu 144 66 Isasay 1990@ Smail.com Kilard Katie Krike 6 7 8 9 10 11 12 13 14 15

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Name. Signature Address. Email/ phone Nicole Dichene 1 KAD P.D. Box 158 Henrich Kamua Swain 2 Amber Fendentz PO BOX 1349 KI 4 Brando Wattson 5-6559 Ananalust. Hanalei 96714 5 6 7 8

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From:	Parker, Thomas W (FHWA)		
To:	mikeinkona@gmail.com		
Subject:	Wainiha Bridges EA Comment 5-23-2016 Response		
Date:	Tuesday, December 13, 2016 1:40:00 PM		
Attachments:	2016-12-9 Wainiha Petition Comments Response FINAL.pdf		
	2016-5-23 DEA Mike Dennis Comments.pdf		

Good morning Mr. Dennis:

Thank you for sending comments on the Draft EA by email dated May 23, 2016. Enclosed you will find a response summary to public comments including a design summary and additional supporting documentation for design criteria utilized on this project. This enclosure has also been uploaded to our project website located at: <u>https://flh.fhwa.dot.gov/projects/hi/hi-stp-sr-560-1-wainiha-stream-bri-12396/</u> (should be posted by the end of this week)

If you have any questions, please contact myself or the project manager, Mike Will at (720) 963-3647, or by email at <u>Michael.will@dot.gov</u>

Regards, Thomas W. Parker Environmental Protection Specialist Federal Highway Administration Central Federal Lands Highway Division 12300 W. Dakota Ave., Suite 280 Lakewood, CO 80228 Work: (720) 963-3688 Mobile: (970) 509-0858

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From:	Will, Michael (FHWA)		
To:	Winterton, Nicole (FHWA)		
Subject:	FW: DEA for Permanent Replacement of the Historic Wainiha Bridges (Kaua'i)		
Date:	Tuesday, May 31, 2016 8:03:43 AM		
Attachments:	Comments PA Wainiha Bridge DEA 5-23-16.pdf ATT00001.htm		
	NEPA NHPA Section 106 Handbook Mar2013.pdf ATT00002 htm		

From: Wendy Wichman [mailto:wendy@preservationassociates.org]
Sent: Monday, May 30, 2016 9:42 PM
To: Will, Michael (FHWA)
Subject: DEA for Permanent Replacement of the Historic Wainiha Bridges (Kaua'i)

May 23, 2016

VIA EMAIL TO: Michael Will, <u>michael.will@dot.gov</u> RE: <u>Comments on the Draft Environmental Assessment (DEA) for the Permanent</u> <u>Replacement of the Historic Wooden Wainiha Bridges</u>

Dear Mr. Will:

I would like to submit my comments regarding the DEA for the permanent replacement of the historic wooden Wainiha bridges (Kaua'i, Hawai'i). The Hanalei Roads Committee and other concerned local residents have testified at public hearings and provided comments on this DEA to emphasize that this project to build the permanent replacement bridges is NOT to replace the "temporary" ACROW-panel bridges, BUT the original historic wooden bridges, which the agency demolished when this project first began. This agency action has been arbitrarily and wrongly separated into two separate "projects." It appears that this approach is an attempt to avoid an adverse effect determination, calling for the first "project" to demolish the historic wooden bridges and build "temporary" replacements; and the second "project" to construct the permanent replacement bridges.

Neither the National Environmental Protection Act (NEPA) nor the Historic Preservation Act (NHPA), Sec. 106 intended for agencies to arbitrarily separate demolition of historic resources from the act of reconstructing them, despite time lags between demolition and reconstruction. Moreover, the agency action resulting in the demolition of the historic wooden one-lane bridges in Wainiha explicitly included in 2005 the stated intention to permanently replace them and specifically labeled the ACROW-panel bridges "temporary" bridges. The environmental review process does not allow separating an agency action into discrete parts or stages simply to avoid an adverse effect determination. I have attached *NEPA and NHPA, A Handbook for Integrating NEPA and Section 106* for information. The historic wooden bridges were demolished to make way for permanent bridges and must be considered as part of a single agency action. The "project" therefore has clearly had an adverse effect on historic properties, namely the demolition of the historic wooden bridges.

These historic wooden one-lane bridges at Wainiha, like the other historic wooden

one-lane bridges along this designated historic roadway (Route 560), are significant contributing elements to the designated historic roadway. The north shore section of this roadway was listed in the state and federal Register of Historic Places for its significance in the areas of engineering, transportation, and social history. As significant contributing elements, these wooden one-lane bridges directly impact the integrity of this roadway's historic character. The historic roadway has even greater significance as the only belt road through this hugely popular and well-traveled north shore area, serving tourists and residents. It is not merely a "rural minor arterial" as claimed by the DEA (1.2.1). In fact, there were 3,790 vehicles per day on this roadway in 2010 (1.2.1) and, today, there are undoubtedly an even greater number. These historic wooden bridges and roadway therefore play an important role in shaping people's experience, perception, and understanding of the region's distinctive history.

From the time that consultation on replacing Wainiha bridges first began, the Hanalei Roads Committee and other concerned members of the community have asked that mitigation for the loss of the original historic bridges include permanent bridges that would resemble the original historic bridges as closely as possible. Consulting parties have requested that the design of the new bridges include elements of the historic bridges such as wooden decking; and wooden railings, spaced widely so that vehicles waiting on one side of the one-lane bridges could see whether there were vehicles already on the bridges. In contrast to the historic bridges, the temporary ACROW-panel bridges have not provided such visibility and resulted in rising tensions between residents and tourists. Consulting parties have also requested that the permanent bridges replicate the width of the historic bridges, which had successfully calmed traffic and maximized pedestrian safety. The final EA could <u>easily</u> incorporate all the design elements requested by the Hanalei Roads Committee and successfully mitigate the demolition of the original historic wooden bridges. Refusal by an agency to adequately mitigate adverse effects because, for example, it wants to minimize the cost of long-term maintenance is not sufficient grounds under NEPA and NHPA, Section 106.

Since 2004, the construction of permanent bridges in Wainiha has been planned to replace the original historic wooden bridges. In fact, the DEA states that the demolition of the original historic wooden bridges and construction of "temporary" ACROW-panel bridges were authorized by the Governor in 2004 and 2007 because construction of the permanent replacement bridges had to be delayed due to safety (1.2.3). Therefore, the EA cannot conclude with a FONSI. It has to reflect an adverse effect on historic properties and provide adequate mitigation. If the final EA fails to provide this, the consulting parties would have strong grounds to appeal a finding of no significant impact (FONSI) based on the current DEA, which wrongly states that the project would have no effect on historic properties because the agency had already demolished them.

Sincerely,

Wendy J. Wichman, Ph.D. Preservation Associates Tel. (808) 271-0853 Email: <u>wendy@preservationassociates.org</u>

Attachments: 1) Comments, Preservation Associates (PDF) 2) NEPA and NHPA, A Handbook

From:	Parker, Thomas W (FHWA)		
To:	"wendy@preservationassociates.org"		
Subject:	Wainiha Bridges EA Comment 5-23-2016 Response		
Date:	Tuesday, December 13, 2016 1:40:00 PM		
Attachments:	2016-5-23 DEA Wendy Wichman Comments.pdf		
	2016-12-9 Wainiha Petition Comments Response FINAL.pdf		

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Regards, Thomas W. Parker Environmental Protection Specialist Federal Highway Administration Central Federal Lands Highway Division 12300 W. Dakota Ave., Suite 280 Lakewood, CO 80228 Work: (720) 963-3688 Mobile: (970) 509-0858

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## KAUAI WAINIHA BRIDGES PROJECT, Kūhiō Highway, Route 560



U.S. Department of Transportation

Federal Highway Administration

## General

During the Draft Environmental Assessment (EA) public comment period which ran from April 23, 2016 to May 23, 2016, numerous comments were received from the public regarding the Wainiha Bridges Project. Major comment themes included a focused on the Draft EA project title, the intent of the project, project design elements, and the typical section of the proposed replacement structures. The purpose of this document is to address these comments in a concise and holistic way. This analysis is being provided to the organizations and individuals that provided comments on the Draft EA. These include the Hanalei Roads Committee, Hui Ho Omalu I Ka Aina, Bob Terao, Carl Imparato, Jonny Wichman, Wendy Wichman, Glen Mickens, Mike Dennis and the 123 individuals who signed the *Petition to Stop the Wainiha Bridges Project*. The Central Federal Lands Highway Division (CFLHD), will include this response as well as the supplement data included herein into the appropriate sections of the Final EA.

## **Major Public Comment Themes**

The purpose of this memorandum is to clarify the Intent of the Wainiha Bridges Project, provide additional information regarding design criteria, and provide an update of the Wainiha Bridges design in light of the public comments received. As identified in the Draft EA, the primary purpose of the project is to replace the three temporary Wainiha bridges (referred to as Wainiha Bridges 1, 2, and 3) to maintain continued access along Kūhiō Highway. Additional issues (secondary project purposes) have been identified through engineering evaluation and agency and public outreach. These include the following:

- Improve operations;
- Manage maintenance requirements; and
- Balance project improvements with the character of the historic roadway corridor.

The bulk of the public comments received fall into one of the below comment categories:

- Draft EA Title and Project Description Mischaracterize the Project. Commenter's identify the project as a rehabilitation project. Commenter's request that we amend the title of the DEA ("Project to Replace Temporary Wainiha Bridges") to reflect the communities' intent to rehabilitation of the historic Wainiha Bridges. Numerous references were made to HDOT's October 2012 Engineering Design Report for the Rehabilitation of Wainiha Bridges.
- 2) Design should include replication of Historic 1957 Bridge Design as much as possible. Design considerations for Width, Decking, and Railings should be discussed further.
- 3) Why aren't two lane structures proposed given the ADT?

# Draft EA Title and Project Description Mischaracterize the Project.

The Wainiha Bridges project has a long history. The Wainiha Bridges have been an aspect of the Kauai Belt Road for over 100 years. Throughout this history, they have suffered numerous failures and emergency conditions warranting their repair, reconstruction, and eventual replacement with temporary Acrow structures erected in 2004 and 2007 under emergency conditions. The most recent history includes the 2004 demolition of the historic steel king post truss Wainiha bridge number 2 and its replacement with a temporary Acrow panel bridge under a September 22, 2004 governor proclamation. In 2007, Wainiha Bridge number 3 was damaged and a load test was performed by HDOT on Wainiha Bridges number 1 and number 3. The results of this load test lead HDOT to reduce the load limit to 3 tons. Again due to safety concerns on October 29, 2007, the Governor signed another proclamation for the demolition and removal of the historic queen post Wainiha bridges number 1 and 3 bridges with temporary Acrow Panel bridges.

As summarized in the National Register nomination for the three historic Wainiha Bridges (#1, #2, and #3) these structures were unique in Hawai'i. Designed to be built quickly and inexpensively, the bridges were an expedient response to the destructive 1957 tidal wave that stranded residents on the west side of the Wainiha River. The county Department of Public Works wasted no time designing new bridges to reconnect the north shore communities, and plans were ready within weeks. The designers used materials that were readily available and had been traditionally used on Kaua'i, including: steel I- beams, 12" lumber for decks, and 2" x 4"s for railings. Almost fifty years later, the bridges are an important feature of the North Shore's rural landscape and an integral part of its historic belt road.

Since the 2004 and 2007 emergency Wainiha bridges replacements, the Wainiha Bridges project has been identified as a project to rehabilitate the Wainiha Bridges. The 2012, Hawaii Department of Transportation (HDOT), Kauai District Engineering Design Report (EDR) was titled Kūhiō Highway, Rehabilitation of Wainiha Bridges Project (2012, HDOT EDR). Furthermore, the Statewide Transportation Implementation Plan (STIP), lists the project as the *Kūhiō Highway (Route 560) Bridge Rehabilitation, Wainiha Stream Bridges #1, #2, #3*.

The FHWA defines "rehabilitation" as "the project requirements necessary to perform the major work required to restore the structural integrity of a bridge as well as work necessary to correct major safety defects." Furthermore, the definition of "rehabilitation" related to the Secretary of Interior's Standard in 36 CFR 67 is as follows: "Rehabilitation means the process of returning a building or buildings to a state of utility, through repair or alteration, which makes possible an efficient use while preserving those portions and features of the building and its site and environment which are significant to its historic, architectural, and cultural values as determined by the Secretary." Unfortunately, the three Wainiha bridges reached a level of structural deficiency that was beyond rehabilitation, they were deemed unsafe, condemned and replaced in 2004 and 2007. As summarized in the Guidelines for Historic Bridge Rehabilitation and Replacement, prepared by the American Association of State Highway and Transportation Officials (AASHTO, 2007), "Not all historic bridges can be saved, but many can. Preservability of a historic bridge, as with any bridge, is a factor of its ability to perform adequately, which is defined by engineers as meeting current minimum standards or guidelines in the areas of load capacity (structural), geometry (functional), and safety." The AASHTO 2007 report goes further to establish guidelines for how to evaluate historic bridge rehabilitation / replacement. "Historical significance must also be a major factor in the decision-making process, including whether the bridge is of such significance that a higher level of effort to preserve it is warranted. If a bridge can be improved to an acceptable level in a prudent manner, within the limits of acceptable technology and without adversely affecting what it is that makes it historic, then the bridge is likely a viable candidate for rehabilitation."

The FHWA has avoided using the term "Rehabilitation" for the Wainiha Bridges Project, because it does not conform the typical definition of a bridge rehabilitation project and could be confusing to the general public and permitting agencies needing to take action on this project. The emergency response taken in 2004 and

2007 resulted in an adverse effect from the removal of the three historic Wainiha bridges. Since the bridges are no longer in place and the main character defining features were removed with them; the term rehabilitation is inappropriate to use since no major character defining remnants of the bridge remain or are able to be reused under the proposed action. However, the FHWA-CFLHD recognizes that the overall property, the Kaua'i Belt Road, is a significant historic site (NRHP site reference # 03001048, and Hawai'i State Inventory of Historic Places [SIHP] # 50-30-02-9396) and that the three historic 1957 Wainiha bridges were considered contributing elements to the road's historic integrity. Therefore the removal of the temporary Acrow Bridges with replacement bridge structures that echo the historic character of the 1957 bridges which adhere to the Secretary of Interior's Standards for such a replacement can be considered rehabilitation to the Kaua'i Belt Road National Register-listed historic property. Throughout the project development process, the FHWA-CFLHD has and continues to treat this as a rehabilitation project in terms of the four Secretary of Interior Standards and Guidelines for the treatment of historic properties (Preserving, Rehabilitating, Restoring, and Reconstructing) for the larger Kaua'i Belt Road historic property. However, characterizing the project as solely a bridge rehabilitation project is an inaccurate description of the project because no part of the bridges are able to be repaired or altered as is typical for rehabilitation projects which preserve those portions or features which convey its historical, cultural, or architectural values. We do agree that the Kaua'i Belt Road as a historic property is being rehabilitated because features of the three contributing Wainiha Bridge properties have been destroyed or lost. We initially considered naming the EA "Kūhiō Highway Rehabilitation Project" but did not because it implies improvements to stretches of roadway beyond the scope of the project and could also lead to misunderstanding of the projects intent. Because of the potential for this confusion, it was decided that the title should focus on the three Wainiha bridges and that "replacement" would be appropriate and would not cause confusion because it would not mischaracterize the project. Reconstruction was also considered and would be appropriate from a transportation standpoint but this terminology was also avoided due to potential confusion with the four treatment standards as an exact reconstruction of these three historic structures has never been HDOT's intent for this project as indicated in the 2012 HDOT EDR report.

Since the initial 2004 replacement of Wainiha Bridge number 2, HDOT initiated various communications and information gathering for the project from the public, state historic preservation division (SHPD), and interested parties. This information gathering effort culminated in the 2012 HDOT EDR report. This report was considered the first phase of two phase process. Phase I was identified as a Conceptual Design / Community Involvement phase where a Context Sensitive Solution for the project could be identified. Phase II was identified as the National Environmental Policy Act and Chapter 343, HRS 200– Environmental Assessment process and Design Phase. The phase 1 2012 HDOT EDR concluded with several key findings and design recommendations for the replacement bridges and that continued coordination would occur during the phase 2 process. Throughout project development, the FHWA-CFLHD has initiated coordination with the SHPD, interested parties, and the public regarding the replacement bridges which meets the intent of the 2012 HDOT EDR recommendations and project purpose and need. The Context Sensitive Design is discussed further within this report.

To improve clarity of the proposed project FHWA is updating the name of the EA to the following: "Wainiha Bridges Project (Replacement of the Temporary Bridges and Rehabilitation of Kauai Belt Road). We have further clarified/summarized this change within the EA's introduction, (project history, section 1.2.3) to describe the rehabilitation of the Kauai Belt Road aspect of the project as it relates to historic preservation. Further discussion of the rehabilitation of the Kauai Belt Road considerations of the project have been included in the cultural resources, Section 3.10 of the EA.

# Context Sensitive Solutions and Context Sensitive Design Considerations for the "Rehabilitation" of the historic Kauai Belt Road through replacement of the Wainiha Bridges.

Given the historical significance of the pre-ACROW 1957 Wainiha bridges and the Governor's Proclamation in 2007 that acknowledged the need to balance safety requirements with historic preservation; a Context Sensitive Solution (CSS) approach has been employed to identify a range of alternatives addressing bridge design considerations including materials, width, and aesthetic considerations in comparison to the project purpose and need and current design standards (i.e. AASHTO, KHRCP). The Federal Highway Administration (FHWA, 2007) defines CSS as a collaborative, interdisciplinary, approach that involves all stakeholders in developing a transportation facility that complements its physical setting and preserves scenic, aesthetic, and historic and environmental resources while maintaining safety and mobility. Context Sensitive Design (CSD), on the other hand, applies to a transportation project's engineering design features, and may include features that help the project fit harmoniously into the community (e.g., aesthetic treatments, color matching, or curbing details). In general CSS focuses on ensuring that designs are balanced with setting, significant resources, and transportation needs. It is an approach that leads to preserving and enhancing scenic, aesthetic, historic, community, and environmental resources, while improving or maintaining safety, mobility, and infrastructure conditions. It puts project needs and both agency and community values on a level playing field and considers all tradeoffs in decision making. Often associated with design in transportation projects, CSS should be a part of all phases of program delivery including long range planning, programming, environmental studies, design, construction, operations, and maintenance. The CSS approach is guided by four core principles:

- 1. Strive towards a shared stakeholder vision to provide a basis for decisions.
- 2. Demonstrate a comprehensive understanding of contexts.
- 3. Foster continuing communication and collaboration to achieve consensus.
- 4. Exercise flexibility and creativity to shape effective transportation solutions, while preserving and enhancing community and natural environments.

The CSS approach recognizes that criteria spelled out in various manuals (State Standards, AASHTO Green Book, Road Design manuals etc.) are not all typically clearly defined for new single lane bridge projects attempting to find a balance between safety and historical value. However, these standards need to be considered during the development process, and design exceptions or variances from these standards should be pursued if it can be shown that there are minimal documented safety issues, or if there are safety concerns that can be effectively mitigated.

For projects such as the Wainiha bridge project, an attempt to meet even the minimum criteria could result in unacceptable impacts to the historical value of the road and adjacent environment, resulting in a need to use criteria lower than those specified as minimum acceptable values in accordance with AASHTO. The AASHTO 2007 guidelines for decision making in historic bridge rehabilitation/replacement project were established to specifically address historic preservation and engineering issues in a manner that reflects the appropriate balance between the two seemingly divergent objectives – preserving old bridges and maintaining a safe, efficient transportation system. Below is a discussion on the bridge design elements of the historic 1957 bridges and our CSD considerations for balancing these elements with current design requirements for the replacement structures.

#### Bridge Width

Throughout the prior HDOT project engagement (2008 to 2013) and the on-going public outreach (2014-Present) with the local community, project stakeholders and the regulatory community; consideration of bridge width has been an element of continuing discussion. Due to the historical significance of the Wainiha Bridges and the Kauai Belt Road, the local stakeholders would prefer permanent replacement structures that closely matching the historic bridge widths. However, because it is HDOT's mission "To provide a safe, efficient, accessible and intermodal transportation system that ensures the mobility of people and goods, and enhances and/or preserves economic prosperity and the quality of life", a goal of the project is to achieve a balance of this historical context with other factors such as current design standards, safety, and functionality while minimizing impacts other sensitive environment resources.

The original Wainiha bridges, Bridge 1 and Bridge 3, were constructed in 1904. In 1924, an alternate stream channel for Wainiha Stream was created during a storm and an additional bridge was required. This new bridge, Bridge 2, was completed in 1931. By 1966, all three of these bridges were replaced due to damage as a result of destructive storm events. The previous Wainiha Bridges (before the ACROW Panel bridges) were built approximately sixty years ago. Those bridges were built as a temporary solution in response to the devastating tsunami in 1957. They did not meet today's design standards and were not envisioned to handle the volume and vehicular loading of today's traffic along Kūhiō Highway. The bridges that were constructed in 1957 and 1966 had the following dimensions:



Figure 1. 1957 Bridge 1 – Approximately 42-feet in length and 11-feet in width.



Figure 2. 1957 Bridge 2 – Approximately 78-feet in length and 10-feet in width.



Figure 3. 1957 Bridge 3 – Approximately 146-feet in length and 11-feet in width.

When these three bridges were again damaged by storm events, the Governor signed a proclamation on September 22, 2004 and another one on October 29, 2007, allowing these bridges to be replaced with temporary Acrow bridges. The 2007 proclamation stated that the design of the permanent repairs had been delayed "by the need to balance safety requirements with concerns regarding historic preservation and community preferences for maintaining the horizontal alignment and single lane nature of the Bridges". The bridges were replaced with temporary ACROW bridges in 2004 (Bridge 2) and 2007 (Bridges 1 and 3). Figures 4-6 below show the as-built typical sections for the existing Acrow Bridges.



Figure 4. Acrow Bridge 1 – 14 feet wide travel way



Figure 5. Acrow Bridge 2 – 12 feet wide travel way



Figure 6. Acrow Bridge 3 – 14 feet wide travel way

Following installation of the temporary bridge #2 in 2004, HDOT began working with a local consultant, AECOM, to identify long term engineering solutions for permanent replacement of the temporary ACROW bridges; with the goal of finding a CSS that would balance the historical value to the safety needs of a modern facility. Included in this effort was extensive public outreach that started in 2005 and continued through 2012, when the Engineering Design Report (HDOT 2012 EDR) was completed. Through the stakeholder outreach, it became apparent the public had a strong preference towards preservation of the historical context of the road by matching the alignment, widths, and aesthetics associated with the 1957 and 1966 bridges. The results of the 2012 HDOT EDR report recommended an 11-foot wide bridge for Bridge 1 and 16-foot widths for Bridges 2 and 3. The 2012 HDOT EDR stated that *In keeping with community preference and to maintain as much of the character of the rehabilitated bridges as possible and in accordance with Kūhiō Highway (Route 560) Historic Road Corridor Plan (KHRCP), the rehabilitated bridges will be of one-lane construction. The single lane bridge design does not meet AASHTO standards and will require a design exception. The rehabilitated for Bridge #1 will have a maximum of 11-foot width consisting of one travel lane. Bridges #2 and #3 will have a maximum of 16-foot clear width, including one 11-foot wide travel lane and a 5-foot wide bike/pedestrian lane.* 

8

The EDR report goes on to state that: However, Hanalai Roads Committee (HRC) and the local community prefer to have a width less than 14-feet wide, while HDOT recommends a 16-foot width. The community's reasoning for the narrower bridge width is for traffic calming, and to adhere to the historic nature of the roadway. All parties have agreed to continue working out a solution during the design and environmental permitting phase (Phase II) of the project.

The 2012 HDOT EDR report concluded with the following determination: *However, HRC and the local community have not accepted the proposed alternatives.* The primary point of disagreement involves the bridge width for Bridges #2 and #3. HRC prefers to have a width less than 14-feet wide, while HDOT, FHWA, and AASHTO standards require a 16-foot clear width, as set forth in the KHRCP. At the January 26, 2012 Public Meeting conducted in accordance with Section 106 Procedures of the National Historic Preservation Act and the National Environment Policy Act (NEPA), the local community insisted upon 11-feet wide bridges as they existed before removal in 2004 and 2007. The community's reasoning for the narrower bridge width is for traffic calming, and to adhere to the historic nature of the roadway. The parties have agreed to continue working out a solution as we work through the Section 106 Process and the Environmental Assessment.

In 2013, Central Federal Lands Highway Division (CFLHD) entered into a Memorandum of Agreement (MOA) with HDOT to provide for delivery and construction of the Wainiha bridge replacement project. After extensive review of available information, CFLHD formally initiated the environmental compliance process with public meetings held in December 2014 and March of 2015. A common concern expressed by the public at these meetings was that the community wanted reassurance that the work previously completed was not lost and the design process was not starting over.

On April 23, 2016 the Draft EA was released for public comment. The Draft EA presented a proposed bridge design for three permanent one-lane bridges with a 14-foot roadway section from rail to rail, with an additional 1-½ feet on each side to support bridge rails and for hanging utilities. During the public comment period 15 agency and public comments were received and petition entitled The "Petition to Stop the Wainiha Bridge Project" was circulated by concerned citizens. One hundred and twenty three signatures were obtained as part of the Wainiha Petition. The Petition read as follows:

As residents of Hanalei we are interested in preserving and protecting our home. We live in Hanalei because of its country lifestyle and a way of life that is rapidly disappearing in other parts of Hawaii. Kauai is being squeezed by pressures to develop our area by the tourism industry and other developers. We feel it is our duty to protect the Hanalei lifestyle for future generations.

The Hawaii Department of Transportation has decided to replace the three bridges in Wainiha. Currently these three bridges are **11 feet wide**. The HDOT proposes to increase the width of these three bridges to **14 feet wide**. This is unacceptable for the following reasons: If we allow HDOT to make the 3 Wainiha bridges 14 feet wide it will allow tour buses to access our beaches and parks in Haena and Kee. This will forever change the peaceful tranquility and country feel of this area. It will allow massive development in Kee. It will change the area from rural use to a tourist Mecca . We are strongly opposed to widening the 3 bridges. We want them kept as is. If the bridges need to be upgraded for safety, we ask that the community's wishes be obeyed, and the historical nature of the 3 bridges remain. The community wants 11 foot wide bridges.

Unfortunately, this petition did not provide a clear comparison of the existing Acrow bridge widths versus the proposed bridge widths. For the last nine years (Since the 2007 replacement) the Wainiha Acrow Bridges have accommodated a 12-foot minimum (Bridge 2), single-lane bridge roadway typical section (Figure 5). Additionally, the temporary Acrow Wainiha Bridges 1 and 3 currently have a 13-foot 7-inch

single-lane bridge typical section as identified in Figures 4 and 6. The proposed action as presented within the Draft EA would make the bridge widths uniform for all three bridges at 14-feet.

The public comments received during the Draft EA public comment period was consistent with public input shared in the 2012 HDOT EDR. The community preference is towards maintaining the historical and rural nature that is unique to the North Shore of Kauai with new single lane bridges that replicate the 1957/1966 bridges. However, there was also a small minority that expressed interest for improving operational characteristics with consideration of a two lane bridge alternative with widths that would more effectively accommodate vehicular access, emergency vehicle access, maintenance vehicles, and trailers. A summary of the primary issues identified by the public is described below:

#### **Operations**

- The Acrow bridges don't function as well as the older bridges. It is more difficult to see across the bridges with the Acrow bridges. The rails are too high, with tighter spacing, the roadway and bridges are higher, and vegetation becomes overgrown and is not well-maintained.
- It is not uncommon for two vehicles to enter the bridge from opposite sides at the same time and one have to back up. Road rage sometimes occurs.
- Ensuring safe ingress and egress is important. Emergency vehicle access is necessary, with consideration of width, load capacity, and ability to withstand storms. Safe access in an emergency is important.
- Speeds are a concern. Narrow bridges help to keep speeds low. Wider bridges make people go faster and it becomes more unsafe.
- The high project ADT of >3,200 vehicles per day (per the 2012 HDOT EDR), many of which are tourists don't seem to be familiar with navigating the one-lane bridges of the north shore.

#### Maintenance Considerations

- Vehicles repeatedly hit the timber rails on the older bridges. This required repairs and replacements.
- Timber decking and railing experience increased wear and/or rot from the high use and the corrosive saline environment, which results in periodic repair and replacement.
- The ACROW bridges require bolt tightening and corrosion protection.
- Vegetation often becomes overgrown and is not well-maintained. This affects visibility.

#### Construction Impacts

- Impacts to the stream and estuary need to be adequately addressed and minimized.
- Traffic impacts during construction are a concern.

#### Evaluation of Bridge Widths for the Wainiha Bridge project

Based on the variety of standard recommendations identified, stakeholder input, and the information presented in the 2012 HDOT EDR; CFLHD wanted to ensure the replacement Wainiha bridge design was consistent with a CSD will meeting minimum design standards. CFLHD evaluated standard design guidance to evaluate both one lane and two land bridge design standards before developing the proposed fourteen foot (14') Wainiha bridge design. This design attempts to balance community desires with minimum acceptable design standards and the stated project purpose and need. The following describes the evaluation approach and the bridge widths considerations made by the FHWA-CFLHD:

#### Single Lane - Two Way Bridges

A review of the reported crash history does not indicate an abnormal safety situation (either on the previous one lane bridges or on the current one-lane ACROW bridges), despite ADT significantly exceeding the Low Volume Road threshold. Over the eleven years of crash data provided by HDOT (from 2000 to 2011), there

have been approximately 17 crashes in the vicinity of the bridges. Of these 17 crashes, there have been zero fatalities and five injury crashes. Only one crash occurred in the last four years of the data analyzed. The standard AASHTO design criteria and guidelines, as it relates to new construction of one lane bridges, typically requires that one lane bridges only be considered for low volume roads (ADT <400 vpd). A design exception is warranted for the three Wainiha bridges due the higher volumes estimated for the route. However, it should also be noted, that the bridges in the Hanalei area are all single lane, two directional bridges, and the new bridges would be consistent with the driver expectancy for the historic route.

#### Single Lane - Two Way Bridge Width Considerations

Single lane bridge width design parameters are another consideration where traditional design standards are not clearly defined with consideration of site-specific historical context. Available guidance found through various nationwide sources suggests varying approaches by Land Management Agencies (LMA) to address challenges with replication of historical bridge widths while maintaining an acceptable level of engineering standard; from simply using the AASHTO Policy for highway bridges to development of Land Management Agency-specific policies to address the historic bridges they own and maintain. The following are a few of the guidelines/policies identified during our guidance review:

#### New York Department of Transportation (Geometric Design Policy for Bridges Appendix 2B):

"When all requirements have been met, and when a final decision has been made to replace an existing onelane bridge by another one-lane bridge, and when Design Approval, specifying that decision, has been obtained, the structural design normally shall produce plans for a bridge 14 ft. wide between railings, except that the replacement shall not be narrower than the existing one-lane bridge. Minor variations are permissible to account for the intricacies of particular structural components."

#### National Park Service – Park Roads Standards (1984)

"The total roadway width (including shoulders for low volume, one-lane roads should not exceed 14 feet because of the tendency of drivers to use a wider facility as a two lane road."

#### USDA Forest Service Design Guidelines (FSH 7709.56b) (2014)

"Most National Forest System (NFS) road bridges carry low-volume, low-speed traffic. Most of AASHTO's design specifications and standards are written for higher-speed, higher-volume roads."

#### Furthermore the Forest Service guidance states:

"Use a 14-foot width as the minimum clear distance between traffic barriers for bridges, cattle guards, and other single-lane road structures. Use widths greater than 14 feet to accommodate curve widening, offhighway vehicles, and minor deviations (up to 2 feet) resulting from using standard modular structural units. Ensure that a single-lane bridge does not create the appearance of two lanes of traffic."

#### AASHTO's A Policy on Geometric Design of Highways and Streets (2011)

The minimum roadway width for new and reconstructed bridges should match the approach roadway width for Design volumes over 2,000 vehicles per day.

#### AASHTO's Guidelines for Geometric Design of Very Low-Volume Local Roads (2001)

"One lane bridges may be provided on single lane roads and two lane roads with ADT less than 100 vehicle per day where the designer finds that a one-lane bridge can operate effectively. The minimum width of a one lane bridge should be 4.5m (15ft) unless the designer concludes that a narrower bridge can function effectively (e.g., based on the safety performance of similar bridges maintained by the same agency)"

#### Kūhiō Highway (Route 560) Historic Road Corridor Plan (KHRCP)

As summarized in the 2012 HDOT-EDR, a document entitled *Kūhiō Highway (Route 560) Historic Road Corridor Plan (KHRCP)* was prepared to provide a guideline for project planning on the Kūhiō Highway. The KHRCP "Introduction" summarizes the report as follows:

"This planning document has been developed to provide the Hawaii State Department of Transportation (HDOT), Highways Division, with a framework for decision making and actions on Kūhiō Highway, Route 560. It focuses on a specific concept for the highway involving rural-historic road design intended to protect the corridor's natural and historic conditions and characteristics. The provisions of this document do not apply to all HDOT highway facilities, but only to the Kauai District office and the management and operations of Route 560."

"The HDOT will specifically use this document as a working plan to provide the necessary direction for current and long-term actions regarding preservation, rehabilitation, restoration, reconstruction and improvement, and repair and maintenance work on Route 560 over the next 25 years."

The KHRCP serves as a community framework for HDOT Highways Division – in regards to Kūhiō Highway. The corridor plan addresses specifically one-lane bridges and states: *"Replacement of any one-lane bridges should:* 

- 1) be reconstructed, as much as practical, with bridge similar in design;
- 2) have a single 12 feet-wide travel lane and 2 feet-wide shoulders;
- *3)* have parapets or rails that are designed to be in character with the existing one-lane bridges along Route 560;
- 4) accommodate pedestrian/bicycle access within or outside of the bridge;
- 5) have a posted load of 15 tons and be capable of accommodating 18-ton fire trucks and other public utility or service vehicles; and
- 6) incorporate AASHTO guidance on crash-tested features."

The Hanalei Roads Committee (HRC) is comprised of members who contributed to the KHRCP from the Kūhiō Highway Community Advisory Committee. In meetings held with HDOT and the HRC during phase I of the Wainiha Project, it was conveyed that the bridge guidelines in the Corridor Plan were to be used as a framework, and that subsequent design could deviate slightly from the KHRCP.

The KHRCP planning level document was prepared in an effort to establish guidelines for improvements to the historic Kūhiō Highway Corridor. Recommendations from the report suggest that one lane bridges be replaced with one 12' lane with 2' shoulders (16-foot wide bridges). Despite the recommendations provided from this document, the local stakeholders feel the Hanalei area is a unique district along the Historic Kūhiō Highway Corridor and further consideration should be made with regards to width of the new bridges to more closely match the historic width.

#### **Bridge Width Evaluation**

The FHWA-CFLHD evaluated 4 bridge widths before developing the proposed bridge design alternative as presented within the to the April 2016 draft EA. Below is a summary of the bridge width evaluation conducted by FHWA-CFLHD.

#### 11-foot wide bridge

• This bridge width was presented in the EDR as the preferred width for all of the Wainiha Bridges expressed by the local community and the Hanalei Roads Committee as it more closely matches the historic/previous bridge widths and the narrower widths help to slow traffic. The EDR also recommended this width bridge for Bridge #1. The local stakeholders feel that the narrow one-lane

bridges are part of the pace, lifestyle and culture of the area. They are part of what makes the area so special and unique.

#### 13-foot wide bridge

• This bridge width was included as an alternative in the evaluation to compare against for functional use, verifying the design vehicle can maneuver the bridges without damaging the approach rails.

#### 14-foot wide bridge

• This bridge width was selected for evaluation as it matches AASHTO's guidance with regards to single lane road widths. It was also selected as a preferred alternative in a letter to HDOT from the HRC, indicating 14-foot wide bridges would be considered acceptable. However, this letter was later redacted in a follow up letter dated February 27th, 2012 where they indicated a preference for 11-foot bridge widths.

#### 16-foot wide bridge

• This bridge width was presented in the 2012 HDOT EDR as the recommended bridge width for bridges 2 and 3.

For comparative purposes and with consideration of the draft project purpose and need, the above bridge widths were evaluated against the following criteria:

1. AASHTO Controlling Design Criteria (for documentation of design exceptions)

Road Classification: Rural Arterial ADT: >3200 vpd (per the EDR) Design Speed / Posted Speed: 25mph Design Vehicle: AASHTO SU-40 Accident History: 11 year review of HDOT data (No abnormal safety situations)

- o Bridge Width- Match existing approach roadway width
- Lane Width (Travel-way) 22-foot (11 foot lanes)
- Shoulder Width Minimum 8-foot shoulders
- 2. Functionality To evaluate the functionality of the different bridge widths, AutoTurn (design engineering software) was used to simulate the design vehicle's tracking movements (front overhang and tires) as it travels the proposed roadway alignment. The design vehicle identified and agreed to during project scoping is a single unit truck (AASHTO's SU-40), a 39.5 foot single unit vehicle similar to a delivery truck. A passenger car towing a boat trailer was also evaluated, but the single unit truck has a larger turning radius and is therefore the controlling design vehicle.

Shy distance (the distance from the edge of traveled way to the face of the barrier) was also considered under functionality. FHWA guidance recommends a minimum of 2 feet be provided (Section 8.5.3.3.4 of the Project Development and Design Manual).

- 3. **Maintenance** Maintenance was considered a critical evaluation criterion due to the potential long term commitment of maintenance funding necessary to support the preferred alternative. To evaluate anticipated maintenance of the various bridge widths, anecdotal evidence was used based on feedback from both the public and HDOT district staff.
- 4. **Pedestrian and Bicycle Safety** Although the bridges will not be designed to fully accommodate pedestrians and bicycles, their safety is still a consideration in the width of the Wainiha bridges.

See the below Table 1 for an evaluation of the different bridge widths evaluated against these different measures:

Table 1. Bridge Width Considerations					
		11 ft (10-foot lane, 0.5- foot shoulders)	13 ft (11-foot lane, 1.0- foot shoulders) Note: Lane widths could be striped at 10-foot for traffic calming and added pedestrian refuge)	14 ft (11-foot lane, 1.5- foot shoulders) Note: Lane widths could be striped at 10-foot for traffic calming and added pedestrian refuge)	16 ft (11-foot lane, 2.5- foot shoulders) Note: Lane widths could be striped at 10-foot for traffic calming and added pedestrian refuge)
AASHTO Controlling Criteria	Lane Width	Design exception required	Meets AASHTO standard	Meets AASHTO standard	Meets AASHTO standard
	Shoulder Width	Design exception required	Design exception required	Design exception required	Design exception required
	Bridge Width	Design exception required	Design exception required	Design exception required	Design exception required
Functionality	Design Vehicle (Verifying the design vehicle can successfully navigate the bridge)	Does <u>not</u> accommodate design vehicle at bridges 2 and 3.	Accommodates design vehicle	Accommodates design vehicle	Accommodates design vehicle
	Shy Distance	Does not meet recommended guidance	Does not meet recommended guidance	Does not meet recommended guidance	Meets recommended guidance.
	Level of Service	Unchanged	Unchanged	Unchanged	Unchanged
Maintenance	Maintenance (related to width only)	Anecdotal evidence confirms that the bridge rails get hit by larger vehicles at Bridges 2 and 3, requiring frequent maintenance.	Maintenance of bridge rails is anticipated to be reduced as bridge width widens.	Maintenance of bridge rails is anticipated to be reduced as bridge width widens.	Maintenance of bridge rails is anticipated to be reduced as bridge width widens.
Pedestrian and Bicycle Safety	Pedestrian and Bike Safety	At this width, pedestrians and bicycles would have to walk in the travel lane.	Pedestrians and bicycles have very little room to move if a vehicle enters the bridge at the same time.	In the event that a pedestrian or bicyclist is using the bridge, it provides them some refuge if a vehicle enters the bridges at the same time.	In the event that a pedestrian or bicyclist is using the bridge, it provides them some refuge if a vehicle enters the bridges at the same time.
Miscellaneous	Miscellaneous	Closely matches historical widths			Could be perceived as a two-lane road, reducing overall safety for vehicles and pedestrians and bikes in the event that they use the bridge.

During design development, the FHWA-CFLHD also reviewed the design of the historic 1957 Wainiha Bridges to identify a suitable replacement structure design. The proposed design recommendations discussed within the 2012 HDOT EDR served as a starting point for developing the draft Wainiha Bridges design. Though the 2012 HDOT EDR recommended bridge widths vary slightly from the 14 foot bridge (See Figure 8 Below) width presented in the April 2016 EA, CFLHD proposed the 14 foot width because it is a CSD which best meets standard one lane bridge design standards while not being excessively wide (See Figure 7 below), thereby minimizing the effect to the scale of the historic bridges within their historic landscape.



Figure 7. 2012 HDOT EDR Preferred Design Rendering



Figure 8. Proposed Typical Section from Draft April 2016 EA (Figure 2-1).

#### Bridge Deck and Rail Design Considerations

Additionally, the 1957 Wainiha bridges contained several key design elements that were to be considered as aesthetic treatments for the replacement Wainiha Bridges. These elements included the decking material, pedestrian and vehicle railing, and end treatments. The 2012 HDOT EDR stated that bridge decking will be designed to mimic the placement of the timber planking on the previous bridges. Replacement design will incorporate timber or timber facsimile for the traveled way surface. The public has commented numerous

times on wanting to replicate the unique look, feel and sound of the historic Wainiha bridges. It is well documented that in a wet environment such as that found at the Wainiha Bridges, timber planks experience increased wear and/or rot. This results in a need for replacement periodically, which adds considerably to HDOT's maintenance workload and material costs as well as major traffic stoppages during such repairs. Additionally, the CLFHD has also received design recommendations from the National Marine Fisheries Service (NMFS) on other similar bridges near the Kauai coast. The NMFS has recommended that CFLHD avoid the use of metal (e.g. copper) and pressure treated lumber (e.g. creosote) and further ensure that materials used for the bridge or retaining walls are nontoxic to aquatic organisms. Copper leaches from metal treated wood while polycyclic aromatic hydrocarbons leach from wood treated with creosote. Avoiding the use of these types of treated wood products would avoid or minimize potential adverse effects to human and fish health within adjacent aquatic habitats. As presented in the April 23, 2016 draft EA, the FHWA-CFLHD initially proposed a cast in place concrete bridge deck that was treated with a timber-like appearance. This design was intended to provide a timber facsimile (through color and surface application and treatment) for aesthetic purposes while reducing maintenance costs and addressing aquatic resource concerns raised by the NMFS. However, following the public comments that support a bridge design that replicates the timber deck of the 1957 Wainiha Bridges; the CFLHD has spent the last few months redesigning the Wainiha bridge to include a true timber deck. The proposed Wainiha Bridges now include a timber deck made from 4 inch by 12 inch treated lumber installed longitudinally as was present on the 1957 historic Wainiha bridges (See Figure 10). This design revision is presented in figures 9 through 12 below. The EA is being updated to present the modified bridge deck design.

Additionally, it was documented within the 2012 HDOT EDR that all replacement Wainiha bridges will utilize vehicular and pedestrian compliant railings. The 1957 bridge railings consisted of a simple 2x4 lumber design. It was assumed in the EDR that the proposed rails could use Structural Steel Tube (SST) Railings for the replacement bridges that comply with Test Level 2 (TL-2) of the AASHTO standards while mimicking the aesthetics of the 1957 bridges. Railing picket spacing was also discussed as a desire to mimic the original 1957 Bridge railing spacing has been expressed by the local community. During design development, the FHWA-CFLHD elected to utilize the SST railing as recommended within the 2012 HDOT EDR report to restore the visual aesthetic of the historic 1957 Wainiha bridges rails while ensuring rail crashworthiness and maintenance objectives are met for the replacement structures. As is shown in Figures 9 through 12, the proposed SST railing is aesthetically similar to the 1957 bridges, while meeting current crashworthiness standards. The SST has similar rail picket spacing and is slightly shorter than the 1957 railings to improve sight distance on the bridges.



Figure 9. Modified Proposed Typical Section with Timber Deck.



Figure 10. Bridge 3 Pre Acrow Replacement.



Figure 11. Visual Rendering of Modified Timber Bridge Deck.



Figure 12. Visual Rendering of Modified Timber Bridge Deck.

## Conclusion

The CFLHD in partnership with the HDOT is committed to balancing community and transportation needs for the Wainiha Bridges Project. CFLHD believes that the modifications made to the proposed bridge design as presented in this report and to be included in the forthcoming EA updates would provide replacement Wainiha bridges that would satisfy the projects purpose and need, are consistent with nationally recognized design standards for a roadway with this Average Daily Traffic all the while providing aesthetic deign treatments which echo the historic Wainiha bridges which will complement this segment of the historic Kaua'i Belt Road.

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Appendix C Determination and Delineation of Wetlands and Other Waters of the U.S. for the Wainiha Bridges Project


# Determination and Delineation of Wetlands and Other Waters of the U.S. for the Wainiha Bridges Project

## Kaua'i Island, Hawai'i

2055

Prepared for

Federal Highway Administration, Central Federal Lands Highway Administration

and

**CH2M HILL** 

Prepared by SWCA Environmental Consultants

December 2015

#### DETERMINATION AND DELINEATION OF WETLANDS AND OTHER WATERS OF THE U.S. FOR THE WAINIHA BRIDGE PROJECT

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SWCA Project No. 30745

Revised December 3, 2015

#### WATERS OF THE U.S. DETERMINATION/DELINEATION SUMMARY

PROJECT NAME: Wainiha Bridges

- SITE LOCATION: Kauaʻi Island, Hawaiʻi 22.212935°N, -159.543670°W
- OWNER: Federal Highway Administration, Central Federal Lands Highway Division Hawai'i Department of Transportation

SURVEY DATES: September 30-October 2, 2014

PROJECT STAFF: Brian Nicholson, Wetland Specialist Tiffany Bovino Agostini, Botanist/Project Manager Bryson Luke, Field Technician

#### SUMMARY

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division, in partnership with the State of Hawai'i Department of Transportation (HDOT), is proposing to replace three temporary pre-fabricated (ACROW) bridges (Wainiha Bridges 1, 2, and 3) and place temporary one-lane bridges adjacent to or crossing over three additional one-lane bridges (Wai'oli, Waipā, and Waikoko) on Kūhiō Highway (Route 560) between Hanalei and Wainiha, on the north side of Kaua'i Island, Hawai'i (see Figure 1). CH2M HILL contracted SWCA Environmental Consultants (SWCA) on behalf of FHWA to complete a determination and delineation of potential Waters of the U.S. (WoUS) governed by the Clean Water Act and the Rivers and Harbors Act. This report summarizes the findings of the potential WoUS delineation and determination conducted at these locations between September 30 and October 2, 2014. It is broken into six sections, one for each bridge location.

The survey area comprises five non-contiguous survey areas: Wai'oli, Waipā, Waikoko, Wainiha 1, and Wainiha 2 & 3. In all, the whole survey area covers approximately 9.24 acres (3.74 hectares [ha]). Twenty-four wetland sampling points were evaluated in the survey area to determine whether wetlands or other WoUS occur. A detailed field-based determination indicates that 11 of the 24 sampling points meet the three-criterion test for wetlands (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology) pursuant the 1987 *Corps of Engineers Wetland Delineation Manual* and the 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual*: *Hawai'i and Pacific Islands Region*. SWCA delineated approximately 3.88 acres (1.58 ha) of potential WoUS. This comprises 2.78 acres (1.13 ha) of non-wetland WoUS and 1.10 acres (0.45) of wetlands. This conclusion is subject to confirmation by the U.S. Army Corps of Engineers.

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## CONTENTS

1. INTRODUCTION	1
1.1. Regulatory Setting	1
1.2. Project Background	2
1.3. Proposed Project Description	2
2. METHODOLOGY	4
2.1. Wetlands	4
2.1.1. Vegetation	4
2.1.2. Soils	5
2.1.3. Hydrology	5
2.2. Non-Wetland Waters	5
3. DESCRIPTION OF THE SURVEY AREA	6
3.1. Wai'oli Stream Bridge	7
3.2. Waipā Stream Bridge	8
3.3. Waikoko Stream Bridge	9
3.4. Wainiha Bridge 1	0
3.5. Wainiha Bridges 2 & 3	0
4. <b>RESULTS</b>	2
4.1. Wai'oli Stream Bridge	2
4.1.1. Wetlands	3
4.1.2. Non-Wetland Waters	3
4.2. Waipā Stream Bridge	4
4.2.1. Wetlands	4
4.2.2. Non-Wetland Waters1	5
4.3. Waikoko Stream Bridge	5
4.3.1. Wetlands	5
4.5.2. Non-welland waters	0
4.4. Walling Bridge I	0 7
4.4.1. Wetlands	' 7
45 Wainiba Bridges 2 & 3	, 8
4.5.1. Wetlands	8
4.5.2. Non-Wetland Waters	9
5. CONCLUSIONS	0
6. LITERATURE CITED	1

### APPENDICES

Appendix A.	Data Forms

Appendix B. Results Maps

Appendix C. Survey Area Photographs

Appendix D. National Wetland Inventory and National Hydrography Dataset Maps

### FIGURES

### TABLES

Table 1.	Wetland Plant Indicators	5
Table 2.	Acreage of Bridge Survey Areas	5
Table 3.	Soils in Wai'oli Survey Area	7
Table 4.	National Wetland Inventory results for Wai'oli Survey Area	7
Table 5.	Soils in Waipā Survey Area	3
Table 6.	National Wetland Inventory Results for Waipā Survey Area	3
Table 7.	Soils in the Waikoko Survey Area	)
Table 8.	National Wetland Inventory Results for Waikoko Survey Area	)
Table 9.	Soils in the Wainiha Bridge 1 Survey Area	)
Table 10.	Soils in the Wainiha Bridges 2 & 3 Survey Area	1
Table 11.	National Wetland Inventory Results for the Wainiha Bridges 2 & 3 Survey Area 11	1
Table 12.	Acreage of Potential Waters of the U.S. in the Wainiha Bridges Project Survey Area	2
Table 13.	Potential Waters of the U.S. Delineated in the Wai'oli Survey Area	2
Table 14.	Determination of Sampling Points at the Wai'oli Survey Area	3
Table 15.	Potential Waters of the U.S. Delineated in the Waipā Survey Area14	1
Table 16.	Determination of Sampling Points at the Waipā Survey Area14	1
Table 17.	Potential Waters of the U.S. Delineated in the Waikoko Survey Area15	5
Table 18.	Determination of Sampling Points at the Waikoko Survey Area	5
Table 19.	Potential Waters of the U.S. Delineated in the Wainiha Bridge 1 survey area	7
Table 20.	Determination of Sampling Points at the Wainiha Bridge 1 Survey Area	7
Table 21.	Potential Waters of the U.S. Delineated in the Wainiha Bridges 2 & 3 Survey Area 18	3
Table 22.	Determination of Sampling Points at the Wainiha Bridges 2 & 3 Survey Area	3

### ABBREVIATIONS

CFR	Code of Federal Regulations
CWA	Clean Water Act
CWB	Clean Water Branch
CWRM	Commission on Water Resource Management
DOH	Department of Health
FAC	Facultative
FACW	Facultative Wetland
FHWA	Federal Highway Administration
GPS	global positioning system
ha	hectare(s)
HDOT	State of Hawai'i Department of Transportation
m	meter(s)
MHW	mean high water
MHHW	mean higher high water
m	meter
mm	millimeter(s)
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
NWP	Nationwide Permit
OBL	Obligate
SCAP	Stream Channel Alteration Permit
SWCA	SWCA Environmental Consultants
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WoUS	Waters of the U.S.

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# 1. INTRODUCTION

This report describes the extent and location of potential Waters of the U.S. (WoUS) in the Wainiha Bridges survey area in Kaua'i County, State of Hawai'i. The survey area covers 9.24 acres (3.74 hectares [ha]). The regulatory setting, project background, and proposed project description are described below.

# 1.1. Regulatory Setting

The U.S. Army Corps of Engineers (USACE) derives its regulatory authority over WoUS from two federal laws: 1) Section 10 of the Rivers and Harbors Act of 1899 and 2) Section 404 of the Clean Water Act (CWA) of 1972.

Under Section 404 of the CWA, dredged and fill material may not be discharged into jurisdictional WoUS (including wetlands) without a permit. Wetlands are a subset of jurisdictional WoUS and are jointly defined by the USACE and the U.S. Environmental Protection Agency (40 Code of Federal Regulations [CFR] 230.3) as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Section 10 of the Rivers and Harbors Act of 1899 prevents unauthorized obstruction or alteration of navigable WoUS. Navigable waters are defined as "subject to the ebb and flow of the tide and/or presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (33 CFR 322.2(a)). A Section 10 permit is required for non-fill discharging activities that would place any structure below, within, or over navigable WoUS, or would involve excavation/dredging or deposition of material or any obstruction or alteration in navigable WoUS.

The new CWA Rule, which went in to effect on August 28, 2015 (with exclusions), defines WoUS subject to agency jurisdiction as follows (40 CFR 230.3):

- 1. Navigable waters
- 2. Interstate waters and wetlands
- 3. Territorial seas
- 4. Impoundments of WoUS
- 5. Tributaries to 1–3
  - a. A *tributary* is defined as water that contributes flow, either directly or through another water, including an impoundment, into Category 1–3 waters.
  - b. Requires both an ordinary high water mark (OHWM) and bed/banks.
  - c. Can be human-made.
- 6. Adjacent waters to 1-5
- 7. Similarly situated waters with significant nexus (e.g., Prairie potholes, vernal pools)
- 8. Case-specific waters with significant nexus
  - a. within a 100-year floodplain, but more than 1,500 feet from an OHWM, or
  - b. within 4,000 feet of an OHWM or high tide line.

The 1987 *Corps of Engineers Wetlands Delineation Manual* (USACE 1987 Manual; USACE 1987), as amended, outlines the technical guidelines and methods for identifying and delineating wetlands potentially subject to Section 404 of the CWA. This manual is supplemented by the 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Hawai'i and Pacific Islands Region* (Hawai'i and Pacific Island Regional Supplement; USACE 2012).

The limits of jurisdiction for non-wetland, tidally influenced WoUS extend to the high tide line or mean high water (MHW) line. A more conservative approach than the MHW, the mean higher high water (MHHW) line, is often used. The jurisdictional boundary for non-tidal, non-wetland waters is the OHWM.

# 1.2. Project Background

The Federal Highway Administration (FHWA) Central Federal Lands Highway Division, in partnership with the State of Hawai'i Department of Transportation (HDOT), is proposing to replace the three temporary pre-fabricated (ACROW) bridges on Kūhiō Highway (Route 560) between Hanalei and Wainiha, on the north side of Kaua'i Island, Hawai'i (Figure 1). These three bridges are located along Kūhiō Highway between mile post (MP) 6.4 and 6.7 near the mouth of the Wainiha Stream before it feeds into Wainiha Bay. The previous bridges at these three locations were replaced under state emergency actions in 2004 and 2007 with temporary ACROW bridges as a temporary measure to keep the roadway open until design and environmental compliance for the new structures could be completed. The three bridges are owned and maintained by HDOT.

In addition, the project requires the placement of temporary one-lane bridges adjacent to or crossing over three historic one-lane bridges along Kūhiō Highway located at Wai'oli, Waipā, and Waikoko Streams that access the Wainiha Bridges project site. These historic bridges have low load capacities, and temporary bridges would allow construction loads to access the Wainiha project site without affecting the historic integrity of these bridges.

# 1.3. Proposed Project Description

FHWA and HDOT propose to remove the existing three temporary ACROW bridges and abutments at Wainiha Bridges 1, 2, and 3, and replace them with new one-lane, concrete girder bridges that closely match the existing alignment. The width of the new bridges would be close to the existing bridge widths to maintain the existing roadway character. The existing, temporary ACROW bridges at the Wainiha project site would be shifted makai to accommodate traffic during construction of the new bridges. All components of the temporary bridges would be removed upon completion of the project.

Construction access to Wainiha Bridges 1, 2, and 3 can only be provided from east of the project location; therefore, the project also requires placement of temporary one-lane bridges adjacent to or crossing over three additional one-lane bridges along Kūhiō Highway: Wai'oli (MP 3.93), Waipā (MP 3.90), and Waikoko (MP 4.22). Temporary structures will be placed adjacent to or over the Wai'oli, Waipā, and Waikoko Bridges to accommodate construction loads needed for the project and to avoid affecting the historic integrity of these bridges. No piers are anticipated at these three load-restricted bridges; however, length limitations may require an abutment to encroach minimally into the stream channel on one or both sides of Wai'oli Stream and Waipā Stream. No in-water work is anticipated at Waikoko Stream.

In addition, two potential staging areas would also be required as part of the project. These are proposed along  $K\bar{u}hi\bar{o}$  Highway near Lumahai Beach, one on the southwest side of the road and one on the east side of the road. Staging would also occur at each bridge location.



Figure 1. Location of the survey area.

# 2. METHODOLOGY

Before the wetland delineation fieldwork, SWCA reviewed aerial photography, topographic maps, and data sets, including the Natural Resources Conservation Service (NRCS) SSURGO dataset, U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) data, the U.S. Geological Survey (USGS) National Hydrography Dataset, the *State of Hawai'i Atlas of Hawaiian Watersheds & Their Aquatic Resources* (Parham et al. 2008), the State of Hawai'i Department of Aquatic Resources dataset, and other available publications, technical reports, and geographic information systems datasets to collect information on wetlands and WoUS potentially in the survey area.

SWCA biologists conducted the WoUS determination and delineation fieldwork between September 30 and October 2, 2014. The geographic coordinates of sampling points and features were collected in the field with Trimble GeoXT 6000 Series global positioning system (GPS) unit, and data were post-processed in ArcGIS using GPS Correct to sub-meter accuracy. The linear length and acreage of these features were calculated by projecting these point and line data files in a geographic information system.

# 2.1. Wetlands

Biologists employed methods for determining the presence of wetlands as prescribed by the USACE 1987 Manual (USACE 1987) and the Hawai'i and Pacific Island Regional Supplement (USACE 2012). Based on these documents, jurisdictional wetlands are identified using the following three criteria: hydrophytic vegetation, hydric soils, and wetland hydrology. All three criteria must be present for an area to be considered a wetland, unless the site is disturbed. An explanation of the three wetland criteria is provided below. Wetland determination data forms prepared during the survey are included in Appendix A. Results maps and survey area photographs are provided in Appendices B and C, respectively.

### 2.1.1. Vegetation

The USACE defines *hydrophytic vegetation* as "the community of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to influence plant occurrence" (USACE 2012). The *State of Hawai i* 2014 Wetland Plant List (Lichvar et al. 2014) designates wetland indicator statuses for plants in the Hawaiian Islands. The use of plant indicators helps estimate the probability of a species occurring in wetlands versus uplands. Plants are considered hydrophytes if they are classified as Obligate (OBL), Facultative Wetland (FACW), or Facultative (FAC). Descriptions of the plant indicator statuses are provided in Table 1.

At each sampling point, the absolute percentage cover was estimated for each plant species within each vegetation strata (i.e., tree, shrub, herb, woody vine). These species were then compared with *State of Hawai'i 2014 Wetland Plant List* (Lichvar et al. 2014). Taxonomy and nomenclature follow Wagner et al. (1999, 2012), Wagner and Herbst (2003), and Staples and Herbst (2005).

Plant Indicator	Code	Description
Obligate Wetland species	OBL	Almost always is a hydrophyte, rarely in uplands.
Facultative Wetland species	FACW	Usually is a hydrophyte, but occasionally found in uplands.
Facultative species	FAC	Commonly occurs as either a hydrophyte or non-hydrophyte.
Facultative Upland species	FACU	Occasionally is a hydrophyte, but usually occurs in uplands.
Upland species	UPL	Rarely is a hydrophyte, almost always in uplands.

#### Table 1. Wetland Plant Indicators

Source: Lichvar et al. (2012).

### 2.1.2. Soils

The NRCS defines a *hydric soil* as one that is "formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (NRCS 2010). The NRCS National List of Hydric Soils (NRCS 2012) for Kaua'i Island includes 12 hydric soils for the island. SWCA compared the NRCS National List of Hydric Soils with soils mapped in the survey area by the NRCS.

This generalized soil survey does not always capture the true hydric condition of the soils on individual sites; therefore, on-site soil evaluations of wetlands by specialists are also necessary. Soil characteristics were determined in the field by digging pits using a trenching shovel. SWCA biologists identified soil samples in the field with standardized color chips (i.e., Munsell Soil Color Charts; Kollmorgen Instruments Corporation 1998) of hue, value, and chroma, and by texture (sand, silt, clay, loam, muck, and peat). Anaerobic soil conditions and the presence of gleyed soils were of particular interest (USACE 1987).

### 2.1.3. Hydrology

Wetland hydrology examines the behavior of water in wetlands. Indicators of wetland hydrology are classified as primary or secondary. Examples of primary hydrologic indicators in Hawai'i include soil saturation, high water table, surface water, hydrogen sulfide odor, sediment and drift deposits, algal mats, iron deposits, and the presence of tilapia (*Oreochromis* sp./*Sarotherodon* sp.) redds or aquatic fauna (USACE 2012). Secondary regional hydrologic indicators include surface soil cracks and geomorphic position. One primary indictor or any two secondary indicators must be present to conclude that wetland hydrology is present (USACE 2012). SWCA evaluated both primary and secondary hydrology indicators at each sampling point.

### 2.2. Non-Wetland Waters

Potential non-wetland WoUS, including ephemeral, intermittent, and perennial streams, were delineated based on the high tide line or OHWM. SWCA field personnel delineated the boundaries of tidal non-wetland waters by recording the location of the high tide line. The *high tide line* is defined as the intersection of the land with the water's surface at the <u>maximum height</u> reached by a rising tide (33 CFR 328). The high tide line was determined in the field based on physical characteristics or indicators. Examples of indicators include line of oil or scum, deposit of fine shell or debris, vegetation lines, tide gauges, topography, or other suitable means.

# 3. DESCRIPTION OF THE SURVEY AREA

The survey area is on the west side of the Island of Kaua'i between Hanalei and Wainiha along Kūhiō Highway (Route 560) (see Figure 1). The survey area comprises five non-contiguous survey areas: Wai'oli, Waipā, Waikoko, Wainiha 1, and Wainiha 2 & 3 (as described below). In all, the whole survey area covers approximately 9.24 acres (3.74 ha), as outlined in Table 2. The two staging areas were not surveyed for potential WoUS.

Bridge Survey Area	Acres
Waiʻoli	1.26
Waipā	1.45
Waikoko	1.46
Wainiha 1	1.60
Wainiha 2 & 3	3.47
Total	9.24

 Table 2.
 Acreage of Bridge Survey Areas

A general description of the survey area is provided below. More detailed descriptions of each of the five areas are provided in Sections 3.1 through 3.5.

### Hydrology

Mean annual rainfall in the survey area is approximately 89.5 inches (2,275 millimeters [mm]). Rainfall is typically highest in March and lowest in June (Giambelluca et al. 2013). The closest rainfall gauge to the survey area (Wainiha [WNHH1]) experienced 7.78 inches (198 mm) of rain for 2014 through the end of October, which is slightly above average (National Oceanic and Atmospheric Administration (NOAA)/National Weather Service 2014). Waters passing under Waikoko, Waipā, and Wai'oli Bridges flow into Hanalei Bay, whereas waters passing under Wainiha 1, 2, & 3 flow into Wainiha Bay. Maps of the National Hydrography Dataset and NWI data are provided in Appendix D.

### Flora

A description of the vegetation at each area is provided in the sections below. No state or federally listed threatened, endangered, or candidate endangered plant species, or rare native Hawaiian plant species, were observed in the survey area during the survey by SWCA (SWCA 2015).

### Fauna

Several federally and state-listed animal species were observed during the survey or are likely to occur in the survey area based on habitat or previous surveys. These species are the Hawaiian coot (*Fulica alai*), Hawaiian gallinule or 'alae 'ula (*Gallinula galeata sandvicensis*), Hawaiian stilt (*Himantopus mexicanus knudseni*), Hawaiian duck (*Anas wyvilliana*), nēnē or Hawaiian goose (*Branta* sandvicensis), Hawaiian petrel (*Pterodroma sandwichensis*), Newell's shearwater (*Puffinus auricularis newelli*), band-rumped storm petrel (*Oceanodroma castro*), Hawaiian hoary bat (*Lasiurus cinereus semotus*), Hawaiian monk seal (*Neomonachus schauinslandi*), green sea turtle (*Chelonia mydas*), and hawksbill sea turtle (*Eretmochelys imbricata*). In addition, surrounding waters are designated as marine critical habitat for the Hawaiian monk seal (SWCA 2015).

# 3.2. Wai'oli Stream Bridge

The Wai'oli Bridge survey area covers approximately 1.26 acres (0.51 ha) and is roughly 1,300 feet (396 meters [m]) from the Wai'oli Stream mouth. The existing bridge is approximately 100 feet (30.5 m) long and 15 feet (4.5 m) wide. The survey area encompasses parts of two residential parcels on the makai (seaward) side of the bridge and part of one residential parcel and an undeveloped parcel on the mauka (landward) side of the bridge. All four parcels were observed during the site visit.

Elevations in the survey area range from sea level to roughly 28 feet (8.5 m) above sea level. The NRCS identifies three soil types in the Wai'oli Bridge survey area (Table 3): Mokuleia fine sandy loam; Mokuleia clay loam, poorly drained variant; and rock outcrop (Foote et al. 1972; NRCS 2013). The Mokuleia clay loam, poorly drained variant soil type is listed as a hydric soil (NRCS 2012).

Soil Series	Acres	Hydric
Mokuleia clay loam, poorly drained variant (W)	0.02	Yes
Mokuleia fine sandy loam (Mr)	0.64	No
Rock outcrop	0.31	N/A
Water > 40 acres	0.29	N/A
Total	1.26	

Table 3. Soils in Wai'oli Survey Area

Source: NRCS (2013).

The NWI program identifies three wetlands or aquatic resource types in the survey area (Table 4): Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded (R2UBH); Palustrine, Emergent, Persistent, Semipermanently Flooded (PEMF); and Palustrine, Forested, Seasonally Flooded (PFOC). The State of Hawai'i and the USGS identify Wai'oli Stream traversing the survey area (Appendix D).

Wetland Classification Code	Acres	Description
PEMF	0.02	Palustrine, Emergent, Persistent, Semipermanently Flooded
PFOC	0.34	Palustrine, Forested, Seasonally Flooded
R2UBH	0.05	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded
Total	0.42	

Table 4. National Wetland Inventory results for Wai'oli Survey Area

Source: USFWS (2014).

Four vegetation types are present at the Wai'oli Bridge survey area: ruderal vegetation, ornamental landscaping, emergent wetland, and hau thicket. On the makai side of the bridge, the vegetation is dominated by ornamental landscaping, which is characterized by manicured lawns of wide-leaved carpetgrass (*Axonopus compressus*), interspersed with herbaceous plants (Figure C1, Appendix C). Ornamental plantings adjacent to residences on both sides of the bridge include Areca palm (*Dypsis lutescens*), mango (*Mangifera indica*), red ginger (*Alpinia purpurata*), ti (*Cordyline fruticosa*), and torch ginger (*Etlingera elatior*). Taro vine (*Epipremnum pinnatum*) is climbing on several trees, and umbrella sedge (*Cyperus involucratus*) is present along the stream's edge. On the mauka side, a dense mat of the

non-native California grass (*Urochloa mutica*) is present on the western side of the stream. Ruderal vegetation occurs along the highway right-of-way and is primarily dominated by wedelia (*Sphagneticola trilobata*), Hilo grass (*Paspalum conjugatum*), java plum (*Syzygium cumini*), and giant reed (*Arundo donax*). The indigenous hau (*Hibiscus tiliaceus*) also forms small dense stands along the stream on both sides of the highway.

## 3.3. Waipā Stream Bridge

The Waipā Bridge survey area is approximately 0.5 mile (0.8 kilometer [km]) west of Hanalei and covers approximately 1.45 acres (0.59 ha). The existing bridge is approximately 80 feet (24.4 m) long and 25 feet (7.6 m) wide. The survey area consists of wooded, undeveloped parcels on both the makai (seaward) and mauka (landward) side of the bridge. There is also a recreational area for Kamehameha Schools on the makai side. All parcels were surveyed during the site visit, although small portions of the residential areas on the east side of the stream were not accessed.

Elevations in the survey area range from sea level to roughly 11 feet (3.4 m) above sea level. The NRCS identifies two soil types in the survey area (Table 5): Mokuleia fine sandy loam and beaches (Foote et al. 1972; NRCS 2013). Neither is listed as a hydric soil (NRCS 2012).

Soil Series	Acres	Hydric
Beaches	0.86	N/A
Mokuleia fine sandy loam (Mr)	0.28	No
Water > 40 acres	0.29	N/A
Total	1.43	

Table 5. Soils in Waipā Survey Area

Source: NRCS (2013).

The NWI program identifies two wetland and aquatic resource types in the survey area (Table 6): Palustrine, Forested, Seasonally Flooded (PFOC) and Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded (R3UBH). The State of Hawai'i and the USGS identify Waipā Stream traversing the survey area (Appendix D).

Wetland Classification Code	Acres	Description
PFOC	0.30	Palustrine, Forested, Seasonally Flooded
R3UBH	0.15	Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded
Total	0.45	

Table 6. National Wetland Inventory Results for Waipā Survey Area

Source: USFWS (2014).

At the Waipā Bridge survey area, the vegetation is dominated by a dense hau thicket on both sides of the bridge (Figure C2, Appendix C). Little to no other plants occur in this vegetation type. Along the stream's edge, in areas where hau is not present, umbrella sedge and California grass are common. The ruderal vegetation type at Waipā is dominated by Hilo grass, Guinea grass (*Urochloa maxima*), wedelia, elephant grass (*Cenchrus purpureus*), West Indian dropseed (*Sporobolus indicus*), and basketgrass (*Oplismenus*)

*hirtellus*). Maunaloa (*Canavalia cathartica*) is climbing throughout. Ironwood trees (*Casuarina equisetifolia*) and false kamani (*Terminalia catappa*) are also present, primarily on the makai side of the bridge. The native kou (*Cordia subcordata*) is planted just along the edge of the survey area near the recreation area.

## 3.4. Waikoko Stream Bridge

The Waikoko Bridge survey area is approximately 0.8 mile (1.3 km) west of Hanalei and covers approximately 1.46 acres (0.59 ha). The existing bridge is approximately 25 feet (7.6 m) long and 15 feet (4.6 m) wide. The survey area consists of a beach on the makai (seaward) side of the bridge and densely vegetated areas on the mauka (landward) side of the bridge. All four parcels were observed during the site visit.

Elevations in the survey area range from sea level to roughly 15 feet (4.5 m) above sea level. The NRCS identifies one soil type in the survey area (Table 7), Mokuleia fine sandy loam, which is not listed as a hydric soil (NRCS 2012).

Soil Series	Acres	Hydric
Mokuleia fine sandy loam	1.39	No
Total	1.39	

Table 7. Soils in the Waikoko Survey Area

Source: NRCS (2013).

The NWI program identifies two wetland and aquatic resource types in the survey area (Table 8): Marine, Intertidal, Unconsolidated Shore, Irregularly Flooded (M2USP) and Riverine, Upper Perennial, Rock Bottom, Permanently Flooded (R3RBH). The State of Hawai'i and the USGS identify Waikoko Stream traversing the survey area (Appendix D).

Table 8. National Wetland Inventory Results for Waikoko Survey Area

Wetland Classification Code	Acres	Description
M2USP	0.12	Marine, Intertidal, Unconsolidated Shore, Irregularly Flooded
R3RBH	0.05	Riverine, Upper Perennial, Rock Bottom, Permanently Flooded
Total	0.17	

Source: USFWS (2014).

The vegetation types in the Waikoko Bridge survey area are ruderal vegetation, mixed non-native forest, hau thicket, and ornamental landscaping. Hau thickets are present on the mauka side of the bridge, adjacent to standing water. The mixed non-native forest is dominated by ironwood trees and large false kamani trees that create a dense canopy. Taro vine, maunaloa, and maile pilau (*Paederia foetida*) are climbing over trees, and patches of laua'e fern (*Phymatosorus grossus*) are present in the understory. The most common species in the ruderal vegetation along the highway are wedelia, wide-leaved carpetgrass, Guinea grass, Hilo grass, dallis grass (*Paspalum dilatatum*), narrow-leaved plantain (*Plantago lanceolata*), and short-stature koa haole (*Leucaena leucocephala*) (Figure C3, Appendix C). Naupaka (*Latin name*), ti, hala (*Pandanus tectorius*), and coconut trees (*Cocos nucifera*) are planted in the survey area. The native *Cyperus polystachyos* and nanea (*Vigna marina*) were also seen at the survey area.

# 3.5. Wainiha Bridge 1

The Wainiha Bridge 1 survey area covers approximately 1.60 acres (0.65 ha). The bridge itself spans an ephemeral drainage or backwater of the estuary. The survey area consists of an estuary on the makai (seaward) side of the bridge and undeveloped vegetated and residential parcels on the mauka (landward) side of the bridge. The Wainiha General Store is just northwest of the survey area. The entire area was accessible during the site visit.

Elevations in the survey area range from sea level to roughly 26 feet (7.9 m) above sea level. The NRCS identifies four soil types in the survey area (Table 9): Hanamā'ulu silty clay, Mokuleia fine sandy loam, beaches, and rough broken land (Foote et al. 1972; NRCS 2013). None of the soil types are listed as a hydric soil (NRCS 2012).

Soil Series	Acres	Hydric
Beaches	0.68	N/A
Hanamā'ulu silty clay, 3 to 8 percent slopes	0.005	No
Mokuleia fine sandy loam	0.63	No
Rough broken land	0.03	N/A
Water > 40 acres	0.26	NA
Total	1.60	

Table 9. Soils in the Wainiha Bridge 1 Survey Area

Source: NRCS (2013)

The NWI program does not identify any wetlands or aquatic habitats in the Wainiha Bridge 1 survey area (USFWS 2014). Adjacent to the survey area is an estuarine resource (Estuarine, Subtidal, Unconsolidated Bottom, Subtidal [E1UBL]). The State of Hawai'i and USGS also do not show any water features in the Wainiha Bridge 1 survey area.

The vegetation types in the Wainiha Bridge 1 survey area are ruderal vegetation, mixed non-native forest, hau thicket, and ornamental landscaping. The hau thicket and mixed non-native forest are present on the mauka side of the bridge immediately adjacent to the stream. The mixed non-native forest is characterized by large, spreading false kamani trees, with only a few scattered seedlings and laua'e fern in the understory. The ruderal vegetation occurs in and along the highway right-of-way and in heavily disturbed areas (Figure C4, Appendix C). The water's edge is dominated by umbrella sedge and California grass. On the flatter, drier areas, this vegetation type is largely composed of elephant grass, wedelia, Guinea grass, dallis grass, and short koa haole. *Neonotonia wightii*, maunaloa vine, and moon flower (*Ipomoea alba*) are climbing in trees and over shrubs. Ornamental trees and shrubs are planted adjacent to houses, including ti, hibiscus (*Hibiscus* spp.), Turk's cap (*Malvaviscus penduliflorus*), and beefsteak plant (*Acalypha wilkesiana*). Mowed lawns of wide-leaved carpetgrass and Bermuda grass (*Cynodon dactylon*) are interspersed with weedy grasses and low-growing herbaceous species.

# 3.6. Wainiha Bridges 2 & 3

The Wainiha Bridges 2 & 3 survey area is adjacent to Wainiha Bay and spans the Wainiha Stream. The survey area covers approximately 3.47 acres (1.40 ha). The existing bridges are approximately 300 feet (91.4 m) long and 15 feet (4.5 m) wide. The survey area encompasses parts of residential parcels and a heavily vegetated parcel on the makai (seaward) side of the bridge and part of residential parcels and an

agricultural area on the mauka (landward) side of the bridge. The agricultural area and associated residence were not accessible during the site visit.

Elevations in the survey area range from sea level to roughly 18 feet (5.4 m) above sea level. The NRCS identifies the following two soil types in the survey area (Table 10): Mokuleia clay loam, poorly drained variant and Hanalei silt clay, 0%-2% slopes (Foote et al. 1972; NRCS 2013). Both soil types are considered hydric (NRCS 2012).

Soil Series	Acres	Hydric
Hanalei silty clay, 0 to 2 percent slopes	2.58	Yes
Mokuleia clay loam, poorly drained variant	0.23	Yes
Water > 40 acres	0.65	N/A
Total	3.47	

Table 10. Soils in the Wainiha Bridges 2 & 3 Survey Area

Source: NRCS (2013).

The NWI program identifies four wetland and water types in the survey area (Table 11): Palustrine, Emergent, Semipermanently Flooded, Excavated (PEMFx); Palustrine, Forested, Seasonally Flooded (PFOC); Riverine, Tidal, Unconsolidated Bottom, Permanent-Tidal (R1UBV); and Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded (R2UBH). The State of Hawai'i and the USGS identify two segments of Wainiha Stream traversing the survey area (Appendix D). The total length of this stream, according to the *Atlas of Hawaiian Watersheds & Their Aquatic Resources* (Parham et al. 2008), is 1.1 miles (1.8 km).

 Table 11. National Wetland Inventory Results for the Wainiha Bridges 2 & 3 Survey Area

Wetland Classification Code	Acres	Description
PEMFx	0.05	Palustrine, Emergent, Semipermanently Flooded, Excavated
PFOC	0.15	Palustrine, Forested, Seasonally Flooded
R1UBV	0.33	Riverine, Tidal, Unconsolidated Bottom, Permanent-Tidal
R2UBH	0.05	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded
Total	0.58	

Source: USFWS (2014).

The most dominant vegetation types in the Wainiha Bridges 2 & 3 survey area are emergent wetland and hau thicket. The emergent wetland is a dense mat of non-native California grass. It occurs in the portions of the survey area immediately adjacent to Wainiha Stream (Figure C5, Appendix C). Few other species occur in this mat, although Guinea grass, umbrella sedge, and Job's tears (*Coix lachryma-jobi*) are widely scattered. The most common grasses and herbaceous species found in the ruderal vegetation type in the Wainiha Bridges 2 & 3 survey area are basketgrass, wedelia, Guinea grass, California grass, Hilo grass, honohono (*Commelina diffusa*), and Spanish needle (*Bidens alba*) (Figure C6, Appendix C). Seedlings of non-native trees are sparsely scattered within the right-of-way. Large false kamani trees are also in the survey area, often covered in climbing taro vines. Several other vines are present, including taro vine, maunaloa, *Neonotonia wightii*, and white thunbergia (*Thunbergia fragrans*). Pai'i'ihā (*Cyclosorus dentatus*) and young Chinese fan palm (*Livistona chinensis*) are common in the understory. Ornamental species are also planted.

# 4. RESULTS

Of the 9.24 acres (3.74 ha) surveyed, approximately 3.88 acres (1.58 ha) were delineated as potential WoUS. This comprises 2.78 acres (1.13 ha) of non-wetland WoUS and 1.10 acres (0.45 ha) of wetlands (Table 12). The results for each bridge survey area are discussed in further detail below. The results maps are provided in Appendix B and photographs are provided in Appendix C.

Wetland Classification Code	Classification Description	Acres
Wetlands		
PEM	Palustrine Emergent Marsh	0.39
PFO	Palustrine Forested	0.71
	Wetlands Subtotal	1.10
Non-Wetlands		
E1 (E1UBL)	Estuarine Subtidal	0.37
M2 (M2USP)	Marine Intertidal	0.51
R1 (R1UBV)	Riverine Tidal	1.54
R2 (R2UBH, R2)	Riverine Lower Perennial	0.36
	Non-Wetlands Subtotal	2.78
	Total	3.88

**Table 12.** Acreage of Potential Waters of the U.S. in the WainihaBridges Project Survey Area

# 4.1. Wai'oli Stream Bridge

Approximately 0.31 acre (0.13 ha) of non-wetland WoUS and 0.24 acre (0.10 ha) of wetlands (PEM and PFO) were delineated in the Wai'oli survey area (see Appendix B). The types and acreage of WoUS delineated by SWCA are summarized in Table 13.

WoUS ID	Wetland Classification Code	Acres
14	R2UBH	0.31
15	PEM	0.04
16	PFO	0.10
17	PEM	0.05
18	PEM	0.05
Total		0.55

**Table 13.** Potential Waters of the U.S. Delineated in the Wai'oliSurvey Area

### 4.1.1. Wetlands

As shown in Table 14, three of the five sampling points evaluated by SWCA in the survey area met the three-criterion test indicative of wetland conditions pursuant to the USACE 1987 Manual and the Hawai'i and Pacific Island Regional Supplement. Upland, non-wetland points analogous to wetland points were identified where necessary, and boundary lines were delineated following changes in topography, substrate, vegetation communities, and/or soil indicators. The wetland determination data forms for the sampling points are included in Appendix A and results map are provided in Appendix B.

Sampling Point	Hydrophytic Vegetation Present?	Hydric Soil Present?	Wetland Hydrology Present?	Is the Sampling Point a Wetland?
1	Y	Y	Y	Y
2	Ν	Ν	Ν	Ν
3	Y	Y	Y	Y
4	N	Ν	N	N
5	Y	Y	Y	Y

Table 14. Determination of Sampling Points at the Wai'oli Survey Area

Note: Wetland sampling points are highlighted in gray.

#### Vegetation

Three of the sampling points had hydrophytic vegetation. The dominant plants observed at the three wetland sampling points are hau (FAC), wide-leaved carpetgrass (FAC), California grass (FACW), Job's tears (FAW), and umbrella sedge (FACW).

### Soils

Hydric soils were identified in three of the five sampling points. None of the sampling points were in an area with hydric soils, as listed by the NRCS (NRCS 2012); however, sampling points 1, 3, and 4 are classified as Water > 40 acres by NRCS. Thick Dark Surface (A12) was recorded at sampling point 1, and Depleted Matrix (F3) was recorded at sampling points 3 and 5. No hydric soils were identified at any other sampling points in the Wai'oli survey area.

### Hydrology

Wetland hydrology indicators were observed at three of the five sampling points. Saturation (A3) and High Water Table (A2) was present at all three sampling points. A complete listing of hydrology data collected at all sampling points is provided in Appendix A.

### 4.1.2. Non-Wetland Waters

A single perennial non-wetland water (Wai'oli Stream) was identified in the survey area (see Appendix B). This segment of Wai'oli Stream is likely to be occasionally influenced by the tide due to its proximity to the ocean. The high tide line was determined using topography (i.e., a break in the slope and elevation) and vegetation lines.

## 4.2. Waipā Stream Bridge

In all, approximately 0.31 acre (0.13 ha) of tidal, non-wetland WoUS (R1) and 0.27 acre (0.11 ha) of wetlands (PFO) were delineated in the Waipā survey area (see Appendix B). The types and acreage of WoUS delineated by SWCA are summarized in Table 15.

WoUS ID	Wetland Classification Code	Acres
12	R1UBV	0.31
13	PFO	0.15
20	PFO	0.12
Total		0.58

**Table 15.** Potential Waters of the U.S. Delineated in the WaipāSurvey Area

## 4.2.1. Wetlands

As shown in Table 16, three of the eight points evaluated by SWCA at the Waipā survey area met the three-criterion test indicative of wetland conditions pursuant to the USACE 1987 Manual and the Hawai'i and Pacific Island Regional Supplement. Upland, non-wetland points analogous to wetland points were identified where necessary, and boundary lines were delineated following changes in topography, substrate, vegetation communities, and/or soil indicators. The wetland determination data forms for the sampling points are included in Appendix A.

Sampling Point	Hydrophytic Vegetation Present?	Hydric Soil Present?	Wetland Hydrology Present?	Is the Sampling Point a Wetland?
1	Y	Y	Y	Y
2	Y	Ν	Ν	Ν
3	Y	Ν	Ν	Ν
4	Y	Ν	Ν	Ν
5	Y	Y	Y	Y
6	Y	Ν	Ν	Ν
7	Y	Y	Y	Y
8	Y	Ν	Ν	Ν

Table 16. Determination of Sampling Points at the Waipā Survey Area

Note: Wetland sampling points are highlighted in gray.

### Vegetation

All eight sampling points had hydrophytic vegetation. The dominant plants observed at the wetland sampling points are hau (FAC), wedelia (FAC), and umbrella sedge (FACW). Complete vegetation data collected at all sampling points are provided in Appendix A.

### Soils

Hydric soils were identified in three of the eight sampling points. All three wetland sampling points are located on the Beaches (BS) soil type, although sampling point 5 occurs near the boundary of Hanalei silty clay loam, 0 to 2 percent slopes (HmA) listed by the NRCS as a hydric soil (NRCS 2012). Sandy Redox (S5) was recorded at all three positive wetland sampling points. No hydric soils were identified at any other sampling points in the survey area.

### Hydrology

Wetland hydrology indicators were observed at three of the eight sampling points. Oxidized Rhizospheres on Living Roots (C3) were present at all three positive wetland sampling points. Water Marks (B1) were also observed at sampling point 1, and Saturation (A3) was observed at sampling point 5. A complete listing of hydrology data collected at all sampling points is provided in Appendix A.

### 4.2.2. Non-Wetland Waters

A single perennial, non-wetland water (Waipā Stream) was identified in the survey area (see Appendix B). This segment of Waipā Stream was determined to be tidally influenced due to its proximity to the ocean and the presence of marine/estuarine biota observed during SWCA's fieldwork. The high tide line was determined based on topography and the vegetation line. The stream mouth is shaped by a variety of natural conditions, and shifts throughout the year. Natural conditions influencing elevation and physical features near the mouth include streamflow, sediment deposition, ocean tide, and wave action.

# 4.3. Waikoko Stream Bridge

Approximately 0.80 acre (0.32 ha) of tidal, non-wetland WoUS (R1 and M2) and 0.04 acre (0.02 ha) of wetlands (PFO) were delineated in the Waikoko survey area (Figure 4). The types and acreage of WoUS delineated by SWCA are summarized in Table 17.

WoUS ID	Wetland Classification Code	Acres
10	M2USP	0.51
11	R1UBV	0.29
19	PFO	0.04
Total		0.84

Table 17. Potential Waters of the U.S. Delineated in the Waikoko Survey Area

### 4.3.1. Wetlands

As shown in Table 18, two of the four points evaluated by SWCA in the survey area met the threecriterion test indicative of wetland conditions pursuant to the USACE 1987 Manual and the Hawai'i and Pacific Island Regional Supplement. Upland, non-wetland points analogous to wetland points were identified where necessary, and boundary lines were delineated following changes in topography, substrate, vegetation communities, and/or soil indicators. The wetland determination data forms for the sampling points are included in Appendix A.

Sampling Point	Hydrophytic Vegetation Present?	Hydric Soil Present?	Wetland Hydrology Present?	Is the Sampling Point a Wetland?
1	Y	Ν	Ν	Ν
2	Y	Y	Y	Y
3	Y	Ν	Ν	Ν
4	Y	Y	Y	Y

Table 18. Determination	of Sampling	Points at the	Waikoko Surve	y Area

*Note*: Wetland and other WoUS sampling points are highlighted in gray.

#### Vegetation

All four sampling points had hydrophytic vegetation present. The dominant plant observed at the two WoUS sampling points was hau (FAC). Complete vegetation data collected at all sampling points are provided in Appendix A.

#### Soils

The NRCS places all four sampling points within the Mokuleia fine sandy loam (Mr) soil type, which is not listed as a hydric soil type (NRCS 2012). However, hydric soils were identified in two of the four sampling points. The Sandy Redox (S5) hydric soil indicator was present at sampling points 2 and 4. No hydric soils were identified at any other sampling points in the survey area.

### Hydrology

Wetland hydrology indicators were observed at two of the four sampling points. High Water Table (A2), saturation (A3), and Sediment Deposits (B2) were present at the two wetland sampling points. Geomorphic Position (D2) was also noted at both points. Depth of the High Water Table ranged from 0.5 to 6.0 inches (12.8 to 152.4 mm) at these sites. A complete listing of hydrology data collected at all sampling points is provided in Appendix A.

### 4.3.2. Non-Wetland Waters

Waikoko Stream, a perennial, tidal stream, was identified in the survey area (see Appendix B). This portion of Waikoko Stream in the survey area is tidal. Waikoko Stream is connected to the Pacific Ocean (Hanalei Bay) depending on the tidal and rainfall.

### 4.4. Wainiha Bridge 1

Approximately 0.37 acre (0.15 ha) of estuarine non-wetland WoUS (Estuarine, Subtidal [E1]) and 0.05 acre (0.02 ha) of riverine non-wetland WoUS (Riverine, Lower Perennial [R2]) were delineated in the Wainiha Bridge 1 survey area (see Appendix B). The types and acreage of WoUS delineated by SWCA are summarized in Table 19.

WoUS ID	Wetland Classification Code	Acres
08	E1UBL	0.37
09	R2	0.05
Total		0.42

Table 19. Potential Waters of the U.S. Delineated in the Wainiha Bridge 1 survey area.

### 4.4.1. Wetlands

As shown in Table 20, the only sampling point evaluated by SWCA in the survey area did not meet the three-criterion test indicative of wetland conditions pursuant to the USACE 1987 Manual and the Hawai'i and Pacific Island Regional Supplement (see Appendix B). The wetland determination data form for the sampling point is included in Appendix A.

Table 20. Determination of Sampling Points at the Wainiha Bridge 1 Survey Area

Sampling	Hydrophytic	Hydric Soil	Wetland	Is the Sampling Point a Wetland?
Point	Vegetation Present?	Present?	Hydrology Present?	
1	Y	Ν	Ν	Ν

Note: Wetland sampling points are highlighted in gray.

#### Vegetation

Hydrophytic vegetation is present at the sampling point because of the abundance of false kamani (FAC). Vegetation data collected at the sampling point is provided in Appendix A.

#### Soils

Hydric soils were not identified at the sampling point.

### Hydrology

No wetland hydrology indicators were observed at the sampling point.

### 4.4.2. Non-Wetland Waters

A single perennial, non-wetland water (Wainiha Stream) was identified in the survey area (see Appendix B). This segment of Wainiha Stream was determined to be tidally influenced because of its proximity to the ocean and the salinity observed during SWCA's fieldwork. The high tide line was determined using topography, as well as the vegetation line.

### 4.5. Wainiha Bridges 2 & 3

In all, approximately 0.94 acre (0.38 ha) of tidal, non-wetland WoUS (R1) and 0.55 acre (0.22 ha) of wetlands (PEM and PFO) were delineated in the survey area (see Appendix B). The types and acreage of WoUS delineated by SWCA are summarized in Table 21.

WoUS ID	Wetland Classification Code	Acres
01	PFO	0.30
02	PEM	0.14
03	R1UBV	0.32
04	PEM	0.09
05	PEM	0.02
06	R1UBV	0.62
Total		1.49

**Table 21.** Potential Waters of the U.S. Delineated in the WainihaBridges 2 & 3 Survey Area

### 4.5.1. Wetlands

As shown in Table 22, three of the six sampling points evaluated by SWCA in the survey area met the three-criterion test indicative of wetland conditions pursuant to the USACE 1987 Manual and the Hawai'i and Pacific Island Regional Supplement (Appendix B). Upland, non-wetland points analogous to wetland points were identified where necessary, and boundary lines were delineated following changes in topography, substrate, vegetation communities, and/or soil indicators. The wetland determination data forms for the sampling points are included in Appendix A.

Sampling Point	Hydrophytic Vegetation Present?	Hydric Soil Present?	Wetland Hydrology Present?	Is the Sampling Point a Wetland?
1	Y	Ν	Ν	Ν
2	Y	Y	Y	Y
3	Y	Ν	Ν	Ν
4	Y	Y	Y	Y
5	Y	Ν	Ν	Ν
6	Y	Y	Y	Y

Table 22. Determination of Sampling Points at the Wainiha Bridges 2 & 3 Survey Area

Note: Wetland sampling points are highlighted in gray.

#### Vegetation

All six sampling points had hydrophytic vegetation present. The dominant plants observed at the three wetland sampling points are California grass (FACW), Guinea grass, hau (FAC), and wedelia (FAC). Complete vegetation data collected at all sampling points are provided in Appendix A.

#### Soils

Hydric soils were identified in three of the six sampling points. Of the three wetland sampling points, the NRCS soil map places sampling points 4 and 6 in Hanalei silty clay, 0 to 2 percent slopes (HnA), listed as a hydric soil (NRCS 2012). The NRCS soil map places sampling point 2 in a Water (W) feature, although it occurs near the boundary of HnA soil. Redox Depressions (F8) were recorded at sampling points 2 and 6. No hydric soils were identified at any other sampling points in the survey area.

### Hydrology

Wetland hydrology indicators were observed at three of the six sampling points. Saturation (A3) was present at sampling point 2, Surface Water (A1) was present at sampling point 4, and a High Water Table (A2) was observed sampling point 6. A complete listing of hydrology data collected at all sampling points is provided in Appendix A.

### 4.5.2. Non-Wetland Waters

A single perennial, non-wetland water (Wainiha Stream) was identified in the survey area (see Appendix B). This segment of Wainiha Stream was determined to be tidally influenced because of its proximity to the ocean and the presence of marine/estuarine biota observed during SWCA's fieldwork. The high tide line was determined using topography (i.e., a break in the slope and elevation) and vegetation line.

In addition, three human-made ditches were identified in the Wainiha Bridges 2 & 3 survey area (see Appendix B).

# 5. CONCLUSIONS

SWCA sampled conditions at 24 sampling points in the survey area to determine whether wetlands or other WoUS exist and to delineate the boundaries between these resources and uplands. In SWCA's professional opinion, 11 of the 24 points satisfy the criteria to be a wetland pursuant to the USACE 1987 Manual or the recent Hawai'i and Pacific Island Regional Supplement. SWCA delineated approximately 0.39 acre (15.78 ha) of PEM and 0.71 acre (0.28 ha) of PFO wetlands. In addition, SWCA delineated 2.78 acres (1.13 ha) of non-wetland waters comprising 1.90 acres (0.77 ha) of riverine, 0.37 acre (0.15 ha) of estuarine, and 0.51 acre (0.20 ha) of marine. Human-made ditches were also delineated near Wainiha Bridges 2 &3. The wetlands and streams are potential WoUS because of their connection to the Pacific Ocean. It is unknown whether the ditches have a "significant nexus."

This information is being incorporated into planning and design documents in an effort to avoid and minimize impacts to jurisdictional waters wherever practicable. For any unavoidable impacts, FHWA will consult with the appropriate Federal and State regulatory agencies including the USACE and the State Department of Health (DOH) Clean Water Branch (CWB) and obtain all necessary permits before commencing any in water work.

Because the project involves non-fill discharging activities over a WoUS, a Section 10 permit may be required. If the proposed project intends to place dredged or fill material within the delineated feature (e.g., bridge foundations or pillars), it could be subject to either a Section 10 or Section 404 Permit. These conclusions are subject to confirmation by the USACE Honolulu District.

The general rule regarding the state Section 401 water quality certification is, if the USACE identifies that a permit (NWP/LOP/SIP) under Section 404 is required, the applicant will likely need a Section 401 water quality certification from DOH CWB. If the CWB responds and requires a 401 water quality certification, it can take several months to a year to process. In addition, a Stream Channel Alteration Permit (SCAP) may be required from the Commission on Water Resource Management (CWRM), depending on the activities proposed. SWCA recommends submitting a Request for Determination (RFD) from CWRM. If a SCAP is required, the permit timeframe is 90 days.

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# Appendix A

Data Forms

#### WETLAND DETERMINATION DATA FORM – Hawai'i and Pacific Islands Region

Project/Site: Waikoko Stream Bridge	City: Hanalei	Sampling Date: 10.1	.2014 Time: 15:00
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island: Kaua	ai Sampling Point: P1
Investigator(s): B Nicholson / B Luke / T Agostini		TMK/Par	rcel: 4-5-6-003-002
Landform (hillslope, coastal plain, etc.): Roadside fill/slope		Local relief (concave, convex, none): none	
Lat: 22.2077258139 N Long: -159.517009659	N	Datum: NAD UTM 4N	_ Slope (%): <u>10</u>
Soil Map Unit Name: Mokuleia fine sandy loam (Mr)		NWI classification:	UPL
Are climatic / hydrologic conditions on the site typical for this time of year	? Yes X No	(If no, explain in Remark	s.)
Are Vegetation, Soil, or Hydrology significantly di	sturbed? Are "Norma	al Circumstances" present	t? Yes X No
Are Vegetation, Soil, or Hydrology naturally problem	ematic? (If needed,	explain any answers in R	emarks.)
SUMMARY OF FINDINGS – Attach site map showing s	ampling point locati	ons, transects, imp	ortant features, etc.

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes         X         No           Yes         No         X           Yes         No         X	Is the Sampled Area within a Wetland?	Yes	No <u>×</u>
Remarks:				

#### VEGETATION – Use scientific names of plants.

10	Absolute	Dominant	Indicator	Dominance Test worksheet:									
<u>Tree Stratum</u> (Plot size: <u>10</u> ) 1. <u>Hibiscus tillaceous (Talipariti tiliaceum)</u>	<u>% Cover</u> 85	Species? Y	<u>Status</u> FAC	Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)									
2				Total Number of Dominant Species Across All Strata: <sup>3</sup> (B)									
4		·		Percent of Dominant Species									
	85	- Total Co	ver										
Sapling/Shrub Stratum (Plot size: 10")				Prevalence Index worksheet:									
1				Total % Cover of: Multiply by:									
2				OBL species x 1 =									
3				FACW species x 2 =									
4				FAC species x 3 =									
5.				FACU species x 4 =									
	0	= Total Co	over	UPL species x 5 =									
Herb Stratum (Plot size: 10' )				Column Totals: (A) (B)									
1. Phymatosorus grossus	40	Y	FACU										
2. Megathyrsus maximus	5	<u>N</u>	FAC	Prevalence Index = B/A =									
3			a7	Hydrophytic Vegetation Indicators:									
4				1 - Rapid Test for Hydrophytic Vegetation									
5.				2 - Dominance Test is >50%									
6.			2000 - 100 -	3 - Prevalence Index is $≤3.0^1$									
7.				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in									
8				Remarks or in the delineation report)									
··	45	= Total Co	ver	The stress of the state of the stress of the									
Woody Vine Stratum (Plot size: 10' )				be present, unless disturbed or problematic.									
1. Epipremnum pinnatum	20	Y	FAC										
2				Hydrophytic									
	20	= Total Co	ver	Present? Yes X No									
Remarks:				•									
Depth	Matrix		Red	Redox Features									
------------------------	----------------------	-------------	--------------------	---------------------------	-------------------	----------------------------	---------------------------	----------------------------------	-------------	---------	---------------------	--	--
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remai	rks			
0-8	7.5 YR 3/3	100	vi <u></u>			· <u>··</u> ·····	Loam						
8-18	10 YR 4/3	100	in D				Sandy Loam						
				· ·									
<sup>1</sup> Type: C=C	Concentration, D=Dep	oletion, RM	=Reduced Matrix, N	IS=Masked S	Sand Gra	ains.	<sup>2</sup> Location: Pl	=Por	e Lining, M	M=Mat	rix.		
Hydric Soil	Indicators:						Indicators for P	oble	matic Hyd	iric Sc	oils <sup>3</sup> :		
Histosc	I (A1)		Sandy Red	ox (S5)			Stratified Lag	ers (	A5)				
Histic E	pipedon (A2)		Dark Surfac	Sandy Mucky Mineral (S1)									
Black H	listic (A3)		Loamy Gley	Red Parent Material (F21)									
Hydrog	en Sulfide (A4)		Depleted M	Depleted Matrix (F3)				Very Shallow Dark Surface (TF12)					
Muck P	resence (A8)		Redox Dark	Surface (F6	5)	Other (Explain in Remarks)							
Deplete	d Below Dark Surfac	ce (A11)	Depleted D	ark Surface (	F7)								
Thick D	ark Surface (A12)		Redox Dep	ressions (F8)	)	<sup>3</sup> Indic	cators of hydrophytic	/egeta	ation and	wetlan	d hydrology		
Sandy	Gleyed Matrix (S4)			(ii) (ii)		mu	ust be present, unless	distu	rbed or pr	oblem	atic.		
Restrictive	Layer (if observed)	:							-				
Type:													
Depth (ir	nches):						Hydric Soil Prese	ent?	Yes		No X		
Remarks:													

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)								
Primary Indicators (minimum of one required; check all that apply) Secondary Indicators (minimum of two required								
	Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Drainage Patterns (B10) Roots (C3)Dry-Season Water Table (C2) Salt Deposits (C5) oils (C6)Stunted or Stressed Plants (D1) Geomorphic Position (D2) m, CNMI,Shallow Aquitard (D3) FAC-Neutral Test (D5)							
Water-Stained Leaves (B9) Other (Explain in Remarks)	-							
Field Observations:								
Surface Water Present? Yes <u>No </u> Depth (inches):								
Water Table Present?       Yes       No X       Depth (inches):         Saturation Present?       Yes       No X       Depth (inches):         (includes capillary fringe)       Yes       No X       Depth (inches):	Wetland Hydrology Present? Yes No X							
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspec	tions), if available:							
Remarks:								

Project/Site: Waikoko Stream Bridge	City: <u>Hanalei</u> Sampling Date: <u>10.1.2014</u> Time: <u>15:20</u>
Applicant/Owner: HDOT	State/Terr/Comlth.: HI Island: Kauai Sampling Point: P2
Investigator(s): B Nicholson / B Luke / T Agostini	TMK/Parcel: 4-5-6-003-002
Landform (hillslope, coastal plain, etc.): Floodplain, Base of Slope	Local relief (concave, convex, none): none
Lat: 22.2077116447 N Long: -159.517039571 V	Datum: <u>NAD UTM 4N</u> Slope (%): <u>0</u>
Soil Map Unit Name: Mokuleia fine sandy loam (Mr)	NWI classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year	Yes X No (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly dis	urbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation, Soil, or Hydrology naturally proble	natic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing s	mpling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u>X</u> Yes <u>X</u> Yes <u>X</u>	No No No	Is the Sampled Area within a Wetland?	Yes X	No
Remarks:					

10 ft down slope of P1

	Absolute	Dominant	Indicator	Dominance Test worksheet:	
Tree Stratum (Plot size: 10 )	<u>% Cover</u>	Species?	<u>Status</u>	Number of Dominant Species	
1. Hibiscus ullaceous	90	ř	FAC	That Are OBL, FACW, or FAC: (A	4)
2	·			Total Number of Dominant	
3			<u> </u>	Species Across All Strata: (E	3)
4				Percent of Dominant Species	
5				That Are OBL, FACW, or FAC: 100 (A	4/B)
Copling/Chruh Stratum (Plat size, 10'	95	= Total Co	ver	Prevalence Index worksheet:	
				Total % Cover of: Multiply by:	
1			·		
2	·				
3	·	<u> </u>			
4	·			FAC species X 3 =	
5				FACO species X 4 =	
Herb Stratum (Plot size: 10'	0	= 1 otal Co	over		
1					(B)
2	·			Prevalence Index = $B/A =$	
3			·	Hydrophytic Vegetation Indicators:	
A.			·	1 - Rapid Test for Hydrophytic Vegetation	
				2 - Dominance Test is >50%	
6				3 - Prevalence Index is ≤3.0 <sup>1</sup>	
7	·		·	Problematic Hvdrophytic Vegetation <sup>1</sup> (Explain in	in
8	·		·	Remarks or in the delineation report)	
0	0	- Total Co	vor	1	
Woody Vine Stratum (Plot size: 10' )		= 10(a) 00	vei	'Indicators of hydric soil and wetland hydrology mus	st
1					
2.				Hydrophytic	
	0	= Total Co	ver	Present? Yes $\frac{X}{2}$ No	
Remarks:					
only tree stratum					

Profile Desc	ription: (Describe	to the de	pth needed to docu	ment the	indicator	or confiri	n the absence	of indicato	ors.)	
Depth	Matrix		Rede	s		_				
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
0-6	10 YR 5/2	80	7.5 YR 5/6	20		Μ	Sandy Loam	Redox		
					·					
					·	·				
						·				
					·					
				·		·				
					. <u> </u>					
<sup>1</sup> Type: C=Co	oncentration, D=Dep	letion, RM	I=Reduced Matrix, M	S=Maske	d Sand Gr	ains.	<sup>2</sup> Locatio	on: PL=Por	e Lining, M=N	latrix.
Hydric Soil	Indicators:						Indicators	for Proble	matic Hydric	Soils <sup>3</sup> :
Histosol	(A1)		X Sandy Redo	ox (S5)			Strat	ified Layers	(A5)	
Histic Ep	pipedon (A2)		Dark Surface (S7)				Sandy Mucky Mineral (S1)			
Black Hi	stic (A3)		Loamy Gleyed Matrix (F2)				Red Parent Material (F21)			
Hydroge	n Sulfide (A4)		Depleted Matrix (F3)				Very Shallow Dark Surface (TF12)			
Muck Pr	esence (A8)		Redox Dark Surface (F6)				Other (Explain in Remarks)			
Depleted	d Below Dark Surfac	e (A11)	Depleted Da	irk Surface	e (F7)					
Thick Da	ark Surface (A12)		Redox Depressions (F8) <sup>3</sup> Indi			dicators of hydrophytic vegetation and wetland hydrology				
Sandy G	eleyed Matrix (S4)					mı	ust be present,	unless distu	rbed or proble	matic.
Restrictive I	_ayer (if observed)	:								
Туре:										
Depth (in	ches):						Hydric Soil	Present?	Yes X	No
Remarks:							1			
Sandy Redox	: (S5)									

Wetland Hydrology Indicate	ors: (Explai	n observati	ons in Remarks, if needed.)				
Primary Indicators (minimum	of one requ		Secondary Indicators (minimum of two required)				
Surface Water (A1)		_	_ Aquatic Fauna (B13)		Surface Soil Cracks (B6)		
High Water Table (A2)		_	_ Tilapia Nests (B17)		Sparsely Vegetated Concave Surface (B8)		
Saturation (A3)		_	_ Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)		
Water Marks (B1)		_	Oxidized Rhizospheres on Living	Roots (C3)	Dry-Season Water Table (C2)		
X Sediment Deposits (B2)		_	Presence of Reduced Iron (C4)	)	Salt Deposits (C5)		
Drift Deposits (B3)		_	_ Recent Iron Reduction in Tilled Sc	oils (C6)	Stunted or Stressed Plants (D1)		
Algal Mat or Crust (B4)		_	_ Thin Muck Surface (C7)		X Geomorphic Position (D2)		
Iron Deposits (B5)	Iron Deposits (B5) Fiddler Crab Burrows (C10) (Guam, CNMI,				Shallow Aquitard (D3)		
Inundation Visible on Aer	Inundation Visible on Aerial Imagery (B7) and American Samoa)				FAC-Neutral Test (D5)		
Water-Stained Leaves (P	39)		Other (Explain in Remarks)				
Field Observations:							
Surface Water Present?	Yes	_ <sub>No</sub> X	Depth (inches):				
Water Table Present?	Yes X	No	Depth (inches): 6"				
Saturation Present? (includes capillary fringe)	Yes X	No	_ Depth (inches): <sup>2"</sup>	Wetland H	-lydrology Present? Yes $\frac{\chi}{2}$ No		
Describe Recorded Data (stre	am gauge,	monitoring	well, aerial photos, previous inspec	tions), if ava	ailable:		
Remarks:							
High Water Table (A2), Satura	ation (A3), S	ediment De	eposits (B2), Geomorphic Position (I	D2)			

Project/Site: Waikoko Stream Bridge	City: Hanalei	i	_ Sampling Da	te: 10.1.201	4 Time: 15:40	
Applicant/Owner: HDOT	State/Terr/Co	_ State/Terr/Comlth.: HI		Kauai	Sampling Point: P3	
Investigator(s): B Nicholson / B Luke / T Agostini			Т	MK/Parcel:	4-5-6-003-002	
Landform (hillslope, coastal plain, etc.): Roadside depression		_ Local relief (c	oncave, conve	x, none): <u>no</u>	ne	
Lat: 22.2066798706 N Long: -159.5164	95614 W	Datum: <u>NAD UTM 4N</u> Slope (%): 2				
Soil Map Unit Name: Mokuleia fine sandy loam (Mr)			NWI classif	ication: UPL		
Are climatic / hydrologic conditions on the site typical for this time	of year? Yes X	No (If	no, explain in	Remarks.)		
Are Vegetation, Soil, or Hydrology signification	antly disturbed?	Are "Normal C	ircumstances"	present? Y	<sup>'</sup> es X No	
Are Vegetation, Soil, or Hydrology natural	y problematic?	(If needed, ex	plain any answ	ers in Rema	rks.)	
SUMMARY OF FINDINGS – Attach site map show	ving sampling po	oint location	is, transect	s, importa	ant features, etc.	

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u>X</u> Yes <u> </u>	No No _X No _X	Is the Sampled Area within a Wetland?	Yes	No <u>×</u>
Remarks:					

4.01	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 10')	% Cover	Species?	Status	Number of Dominant Species
1. Terminalia catappa	80	Y	FAC	That Are OBL, FACW, or FAC: <u>3</u> (A)
2. Hibiscus tillaceus (Talipariti tiliaceum)	20	Y	FAC	Total Number of Dominant
3				Species Across All Strata: <u>3</u> (B)
4				
5.				That Are OBL EACW or EAC 100 (A/B)
	100	= Total Co	ver	
Sapling/Shrub Stratum (Plot size: 10' )				Prevalence Index worksheet:
1. Terminalia catappa	10	Y	FAC	Total % Cover of: Multiply by:
2.				OBL species x 1 =
3.				FACW species x 2 =
4		·		FAC species x 3 =
5		·		FACU species x 4 =
	10	– Total Co	vor	$IIPI \text{ species} \qquad x 5 =$
Herb Stratum (Plot size: <sup>10'</sup> )		_ = 10(a) 00		$\begin{array}{c} column Totals: \\ (A) \\ (B) \\ \end{array}$
1.				
2.				Prevalence Index = B/A =
3.				Hydrophytic Vegetation Indicators:
4				1 - Rapid Test for Hydrophytic Vegetation
5		·		2 - Dominance Test is >50%
6				3 - Prevalence Index is ≤3.0 <sup>1</sup>
7		·		Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
7		·		Remarks or in the delineation report)
8	0			
Woody Vine Stratum (Plot size: 10'	0	= I otal Co	ver	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed or problematic.
1		·		Hydrophytic
Z	0			Vegetation
	<u> </u>		ver	Present? fes <u>~</u> No
Remarks:				

Profile Des	cription: (Describe	to the de	pth needed to docu	ment the	indicator	or confirm	the absence	of indicators.)		
Depth	Matrix		Redo	ox Feature	S					
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks		
0-12	10 YR 3/3	100					Clay Loam			
12-24	5 Y 3/2	80	5 Y 6/3	20			Sandy Clay Loam	Sand but no redox		
<sup>1</sup> Type: C=C	oncentration, D=Dep	letion, RM	I=Reduced Matrix, M	S=Masked	d Sand Gra	ains.	<sup>2</sup> Locatio	on: PL=Pore Lining, M=Matrix.		
Hydric Soil	Indicators:	,	,				Indicators	for Problematic Hydric Soils <sup>3</sup> :		
Histoso	l (A1)		Sandy Redo	x (S5)			Stratifi	ed Layers (A5)		
Histic E	pipedon (A2)		Dark Surface (S7)			Sandy Mucky Mineral (S1)				
Black H	istic (A3)		Loamy Gleyed Matrix (F2)			Red Parent Material (F21)				
Hydroge	en Sulfide (A4)		Depleted Matrix (F3)			Very Shallow Dark Surface (TF12)				
Muck P	resence (A8)		Redox Dark Surface (F6)			Other (Explain in Remarks)				
Deplete	d Below Dark Surfac	e (A11)	Depleted Da	e (F7)						
Thick D	ark Surface (A12)		Redox Depr	8)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology					
Sandy (	Gleyed Matrix (S4)					mu	st be present,	unless disturbed or problematic.		
Restrictive	Layer (if observed)	:								
Туре:										
Depth (in	ches):						Hydric Soil	Present? Yes <u>No</u> X		
Remarks:										
Color variation	on in layers of sand.	Does not s	seem to be a function	of anaero	bic conditi	ons. Might	be deposition	al.		

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)							
Primary Indicators (minimum of one required; check all that apply) Secondary Indicators (minimum of two required)							
Surface Water (A1)       Aquatic Fauna (B13)         High Water Table (A2)       Tilapia Nests (B17)         Saturation (A3)       Hydrogen Sulfide Odor (C1)         Water Marks (B1)       Oxidized Rhizospheres on Living R         Sediment Deposits (B2)       Presence of Reduced Iron (C4)         Drift Deposits (B3)       Recent Iron Reduction in Tilled Sc         Algal Mat or Crust (B4)       Thin Muck Surface (C7)         Iron Deposits (B5)       Fiddler Crab Burrows (C10) (Guar         Inundation Visible on Aerial Imagery (B7)       and American Samoa)	Secondary Indicators (Infinitiation of two required)						
Water-Stained Leaves (B9) Other (Explain in Remarks)							
Field Observations:							
Surface Water Present? Yes No X Depth (inches):							
Water Table Present? Yes No X Depth (inches):	X						
Saturation Present? Yes <u>No X</u> Depth (inches): (includes capillary fringe)	Wetland Hydrology Present? Yes No X						
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspect	tions), if available:						
Remarks:							

Project/Site: Waikoko Stream Bridge	City: <u>Hanalei</u> Sampling Date: <u>10.1.2014</u> Time: <u>16:10</u>
Applicant/Owner: HDOT	State/Terr/Comlth.: <u>HI</u> Island: <u>Kauai</u> Sampling Point: <u>P4</u>
Investigator(s): B Nicholson / B Luke / T Agostini	TMK/Parcel: 4-5-6-003-002
Landform (hillslope, coastal plain, etc.): Floodplain, Base of Slope	Local relief (concave, convex, none): none
Lat: 22.2076390733 N Long: -159.516953035 V	Datum: <u>NAD UTM 4N</u> Slope (%): <u>0</u>
Soil Map Unit Name: Mokuleia fine sandy loam (Mr)	NWI classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year?	Yes X No (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly dis	urbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation, Soil, or Hydrology naturally proble	natic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing s	mpling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes X Yes X Yes X	No No No	Is the Sampled Area within a Wetland?	Yes X	No
Remarks:					
edge of water					

	Absolute	Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 10')	% Cover	Species? Status	Number of Dominant Species
1. Hibiscus tillaceous (Talipariti tiliaceum)	95	Y FAC	That Are OBL, FACW, or FAC: 1 (A)
2			Total Number of Dominant
3			Species Across All Strata: 1 (B)
4			Percent of Dominant Species
5			That Are OBL, FACW, or FAC: <u>100</u> (A/B)
	95	= Total Cover	Drevelence Index werkeheet:
Sapling/Shrub Stratum (Plot size: 10 )			Tatal % Orange (
1			NUITIPIY by:
2			OBL species X 1 =
3		·	FACW species x 2 =
4			FAC species x 3 =
5		·	FACU species x 4 =
10'	0	= Total Cover	UPL species x 5 =
Herb Stratum (Plot size: 10 )			Column Totals: (A) (B)
1			Drovolance Index D/A
2		·	Prevalence index = B/A =
3			Hydrophytic vegetation indicators:
4			1 - Rapid Test for Hydrophytic Vegetation
5			2 - Dominance Test is >50%
6			3 - Prevalence Index is ≤3.0'
7			Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
8			Remarks of in the delineation report)
	0	= Total Cover	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
Woody Vine Stratum (Plot size: 10 )			be present, unless disturbed or problematic.
1			Hudrophytic
2			Vegetation
	0	= Total Cover	Present? Yes X No
Remarks:			
only tree stratum			

Profile Desc	Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)										
Depth	Matrix		Rede	ox Feature	S	0	_				
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks			
0-6	10 YR 5/2	80	7.5 YR 5/6	20		Μ	Sandy Loam	Redox			
						·					
			<u></u>		·						
					<u></u>						
						·					
<u> </u>					·	·					
<sup>1</sup> Type: C=C	oncentration, D=De	pletion, RN	/I=Reduced Matrix, M	S=Maske	d Sand Gr	ains.	<sup>2</sup> Locati	on: PL=Pore Lining, M=Matrix.			
Hydric Soil	Indicators:						Indicators	for Problematic Hydric Soils <sup>3</sup> :			
Histosol	(A1)		X Sandy Redo	ox (S5)			Stratified Layers (A5)				
Histic E	pipedon (A2)		Dark Surfac	e (S7)			Sandy Mucky Mineral (S1)				
Black H	istic (A3)		Loamy Gley	ed Matrix	(F2)		Red Parent Material (F21)				
Hydroge	en Sulfide (A4)		Depleted Ma	atrix (F3)			Very Shallow Dark Surface (TF12)				
Muck Pr	esence (A8)		Redox Dark	Surface (I	=6)		Other	(Explain in Remarks)			
Deplete	d Below Dark Surfac	ce (A11)	Depleted Da	rk Surface	e (F7)						
Thick Da	ark Surface (A12)		Redox Depr	essions (F	8)	<sup>3</sup> Indio	cators of hydrop	ohytic vegetation and wetland hydrology			
Sandy G	Bleyed Matrix (S4)					mu	ust be present,	unless disturbed or problematic.			
Restrictive	Layer (if observed)	):									
Туре:											
Depth (in	ches):						Hydric Soil	Present? Yes $\frac{X}{X}$ No			
Remarks:							I				
Sandy Redox	(S5)										
L											
<b>HYDROLOG</b>	Y										

#### Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.) Primary Indicators (minimum of one required; check all that apply) Secondary Indicators (minimum of two required) Surface Water (A1) \_\_\_\_ Aquatic Fauna (B13) \_\_\_\_ Surface Soil Cracks (B6) High Water Table (A2) \_\_\_\_ Tilapia Nests (B17) \_\_\_\_ Sparsely Vegetated Concave Surface (B8) Saturation (A3) \_\_\_\_ Hydrogen Sulfide Odor (C1) \_\_\_\_ Drainage Patterns (B10) Water Marks (B1) Oxidized Rhizospheres on Living Roots (C3) Dry-Season Water Table (C2) X Sediment Deposits (B2) Presence of Reduced Iron (C4) Salt Deposits (C5) \_\_\_\_ Drift Deposits (B3) \_\_\_ Recent Iron Reduction in Tilled Soils (C6) Stunted or Stressed Plants (D1) Thin Muck Surface (C7) X Geomorphic Position (D2) Algal Mat or Crust (B4) \_\_\_\_ Iron Deposits (B5) Fiddler Crab Burrows (C10) (Guam, CNMI, \_\_\_\_ Shallow Aquitard (D3) Inundation Visible on Aerial Imagery (B7) FAC-Neutral Test (D5) and American Samoa) Water-Stained Leaves (B9) Other (Explain in Remarks) **Field Observations:** Yes <u>No X</u> Depth (inches): Surface Water Present? Yes X \_ No \_\_\_\_\_ Depth (inches): 0.5" Water Table Present? Wetland Hydrology Present? Yes XSaturation Present? Yes X No Depth (inches): surface No (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: High Water Table (A2), Saturation (A3), Sediment Deposit (B2), Geomorphic Position (D2)

Project/Site: Waipa Stream Bridge	City: <u>Hanalei</u> Sampling Date: <u>9.30.2014</u> Time: <u>14:20</u>
Applicant/Owner: HDOT	State/Terr/Comlth.: HI Island: Kauai Sampling Point: P1
Investigator(s): B Nicholson / B Luke / T Agostini	TMK/Parcel: <u>4-5-6-004-022</u>
Landform (hillslope, coastal plain, etc.): Coastal Plain	Local relief (concave, convex, none): <u>Concave</u>
Lat: 22.2043095223 N Long: -159.514358202 V	Datum: <u>NAD UTM 4N</u> Slope (%): 1
Soil Map Unit Name: Beaches	NWI classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year	Yes X No (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly dis	turbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation, Soil, or Hydrology naturally proble	matic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing s	ampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes X Yes X Yes X	No No No	Is the Sampled Area within a Wetland?	Yes X	No
Remarks:					

Point 30' from edge of road, makai

	Absolute	Dominant	Indicator	Dominance Test worksheet:	
<u>Hibiscus tillaceus (Talipariti tiliaceum)</u>	<u>% Cover</u>	Species?	<u>Status</u>	Number of Dominant Species	<i>(</i> <b>•</b> )
			170	That Are OBL, FACW, or FAC:	(A)
2				Total Number of Dominant	
3				Species Across All Strata: 1	(B)
4				Percent of Dominant Species	
5				That Are OBL, FACW, or FAC: 100%	(A/B)
Sopling/Shrub Stratum (Plot size: 15'	90	= Total Cov	ver	Prevalence Index worksheet	
				Total % Cover of: Multiply by:	
1			·		
2					
3				FACW species $x = $	
4	-			FAC species x 3 =	
5				FACU species x 4 =	
Herb Stratum (Plot size: 15'	0	= Total Co	over		
1				Column Totals: (A)	_ (B)
2			·	Prevalence Index = B/A =	
3				Hydrophytic Vegetation Indicators:	
Δ				1 - Rapid Test for Hydrophytic Vegetation	
				2 - Dominance Test is >50%	
				3 - Prevalence Index is ≤3.0 <sup>1</sup>	
7			·	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain	ו in
0		·		Remarks or in the delineation report)	
0	0	– Total Co		4	
Woody <u>Vine Stratum</u> (Plot size: 15' )			ver	Indicators of hydric soil and wetland hydrology m	ust
1.					
2.	•			Hydrophytic	
	0	= Total Co	ver	VegetationPresent?Yes $\underline{\times}$ No	
Remarks:				1	
Dense hau					

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)										
Depth	Matrix		Rede	ox Feature	s					
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
0-6	10 YR 2/2	100					Loam	Organic	layer	
6-17	2.5 Y 6/3	96	7.5 YR 5/6	4			Sand	Oxidized	roots	
	-									
			-					·		
			-					·		
<sup>1</sup> Type: C=Co	oncentration D=Dei	pletion RM	I=Reduced Matrix M	S=Masker	Sand Gra	ains	<sup>2</sup> l ocati	ion <sup>.</sup> PI =Por	e Linina M=M	latrix
Hydric Soil	indicators:	,					Indicators	s for Proble	matic Hydric	Soils <sup>3</sup> :
Histosol	(A1)		X Sandy Redo	ox (S5)			Strati	fied Lavers (	A5)	
Histic Ep	bipedon (A2)		Dark Surfac	e (S7)			Sandy	Mucky Min	eral (S1)	
Black Hi	stic (A3)		Loamv Glev	ed Matrix (	(F2)		Red F	Parent Mater	al (F21)	
Hvdroge	n Sulfide (A4)		Depleted Ma	Very Shallow Dark Surface (TF12)				2)		
Muck Pr	esence (A8)		Redox Dark	Surface (F	-6)		Other (Explain in Remarks)			
Depleted	Below Dark Surfac	ce (A11)	Depleted Da	ark Surface	e (F7)			X 1 <sup>2</sup> -	/	
Thick Da	ark Surface (A12)		Redox Depr	essions (F	8)	<sup>3</sup> Indic	ators of hydro	phytic veget	ation and wetla	and hydrology
Sandy G	leyed Matrix (S4)		<u> </u>		- /	mu	ist be present,	unless distu	rbed or proble	matic.
Restrictive I	ayer (if observed)	:					-			
Туре:										
Depth (ind	ches):						Hydric Soi	I Present?	Yes X	No
Remarks:							•			
Sandy Redox	(S5). Technically S	andy Red	ox should have a chr	oma of 2 o	r less but	strong hyc	Irology indicate	ors for hydric	conditions	

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)					
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (minimum of two required)				
Surface Water (A1)       Aquatic Fauna (B13)         High Water Table (A2)       Tilapia Nests (B17)         Saturation (A3)       Hydrogen Sulfide Odor (C1)         X Water Marks (B1)       X Oxidized Rhizospheres on Living I         Drift Deposits (B2)       Presence of Reduced Iron (C4)         Drift Deposits (B3)       Recent Iron Reduction in Tilled So         Algal Mat or Crust (B4)       Thin Muck Surface (C7)         Iron Deposits (B5)       Fiddler Crab Burrows (C10) (Guar         and American Samoa)       Other (Each in Each i					
Water-Stained Leaves (B9) Other (Explain in Remarks)					
Field Observations:					
Surface Water Present? Yes <u>No </u> Depth (inches):					
Water Table Present? Yes <u>No X</u> Depth (inches):	X				
Saturation Present? Yes <u>No X</u> Depth (inches): (includes capillary fringe)	Wetland Hydrology Present? Yes X No				
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspec	tions), if available:				
Remarks:					
Indicators are Water Marks (B1), Oxidized Roots (C3), Geomorphic Position (D2) Depression area connected to river.					

Project/Site: Waipa Stream Bridge	City: Hanalei		_ Sampling Da	ate: <u>9.30.201</u>	4 Time: 14:40
Applicant/Owner: HDOT	State/Terr/Co	mlth.: HI	Island:	Kauai	Sampling Point: P2
Investigator(s): B Nicholson / B Luke / T Agostini				TMK/Parcel:	4-5-6-004-022
Landform (hillslope, coastal plain, etc.): Road Fill Slope		Local relief (	concave, conve	ex, none): <u>Co</u>	oncave
Lat: 22.2042880825 N Long: -159.514395	5423 W	D	atum: NAD UT	M 4N SI	ope (%): <u>5</u>
Soil Map Unit Name: Beaches			NWI classi	fication: PFC	OC
Are climatic / hydrologic conditions on the site typical for this time of	year? Yes X	No (I	f no, explain in	Remarks.)	
Are Vegetation, Soil, or Hydrology significan	tly disturbed?	Are "Normal (	Circumstances'	" present? Y	res X No
Are Vegetation, Soil, or Hydrology naturally	problematic?	(If needed, ex	plain any ansv	vers in Rema	rks.)
SUMMARY OF FINDINGS – Attach site map showin	ng sampling po	int locatio	ns, transect	ts, importa	ant features, etc.
v					

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u>×</u> Yes Yes	No No _X No _X	Is the Sampled Area within a Wetland?	Yes	No <u>×</u>
Remarks:					

Roadside fill, upland area near highway, 4ft from edge of pavement.

	Absolute	Dominant	Indicator	Dominance Test worksheet:
1)	<u>% Cover</u>	Species?	Status	Number of Dominant Species         That Are OBL, FACW, or FAC:       4         (A)
2	<u> </u>			Total Number of Dominant
3		·		Species Across All Strata: <u>4</u> (B)
4 5				Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)
15'	0	= Total Co	ver	Developed in development of
Sapling/Shrub Stratum (Plot size: 15 )	F	V	EAC	Prevalence index worksneet:
1. Hibiscus tillaceus (Talipariti tillaceum)	5	Y	FAC	Total % Cover of: Multiply by:
2				OBL species x 1 =
3				FACW species x 2 =
4	<u> </u>			FAC species x 3 =
5				FACU species x 4 =
	5	= Total Co	over	UPL species x 5 =
Herb Stratum (Plot size: 15' )		-		Column Totals: (A) (B)
1. Paspalum conjugatum	40	Y	FAC	
2. Cenchrus purpureus	30	Υ	FAC	Prevalence Index = $B/A = 3.0$
3. Sphagneticola trilobata	30	Y	FAC	Hydrophytic Vegetation Indicators:
4. Kyllinga brevifolia	5	Ν	FAC	1 - Rapid Test for Hydrophytic Vegetation
5				2 - Dominance Test is >50%
6		·		3 - Prevalence Index is ≤3.0 <sup>1</sup>
7		·		Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
7				Remarks or in the delineation report)
8	105	- Total Ca		
Woody Vine Stratum (Plot size: 15' )		= 10tal C0	vei	Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1		·		
2	<u> </u>			Hydrophytic Vegetation
	0	= Total Co	ver	Present? Yes $\frac{\chi}{\chi}$ No
Remarks:				

#### SOIL

# Sampling Point: P2

Profile Desc	ription: (Describe	e to the de	pth needed to docu	ment the	indicator	or confiri	m the absence	of indicators.)		
Depth Matrix			Red	ox Feature	25			,		
(inches)	Color (moist)	%	Color (moist)	<u>%</u>	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks		
0-2	7.5 YR 3/2	100								
2-14	5 YR 4/4	90	5 YR 3/4	5			Clay Loam	not redox		
			5 YR 5/8	5	С	М	Clay Loam			
						·				
<sup>1</sup> Type: C=Co	oncentration. D=De	pletion. RN	- /=Reduced Matrix, M	IS=Maske	d Sand Gr	ains.	<sup>2</sup> Locatio	on: PL=Pore Lining, M=Matrix.		
Hydric Soil	Indicators:						Indicators	for Problematic Hydric Soils <sup>3</sup> :		
Histosol	(A1)		Sandy Redo	ox (S5)			Stratifi	ed Layers (A5)		
Histic Ep	pipedon (A2)		Dark Surface (S7)				Sandy	Sandy Mucky Mineral (S1)		
Black Hi	stic (A3)		Loamy Gleyed Matrix (F2)				Red P	Red Parent Material (F21)		
Hvdroae	n Sulfide (A4)		Depleted Matrix (F3)				Very Shallow Dark Surface (TF12)			
Muck Pr	esence (A8)		Redox Dark Surface (F6)				Other (Explain in Remarks)			
Depleter	Below Dark Surfa	ce (A11)	Depleted D	ark Surfac	e (F7)					
Dopieted	ark Surface (A12)	00 (/ (/ / / /	Beday Dep	ressions (I	=8)	<sup>3</sup> India	cators of hydror	bytic vegetation and wetland bydrology		
Sandy G	leved Matrix (S4)			03310113 (1	0)	must be present unless disturbed or problematic				
Restrictive I	aver (if observed	).								
Type <sup>.</sup>		/-								
Depth (inches):					Hydric Soil	Present? Yes <u>No X</u>				
Remarks:										
Likely fill mate	Likely fill material. Does not contain 10% redox reg for E21									
Entery ini mat										

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)								
Primary Indicators (minimum	of one requ		Secondary Indicators (minimum of two required)					
Surface Water (A1)		_	_ Aquatic Fauna (B13)		Surface Soil Cracks (B6)			
High Water Table (A2)		_	_ Tilapia Nests (B17)		Sparsely Vegetated Concave Surface (B8)			
Saturation (A3)			_ Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)			
Water Marks (B1)			_ Oxidized Rhizospheres on Living I	Roots (C3)	Dry-Season Water Table (C2)			
Sediment Deposits (B2)		_	Presence of Reduced Iron (C4)		Salt Deposits (C5)			
Drift Deposits (B3)		_	_ Recent Iron Reduction in Tilled Sc	oils (C6)	Stunted or Stressed Plants (D1)			
Algal Mat or Crust (B4)		_	_ Thin Muck Surface (C7)		Geomorphic Position (D2)			
Iron Deposits (B5)		_	_ Fiddler Crab Burrows (C10) (Guar	n, CNMI,	Shallow Aquitard (D3)			
Inundation Visible on Ae	erial Imagery	/ (B7)	and American Samoa)		FAC-Neutral Test (D5)			
Water-Stained Leaves (	B9)	_	Other (Explain in Remarks)					
Field Observations:								
Surface Water Present?	Yes	No _X	Depth (inches):					
Water Table Present?	Yes	No	Depth (inches):					
Saturation Present? (includes capillary fringe)	Yes	No _X	_ Depth (inches):	Wetland H	lydrology Present? Yes <u>No</u> X			
Describe Recorded Data (st	ream gauge	, monitoring	well, aerial photos, previous inspect	tions), if ava	ilable:			
Remarks:								
Along roadside (makai)								

Project/Site: Waipa Stream Bridge	City: Hanalei	Sampling Date: 10.	.1.2014 Time: 8:10			
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island: Ka	uai Sampling Point: P3			
Investigator(s): B Nicholson / B Luke / T Agostini		TMK/Pa	arcel: <u>4-5-6-004-022</u>			
Landform (hillslope, coastal plain, etc.): Coastal Plain	Local relief	Local relief (concave, convex, none): <u>none</u>				
Lat: 22.204322351 N Long: -159.5141	14114 W	Datum: NAD UTM 4N	Slope (%): <u>0</u>			
Soil Map Unit Name: Beaches		NWI classification	: UPL			
Are climatic / hydrologic conditions on the site typical for this time	of year? Yes X No	(If no, explain in Remar	ks.)			
Are Vegetation, Soil, or Hydrology signific	antly disturbed? Are "Norma	I Circumstances" preser	nt? Yes X No			
Are Vegetation, Soil, or Hydrology natural	ly problematic? (If needed, o	explain any answers in	Remarks.)			
SUMMARY OF FINDINGS – Attach site map show	ving sampling point location	ons, transects, im	portant features, etc.			
Hydrophytic Vegetetien Present? Veg X						

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u>^</u> Yes Yes	No No X No X	Is the Sampled Area within a Wetland?	Yes	No <u>×</u>
Remarks:					

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 15)	% Cover	Species?	<u>Status</u>	Number of Dominant Species
1. Cordia subcordata	30	Y	FACU	That Are OBL, FACW, or FAC: <u>3</u> (A)
2. Hibiscus tillaceus (Talipariti tiliaceum)	5	N	FAC	Total Number of Dominant
3				Species Across All Strata: <u>3</u> (B)
4	·			
5				That Are OBL FACW or FAC 100 (A/B)
	35	= Total Co	ver	
Sapling/Shrub Stratum (Plot size: 15' )				Prevalence Index worksheet:
1				Total % Cover of: Multiply by:
2.				OBL species x 1 =
3.				FACW species x 2 =
4				FAC species x 3 =
				FACU species x 4 =
	0	– Total Cc		$\frac{1100 \text{ species}}{100 \text{ species}} = \frac{100 \text{ species}}{100 \text{ species}}$
Herb Stratum (Plot size: 15' )		10(0100	//61	Column Totals: (A) (B)
1. Sphagneticola trilobata	60	Y	FAC	
2. Paspalum conjugatum	30	Υ	FAC	Prevalence Index = B/A =
3. Bidens alba	3	N	UPL	Hydrophytic Vegetation Indicators:
4. Epiprenum pinnatum	3	N	FAC	1 - Rapid Test for Hydrophytic Vegetation
5				2 - Dominance Test is >50%
6.				3 - Prevalence Index is ≤3.0 <sup>1</sup>
7				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
0		·		Remarks or in the delineation report)
0	96	- Total Ca	Vor	
Woody Vine Stratum (Plot size: <sup>15'</sup> )			ver	Indicators of hydric soil and wetland hydrology must
1.				
2				Hydrophytic
<u> </u>	0	= Total Co	ver	VegetationPresent?YesYesX
Remarks:				

Profile Des	cription: (Describe	to the de	pth needed to docur	nent the	indicator	or confirm	n the absenc	e of indicato	ors.)	
Depth	Matrix		Redo	x Feature	S					
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	<u> </u>	Remark	(S
0-3	10 YR 3/2	100					Loam	organic ı	natter	
3-24	10 YR 5/3	100	10 YR 5/6				Sand			
								<u> </u>		
<sup>1</sup> Type: C=C	Concentration D-Dev	letion RM	A-Reduced Matrix M	S-Masker		ains	21 ocat	tion: PI =Por	elinina M	-Matrix
Hvdric Soil	Indicators:						Indicator	s for Proble	matic Hvd	ric Soils <sup>3</sup> :
Histoso	bl (A1)		Sandy Redo	x (S5)			Strati	fied Lavers (	A5)	
Histic E	Epipedon (A2)		Dark Surface (S7)				Sandy Mucky Mineral (S1)			
Black H	listic (A3)		Loamv Gleve	ed Matrix	(F2)		Red I	Parent Mater	ial (F21)	
Hydrog	en Sulfide (A4)		Depleted Matrix (F3)				Very Shallow Dark Surface (TF12)			
Muck P	Presence (A8)		Redox Dark	Surface (I	-6)		Other (Explain in Remarks)			
Deplete	ed Below Dark Surfac	ce (A11)	Depleted Da	rk Surface	, (F7)			<b>`</b>	,	
Thick D	ark Surface (A12)	( )	Redox Depre	essions (F	(8)	<sup>3</sup> Indic	ators of hvdro	phytic veaet	ation and w	etland hvdrology
Sandy	Gleyed Matrix (S4)			,	,	mu	ist be present.	, unless distu	rbed or pro	blematic.
Restrictive	Layer (if observed)	:						-		
Type:										
Depth (ir	nches):						Hydric So	il Present?	Yes	Xo X
Remarks:										

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)								
Primary Indicators (minimum of one required; check	Secondary Indicators (minimum of two required)							
Surface Water (A1)	Aquatic Fauna (B13)	Surface Soil Cracks (B6)						
High Water Table (A2)	Tilapia Nests (B17)	Sparsely Vegetated Concave Surface (B8)						
Saturation (A3)	Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)						
Water Marks (B1)	Oxidized Rhizospheres on Living F	Roots (C3) Dry-Season Water Table (C2)						
Sediment Deposits (B2)	Presence of Reduced Iron (C4)	Salt Deposits (C5)						
Drift Deposits (B3)	Recent Iron Reduction in Tilled So	ils (C6) Stunted or Stressed Plants (D1)						
Algal Mat or Crust (B4)	Thin Muck Surface (C7)	Geomorphic Position (D2)						
Iron Deposits (B5)	Fiddler Crab Burrows (C10) (Guan	n, CNMI, Shallow Aquitard (D3)						
Inundation Visible on Aerial Imagery (B7)	and American Samoa)	FAC-Neutral Test (D5)						
Water-Stained Leaves (B9)	Other (Explain in Remarks)							
Field Observations:								
Surface Water Present? Yes No X	_ Depth (inches):							
Water Table Present? Yes No X	_ Depth (inches):							
Saturation Present? Yes No X	_ Depth (inches):	Wetland Hydrology Present? Yes No X						
(includes capillary fringe)		· · · · · · · · · · · · · · · · · · ·						
Describe Recorded Data (stream gauge, monitoring	well, aerial photos, previous inspect	ions), if available:						
Remarks:								

Project/Site: Waipa Stream Bridge	City: <u>Hanalei</u>	Sampling Date: <u>10.1</u>	.2014 Time: 08:35					
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island: Kaua	ai Sampling Point: P4					
Investigator(s): B Nicholson / B Luke / T Agostini		TMK/Par	cel: <u>4-5-6-004-022</u>					
Landform (hillslope, coastal plain, etc.): Coastal plain	Local relief	(concave, convex, none)	none					
Lat: 22.203940981 N Long: -159.513	639538 W	Datum: NAD UTM 4N	Slope (%): <u>0</u>					
Soil Map Unit Name: Beaches		NWI classification:	UPL					
Are climatic / hydrologic conditions on the site typical for this time	e of year? Yes X No	(If no, explain in Remarks	5.)					
Are Vegetation, Soil, or Hydrology signifi	cantly disturbed? Are "Norma	I Circumstances" present	? Yes X No					
Are Vegetation, Soil, or Hydrology natura	ally problematic? (If needed,	explain any answers in Re	emarks.)					
SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.								
Hydrophytic Vegetation Present? Yes X No	Is the Sampled Area							

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes Yes	No <u>X</u> No <u>X</u>	Is the Sampled Area within a Wetland?	Yes	No <u>×</u>
Remarks:					

	Absolute	Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 15)	% Cover	Species? Status	Number of Dominant Species
1. Hibiscus tillaceus (Talipariti tiliaceum)	85	Y FAC	That Are OBL, FACW, or FAC: 1 (A)
2. Terminalia catappa	15	N FAC	Total Number of Dominant
3			Species Across All Strata: 1 (B)
4			
5.			Percent of Dominant Species
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15' )			Prevalence Index worksheet:
1			Total % Cover of: Multiply by:
2.			OBL species x 1 =
3.			FACW species x 2 =
4			FAC species x 3 =
5		· ·	FACU species x 4 =
···	0	- Total Cover	UPL species $x 5 =$
Herb Stratum (Plot size: 15' )			Column Totals: (A) (B)
1.			
2.			Prevalence Index = B/A =
3			Hydrophytic Vegetation Indicators:
4			1 - Rapid Test for Hydrophytic Vegetation
5		· ·	X 2 - Dominance Test is >50%
6		· ·	3 - Prevalence Index is ≤3.0 <sup>1</sup>
7		·	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
7		·	Remarks or in the delineation report)
o	0		
Woody Vine Stratum (Plot size: 15')	0	= Total Cover	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1			be present, unless disturbed or problematic.
2		· ·	Hydrophytic
<u>ــــــــــــــــــــــــــــــــــــ</u>	0	- Total Covar	Vegetation
Deveele	· · · · · ·		
Kemarks:			

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)											
Depth	Matrix		Redox Features								
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks		
0-3	10 YR 3/2	100					Loam				
3-24	10 YR 5/3	96	10 YR 5/6	4			Sand				
							·				
<u></u> .			·								
				C Maakar			21 agetic		olining M M	otriv	
	ncentration, D=Dep	Sietion, Riv		S=IVIASKed	a Sand Gra	uns.	Indicators	for Problem	e Lining, MeM	aurix.	
Hyune Soin				(05)			mulcators			50115 .	
Histosol	(A1)		Sandy Redo	x (S5)			Stratified Layers (A5)				
Histic Ep	oipedon (A2)		Dark Surface	e (S7)			Sandy Mucky Mineral (S1)				
Black Hi	stic (A3)		Loamy Gley	ed Matrix (	(F2)		Red Parent Material (F21)				
Hydroge	n Sulfide (A4)		Depleted Ma	atrix (F3)			Very Shallow Dark Surface (TF12)				
Muck Pr	esence (A8)		Redox Dark	Surface (F	-6)	Other (Explain in Remarks)					
Depleted	Below Dark Surfac	ce (A11)	Depleted Da	rk Surface	e (F7)						
Thick Da	ark Surface (A12)		Redox Depr	essions (F	8)	<sup>3</sup> Indic	dicators of hydrophytic vegetation and wetland hydrology				
Sandy G	ileyed Matrix (S4)					mu	ist be present, i	unless distu	rbed or proble	matic.	
Restrictive I	ayer (if observed)	:									
Туре:										V	
Depth (inches):					Hydric Soil	Present?	Yes	No 🔨			
Remarks:											
Sand after 3", did not form clear hydrology indicator (oxidized roots). Possibly due to coral parent materi							ent material.				

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)									
Primary Indicators (minimum of one required; check	Secondary Indicators (minimum of two required)								
Surface Water (A1) High Water Table (A2)	Aquatic Fauna (B13) Tilapia Nests (B17)	<ul> <li>Surface Soil Cracks (B6)</li> <li>Sparsely Vegetated Concave Surface (B8)</li> <li>Decision Patterns (D42)</li> </ul>							
Saturation (AS)     Water Marks (B1)     Sediment Deposits (B2)     Drift Deposits (B3)     Algal Mat or Crust (B4)     Iron Deposits (B5)     Inundation Visible on Aerial Imagery (B7)     Water-Stained Leaves (B9)	<ul> <li>Aydrogen Suniae Odor (C1)</li> <li>Oxidized Rhizospheres on Living Roots (C3)</li> <li>Presence of Reduced Iron (C4)</li> <li>Recent Iron Reduction in Tilled Soils (C6)</li> <li>Thin Muck Surface (C7)</li> <li>Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa)</li> <li>Other (Explain in Remarks)</li> </ul>	<ul> <li>Drainage Patterns (BT0)</li> <li>Dry-Season Water Table (C2)</li> <li>Salt Deposits (C5)</li> <li>Stunted or Stressed Plants (D1)</li> <li>Geomorphic Position (D2)</li> <li>Shallow Aquitard (D3)</li> <li>FAC-Neutral Test (D5)</li> </ul>							
Field Observations:									
Surface Water Present? Yes No X	_ Depth (inches):								
Water Table Present? Yes No X	_ Depth (inches):	X							
Saturation Present? Yes <u>No X</u> (includes capillary fringe)	_ Depth (inches): Wetland	Hydrology Present? Yes No X							
Describe Recorded Data (stream gauge, monitoring	well, aerial photos, previous inspections), if a	vailable:							
Remarks:									
Some indication of past flooding, but no distinct drift l	ine. Frequency of flooding unclear. No hydrolo	ogy after flood event on 9/30.							

Project/Site: Waipa Stream Bridge	City: Hanalei		Sampling Da	te: <u>10.1.201</u> 4	<sup>1</sup> Time: 09:15
Applicant/Owner: HDOT	State/Terr/Com	lth.: HI	Island:	Kauai	Sampling Point: P5
Investigator(s): B Nicholson / B Luke / T Agostini			т	MK/Parcel:	4-5-6-004-022
Landform (hillslope, coastal plain, etc.): Floodplain	L	Local relief (cor	ncave, conve	x, none): <u>nor</u>	ne
Lat: 22.2037999569 N Long: -159.513	3884112 W	Datu	ım: UTM 4N	Slo	ope (%): <u>0</u>
Soil Map Unit Name: Beaches			NWI classif	ication: UPL	
Are climatic / hydrologic conditions on the site typical for this tim	e of year? Yes X N	lo (If n	o, explain in	Remarks.)	
Are Vegetation, Soil, or Hydrology signif	icantly disturbed? A	Are "Normal Cir	cumstances"	present? Y	es <u>X</u> No
Are Vegetation, Soil, or Hydrology natur	ally problematic? (I	If needed, expl	ain any answ	ers in Remar	ks.)
SUMMARY OF FINDINGS – Attach site map sho	owing sampling poir	nt locations	, transect	s, importa	int features, etc.
1	1				

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes X Yes X Yes X	No No No	Is the Sampled Area within a Wetland?	Yes X	No
Remarks:					

	Absolute	Dominant	Indicator	Dominance Test worksheet:
<u>Tree Stratum</u> (Plot size: <u>5</u> )	% Cover	Species?	Status	Number of Dominant Species
1. Hibiscus tillaceus	15	Y	FAC	That Are OBL, FACW, or FAC: 3 (A)
2				Tatal Number of Deminant
3.				Species Across All Strata: 3 (B)
4				
5		·		Percent of Dominant Species
	15	Tatal Ca		That Are OBL, FACW, or FAC: (A/B)
Sapling/Shrub Stratum (Plot size: <sup>5'</sup> )	-10		ver	Prevalence Index worksheet:
<u></u>				Total % Cover of: Multiply by:
··		·		
2		·		
3		·		FAC vv species
4		·	······	FAC species x 3 =
5		·		FACU species x 4 =
5	0	= Total Co	over	UPL species x 5 =
Herb Stratum (Plot size: <u>5</u> )	50	V	540	Column Totals: (A) (B)
1. Sphagneticola trilobata	50	Y	FAC	
2. Cyperus involucratus	40	Y	FACW	Prevalence Index = B/A =
3. Canavalia cathartica	10	Ν	FACU	Hydrophytic Vegetation Indicators:
4				1 - Rapid Test for Hydrophytic Vegetation
5.				2 - Dominance Test is >50%
6				3 - Prevalence Index is ≤3.0 <sup>1</sup>
7				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
7		·		Remarks or in the delineation report)
ð	100			
Woody Vine Stratum (Plot size: 5'	100	= Total Co	ver	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
				be present, unless disturbed or problematic.
1		·		Hydrophytic
2		·		Vegetation
	0	= Total Co	ver	Present? Yes <u>×</u> No
Remarks:				•

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)											
Depth	Matrix		Red	Redox Features							
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks		
0-4	10 YR 2/1	100					Loam Clay Organic and rocks				
4-16	7.5 YR 6/2	97	7.5 YR 5/6	3			Sand Loam				
				. <u></u>			·				
				<u> </u>							
							·				
<sup>1</sup> Type: C=Co	oncentration, D=De	pletion, RN	/I=Reduced Matrix, N	IS=Maske	d Sand Gra	ains.	<sup>2</sup> Locati	on: PL=Po	re Lining, M=N	latrix.	
Hydric Soll	indicators:						Indicators	TOF Proble		5011S :	
Histosol	(A1)		X Sandy Red	ox (S5)			Stratif	ied Layers	(A5)		
Histic Ep	opedon (A2)		Dark Surfac	e (S7)	(50)		Sandy Mucky Mineral (S1)				
Black Hi	stic (A3)		Loamy Gley	ed Matrix	(F2)		Red Parent Material (F21)				
Hydroge	n Sulfide (A4)		Depleted Ma	atrix (F3)			Very S	Very Shallow Dark Surface (TF12)			
Muck Pr	esence (A8)		Redox Dark	Surface (	F6)		Other	(Explain in	Remarks)		
Depleted	d Below Dark Surfa	ce (A11)	Depleted Da	ark Surface	e (F7)	0					
Thick Da	ark Surface (A12)		Redox Depr	essions (F	-8)	°Indic	ators of hydrop	phytic veget	ation and wetle	and hydrology	
Sandy G	Bleyed Matrix (S4)					mu	ist be present,	unless distu	urbed or proble	matic.	
Restrictive I	_ayer (if observed	):									
Depth (inc	ches):						Hvdric Soil	Present?	Yes X	No	
Remarks:							,				
Sandy redox	(\$5)										
Callay readx	(88)										
HYDROLOG	(										

#### Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.) Primary Indicators (minimum of one required; check all that apply) Secondary Indicators (minimum of two required) Surface Water (A1) \_\_\_\_ Aquatic Fauna (B13) \_\_\_\_ Surface Soil Cracks (B6) \_\_\_\_ Tilapia Nests (B17) \_\_\_\_ Sparsely Vegetated Concave Surface (B8) High Water Table (A2) Saturation (A3) \_\_\_\_ Hydrogen Sulfide Odor (C1) \_\_\_\_ Drainage Patterns (B10) Water Marks (B1) X Oxidized Rhizospheres on Living Roots (C3) Dry-Season Water Table (C2) \_\_\_ Sediment Deposits (B2) Presence of Reduced Iron (C4) \_\_\_\_ Salt Deposits (C5) \_\_\_\_ Drift Deposits (B3) \_\_\_ Recent Iron Reduction in Tilled Soils (C6) \_\_\_\_ Stunted or Stressed Plants (D1) \_\_\_\_ Algal Mat or Crust (B4) \_\_\_\_ Thin Muck Surface (C7) Geomorphic Position (D2) \_\_\_\_ Iron Deposits (B5) \_\_\_\_ Fiddler Crab Burrows (C10) (Guam, CNMI, \_\_\_\_ Shallow Aquitard (D3) Inundation Visible on Aerial Imagery (B7) FAC-Neutral Test (D5) and American Samoa) Water-Stained Leaves (B9) Other (Explain in Remarks) Field Observations: Yes <u>No X</u> Depth (inches): Surface Water Present? Yes X \_ No \_\_\_\_ Depth (inches): 16" Water Table Present? Saturation Present? Yes X No Depth (inches): 4-5" Wetland Hydrology Present? Yes $\frac{X}{X}$ No (includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: Faint oxy rhizo

Project/Site: Waipa Stream Bridge	_ City: Hanalei	Sampling Date: <u>10.1.2014</u> Time: <u>09:35</u>						
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island:Kauai Sampling Point:	P6					
Investigator(s): B Nicholson / B Luke / T Agostini		TMK/Parcel: <u>4-5-6-004-022</u>						
Landform (hillslope, coastal plain, etc.): Coastal plain	Local relief	(concave, convex, none): none						
Lat: 22.20382004250 N Long: -159.513844556	00 W 00	Datum: <u>NAD UTM 4N</u> Slope (%): 2						
Soil Map Unit Name: Beaches		NWI classification: UPL						
Are climatic / hydrologic conditions on the site typical for this time of year	r? Yes X No	(If no, explain in Remarks.)						
Are Vegetation, Soil, or Hydrology significantly of	listurbed? Are "Normal	I Circumstances" present? Yes X No						
Are Vegetation, Soil, or Hydrology naturally prob	plematic? (If needed, e	explain any answers in Remarks.)						
SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.								
Hydrophytic Vegetation Present? Yes X No	Is the Sampled Area							

Hydric Soil Present? Wetland Hydrology Present?	Yes Yes	No X No X	within a Wetland?	Yes	No <u>X</u>
Remarks:					

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 5)	<u>% Cover</u>	Species?	Status	Number of Dominant Species
1. Hibiscus tillaceus	60	Y	FAC	That Are OBL, FACW, or FAC: $2$ (A)
2. Terminalia catappa	35	Y	FAC	Total Number of Dominant
3. Casuarina equisetifolia	10	N	FACU	Species Across All Strata: <u>2</u> (B)
4				Demonst of Deminent Creation
5				That Are OBL, FACW, or FAC: 100 (A/B)
	105	= Total Co	ver	
Sapling/Shrub Stratum (Plot size: 5' )				Prevalence Index worksheet:
1				Total % Cover of:Multiply by:
2				OBL species x 1 =
3				FACW species x 2 =
4.				FAC species x 3 =
5.				FACU species x 4 =
	0	= Total Co	ver	UPL species x 5 =
Herb Stratum (Plot size: 5' )				Column Totals: (A) (B)
1				
2				Prevalence Index = B/A =
3.				Hydrophytic Vegetation Indicators:
4.				1 - Rapid Test for Hydrophytic Vegetation
5				2 - Dominance Test is >50%
6	·	·		3 - Prevalence Index is $\leq 3.0^{1}$
7				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
0	·	·		Remarks or in the delineation report)
0	0	Tetal Ca		
Woody Vine Stratum (Plot size: 5')	<u> </u>	= Total Co	ver	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed of problematic.
2	·	·		Hydrophytic
<u>ک.</u>	0	– Total Co	vor	Vegetation Present? Ves X No
Descela			vei	
Remarks:				

Profile Desc	ription: (Describe	to the de	pth needed to docum	nent the i	ndicator o	or confirn	n the absence o	f indicato	rs.)		
Depth	Matrix		Redox	k Feature	S						
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remar	rks	
0-3	10 YR 3/1	100					Clay Loam				
3-20	2.5 YR 6/3	100					Sand				
							· · _				
<sup>1</sup> Type: C=C	oncentration, D=Dep	oletion, RN	I=Reduced Matrix, MS	S=Maskec	I Sand Gra	ains.	<sup>2</sup> Location	: PL=Por	e Lining, N	/I=Matrix.	
Hydric Soil	Indicators:						Indicators for	or Probler	natic Hyd	Iric Soils <sup>3</sup> :	
Histosol	(A1)		Sandy Redox	(S5)			Stratified	d Layers (A	45)		
Histic Ep	pipedon (A2)		Dark Surface	(S7)			Sandy Mucky Mineral (S1)				
Black Hi	stic (A3)		Loamy Gleye	d Matrix (	F2)		Red Parent Material (F21)				
Hydroge	en Sulfide (A4)		Depleted Mat	rix (F3)			Very Shallow Dark Surface (TF12)				
Muck Pr	esence (A8)		Redox Dark S	Surface (F	6)		Other (Explain in Remarks)				
Deplete	d Below Dark Surfac	ce (A11)	Depleted Dar	k Surface	(F7)						
Thick Da	ark Surface (A12)		Redox Depre	ssions (F	8)	<sup>3</sup> Indic	icators of hydrophytic vegetation and wetland hydrology				
Sandy G	Bleyed Matrix (S4)					mu	ist be present, ur	nless distu	rbed or pr	oblematic.	
Restrictive	Layer (if observed)	:									
Type:											
Depth (in	ches):						Hydric Soil P	resent?	Yes	No X	
Remarks:											
No redox; no	t gleyed										

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)								
Primary Indicators (minimum of one required; check	Secondary Indicators (minimum of two required)							
<ul> <li>Surface Water (A1)</li> <li>High Water Table (A2)</li> <li>Saturation (A3)</li> <li>Water Marks (B1)</li> <li>Sediment Deposits (B2)</li> <li>Drift Deposits (B3)</li> <li>Algal Mat or Crust (B4)</li> <li>Iron Deposits (B5)</li> <li>Inundation Visible on Aerial Imagery (B7)</li> <li>Water Stained Leaves (B9)</li> </ul>	Aquatic Fauna (B13) Tilapia Nests (B17) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots (C3) Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C6) Thin Muck Surface (C7) Fiddler Crab Burrows (C10) (Guam, CNMI, and American Samoa) Other (Explain in Remarks)	<ul> <li>Surface Soil Cracks (B6)</li> <li>Sparsely Vegetated Concave Surface (B8)</li> <li>Drainage Patterns (B10)</li> <li>Dry-Season Water Table (C2)</li> <li>Salt Deposits (C5)</li> <li>Stunted or Stressed Plants (D1)</li> <li>Geomorphic Position (D2)</li> <li>Shallow Aquitard (D3)</li> <li>FAC-Neutral Test (D5)</li> </ul>						
Field Observations:								
Surface Water Present? Yes No X	Depth (inches):							
Water Table Present? Yes No X	Depth (inches):	X						
Saturation Present? Yes <u>No X</u> (includes capillary fringe)	Depth (inches): Wetland	Hydrology Present? Yes No X						
Describe Recorded Data (stream gauge, monitoring	well, aerial photos, previous inspections), if av	ailable:						
Remarks:								
Leaves not correct color for water stain (not greyed of	out), maybe just wet from rain/flood event 9/30							

Project/Site: Waipa Stream Bridge	City: <u>Hanalei</u>	Sampling Date:	10.1.2014 Time: 09:45
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island:	Kauai Sampling Point: P7
Investigator(s): B Nicholson / B Luke / T Agostini		TMK	/Parcel: 4-5-6-004-022
Landform (hillslope, coastal plain, etc.): Coastal plain	Local reli	ef (concave, convex, no	one): <u>none</u>
Lat: 22.2041018105 N Long: -159.514	4292215 W	Datum: NAD UTM 4	√ Slope (%): <u>0</u>
Soil Map Unit Name: Beaches		NWI classificati	on: PFOC
Are climatic / hydrologic conditions on the site typical for this tim	e of year? Yes X No	_ (If no, explain in Rem	narks.)
Are Vegetation, Soil, or Hydrology signif	icantly disturbed? Are "Norn	nal Circumstances" pre	sent? Yes X No
Are Vegetation, Soil, or Hydrology natur	ally problematic? (If needed	l, explain any answers	in Remarks.)
SUMMARY OF FINDINGS – Attach site map sho	wing sampling point locat	tions, transects, i	mportant features, etc.

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u>X</u> Yes <u>X</u> Yes <u>X</u>	No No No	Is the Sampled Area within a Wetland?	Yes X	No
Remarks:					

10	Absolute	Dominant Ind	dicator	Dominance Test worksheet:
<u>Tree Stratum</u> (Plot size: 10 )	<u>% Cover</u>	Species? S	Status	Number of Dominant Species
1. Hibiscus tiliaceus (Taiparti tiliaceum)	90	Y F/	AC	That Are OBL, FACW, or FAC: (A)
2		·		Total Number of Dominant
3		· ·		Species Across All Strata: (B)
4		· ·		Percent of Dominant Species
5		· ·		That Are OBL, FACW, or FAC: 100 (A/B)
Copling/Chruh Strotum (Plot size: 10'	90	= Total Cover		Prevalence Index worksheet:
<u>Saping/Shub Stratum</u> (Plot size. ···				Total % Cover of: Multiply by:
1			,	
2		·		
3	•			FACW species $x 2 = $
4		· ·		
5		·		FACU species X 4 =
Herb Stratum (Plot size: 10'	0	_ = Total Cove	r	UPL species         x 5 =           0 is         x 5 =
				Column Totals: (A) (B)
1		·		Prevalence Index = B/A =
2		·		Hydrophytic Vegetation Indicators:
3		·		1 - Rapid Test for Hydrophytic Vegetation
4		·		$\overline{\mathbf{X}}$ 2 - Dominance Test is >50%
- D				3 - Prevalence Index is < 3.01
б		·		Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
/		·		Remarks or in the delineation report)
8				
Woody Vine Stratum (Plot size: 10'	0	= Iotal Cover	•	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed or problematic.
2		·		Hydrophytic
	0	– Total Cover		Vegetation Present? Yes X No
Pomarka				
Remarks.				

Profile Desc	cription: (Describe	to the de	pth needed to docu	ment the	indicator	or confirr	n the absence of ir	ndicator	s.)		
Depth	Matrix		Rede	ox Feature	es		_				
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks		
0-6	10 YR 2/1	100					Clay Loam				
6-22	7.5 YR 5/2	95	5 YR 5/6	5			Sand				
		_									
							· ·				
				· · · · · · · · · · · · · · · · · · ·			·				
				. <u> </u>							
<sup>1</sup> Type: C=C	<sup>1</sup> Type: C=Concentration D=Depletion RM=Reduced Matrix MS=Masked Sand Grains <sup>2</sup> Location: PL=Pore Liping M=Matrix										
Hydric Soil Indicators: Indicators: Indicators for Problematic Hydric Soils <sup>3</sup> :											
Histosol	(A1)		X Sandy Red	ox (S5)			Stratified	Layers (	A5)		
Histic Ep	pipedon (A2)		Dark Surface (S7)				Sandy Muc	cky Mine	ral (S1)		
Black Hi	stic (A3)		Loamy Gley	Loamy Gleyed Matrix (F2)				Red Parent Material (F21)			
Hydroge	en Sulfide (A4)		Depleted Ma	atrix (F3)			Very Shallow Dark Surface (TF12)				
Muck Pr	resence (A8)		Redox Dark	Surface (	F6)		Other (Explain in Remarks)				
Deplete	d Below Dark Surfac	ce (A11)	Depleted Date	ark Surfac	e (F7)						
Thick Da	ark Surface (A12)		Redox Depr	essions (F	-8)	<sup>3</sup> Indic	dicators of hydrophytic vegetation and wetland hydrology				
Sandy G	Bleyed Matrix (S4)					mu	ust be present, unles	ss disturt	ped or probler	natic.	
Restrictive	Layer (if observed)	):									
Туре:											
Depth (in	ches):						Hydric Soil Pres	sent?	Yes X	No	
Remarks:							1				
Sandy redox	(S5)										

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)									
Primary Indicators (minimum	of one requir	ed; check	all that apply)		Secondary Indicators (minimum of two required)				
Surface Water (A1)			Aquatic Fauna (B13)		Surface Soil Cracks (B6)				
High Water Table (A2)			Tilapia Nests (B17)		Sparsely Vegetated Concave Surface (B8)				
Saturation (A3)			Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)				
Water Marks (B1) Oxidized Rhizospheres on Living Roots (C3)				Roots (C3)	Dry-Season Water Table (C2)				
Sediment Deposits (B2)			Presence of Reduced Iron (C4)		Salt Deposits (C5)				
Drift Deposits (B3) Recent Iron Reduction in Tilled Soils (C6)				oils (C6)	Stunted or Stressed Plants (D1)				
Algal Mat or Crust (B4) Thin Muck Surface (C7)					Geomorphic Position (D2)				
Iron Deposits (B5) Fiddler Crab Burrows (C10) (Guam, CNMI,				m, CNMI,	Shallow Aquitard (D3)				
Inundation Visible on Aerial Imagery (B7) and American Samoa)					FAC-Neutral Test (D5)				
Water-Stained Leaves (E	39)		Other (Explain in Remarks)						
Field Observations:	-								
Surface Water Present?	Yes	_ <sub>No</sub> X	_ Depth (inches):						
Water Table Present?	Yes	<u>No X</u>	Depth (inches):						
Saturation Present? (includes capillary fringe)	Yes	No X	_ Depth (inches):	Wetland Hy	ydrology Present? Yes $\frac{X}{2}$ No				
Describe Recorded Data (stre	eam gauge, r	nonitoring	well, aerial photos, previous inspec	tions), if avail	lable:				
Remarks:									
Oxidized Rhizospheres									

Project/Site: Waipa Stream Bridge	City: Hanalei	Sampling Date: 10.1.2	2014 Time: 10:00			
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island: Kauai	i Sampling Point: P8			
Investigator(s): B Nicholson / B Luke / T Agostini		TMK/Parc	el: 4-5-6-004-022			
Landform (hillslope, coastal plain, etc.): Roadfill slope	Local relie	Local relief (concave, convex, none):				
Lat: 22.2041308608 N Long: -159.51424	49206 W	Datum: NAD UTM 4N	Slope (%): 25-30			
Soil Map Unit Name: Beaches		NWI classification: PFOC				
Are climatic / hydrologic conditions on the site typical for this time of	of year? Yes X No	(If no, explain in Remarks	.)			
Are Vegetation, Soil, or Hydrology significa	antly disturbed? Are "Norma	al Circumstances" present?	Yes X No			
Are Vegetation, Soil, or Hydrology naturally	y problematic? (If needed,	, explain any answers in Re	marks.)			
SUMMARY OF FINDINGS – Attach site map show	ving sampling point locati	ions, transects, impo	ortant features, etc.			

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u>X</u> Yes Yes	No No _X No _X	Is the Sampled Area within a Wetland?	Yes	No <u>×</u>
Remarks:					

401	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 10 )	<u>% Cover</u>	Species?	<u>Status</u>	Number of Dominant Species
1. HIDISCUS tillaceus	75	Y	FAC	That Are OBL, FACW, or FAC: _4(A)
2		·		Total Number of Dominant
3		·		Species Across All Strata: 5 (B)
4				Percent of Dominant Species
5		·		That Are OBL, FACW, or FAC: <u>80</u> (A/B)
10	75	= Total Co	ver	
Sapling/Shrub Stratum (Plot size: 10 )	-	V	FAO	Prevalence Index worksheet:
	5	Y	FAC	Total % Cover of:Multiply by:
2. Psidium guajava	5	Y	FACU	OBL species x 1 =
3		·		FACW species x 2 =
4				FAC species x 3 =
5				FACU species x 4 =
	10	= Total Co	over	UPL species x 5 =
Herb Stratum (Plot size: <u>10'</u> )				Column Totals: (A) (B)
1. Oplismenus hirtellus	50	Y	FAC	
2. Sphagneticola trilobata	30	Y	FAC	Prevalence Index = B/A =
3. Canavalia cathartica	5	Ν	FACU	Hydrophytic Vegetation Indicators:
4. Cyperus involucratus	5	Ν	FACU	1 - Rapid Test for Hydrophytic Vegetation
5.				2 - Dominance Test is >50%
6.				3 - Prevalence Index is ≤3.0 <sup>1</sup>
7.	·			Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
8	·	·		Remarks or in the delineation report)
···	90	– Total Co	vor	1
Woody Vine Stratum (Plot size: <sup>10'</sup> )		= 10(a) C0	vei	Indicators of hydric soil and wetland hydrology must
1.				
2.				Hydrophytic
	0	= Total Co	ver	Vegetation Present? Yes X No
Remarks:		10101 00		

Depth	Matrix		Redo	ox Feature	S						
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks		ks	
0-12	5 YR 3/3	100					Clay Loam	Fill mat			
	- <u>-</u>										
<sup>1</sup> Type: C=C	Concentration, D=De	oletion, RM	=Reduced Matrix, M	S=Masked	I Sand Gra	ains.	<sup>2</sup> Locatio	on: PL=Por	e Lining, N	/I=Matrix.	
Hydric Soil	Indicators:						Indicators	for Proble	matic Hyd	lric Soils <sup>3</sup> :	
Histosol (A1)			Sandy Redo	x (S5)			Stratifi	ed Layers (	A5)		
Histic E	pipedon (A2)		Dark Surface	Dark Surface (S7)				Sandy Mucky Mineral (S1)			
Black H	listic (A3)		Loamy Gley	Loamy Gleyed Matrix (F2)				Red Parent Material (F21)			
Hydrog	en Sulfide (A4)		Depleted Ma	Depleted Matrix (F3)			Very Shallow Dark Surface (TF12)				
Muck F	resence (A8)		Redox Dark	Redox Dark Surface (F6)			Other (Explain in Remarks)				
Deplete	ed Below Dark Surfac	ce (A11)	Depleted Da	rk Surface	e (F7)						
Thick D	ark Surface (A12)	. ,	Redox Depr	<sup>3</sup> Indic	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology						
Sandy	Gleyed Matrix (S4)			<u> </u>			must be present, unless disturbed or problematic.				
Restrictive	Layer (if observed)	:									
Туре:											
Depth (ir	nches):						Hydric Soil	Present?	Yes	No X	
Remarks:							•				
_ikely some	fill along road										

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)								
Primary Indicators (minimum of one required; check	all that apply)	Secondary Indicators (minimum of two required)						
Surface Water (A1)	Aquatic Fauna (B13)	Surface Soil Cracks (B6)						
High Water Table (A2)	High Water Table (A2) Tilapia Nests (B17)							
Saturation (A3)	Saturation (A3) Hydrogen Sulfide Odor (C1)							
Water Marks (B1)	er Marks (B1) Oxidized Rhizospheres on Living Roots (C3)							
Sediment Deposits (B2)	Presence of Reduced Iron (C4)	Salt Deposits (C5)						
Drift Deposits (B3)	Recent Iron Reduction in Tilled Soils	s (C6) Stunted or Stressed Plants (D1)						
Algal Mat or Crust (B4)	Thin Muck Surface (C7)	Geomorphic Position (D2)						
Iron Deposits (B5)	, CNMI, Shallow Aquitard (D3)							
Inundation Visible on Aerial Imagery (B7)	and American Samoa)	FAC-Neutral Test (D5)						
Water-Stained Leaves (B9)	Other (Explain in Remarks)							
Field Observations:								
Surface Water Present? Yes No X	Depth (inches):							
Water Table Present? Yes No X	Depth (inches):							
Saturation Present? Yes No X	Depth (inches):	Wetland Hydrology Present? Yes No $X$						
(includes capillary fringe)		ana) if an allahan						
Describe Recorded Data (stream gauge, monitoring v	well, aeriai photos, previous inspectio	ons), if available:						
Remarks:								

Project/Site: Waioli Stream Bridge	City: Hanalei	Sampling Date:	9.30.201	<sup>4</sup> Time: 9:55		
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island:	Kauai	Sampling Point: P1		
Investigator(s): B Nicholson / B Luke / T Agostini		TM	K/Parcel:	4-5-5-006-888		
Landform (hillslope, coastal plain, etc.): Floodplain	Local relief	Local relief (concave, convex, none):				
Lat: 22.2003320554 N Long: -159.507080326 V	l .	Datum: NAD UTM 4	<sup>1N</sup> SI	ope (%): <u>0</u>		
Soil Map Unit Name: Water > 40 acres		NWI classification: PFOC				
Are climatic / hydrologic conditions on the site typical for this time of year?	Yes X No	(If no, explain in Re	marks.)			
Are Vegetation, Soil, or Hydrology significantly dis	turbed? Are "Norma	al Circumstances" pre	esent? Y	es X No		
Are Vegetation, Soil, or Hydrology naturally proble	matic? (If needed,	explain any answers	s in Rema	rks.)		
SUMMARY OF FINDINGS – Attach site map showing s	ampling point location	ons, transects,	importa	ant features, etc.		

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u>X</u> Yes <u>X</u> Yes <u>X</u>	No No No	Is the Sampled Area within a Wetland?	Yes X	No
Remarks:					

Spot is a ridge in middle running parallel to river.

10	Absolute	Dominant	Indicator	Dominance Test worksheet:		
<u>Tree Stratum</u> (Plot size: <u>10</u> ) 1. <u>Hibiscus tiliaceus</u> )	<u>% Cover</u> 80	Species? Y	<u>Status</u> FAC	Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
2 3				Total Number of Dominant Species Across All Strata:	2	(B)
4 5				Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)
Conting (Christian Christian (Distring 10)	80	= Total Co	ver	Broyalanca Inday workshoot		
Sapling/Shrub Stratum (Plot size: 10)				Total % Cover of		
1					wuttiply by.	
2				OBL species >	<1 =	_
3				FACW species >	< 2 =	_
4				FAC species >	< 3 =	_
5				FACU species >	x 4 =	_
	0	= Total Co	over	UPL species	< 5 =	_
Herb Stratum (Plot size: 10)				Column Totals: (	A)	(B)
1. Cyperus involucratus	40	Y	FACW			
2				Prevalence Index = B/A =	=	
3				Hydrophytic Vegetation Indic	ators:	
4.				1 - Rapid Test for Hydroph	ytic Vegetation	
5				2 - Dominance Test is >50	%	
6				3 - Prevalence Index is ≤3.	0 <sup>1</sup>	
7				Problematic Hydrophytic V	egetation <sup>1</sup> (Expla	in in
7				Remarks or in the delinea	ation report)	
8	40					
Woody Vine Stratum (Plot size: 10' )	40	= Total Co	ver	<sup>1</sup> Indicators of hydric soil and we be present, unless disturbed or	etland hydrology	must
1				Hydrophytic		
2				Vegetation		
	0	= Total Co	ver	Present? Yes $\underline{X}$	No	
Remarks:						
Some Java plum in overstory outside plot.						

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)										
Depth	Matrix		Redo	ox Feature	S					
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
0-22	10 YR 2/1	100					Clay Loam	Mineral I	ayer w/ orgar	nic mat
<u> </u>		·								
<u> </u>		·					·			
		·								
		· ·								
·		·								
<sup>1</sup> Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains, <sup>2</sup> Location; PI =Pore Lining, M=Matrix										
Hydric Soil Indicators: Indicators for Problematic Hydric Soils <sup>3</sup> :										
Histosol	(A1)	_	Sandy Redo	x (S5)			Stratif	ed Layers (A	45)	
Histic E	pipedon (A2)	-	Dark Surface (S7)				Sandy	Mucky Mine	eral (S1)	
Black H	istic (A3)	_	Loamy Gleyed Matrix (F2)				Red Parent Material (F21)			
Hydroge	en Sulfide (A4)	_	Depleted Matrix (F3)				Very Shallow Dark Surface (TF12)			
Muck Pr	esence (A8)	_	Redox Dark Surface (F6)				Other (Explain in Remarks)			
Deplete	d Below Dark Surfac	e (A11)	Depleted Da	irk Surface	(F7)					
X Thick Da	ark Surface (A12)	-	Redox Depressions (F8) <sup>3</sup> Indic				dicators of hydrophytic vegetation and wetland hydrology			
Sandy G	Bleyed Matrix (S4)					mu	st be present,	unless distu	rbed or problen	natic.
Restrictive	Layer (if observed):									
Туре:										
Depth (in	ches):						Hydric Soil	Present?	Yes X	No
Remarks:							1			
Assumed to I	pe Thick Dark Surfac	e n(A12). Did ı	not reach deplet	ed layer du	le to prese	ence of wa	ter in soil pit.			

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)										
Primary Indicators (minimum	of one require	ed; check	all that apply)		Secondary Indicators (minimum of two required)					
Surface Water (A1)				<ul> <li>Surface Soil Cracks (B6)</li> <li>Sparsely Vegetated Concave Surface (B8)</li> <li>Drainage Patterns (B10)</li> <li>Dry-Season Water Table (C2)</li> <li>Salt Deposits (C5)</li> <li>Stunted or Stressed Plants (D1)</li> <li>Geomorphic Position (D2)</li> <li>Shallow Aquitard (D3)</li> <li>FAC-Neutral Test (D5)</li> </ul>						
Water-Stained Leaves (B	9)		Other (Explain in Remarks)							
Field Observations: Surface Water Present? Water Table Present? Saturation Present? (includes capillary fringe)	Yes Yes X Yes X	No <u>X</u> No No	_ Depth (inches): _ Depth (inches): 1 _ Depth (inches): <sup>1</sup>	Wetland F	lydrology Present? Yes X No					
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:										
Remarks: Just above OHWM and HTL Land owner says river mouth v	vas seasona	lly blocked	d by sandbar, so river is high. Heavy	/ rains flood	much of the area w/ water.					

Project/Site: Waioli Stream Bridge	City: Hanalei	Sampling Date: 9.3	30.2014 -	Fime: 10:00
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island:Ka	auai Sam	pling Point: P2
Investigator(s): B Nicholson / B Luke		TMK/P	Parcel: 4-5-6	-002-003
Landform (hillslope, coastal plain, etc.): Road fill slope	Local relief	(concave, convex, non	ne): none	
Lat: 22.2003553107 N Long: -159.507206	301 W	Datum: NAD UTM 4N	Slope (%	%): <u>6</u>
Soil Map Unit Name: Rock Outcrop		NWI classification	n: PFOC	
Are climatic / hydrologic conditions on the site typical for this time of	year? Yes X No	(If no, explain in Rema	rks.)	
Are Vegetation, Soil, or Hydrology significar	tly disturbed? Are "Normal	Circumstances" prese	ent? Yes X	No
Are Vegetation, Soil, or Hydrology naturally	problematic? (If needed, e	explain any answers in	Remarks.)	
SUMMARY OF FINDINGS – Attach site map showi	ng sampling point locatio	ons, transects, im	portant f	eatures, etc.
1				

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes Yes Yes	No <u>X</u> No <u>X</u> No <u>X</u>	Is the Sampled Area within a Wetland?	Yes	No <u>X</u>
Remarks:					

Absolute	Dominant	Indicator	Dominance Test worksheet:
% Cover	Species?	Status	Number of Dominant Species
100	Y	FAC	That Are OBL, FACW, or FAC: 2 (A)
			Tatal Number of Densing at
			Species Across All Strata: 4 (B)
			()
			Percent of Dominant Species
100	= Total Co	ver	That Are OBL, FACW, OF FAC (A/B)
	- 1010100	VOI	Prevalence Index worksheet:
20	Υ	UPL	Total % Cover of: Multiply by:
15	Y	UPL	OBL species $0$ $x = 0$
			FACW species $13$ x 2 = $26$
			FAC species $130$ x 3 = $390$
	·		FACU species $13$ x 4 = $52$
35	– Total Co	Wer	$UPL \text{ species } \frac{35}{35} \text{ x } 5 = \frac{175}{35}$
	_ = 10(a) 0(		$\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $
30	Υ	FAC	
10	N	FACU	Prevalence Index = $B/A = 3.37$
5	N	FACW	Hydrophytic Vegetation Indicators:
5	N	FACW	1 - Rapid Test for Hydrophytic Vegetation
3	N	FACW	2 - Dominance Test is >50%
3	N	FACU	3 - Prevalence Index is ≤3.0 <sup>1</sup>
			Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
	·		Remarks or in the delineation report)
56	– Total Co	vor	1
	_ 10tai 00	VEI	Indicators of hydric soil and wetland hydrology must
			Hydrophytic
0	= Total Co	ver	Present? Yes No X
		-	
	Absolute <u>% Cover</u> 100 20 15 35 30 10 5 5 3 3 3 3 	Absolute $\%$ Cover $100$ Dominant Species? 100100Y100Y100= Total Co20Y15Y15Y15Y30Y10N5N3N3N56= Total Co0= Total Co	Absolute $% CoverDominantSpecies?IndicatorStatus100YFAC100YFAC100= Total Cover20YUPL15YUPL15YUPL35= Total Cover30YFAC10NFACU5NFACW3NFACW3NFACW56= Total Cover0= Total Cover$

Depth	Matrix		Redo	x Feature	S				
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks
0-20	2.5 YR 2.5/2	100					Clay Loam	Mineral I	ayer w/ organic mat
							·		
<sup>1</sup> Type: C=C	Concentration D-Der	letion RM	-Reduced Matrix M	S–Masker	Sand Gra	ains	<sup>2</sup> l ocati	on: PI -Por	e Lining M-Matrix
Hydric Soil	Indicators:			0-11103100			Indicators	for Proble	matic Hydric Soils <sup>3</sup> :
Histoso	bl (A1)		Sandy Redo	x (S5)			Stratifi	ed Lavers (/	A5)
Histic E	Epipedon (A2)		Dark Surface	e (S7)			Sandy	Mucky Mine	eral (S1)
Black H	Histic (A3)		Loamy Gleye	ed Matrix (	F2)		Red P	arent Materi	al (F21)
Hydrog	en Sulfide (A4)		Depleted Ma	trix (F3)	,		Very S	hallow Dark	Surface (TF12)
Muck F	Presence (A8)		Redox Dark	Surface (F	6)		Other	(Explain in F	Remarks)
Deplete	ed Below Dark Surfac	ce (A11)	Depleted Da	rk Surface	(F7)				,
Thick D	Dark Surface (A12)	( )	Redox Depre	essions (F	8)	<sup>3</sup> Indic	ators of hydrop	hytic vegeta	ation and wetland hydrology
Sandy	Gleyed Matrix (S4)				,	mu	ist be present,	unless distu	rbed or problematic.
Restrictive	Layer (if observed)	:							
Type:									
Depth (ir	nches):						Hydric Soil	Present?	Yes <u>No</u> X
Remarks:									
Dark soil bu	t not organic. Likely r	oad fill bro	ught in from outside a	area.					
	5 ,		-						

Wetland Hydrology Indicate	ors: (Expla	in observa	ations in Remarks, if needed.)		
Primary Indicators (minimum	of one requ		Secondary Indicators (minimum of two required)		
Surface Water (A1)		_	Aquatic Fauna (B13)		Surface Soil Cracks (B6)
High Water Table (A2)		_	Tilapia Nests (B17)		Sparsely Vegetated Concave Surface (B8)
Saturation (A3)		_	Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
Water Marks (B1)		_	Oxidized Rhizospheres on Living	Roots (C3)	Dry-Season Water Table (C2)
Sediment Deposits (B2)		_	Presence of Reduced Iron (C4)		Salt Deposits (C5)
Drift Deposits (B3)		_	Recent Iron Reduction in Tilled So	oils (C6)	Stunted or Stressed Plants (D1)
Algal Mat or Crust (B4)		_	Thin Muck Surface (C7)		Geomorphic Position (D2)
Iron Deposits (B5)		_	Fiddler Crab Burrows (C10) (Guar	m, CNMI,	Shallow Aquitard (D3)
Inundation Visible on Aer	rial Imagery	(B7)	and American Samoa)		FAC-Neutral Test (D5)
Water-Stained Leaves (B	39)	_	Other (Explain in Remarks)		
Field Observations:					
Surface Water Present?	Yes	No	Depth (inches):		
Water Table Present?	Yes	No	Depth (inches):		
Saturation Present? (includes capillary fringe)	Yes	No	Depth (inches):	Wetland H	łydrology Present? Yes <u>No</u> X
Describe Recorded Data (stre	am gauge	, monitorin	g well, aerial photos, previous inspec	tions), if ava	ilable:
Remarks:					

Project/Site: Waioli Stream Bridge	City: <u>Hanalei</u>	Sampling Date: 9.30.20	014 Time: 10:35
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island: Kauai	Sampling Point: P3
Investigator(s): B Nicholson / B Luke		TMK/Parce	l: <u>4-5-5-005-021</u>
Landform (hillslope, coastal plain, etc.): Floodplain (landscap	ed lawn) Local relief	f (concave, convex, none): <u>'</u>	none
Lat: 22.2005365818 N Long: -159	.507131692 W	Datum: NAD UTM 4N	Slope (%): <u>1</u>
Soil Map Unit Name: Water >40 acres		NWI classification: PF	FOC
Are climatic / hydrologic conditions on the site typical for this	time of year? Yes X No	(If no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology sig	gnificantly disturbed? Are "Norma	al Circumstances" present?	Yes X No
Are Vegetation, Soil, or Hydrology na	aturally problematic? (If needed,	explain any answers in Rem	narks.)
SUMMARY OF FINDINGS – Attach site map s	showing sampling point locati	ons, transects, impo	rtant features, etc.
Hydrophytic Vegetation Present? Yes X No Hydric Soil Present? Yes X No	Is the Sampled Area within a Wetland?	Yes_X No	,

Site sampled in lawn of residential property adjacent to river/stream

Yes X

No

## **VEGETATION – Use scientific names of plants.**

Wetland Hydrology Present?

Remarks:

	Absolute	Dominant	Indicator	Dominance Test worksheet:	
Tree Stratum     (Plot size: 10       1)	<u>% Cover</u>	<u>Species?</u>	<u>Status</u>	Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)	.)
2 3				Total Number of Dominant       Species Across All Strata:         1   (B)	.)
4 5				Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A	/B)
10'	0	= Total Co	over	Development by development of	
Sapling/Shrub Stratum (Plot size: 10 )				Prevalence Index worksheet:	
1				Total % Cover of: Multiply by:	
2				OBL species x 1 =	
3				FACW species x 2 =	
4				FAC species x 3 =	
5				FACU species x 4 =	
	0	= Total C	over	UPL species x 5 =	
Herb Stratum (Plot size: 10')	90	Y	FAC	Column Totals: (A) (I	B)
2. Zingiber zerumbet	5	N	FAC	Prevalence Index = $B/A =$	
2				Hydrophytic Vegetation Indicators:	
3		······		1 Danid Tast for Lludranhutia Vegetation	
4					
5				2 - Dominance Test Is >50%	
6				3 - Prevalence Index is ≤3.0'	
7				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in Remarks or in the delineation report)	i
···	95	– Total Co	wor	1	
Woody Vine Stratum (Plot size: 10')			JVEI	Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	t
				Hydrophytic	
2	0			Vegetation	
	0	= Total Co	over	Present? Yes <u>^ No</u>	
Remarks:					
Disturbed. Lawn/landscaped.					

Profile Desc	ription: (Describe	to the der	oth needed to docu	ment the	indicator	or confirn	n the absence	of indicato	ors.)	
Depth	Matrix		Red	ox Feature	S				,	
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
0-8	10 YR 4/2	100					Clay Loam			
8-16	10 YR 4/2	90	5 YR 5/6	10			Clay Loam	Oxidized	roots	
			·							
<sup>1</sup> Type: C=Ce	oncentration, D=De	pletion, RM	I=Reduced Matrix, M	IS=Maske	d Sand Gra	ains.	<sup>2</sup> Locati	on: PL=Por	e Lining, M=N	Matrix.
Hydric Soil	Indicators:						Indicators	for Proble	matic Hydric	Soils <sup>3</sup> :
Histosol	(A1)		Sandy Redo	ox (S5)			Stratif	ed Layers (/	45)	
Histic Ep	pipedon (A2)		Dark Surfac	e (S7)		Sandy Mucky Mineral (S1)				
Black Hi	stic (A3)		Loamy Gley	ed Matrix	(F2)		Red P	arent Materi	al (F21)	
Hydroge	n Sulfide (A4)		X Depleted M	atrix (F3)			Very S	Shallow Dark	Surface (TF	12)
Muck Pr	esence (A8)		Redox Dark	Surface (I	=6)		Other	(Explain in F	Remarks)	,
Deplete	d Below Dark Surfa	ce (A11)	Depleted Da	ark Surface	e (F7)				,	
Thick Da	ark Surface (A12)		Redox Dep	ressions (F	(8)	<sup>3</sup> Indic	ators of hydror	hvtic vegeta	ation and wet	land hydrology
Sandy G	Gleved Matrix (S4)		<u> </u>		•)	mu	st be present	unless distu	rbed or probl	ematic
Restrictive	_ayer (if observed)	):								
Туре:										
Depth (in	ches):						Hydric Soil	Present?	Yes X	No
Remarks:										

Wetland Hydrology Indicators: (Explain observations in Ren	narks, if needed.)					
Primary Indicators (minimum of one required; check all that apply) Secondary Indicators (minimum of two required)						
Surface Water (A1) Aquatic F	<sup>-</sup> auna (B13)	Surface Soil Cracks (B6)				
🛛 🗵 High Water Table (A2) 🛛 🔄 🔄 Tilapia N	ests (B17)	Sparsely Vegetated Concave Surface (B8)				
Saturation (A3) Hydroger	n Sulfide Odor (C1)	Drainage Patterns (B10)				
Water Marks (B1) X Oxidized	Rhizospheres on Living Roots (C3)	Dry-Season Water Table (C2)				
Sediment Deposits (B2) Presence	e of Reduced Iron (C4)	Salt Deposits (C5)				
Drift Deposits (B3) Recent Ir	ron Reduction in Tilled Soils (C6)	Stunted or Stressed Plants (D1)				
Algal Mat or Crust (B4) Thin Muc	xk Surface (C7)	Geomorphic Position (D2)				
Iron Deposits (B5) Fiddler C	rab Burrows (C10) (Guam, CNMI,	Shallow Aquitard (D3)				
Inundation Visible on Aerial Imagery (B7) and Ar	merican Samoa)	FAC-Neutral Test (D5)				
Water-Stained Leaves (B9) Other (E:	xplain in Remarks)					
Field Observations:						
Surface Water Present? Yes No X Depth (i	nches):					
Water Table Present? Yes X No Depth (i	nches): 12					
Saturation Present? Yes X No Depth (i (includes capillary fringe)	nches): <sup>8</sup> Wetland H	lydrology Present? Yes $\frac{\chi}{\chi}$ No				
Describe Recorded Data (stream gauge, monitoring well, aeria	l photos, previous inspections), if ava	ailable:				
Remarks:						

Project/Site: Waioli Stream Bridge	City: Hanalei	_ Sampling Date: <u>9.30.2014</u> Time: <u>10:55</u>
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island:KauaiSampling Point: P4
Investigator(s): B Nicholson / B Luke		TMK/Parcel: 4-5-5-005-021
Landform (hillslope, coastal plain, etc.): Road fill slope	Local relief (	concave, convex, none): <u>none</u>
Lat: 22.2004949286 N Long: -159.507126367 V	V D	Datum: NAD UTM 4N Slope (%): 2
Soil Map Unit Name: Water >40 acres		NWI classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year?	Yes X No (	lf no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly dis	turbed? Are "Normal	Circumstances" present? Yes X No
Are Vegetation, Soil, or Hydrology naturally proble	matic? (If needed, e:	xplain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sa	ampling point locatio	ns, transects, important features, etc.
Hydrophytic Vegetation Present? Yes No X	Is the Sampled Area	

Hydric Soil Present? Wetland Hydrology Present?	Yes Yes	No X No X	is the Sampled Area within a Wetland?	Yes	No <u>X</u>			
Remarks:								
Site sampled along roadside near residential property adjacent to river/stream.								

40	Absolute	Dominant	Indicator	Dominance Test worksheet:	
<u>Tree Stratum</u> (Plot size: <u>10</u> ) 1. <u>Dypsis lutescens</u> )	<u>% Cover</u> 30	Species? Y	<u>Status</u> UPL	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u>	(A)
2 3				Total Number of Dominant       Species Across All Strata:	(B)
4 5				Percent of Dominant Species That Are OBL, FACW, or FAC: 50	(A/B)
Sopling/Shruh Stratum (Plat size: 10'	30	= Total Co	ver	Provalence Index worksheet:	
				Total % Cover of: Multiply by:	
l					
2					
3				FACW species X 2 =	
4				FAC species X 3 =	_
5				FACU species x 4 =	_
Llorb Strotum (Plot size, 10'	0	= Total Co	over	UPL species x 5 =	_
Hedvchium coronarium	13	Y	FAC	Column Totals: (A)	(B)
2. Axonopus compressus	3	N	FAC	Prevalence Index = B/A =	
3.				Hydrophytic Vegetation Indicators:	
4				1 - Rapid Test for Hydrophytic Vegetation	
5				2 - Dominance Test is >50%	
6				3 - Prevalence Index is ≤3.0 <sup>1</sup>	
7.				Problematic Hydrophytic Vegetation <sup>1</sup> (Expla	ain in
8.				Remarks or in the delineation report)	
	16	= Total Co	ver		
Woody Vine Stratum (Plot size: 10' )				be present, unless disturbed or problematic.	must
1				Hydrophytic	
2				Vegetation	
	0	= Total Co	ver	Present? Yes <u>No ^</u>	
Remarks:					
Disturbed. Lawn/landscaped just off road.					

(inchoc)	Matrix		Redo							
(IIICHES)	Color (moist)	%	Color (moist)	<u>%</u>	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remar	ks
0-18	10 YR 4/4	100					Clay Loam	Lots of r	oots	
	<u></u>									
							<u> </u>			
	<u> </u>									
<sup>1</sup> Type: C=C	Concentration, D=Dep	oletion, RM	=Reduced Matrix, MS	S=Masked	Sand Gra	ains.	<sup>2</sup> Locatio	on: PL=Por	e Lining, N	/I=Matrix.
Hydric Soil	Indicators:						Indicators	for Proble	matic Hyd	lric Soils <sup>3</sup> :
Histoso	ol (A1)		Sandy Redox	(S5)			Stratifi	ed Layers (	A5)	
Histic E	pipedon (A2)		Dark Surface	e (S7)			Sandy	Mucky Min	eral (S1)	
Black H	listic (A3)		Loamy Gleye	ed Matrix (	F2)		Red Pa	arent Mater	ial (F21)	
Hydrog	en Sulfide (A4)		Depleted Ma	trix (F3)			Very S	hallow Dark	< Surface (	TF12)
Muck P	Presence (A8)		Redox Dark	Surface (F	-6)		Other	(Explain in I	Remarks)	
Deplete	ed Below Dark Surfac	e (A11)	Depleted Da	rk Surface	e (F7)					
Thick D	ark Surface (A12)		Redox Depre	essions (F	8)	<sup>3</sup> Indic	ators of hydrop	hytic veget	ation and v	vetland hydrology
Sandy	Gleyed Matrix (S4)					mu	ust be present, i	unless distu	rbed or pr	oblematic.
Restrictive	Layer (if observed)	:								
Туре:										
Depth (ir	nches):						Hydric Soil	Present?	Yes	No X
Remarks:							-			

Wetland Hydrology Indicat	ors: (Expla	ain observ	ations in Remarks, if needed.)			
Primary Indicators (minimum	of one req		Secondary Indicators (minimum of two required)			
Surface Water (A1)		Surface Soil Cracks (B6)				
High Water Table (A2)			Tilapia Nests (B17)		Sparsely Vegetated Concave Surface (B8)	
Saturation (A3)			Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)	
Water Marks (B1)			Oxidized Rhizospheres on Living Re	oots (C3)	Dry-Season Water Table (C2)	
Sediment Deposits (B2)			Presence of Reduced Iron (C4)		Salt Deposits (C5)	
Drift Deposits (B3)			Recent Iron Reduction in Tilled Soil	s (C6)	Stunted or Stressed Plants (D1)	
Algal Mat or Crust (B4)			Thin Muck Surface (C7)		Geomorphic Position (D2)	
Iron Deposits (B5) Fiddler Crab Burrows (C10) (Guam, CNMI,				Shallow Aquitard (D3)		
Inundation Visible on Aerial Imagery (B7) and American Samoa)				FAC-Neutral Test (D5)		
Water-Stained Leaves (	B9)		Other (Explain in Remarks)			
Field Observations:						
Surface Water Present?	Yes	No	Depth (inches):			
Water Table Present?	Yes	No	Depth (inches):			
Saturation Present? (includes capillary fringe)	Yes	No	Depth (inches):	Wetland H	lydrology Present? Yes <u>No</u> X	
Describe Recorded Data (st	ream gauge	, monitorii	ng well, aerial photos, previous inspection	ons), if ava	ilable:	
Remarks:						
No hydrology indicator.						

Project/Site: Waioli Stream Bridge	City: Hanalei	Sampling Da	ate: 10.2.2014	<sup>4</sup> Time: 11:00	
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island:	Kauai	Sampling Point: P5	
Investigator(s): B Nicholson / T Agostini			TMK/Parcel:	4-5-5-006-999	
Landform (hillslope, coastal plain, etc.): floodplain	Local relief	(concave, conve	ex, none): <u>nor</u>	ne	
Lat: 22.200524379 N Long: -159.506776675 V	l	Datum: <u>NAD UTM 4N</u> Slope (%): 2			
Soil Map Unit Name: Mokuleia fine sandy loam		NWI classif	fication: R2U	BH	
Are climatic / hydrologic conditions on the site typical for this time of year?	Yes X No	(If no, explain in	Remarks.)		
Are Vegetation, Soil, or Hydrology significantly dis	turbed? Are "Norma	I Circumstances"	present? Y	es <u>X</u> No	
Are Vegetation, Soil, or Hydrology naturally proble	matic? (If needed,	explain any answ	vers in Remar	ks.)	
SUMMARY OF FINDINGS – Attach site map showing s	ampling point location	ons, transect	s, importa	int features, etc.	

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u>X</u> Yes <u>X</u> Yes <u>X</u>	No No No	Is the Sampled Area within a Wetland?	Yes <u>X</u>	No
Remarks:					

In depression in larger floodplain 10 ft from river.

10	Absolute	Dominant	Indicator	Dominance Test worksheet:	
<u>Tree Stratum</u> (Plot size: <u>10</u> ) 1)	<u>% Cover</u>	Species?	Status	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u>	(A)
2		·		Total Number of Dominant	(P)
3		·		Species Across All Strata.	(D)
45				Percent of Dominant Species	
··	0	- Total Co	ver	That are OBL, FACW, OF FAC.	(A/D)
Sapling/Shrub Stratum (Plot size: 10' )		- 10101 00		Prevalence Index worksheet:	
1				Total % Cover of: Multiply by:	
2.				OBL species x 1 =	
3				FACW species x 2 =	
4				FAC species x 3 =	
5				FACU species x 4 =	
	0	= Total Co	over	UPL species x 5 =	
Herb Stratum (Plot size: 10' )				Column Totals: (A)	(B)
1. Coix lacryma-jobi	40	Y	FACW		
2. Urochloa mutica	30	Y	FACW	Prevalence Index = B/A =	
3. Cyperus involucratus	20	Y	FACW	Hydrophytic Vegetation Indicators:	
4. Sphagneticola trilobata	10	Ν	FAC	1 - Rapid Test for Hydrophytic Vegetation	
5				X 2 - Dominance Test is >50%	
6.				3 - Prevalence Index is ≤3.0 <sup>1</sup>	
7				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain	n in
8.				Remarks or in the delineation report)	
	100	= Total Co	ver	<sup>1</sup> Indiactors of hydric soil and watland hydrology m	unt
Woody Vine Stratum (Plot size: 10' )				be present, unless disturbed or problematic.	นรเ
1				Lu dranku tia	
2				Vegetation	
	0	= Total Co	ver	Present? Yes X No	
Remarks:					
Lawn/landscaped Etlingera elatior overhanging, but not ro	oted so not i	ncluded in	herb stratur	n.	

eptn	Matrix		Redox Features							
nches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
-14	5 YR 4/2	90	5 YR 4/6	10						
				·						
ype: C=C	oncentration, D=Dep	oletion, RN	I=Reduced Matrix, M	IS=Maske	d Sand Gra	ains.	<sup>2</sup> Locatior	: PL=Por	e Lining, M=Ma	trix.
dric Soil	Indicators:						Indicators for	or Proble	matic Hydric S	oils <sup>3</sup> :
_ Histosol	(A1)		Sandy Redo	ox (S5)			Stratified	d Layers (/	45)	
_ Histic Er	pipedon (A2)		Dark Surface	e (S7)			Sandy N	lucky Mine	eral (S1)	
Black H	istic (A3)		Loamy Gley	ed Matrix	(F2)		Red Par	ent Materi	al (F21)	
_ Hydroge	en Sulfide (A4)		X Depleted M	atrix (F3)			Very S	hallow Da	rk Surface (TF1	2)
Muck Pr	esence (A8)		Redox Dark	Surface (I	-6)		Other (E	Explain in F	Remarks)	
Deplete	d Below Dark Surfac	e (A11)	Depleted Date	ark Surface	e (F7)					
_ Thick Da	ark Surface (A12)		Redox Depr	essions (F	8)	<sup>3</sup> Indica	ators of hydroph	ytic vegeta	ation and wetlar	nd hydrology
_ Sandy C	Bleyed Matrix (S4)					mus	st be present, ur	nless distu	rbed or problem	natic.
estrictive	Layer (if observed)	:								
Type:										
Depth (in	ches):						Hydric Soil P	resent?	Yes X	No
emarks:										

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)							
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (minimum of two required)						
	<ul> <li>Surface Soil Cracks (B6)</li> <li>Sparsely Vegetated Concave Surface (B8)</li> <li>Drainage Patterns (B10)</li> <li>Roots (C3)</li> <li>Dry-Season Water Table (C2)</li> <li>Salt Deposits (C5)</li> <li>oils (C6)</li> <li>Stunted or Stressed Plants (D1)</li> <li>Geomorphic Position (D2)</li> <li>m, CNMI,</li> <li>Shallow Aquitard (D3)</li> <li>FAC-Neutral Test (D5)</li> </ul>						
Water-Stained Leaves (B9) Other (Explain in Remarks)	1						
Field Observations:							
Surface Water Present? Yes <u>No X</u> Depth (inches):							
Water Table Present? Yes X No Depth (inches): 12							
Saturation Present? Yes X No Depth (inches): Surface (includes capillary fringe)	Wetland Hydrology Present? Yes X No						
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspec	tions), if available:						
Remarks:							

Project/Site: Wainiha Bridge 1	City: <u>Hanalei</u>	Sampling Date: 10.1.2	014 Time: 10:30
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island: Kauai	Sampling Point: P1
Investigator(s): B Nicholson / B Luke / T Agostini		TMK/Parce	el: <u>4-5-8-006-030</u>
Landform (hillslope, coastal plain, etc.): Road fill slope	Local relief	(concave, convex, none):	none
Lat: 22.2123199949 N Long: -159.53	9403697 W	Datum: NAD UTM 4N	Slope (%): <u>1</u>
Soil Map Unit Name: Mokuleia fine sandy loam (Mr)		NWI classification: U	PL
Are climatic / hydrologic conditions on the site typical for this tim	ne of year? Yes X No	(If no, explain in Remarks.)	)
Are Vegetation, Soil, or Hydrology signif	ficantly disturbed? Are "Norma	I Circumstances" present?	Yes X No
Are Vegetation, Soil, or Hydrology natur	ally problematic? (If needed, e	explain any answers in Rer	marks.)
SUMMARY OF FINDINGS – Attach site map sho	owing sampling point location	ons, transects, impo	rtant features, etc.
1			

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u>X</u> Yes Yes	No No _X No _X	Is the Sampled Area within a Wetland?	Yes	No <u>X</u>
Remarks:					

401	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 10 )	<u>% Cover</u>	Species?	<u>Status</u>	Number of Dominant Species
1. I erminalia catappa	90	Y	FAC	That Are OBL, FACW, or FAC: $2$ (A)
2. Hibiscus tiliaceus (Talipariti tiliaceum)	15	N	FAC	Total Number of Dominant
3	<u>.</u>			Species Across All Strata: 2 (B)
4				
5.				That Are OBL EACW or EAC: 100 (A/B)
	105	= Total Co	ver	
Sapling/Shrub Stratum (Plot size: 10' )				Prevalence Index worksheet:
1. Spathodea campanulata	2	Ν	FACU	Total % Cover of: Multiply by:
2. Schefflera actinophylla	2	Ν	UPL	OBL species x 1 =
3				FACW species x 2 =
4	·			FAC species x 3 =
5				FACIL species x 4 =
- 5	4	Total C		
Herb Stratum (Plot size: <sup>10</sup> ')	·		over	
1 Terminalia catappa (seedlings)	5	Y	FAC	(A)(B)
2.				Prevalence Index = B/A =
3.				Hydrophytic Vegetation Indicators:
4				1 - Rapid Test for Hydrophytic Vegetation
5				X 2 - Dominance Test is >50%
5				$3 - Prevalence Index is \leq 3.0^1$
7				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
0		<u> </u>		Remarks or in the delineation report)
0	5	- Total Ca		
Woody Vine Stratum (Plot size: <sup>10'</sup> )	-		vei	Indicators of hydric soil and wetland hydrology must
1.				
2	·			Hydrophytic
	0	= Total Co	ver	Vegetation       Present?     Yes       X     No
Remarks:				1
Shrubs /saps <5% and not dominant				

I

Profile Desc	ription: (Describe	to the depth n	eeded to docur	ment the i	ndicator o	or confirm	the absence	of indicato	ors.)	
Depth	Matrix		Redo	x Features	6					
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
0-16	5 YR 4/4	100					Sandy Clay			
<u> </u>										
·										
<sup>1</sup> Type: C=C	oncentration. D=Dep	letion. RM=Re	duced Matrix. M	S=Masked	Sand Gra	ins.	<sup>2</sup> Locati	on: PL=Por	e Lining. M=Matrix.	
Hydric Soil	Indicators:	,	,				Indicators	for Proble	matic Hydric Soils <sup>3</sup> :	
Histosol	(A1)		Sandv Redo	x (S5)			Stratif	ied Lavers (/	A5)	
Histic E	bipedon (A2)	-	Dark Surface	e (S7)			Sandy	/ Mucky Mine	eral (S1)	
Black H	stic (A3)	-	Loamy Gleye	ed Matrix (I	=2)		Red P	arent Materi	ial (F21)	
Hydroge	en Sulfide (A4)		Depleted Ma	trix (F3)	,		Very S	Shallow Dark	Surface (TF12)	
Muck Pr	esence (A8)	_	Redox Dark	Surface (F	6)		Other	(Explain in F	Remarks)	
Deplete	d Below Dark Surfac	e (A11)	Depleted Da	rk Surface	(F7)					
Thick Da	ark Surface (A12)	_	Redox Depre	essions (F8	3)	<sup>3</sup> Indica	ators of hydrop	phytic vegeta	ation and wetland hydrold	ogy
Sandy G	Bleyed Matrix (S4)					mus	st be present,	unless distu	rbed or problematic.	
Restrictive	Layer (if observed):	:								
Туре:			_							
Depth (in	ches):		_				Hydric Soi	I Present?	Yes No X	
Remarks:							1			

Wetland Hydrology Indicators: (Explain observation	ions in Remarks, if needed.)			
Primary Indicators (minimum of one required; check	Secondary Indicators (minimum of two required)			
Surface Water (A1)	Surface Soil Cracks (B6)			
High Water Table (A2)	Tilapia Nests (B17)	Sparsely Vegetated Concave Surface (B8)		
Saturation (A3)	_ Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)		
Water Marks (B1)	_ Oxidized Rhizospheres on Living R	oots (C3) Dry-Season Water Table (C2)		
Sediment Deposits (B2)	Presence of Reduced Iron (C4)	Salt Deposits (C5)		
Drift Deposits (B3)	_ Recent Iron Reduction in Tilled Soi	s (C6) Stunted or Stressed Plants (D1)		
Algal Mat or Crust (B4)	_ Thin Muck Surface (C7)	Geomorphic Position (D2)		
Iron Deposits (B5)	_ Fiddler Crab Burrows (C10) (Guam	, CNMI, Shallow Aquitard (D3)		
Inundation Visible on Aerial Imagery (B7)	Inundation Visible on Aerial Imagery (B7) and American Samoa)			
Water-Stained Leaves (B9)	Water-Stained Leaves (B9) Other (Explain in Remarks)			
Field Observations:				
Surface Water Present? Yes No X	Depth (inches):			
Water Table Present? Yes No X	Depth (inches):			
Saturation Present? Yes <u>No X</u> (includes capillary fringe)	_ Depth (inches):	Wetland Hydrology Present? Yes No X		
Describe Recorded Data (stream gauge, monitoring	well, aerial photos, previous inspecti	ons), if available:		
Remarks:				
6 feet above water line, top of steep bank.				

Project/Site: Wainiha Bridge 2&3	City: Hanalei	Sampling Date: 10.1.20	014 Time: 11:30
Applicant/Owner: HDOT	State/Terr/Comlth.: H	Island: Kauai	Sampling Point: P1
Investigator(s): B Nicholson / B Luke / T Agostini		TMK/Parce	l: 4-5-8-007-999
Landform (hillslope, coastal plain, etc.): Road fill slope	Local re	elief (concave, convex, none): <u>r</u>	none
Lat: 22.2126118491 N Long: -159.54362189 V	V	Datum: NAD UTM 4N	Slope (%): <u>1</u>
Soil Map Unit Name: Hanalei Silty Clay, 0 to 2 percent slopes (HnA)		NWI classification: UF	րլ
Are climatic / hydrologic conditions on the site typical for this time of year	? Yes X No	(If no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology significantly d	isturbed? Are "No	rmal Circumstances" present?	Yes X No
Are Vegetation, Soil, or Hydrology naturally prob	lematic? (If need	ed, explain any answers in Rem	narks.)
SUMMARY OF FINDINGS – Attach site map showing	sampling point loc	ations, transects, impor	tant features, etc.

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes         X         No           Yes         No         X           Yes         No         X	Is the Sampled Area within a Wetland?	Yes	No <u>×</u>
Remarks:				

Edge of gravel road

	Absolute	Dominant	Indicator	Dominance Test worksheet:						
<u>Tree Stratum</u> (Plot size: <u>10</u> ) 1. Hibiscus tillaceus (Talipariti tiliaceum)	<u>% Cover</u> 5	<u>Species?</u> Y	<u>Status</u> FAC	Number of Dominant Species That Are OBL_EACW_or EAC: <sup>3</sup> (A)						
2		·								
3		·		Total Number of Dominant						
۵ ۵	·	·								
5		·		Percent of Dominant Species						
···	5	– Total Co	vor	That Are OBL, FACW, or FAC: (A/B)						
Sapling/Shrub Stratum (Plot size: 10'		_ 10tai 00	VEI	Prevalence Index worksheet:						
1				Total % Cover of: Multiply by:						
2.				OBL species x 1 =						
3.				FACW species x 2 =						
4.				FAC species x 3 =						
5.				FACU species x 4 =						
	0	= Total Co	over	UPL species x 5 =						
Herb Stratum (Plot size: 10' )		_		Column Totals: (A) (B)						
1. Oplismenus hirtellus	40	Y	FAC							
2. Sphagneticola trilobata	30	Y	FAC	Prevalence Index = B/A =						
3. Commelina diffusa	10	Ν	FACW	Hydrophytic Vegetation Indicators:						
4. Desmodium incanum	10	Ν	FACU	1 - Rapid Test for Hydrophytic Vegetation						
5. Megathyrsus maximus	5	Ν	FAC	☑ 2 - Dominance Test is >50%						
6. Hedychium coronarium	5	Ν	FAC	3 - Prevalence Index is ≤3.0 <sup>1</sup>						
7.				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in						
8.				Remarks or in the delineation report)						
	100	= Total Cover		<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.						
<u>Woody Vine Stratum</u> (Plot size: <u>10'</u> )										
1										
2		·		Vegetation						
	0	= Total Co	ver	Present? Yes X No						
Remarks:										
Profile Desc	cription: (Describe	to the dep	th needed to docur	ment the i	ndicator	or confirm	n the absence	e of indicators.)		
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Depth (inches)	Matrix	0/	Redo	<u>x Feature</u>	S Turne <sup>1</sup>	1.0.0 <sup>2</sup>	Taxtura	Domorko		
(inches)		100		70	<u> </u>	LOC				
0-18	10 YR 3/2	100					Clay	Road Fill		
							·			
							·			
							<u></u>			
							-			
'Type: C=C	oncentration, D=Dep	pletion, RM	=Reduced Matrix, M	S=Masked	Sand Gra	ains.	<sup>2</sup> Locati	ion: PL=Pore Lining, M=Matrix.		
Hydric Soil	Indicators:						Indicators	s for Problematic Hydric Soils":		
Histosol (A1)			Sandy Redox (S5)				Stratified Layers (A5)			
Histic E	pipedon (A2)		Dark Surface	e (S7)			Sandy Mucky Mineral (S1)			
Black H	istic (A3)		Loamy Gleye	ed Matrix (	F2)		Red F	Parent Material (F21)		
Hydroge	en Sulfide (A4)		Depleted Ma	trix (F3)			Very S	Shallow Dark Surface (TF12)		
Muck Pi	resence (A8)		Redox Dark	Surface (F	6)		Other	(Explain in Remarks)		
Deplete	d Below Dark Surfac	ce (A11)	Depleted Da	rk Surface	(F7)					
Thick Da	ark Surface (A12)		Redox Depre	essions (F	8)	<sup>3</sup> Indic	ators of hydro	phytic vegetation and wetland hydrology		
Sandy C	Gleyed Matrix (S4)					mu	ist be present,	unless disturbed or problematic.		
Restrictive	Layer (if observed)	:								
Туре:										
Depth (in	ches):						Hydric Soi	I Present? Yes <u>No</u> X		
Remarks:										
Edge of grav	el road along top of	bank								

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)							
Primary Indicators (minimum of one required; check all that apply) Secondary Indicators (minimum of two required							
Surface Water (A1) Aquatic Fauna (B13)	Surface Soil Cracks (B6)						
High Water Table (A2) Tilapia Nests (B17)	Sparsely Vegetated Concave Surface (B8)						
Saturation (A3) Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)						
Water Marks (B1) Oxidized Rhizospheres on Livin	ig Roots (C3) Dry-Season Water Table (C2)						
Sediment Deposits (B2) Presence of Reduced Iron (C4)	Salt Deposits (C5)						
Drift Deposits (B3) Recent Iron Reduction in Tilled	Soils (C6) Stunted or Stressed Plants (D1)						
Algal Mat or Crust (B4) Thin Muck Surface (C7)	Geomorphic Position (D2)						
Iron Deposits (B5) Fiddler Crab Burrows (C10) (Gu	uam, CNMI, Shallow Aquitard (D3)						
Inundation Visible on Aerial Imagery (B7) and American Samoa)	FAC-Neutral Test (D5)						
Water-Stained Leaves (B9) Other (Explain in Remarks)							
Field Observations:							
Surface Water Present? Yes <u>No X</u> Depth (inches):							
Water Table Present? Yes <u>No X</u> Depth (inches):							
Saturation Present? Yes No X Depth (inches):	Wetland Hydrology Present? Yes No X						
(includes capillary fringe)							
Describe Recorded Data (stream gauge, monitoring well, aerial priotos, previous inspi	ections), if available:						
Remarks:							

Project/Site: Wainiha Bridge 2&3	Ci	ty: <u>Hanalei</u>	Sampling Dat	e: <u>10.1.201</u>	4 Time: 12:00
Applicant/Owner: HDOT	St	ate/Terr/Comlth.: HI	Island:	Kauai	_ Sampling Point: P2
Investigator(s): B Nicholson / B Luke / T Agostini			Т	MK/Parcel:	4-5-8-007-024
Landform (hillslope, coastal plain, etc.): Road fill slope	9	Local relie	f (concave, convex	, none): <u>no</u>	one
Lat: 22.2125637789 N Long	g: <u>-159.544054269</u> W		lope (%): <u>0</u>		
Soil Map Unit Name: Water >40 acres			NWI classifi	cation: UPI	
Are climatic / hydrologic conditions on the site typical f	for this time of year? Y	es X No	(If no, explain in F	Remarks.)	
Are Vegetation, Soil, or Hydrology	significantly distur	bed? Are "Norma	al Circumstances"	present?	Yes X No
Are Vegetation, Soil, or Hydrology	naturally problema	atic? (If needed,	explain any answe	ers in Rema	arks.)
SUMMARY OF FINDINGS – Attach site n	nap showing sam	pling point locati	ons, transects	s, import	ant features, etc.
Hydrophytic Vegetation Present? Yes X	No	In the Compled Area			
Hydric Soil Present? Yes X	No	within a Wetland?	Ves X	No	
Wetland Hydrology Present? Yes X	No	within a wetland:	103		
Remarks:	·				
Just off road between bridges. Lower topography that	n P1 but still above rive	r			

	Absoluto	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: <sup>10'</sup> )	% Cover	Species?	Status	
1				Number of Dominant Species That Are OPL EACW or EAC: $2$ (A)
1				
2				Total Number of Dominant
3				Species Across All Strata: 2 (B)
4				Dereent of Dominant Spacing
5				That Are OBL, FACW, or FAC: 100 (A/B)
	0	= Total Co	ver	
Sapling/Shrub Stratum (Plot size: 10' )				Prevalence Index worksheet:
1.				Total % Cover of: Multiply by:
2				OBL species x 1 =
				FACW species x 2 =
3				
4				
5				FACU species     X 4 =
	0	= Total Co	over	UPL species x 5 =
Herb Stratum (Plot size:)	90	V		Column Totals: (A) (B)
	00	<u> </u>	FACIO	
2. Sphagneticola trilobata	20	Y	FAC	Prevalence Index = B/A =
3				Hydrophytic Vegetation Indicators:
4				1 - Rapid Test for Hydrophytic Vegetation
5.				2 - Dominance Test is >50%
6				3 - Prevalence Index is ≤3.0 <sup>1</sup>
7	-			Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
7				Remarks or in the delineation report)
8	100			
Weedy Vine Stratum (Plot size: 10'	100	= Total Co	over	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
				be present, unless disturbed or problematic.
1				Hydrophytic
2				Vegetation
	0	= Total Co	over	Present? Yes X No
Remarks:				

Profile Desc	ription: (Describe	to the de	pth needed to docu	ment the	indicator	or confirm	m the absence of	indicators.	)	
Depth	Matrix		Redo	ox Feature	es		_			
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
0-8	7.5 YR 3/1	100	_				Clay Loam			
8-22	7.5 YR 3/1	90	5 YR 4/6	10		m	Clay Loam			
		_								
					<u></u>					
<sup>1</sup> Type: C=Concentration D=Depletion RM=Reduced Matrix MS=Masked Sand Grains <sup>2</sup> I ocation: PI =Pore Lining M=Matrix										
Hydric Soil Indicators: Indicators for Problematic Hydric Soils <sup>3</sup> :								oils³:		
Histosol	(A1)		Sandy Redo	Sandy Redox (S5) Stratified Layers (A5)						
Histic Ep	pipedon (A2)		Dark Surface (S7)				Sandy M	ucky Minera	l (S1)	
Black Hi	stic (A3)		Loamy Gley	ed Matrix	(F2)		Red Parent Material (F21)			
Hydroge	en Sulfide (A4)		Depleted Ma	atrix (F3)			Very Shallow Dark Surface (TF12)			
Muck Pr	esence (A8)		Redox Dark	Surface (	F6)		Other (Explain in Remarks)			, ,
Deplete	d Below Dark Surfac	ce (A11)	Depleted Da	rk Surface	e (F7)					
Thick Da	ark Surface (A12)	( )	X Redox Depr	essions (F	-8)	<sup>3</sup> Indic	licators of hydrophytic vegetation and wetland hydrology			
Sandy G	Gleyed Matrix (S4)				- /	mu	ust be present, unl	less disturbe	d or problem	atic.
Restrictive	Layer (if observed)	:								
Туре:										
Depth (inches):							Hydric Soil Pr	resent? Y	es X	No
Remarks:										
Redox depre	ssions (F8)									

Wetland Hydrology Indicate	vrs: (Explain	ı observati	ions in Remarks, if needed.)				
Primary Indicators (minimum of one required; check all that apply) Secondary Indicators (minimum of two re							
Surface Water (A1)			_ Aquatic Fauna (B13)		Surface Soil Cracks (B6)		
High Water Table (A2)			_ Tilapia Nests (B17)		Sparsely Vegetated Concave Surface (B8)		
X Saturation (A3)		_	_ Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)		
Water Marks (B1)		_	Oxidized Rhizospheres on Living	Roots (C3)	Dry-Season Water Table (C2)		
Sediment Deposits (B2)		_	Presence of Reduced Iron (C4)		Salt Deposits (C5)		
Drift Deposits (B3)		_	_ Recent Iron Reduction in Tilled So	oils (C6)	Stunted or Stressed Plants (D1)		
Algal Mat or Crust (B4)		_	Thin Muck Surface (C7)		X Geomorphic Position (D2)		
Iron Deposits (B5)	Iron Deposits (B5)			m, CNMI,	Shallow Aquitard (D3)		
Inundation Visible on Aer	Inundation Visible on Aerial Imagery (B7)				FAC-Neutral Test (D5)		
Water-Stained Leaves (B	9)	_	Other (Explain in Remarks)				
Field Observations:							
Surface Water Present?	Yes	_ <sub>No</sub> <u>X</u>	_ Depth (inches):				
Water Table Present?	Yes X	_ No	_ Depth (inches): 18"				
Saturation Present? (includes capillary fringe)	Yes X	_ No	_ Depth (inches): <sup>9"</sup>	Wetland I	Hydrology Present? Yes X No		
Describe Recorded Data (stre	am gauge, r	monitoring	well, aerial photos, previous inspec	tions), if ava	ailable:		
Remarks:							
Saturation (A3) Geomorphic p	osition (D2)						

Project/Site: Wainiha Bridge 2&3	_ City: Hanalei	Sampling Date: 10.1	.2014 Time: 12:45				
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island: Kau	ai Sampling Point: P3				
Investigator(s): B Nicholson / B Luke / T Agostini		TMK/Pai	rcel: 4-5-8-006-030				
Landform (hillslope, coastal plain, etc.): Roadfill slope	Local relief	f (concave, convex, none)	: none				
Lat: 22.2127790695 N Long: -159.543438947	W	Datum: NAD UTM 4N	_ Slope (%): <u>2</u>				
Soil Map Unit Name: Water > 40 acres NWI classification: UPL							
Are climatic / hydrologic conditions on the site typical for this time of yea	r? Yes X No	(If no, explain in Remark	s.)				
Are Vegetation, Soil, or Hydrology significantly d	listurbed? Are "Norma	al Circumstances" present	t? Yes X No				
Are Vegetation, Soil, or Hydrology naturally prob	plematic? (If needed,	explain any answers in R	emarks.)				
SUMMARY OF FINDINGS – Attach site map showing a	sampling point location	ons, transects, imp	ortant features, etc.				
Hydrophytic Vegetation Present? Yes X No							

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes     No       Yes     No     X       Yes     No     X	Is the Sampled Area within a Wetland?	Yes	No <u>×</u>
Remarks:				

401	Absolute	Dominant	Indicator	Dominance Test worksheet:
<u>Tree Stratum</u> (Plot size: <u>10</u> ) 1)	<u>% Cover</u>	Species?	Status	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)
2				Total Number of Dominant
3				Species Across All Strata: <u>3</u> (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: <u>100</u> (A/B)
<b>0 1 1 0</b>	0	= Total Co	ver	
Sapling/Shrub Stratum (Plot size: 10 )				Trevalence Index worksneet:
1				I otal % Cover of: Multiply by:
2				OBL species x 1 =
3				FACW species x 2 =
4				FAC species x 3 =
5				FACU species x 4 =
10'	0	= Total Co	over	UPL species x 5 =
Herb Stratum (Plot size: 10 )	05	V	<b>F</b> AO	Column Totals: (A) (B)
1. Megathyrsus maximus	35	Y	FAC	
2. Sphagneticola trilobata	30	Y	FAC	Prevalence Index = B/A =
3. Urochloa mutica	25	Y	FACW	Hydrophytic Vegetation Indicators:
4. Mimosa pudica	10	Ν	FACU	1 - Rapid Test for Hydrophytic Vegetation
5				2 - Dominance Test is >50%
6				3 - Prevalence Index is ≤3.0 <sup>1</sup>
7.				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
8.				Remarks or in the delineation report)
	110	= Total Co	ver	<sup>1</sup> Indiastors of hydric coil and watland hydrology must
Woody Vine Stratum (Plot size: 10' )				be present, unless disturbed or problematic.
1				
2				Hydrophytic Vegetation
	0	= Total Co	ver	Vegetation       Present?     Yes X     No
Remarks:				

Profile Des	cription: (Describe	to the dep	oth needed to docum	nent the	indicator	or confirn	n the absence	of indicato	ors.)		
Depth	Matrix		Redo	x Feature	S	0					
(inches)	Color (moist)	%	Color (moist)	%	Type'	Loc <sup>2</sup>	Texture		Remark	(S	
0-14	7.5 YR 3/3	100			. <u> </u>		Clay Loam				
	·										
		·					·				
					·		·				
	·				·		·				
							·	-			
<sup>1</sup> Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains, <sup>2</sup> Location: PI =Pore Lining, M=Matrix,											
Hydric Soil	Indicators:						Indicators	for Proble	matic Hyd	ric Soils <sup>3</sup> :	
Histoso	ol (A1)		Sandy Redox (S5)			Stratified Layers (A5)					
Histic E	pipedon (A2)		Dark Surface (S7)			Sandy Mucky Mineral (S1)					
Black H	listic (A3)		Loamy Gleye	d Matrix	(F2)		Red Parent Material (F21)				
Hydrog	en Sulfide (A4)		Depleted Mat	trix (F3)			Very Shallow Dark Surface (TF12)				
Muck P	Presence (A8)		Redox Dark S	Surface (	F6)	Other (Explain in Remarks)					
Deplete	ed Below Dark Surfac	e (A11)	Depleted Dark Surface (F7)								
Thick D	ark Surface (A12)		Redox Depressions (F8) <sup>3</sup> Indic			cators of hydrophytic vegetation and wetland hydrology			ogy		
Sandy	Gleyed Matrix (S4)					mu	ist be present, ι	inless distu	rbed or pro	blematic.	
Restrictive	Layer (if observed)	:									
Туре:											
Depth (ir	nches):						Hydric Soil	Present?	Yes	No X	
Remarks:											
Hit asphalt a	at 13 inches - fill mate	rial									

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)							
Primary Indicators (minimum of one required; check all that apply) Secondary Indicators (minimum of two required)							
Surface Water (A1) Aquatic Fauna (B13)	Surface Soil Cracks (B6)						
High Water Table (A2) Tilapia Nests (B17)	Sparsely Vegetated Concave Surface (B8)						
Saturation (A3) Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)						
Water Marks (B1) Oxidized Rhizospheres on Living	Roots (C3) Dry-Season Water Table (C2)						
Sediment Deposits (B2) Presence of Reduced Iron (C4)	Salt Deposits (C5)						
Drift Deposits (B3) Recent Iron Reduction in Tilled Sc	bils (C6) Stunted or Stressed Plants (D1)						
Algal Mat or Crust (B4) Thin Muck Surface (C7)	Geomorphic Position (D2)						
I Iron Deposits (B5) Fiddler Crab Burrows (C10) (Guar	m, CNMI, Shallow Aquitard (D3)						
Inundation Visible on Aerial Imagery (B7) and American Samoa)	FAC-Neutral Test (D5)						
Water-Stained Leaves (B9) Other (Explain in Remarks)							
Field Observations:							
Surface Water Present? Yes No X Depth (inches):							
Water Table Present? Yes <u>No <math>X</math></u> Depth (inches):							
Saturation Present? Yes <u>No X</u> Depth (inches):	Wetland Hydrology Present? Yes No X						
(includes capillary ininge) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspec	tions), if available:						
Remarks:							

Project/Site: Wainiha Bridge 2&3	City: Hanalei Sampling Date: 10.1.2014 Time: 13:00
Applicant/Owner: HDOT	State/Terr/Comlth.: HI Island: Kauai Sampling Point: P4
Investigator(s): B Nicholson / B Luke / T Agostini	TMK/Parcel: 4-5-8-007-999
Landform (hillslope, coastal plain, etc.): Flood plain	Local relief (concave, convex, none): none
Lat: 22.2140023821 N Long: -159.543817411 V	Datum: <u>NAD UTM 4N</u> Slope (%): <u>0</u>
Soil Map Unit Name: Hanalei Silty Clay, 0 to 2 percent slopes (HnA)	NWI classification: UPL
Are climatic / hydrologic conditions on the site typical for this time of year	Yes X No (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly dis	urbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation, Soil, or Hydrology naturally proble	matic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing s	mpling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u>X</u> N Yes <u>X</u> N Yes <u>X</u> N	10 10	Is the Sampled Area within a Wetland?	Yes X	No
Remarks:					

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 10' )	% Cover	Species?	Status	Number of Dominant Species
1. Hibiscus tillaceus (Talipariti tiliaceum)	95	Y	FAC	That Are OBL, FACW, or FAC: $\underline{3}$ (A)
2.				
3				Total Number of Dominant
A.				Species Across Air Strata. (b)
4		·		Percent of Dominant Species
5	05	·		That Are OBL, FACW, or FAC: 100 (A/B)
Sopling/Shrub Stratum (Distaize: 10'	95	= Total Co	ver	Prevalence Index worksheet:
				Total % Cover of: Multiply by:
1		·		
2	·			OBL species x 1 =
3	·			FACW species x 2 =
4	. <u> </u>			FAC species x 3 =
5.				FACU species x 4 =
	0	= Total Co	ver	UPL species x 5 =
Herb Stratum (Plot size: 10' )				Column Totals: (A) (B)
1. Urochloa mutica	5	Y	FACW	
2. Megathyrsus maximus	5	Y	FAC	Prevalence Index = B/A =
3.				Hydrophytic Vegetation Indicators:
4				1 - Rapid Test for Hydrophytic Vegetation
5	. <u> </u>			2 - Dominance Test is >50%
3. <u> </u>	·	·		3 - Prevalence Index is < 3.01
o	·	·		Broblomatic Hydrophytic Vagatation <sup>1</sup> (Evaluin in
/		·		Remarks or in the delineation report)
8		·		
10'	10	= Total Co	ver	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
Woody Vine Stratum (Plot size: 10 )				be present, unless disturbed or problematic.
1	·	·		Hydrophytic
2	·			Vegetation
	0	= Total Co	ver	Present? Yes X No
Remarks:				1

Depth	Matrix		Redo	x Feature	s					
inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks		
Гуре: С=С	oncentration, D=Depl	etion, RM=	Reduced Matrix, M	S=Masked	d Sand Gra	ains.	<sup>2</sup> Location: PL	=Pore Lining, M=	Matrix.	
ydric Soil	Indicators:						Indicators for Pr	oblematic Hydri	ic Soils <sup>3</sup> :	
Histoso	(A1)		Sandy Redo	x (S5)			Stratified Lay	ers (A5)		
_ Histic E	pipedon (A2)		Dark Surface	e (S7)			Sandy Mucky	Mineral (S1)		
Black H	istic (A3)		Loamy Gleye	ed Matrix (	F2)		Red Parent M	laterial (F21)		
_ Hydroge	en Sulfide (A4)		Depleted Ma	trix (F3)			Very Shallow	Dark Surface (T	F12)	
Muck P	resence (A8)		Redox Dark	Surface (F	6)		X Other (Explai	n in Remarks)		
Deplete	d Below Dark Surface	(A11)	Depleted Da	rk Surface	e (F7)					
Thick D	ark Surface (A12)	. ,	Redox Depre	essions (F	8)	<sup>3</sup> Indica	ators of hydrophytic v	egetation and we	etland hydrolog	
Sandy (	Gleyed Matrix (S4)			,	,	mu	st be present, unless	disturbed or prot	olematic.	
estrictive	Layer (if observed):							-		
Туре:										
Depth (in	ches):						Hydric Soil Prese	nt? Yes X	No	
emarks:							•			
o soil pit, st	anding water in large	area								
	- •									

Wetland Hydrology Indicato	ors: (Explai	in observatio	ons in Remarks, if needed.)		
Primary Indicators (minimum of one required; check all that apply)					Secondary Indicators (minimum of two required)
X Surface Water (A1)			Aquatic Fauna (B13)		Surface Soil Cracks (B6)
High Water Table (A2)			Tilapia Nests (B17)		Sparsely Vegetated Concave Surface (B8)
Saturation (A3)			_ Hydrogen Sulfide Odor (C1)		Drainage Patterns (B10)
Water Marks (B1)			Oxidized Rhizospheres on Living	Roots (C3)	Dry-Season Water Table (C2)
Sediment Deposits (B2)			Presence of Reduced Iron (C4)		Salt Deposits (C5)
Drift Deposits (B3)			Recent Iron Reduction in Tilled So	oils (C6)	Stunted or Stressed Plants (D1)
Algal Mat or Crust (B4)			Thin Muck Surface (C7)		Geomorphic Position (D2)
Iron Deposits (B5)			Fiddler Crab Burrows (C10) (Guar	m, CNMI,	Shallow Aquitard (D3)
Inundation Visible on Aer	ial Imagery	(B7)	and American Samoa)		FAC-Neutral Test (D5)
Water-Stained Leaves (B	9)		Other (Explain in Remarks)		
Field Observations:					
Surface Water Present?	Yes X	No	_ Depth (inches): <sup>26-36"</sup>		
Water Table Present?	Yes	No	_ Depth (inches):		
Saturation Present? (includes capillary fringe)	Yes	No	_ Depth (inches):	Wetland H	Hydrology Present? Yes $\frac{\chi}{\chi}$ No
Describe Recorded Data (stre	am gauge,	monitoring	well, aerial photos, previous inspec	tions), if ava	ailable:
Remarks:					

Project/Site: Wainiha Bridge 2&3	City: Hanalei	Sampling Date:	10.1.2014	Time: 13:35
Applicant/Owner: HDOT	State/Terr/Comlth.: H	Island:	Kauai	Sampling Point: P5
Investigator(s): B Nicholson / B Luke / T Agostini		TMP	<pre>K/Parcel: 4·</pre>	-5-8-007-999
Landform (hillslope, coastal plain, etc.): <u>coastal plain</u>	Local	relief (concave, convex, r	none): <u>none</u>	)
Lat: 22.2143801834 N Long: -159.543	773988 W	Datum: NAD UTM 4	N Slop	be (%): <u>5</u>
Soil Map Unit Name: Mokuleia clay loam, poorly drained variant (	Mta)	NWI classificat	tion: UPL	
Are climatic / hydrologic conditions on the site typical for this time	e of year? Yes X No	(If no, explain in Rer	marks.)	
Are Vegetation, Soil, or Hydrology signifi	cantly disturbed? Are "N	ormal Circumstances" pre	esent? Yes	s_XNo
Are Vegetation, Soil, or Hydrology natura	ally problematic? (If nee	ded, explain any answers	in Remark	s.)
SUMMARY OF FINDINGS – Attach site map sho	wing sampling point lo	cations, transects,	importar	nt features, etc.

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u>X</u> Yes Yes	No No _X No _X	Is the Sampled Area within a Wetland?	Yes	No <u>X</u>
Remarks:					

	Absolute	Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 10')	% Cover	Species? Status	Number of Dominant Species
1. Terminalia catappa	95	Y FAC	That Are OBL, FACW, or FAC: $2$ (A)
2	·	· ·	Total Number of Dominant
3		· ·	Species Across All Strata: <u>2</u> (B)
4		· ·	Percent of Dominant Species
5		·	That Are OBL, FACW, or FAC: <u>100</u> (A/B)
10	95	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10 )			Prevalence Index worksheet:
1			Total % Cover of: Multiply by:
2		·	OBL species x 1 =
3			FACW species x 2 =
4			FAC species x 3 =
5.			FACU species x 4 =
	0	= Total Cover	UPL species x 5 =
Herb Stratum (Plot size: 10' )		_	Column Totals: (A) (B)
1			
2			Prevalence Index = B/A =
3			Hydrophytic Vegetation Indicators:
4.			1 - Rapid Test for Hydrophytic Vegetation
5.			2 - Dominance Test is >50%
6			3 - Prevalence Index is ≤3.0 <sup>1</sup>
7			Problematic Hydrophytic Vegetation <sup>1</sup> (Explain in
8		·	Remarks or in the delineation report)
···	0	- Total Cover	1
Woody Vine Stratum (Plot size: <sup>10'</sup> )			'Indicators of hydric soil and wetland hydrology must
1. Epipremnum pinnatum	50	Y FAC	be present, unless disturbed of problematic.
2			Hydrophytic
	50	= Total Cover	Vegetation   Present? Yes $X$ No
Remarks:			,

epth	Matrix		Redo	x Feature	s		_			
nches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remarks	
-14	5 YR 4/3						Clay loam			
	·									
							·			
							·			
							·			
vne: C-C	Concentration D-Depl	letion RM	-Reduced Matrix M	S-Masker	Sand Gra	ains	<sup>2</sup> Location: P	I –Pore	Lining M-N	<i>l</i> atrix
vdric Soil	Indicators:						Indicators for P	roblem	atic Hvdric	Soils <sup>3</sup> :
Histoso	) (A1)		Sandy Redo	((\$5)			Stratified La	vers (AF	5)	
Histic F	ninedon (A2)		Dark Surface	(S7)			Sandy Muck	v Miner	2) al (S1)	
Black H	listic (A3)		Loamy Gleve	d Matrix (	F2)		Red Parent	Material	(F21)	
Hvdroa	en Sulfide (A4)		Depleted Ma	trix (F3)	/		Verv Shallo	v Dark S	Surface (TF	12)
Muck P	Presence (A8)		Redox Dark	Surface (F	-6)		Other (Expla	ain in Re	emarks)	,
_ Deplete	ed Below Dark Surface	e (A11)	Depleted Da	k Surface	(F7)		、 .		,	
Thick D	ark Surface (A12)	. ,	Redox Depre	ssions (F	8)	<sup>3</sup> Indic	ators of hydrophytic	vegetati	on and wet	and hydrology
Sandy (	Gleyed Matrix (S4)					mu	ist be present, unles	s disturb	ed or proble	ematic.
estrictive	Layer (if observed):									
Type:										
Depth (ir	iches).						Hydric Soil Pres	ent?	Yes	NoX
								•		
emarks:										

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (minimum of two required)
Surface Water (A1) Aquatic Fauna (B13)	Surface Soil Cracks (B6)
High Water Table (A2) Tilapia Nests (B17)	Sparsely Vegetated Concave Surface (B8)
Saturation (A3) Hydrogen Sulfide Odor (C1)	Drainage Patterns (B10)
Water Marks (B1) Oxidized Rhizospheres on Living	Roots (C3) Dry-Season Water Table (C2)
Sediment Deposits (B2) Presence of Reduced Iron (C4)	Salt Deposits (C5)
Drift Deposits (B3) Recent Iron Reduction in Tilled Sc	bils (C6) Stunted or Stressed Plants (D1)
Algal Mat or Crust (B4) Thin Muck Surface (C7)	Geomorphic Position (D2)
Iron Deposits (B5) Fiddler Crab Burrows (C10) (Guar	m, CNMI, Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7) and American Samoa)	FAC-Neutral Test (D5)
Water-Stained Leaves (B9) Other (Explain in Remarks)	
Field Observations:	
Surface Water Present? Yes <u>No X</u> Depth (inches):	
Water Table Present? Yes <u>No X</u> Depth (inches):	
Saturation Present? Yes <u>No X</u> Depth (inches):	Wetland Hydrology Present? Yes No X
(Includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspec	tions) if available:
beschbe recorded bata (stream gauge, monitoring weil, achai photos, previous inspec	
Demorila	
Remarks.	

Project/Site: Wainiha Bridge 2&3	City: Hanalei	Sampling Date: 1	0.1.2014 Time: 14:00
Applicant/Owner: HDOT	State/Terr/Comlth.: HI	Island:K	auai Sampling Point: P6
Investigator(s): B Nicholson / B Luke / T Agostini		TMK/F	Parcel: <u>4-5-8-006-030</u>
Landform (hillslope, coastal plain, etc.): <u>coastal plain</u>	Local relie	f (concave, convex, no	ne): <u>none</u>
Lat: 22.2133320768 N Long: -159.543789661 V	V	Datum: NAD UTM 4N	Slope (%): <u>3</u>
Soil Map Unit Name: Hanalei silty clay, 0 to 2 percent slopes		NWI classificatio	n: PFOC
Are climatic / hydrologic conditions on the site typical for this time of year?	Yes X No	(If no, explain in Rema	arks.)
Are Vegetation, Soil, or Hydrology significantly dis	turbed? Are "Norma	al Circumstances" pres	ent? Yes X No
Are Vegetation, Soil, or Hydrology naturally proble	ematic? (If needed,	explain any answers ir	n Remarks.)
SUMMARY OF FINDINGS – Attach site map showing s	ampling point locati	ions, transects, in	nportant features, etc.

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes X Yes X Yes X	No No No	Is the Sampled Area within a Wetland?	Yes X	No
Remarks:					

makai side of highway

	Absolute	Dominant	Indicator	Dominance Test worksheet:	
Iree Stratum     (Plot size: _'0)       1)	<u>% Cover</u>	Species?	Status	Number of Dominant Species That Are OBL, FACW, or FAC: 2	(A)
2		·		Total Number of Dominant	
3		·	<u> </u>	Species Across All Strata: 2	(B)
4 5				Percent of Dominant Species That Are OBL, FACW, or FAC: 100	(A/B)
Conting/Chruh Stratum (Distaires 10'	0	= Total Co	ver	Prevalence Index worksheet:	
Sapling/Shrub Stratum (Plot size: 10)				Total % Cover of: Multiply by:	
1		·	·		
2			·		-
3				FAC w species X 2 =	-
4		·	·	FAC species X 3 =	-
5		·	<u> </u>	FACU species x 4 =	-
Horb Stratum (Plat size: 10'	0	_ = Total Co	over	UPL species x 5 =	-
1 Urochloa mutica	80	Y	FACW	Column Totals: (A)	_ (B)
2. Sphagneticola trilobata	20	Y	FAC	Prevalence Index = B/A =	
3. Cyperus involucratus	2	Ν	FACW	Hydrophytic Vegetation Indicators:	
4.				1 - Rapid Test for Hydrophytic Vegetation	
5			·	2 - Dominance Test is >50%	
6		·	·	3 - Prevalence Index is ≤3.0 <sup>1</sup>	
7		·	·	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain	n in
8		·	·	Remarks or in the delineation report)	
···	100	= Total Co	ver		
Woody Vine Stratum (Plot size: 10' )				be present, unless disturbed or problematic.	lust
1					
2				Hydrophytic Vegetation	
	0	= Total Co	ver	Present? Yes $\frac{X}{}$ No	
Remarks:					

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)											
Depth	Matrix		Redox Features				_				
(inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture		Remark	S	
0-8	7.5 YR 3/1	100	<u> </u>	<u></u>	<u> </u>		Clay Loam				
8-22	7.5 YR 3/1	90	5 YR 4/6	10		Μ	Clay Loam				
						·					
				<u> </u>							
				<u></u>	·						
<sup>1</sup> Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. <sup>2</sup> Location: PL=Pore Lining. M=Matrix.											
Hydric Soil Indicators: Indicators for Problematic Hydric Soils <sup>3</sup> :											
Histosol (A1) Sandy Redox (S5)							Stratified Layers (A5)				
Histic Ep	pipedon (A2)	Dark Surface (S7)				Sandy Mucky Mineral (S1)					
Black Hi	istic (A3)	Loamy Gleyed Matrix (F2)				Red Parent Material (F21)					
Hydroge	en Sulfide (A4)	Depleted Matrix (F3)				Very Shallow Dark Surface (TF12)					
Muck Pr	esence (A8)	Redox Dark Surface (F6)				Other (Explain in Remarks)					
Deplete	d Below Dark Surfa	Depleted Dark Surface (F7)					•	,			
Thick Da	ark Surface (A12)		X Redox Dep	X Redox Depressions (F8) <sup>3</sup> Indic			ators of hydrophytic vegetation and wetland hydrology				
Sandy G	Gleyed Matrix (S4)	<u> </u>			ust be present, unless disturbed or problematic.						
Restrictive	Layer (if observed	):									
Туре:											
Depth (in	ches):						Hydric Soil Pr	resent?	Yes X	No	
Remarks:							·				
Redox depre	ssions (F8)										

Wetland Hydrology Indicators: (Explain observations in Remarks, if needed.)											
Primary Indicators (minimum	of one requi	Secondary Indicators (minimum of two required)									
Surface Water (A1)		Surface Soil Cracks (B6)									
X High Water Table (A2)		Sparsely Vegetated Concave Surface (B8)									
Saturation (A3)			Drainage Patterns (B10)								
Water Marks (B1)		Roots (C3)	Dry-Season Water Table (C2)								
Sediment Deposits (B2)		Salt Deposits (C5)									
Drift Deposits (B3)		Stunted or Stressed Plants (D1)									
Algal Mat or Crust (B4)		X Geomorphic Position (D2)									
Iron Deposits (B5)		Shallow Aquitard (D3)									
Inundation Visible on Aer	ial Imagery	FAC-Neutral Test (D5)									
Water-Stained Leaves (B	9)	_	Other (Explain in Remarks)								
Field Observations:											
Surface Water Present?	Yes	_ <sub>No</sub> <u>X</u>	Depth (inches):								
Water Table Present? Yes X No			Depth (inches): 9"								
Saturation Present? Yes X (includes capillary fringe)		_ No	_ Depth (inches): Wetlan		Hydrology Present? Yes $\frac{\chi}{\chi}$ No						
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:											
Remarks:											
Geomorphic position (D2)											

# Appendix B

**Results Maps** 















# Appendix C

Survey Area Photographs



Figure C1. Wai'oli Bridge taken from the makai west bank.



Figure C2. Waipā Bridge taken from the mauka east bank.



Figure C3. Waikoko Bridge at road, taken from the south.



Figure C4. Wainiha Bridge 1 taken from the makai east bank.



Figure C5. Wainiha Bridge 2 taken from the mauka east bank.



Figure C6. Wainiha Bridge 3 taken from the mauka east bank.

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# Appendix D

National Wetland Inventory and National Hydrography Dataset Maps











Appendix D Biological Resource Survey Report for the Wainiha Bridges Project


## **Biological Resource Survey Report for the Wainiha Bridges Project**

Prepared for

Federal Highway Administration, Central Federal Lands Highway Administration

and

**CH2M HILL** 

Prepared by SWCA Environmental Consultants

November 2015

#### BIOLOGICAL RESOURCE SURVEY REPORT FOR THE WAINIHA BRIDGES PROJECT

Prepared for

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SWCA Project No. 30745

Revised November 30, 2015

#### EXECUTIVE SUMMARY

The Federal Highway Administration, Central Federal Lands Highway Division (FHWA), in partnership with the Hawai'i Department of Transportation (HDOT), is proposing to replace three bridges that span Wainiha Stream and to provide temporary bridges across Waioli, Waipā, and Waikoko Streams along Kūhiō Highway (Route 560) on the Island of Kaua'i. CH2M HILL contracted SWCA Environmental Consultants (SWCA) on behalf of FHWA to conduct biological studies for the project in support of the National Environmental Policy Act (NEPA) document. This report summarizes the findings of the biological resource survey conducted in the survey area by SWCA biologists between September 29, 2014, and October 2, 2014.

Several federally and state-listed animal species were observed during the survey or are likely to occur in the survey area based on habitat or previous surveys. These species are the Hawaiian coot (*Fulica alai*), Hawaiian gallinule (*Gallinula galeata sandvicensis*), Hawaiian stilt (*Himantopus mexicanus knudseni*), and Hawaiian duck (*Anas wyvilliana*) (these four species are collectively referred to as waterbirds); nēnē or Hawaiian goose (*Branta* sandvicensis); Hawaiian petrel (*Pterodroma sandwichensis*), Newell's shearwater (*Puffinus auricularis newelli*), and band-rumped storm petrel (*Oceanodroma castro*) (these three species are collectively referred to as seabirds); Hawaiian hoary bat; Hawaiian monk seal (*Neomonachus schauinslandi*); and green sea turtle (*Chelonia mydas*) and hawksbill sea turtle (*Eretmochelys imbricata*) (these two species are collectively referred to as sea turtles). In addition, portions of the survey area fall within recently designated marine critical habitat for the Hawaiian monk seal. Best management practices (BMPs) are provided to minimize impacts to these listed animals and their habitat during construction.

None of the species recorded in the lower or estuarine portions of the surveyed streams are state- or federally listed threatened, endangered, proposed or candidate species. However, native fishes and aquatic invertebrates have been recorded in the stream, including all five native species of 'o'opu (*Eleotris sandwicensis, Lentipes concolor, Stenogobius hawaiiensis, Awaous stamineus,* and *Sicyopterus stimpsoni*), the two native 'ōpae species (*Atyoida bisulcata* and *Macrobrachium grandimanus*), and three native species of snails (*Neritina granosa, Theodoxus vespertinus,* and *T. cariosus*). Precautions should be taken not to impede upstream and downstream movement of these species. Appropriate recommendations to avoid and minimize impacts to aquatic resources will ultimately depend on final project designs and plans.

No state- or federally listed threatened, endangered, proposed or candidate endangered plant species, or rare native Hawaiian plant species, were observed in the survey area during the survey. The survey area does not contain critical habitat for threatened or endangered plants. The vegetation in the survey area is composed of five main vegetation types: 1) ruderal vegetation, 2) emergent wetland, 3) hau thicket, 4) mixed non-native forest, and 5) ornamental landscaping. The proposed bridge project is not expected to have a significant, adverse impact on botanical resources.

Single-day water quality sampling and additional water quality data suggest elevated turbidity levels within the surveyed streams. Short-term impacts from ground disturbance during the project's construction phase have the potential to impact water quality; however, implementation of BMPs at the site would greatly reduce or eliminate these impacts.

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### CONTENTS

1. I	ntroduction	. 1
2. D	escription of the Survey Area	.1
2.1.	Waioli	. 3
2.2.	Waipā	. 3
2.3.	Waikoko	. 3
2.4.	Wainiha Bridge 1	. 4
2.5.	Wainiha Bridges 2 & 3	.4
3. N	lethods	. 5
3.1.	Flora	. 5
3.2.	Terrestrial and Aquatic Fauna	. 5
3.3.	Wetlands and Streams	. 5
3.4.	Water Quality	. 6
4. R	esults	.7
4.1.	Flora	. 7
4	1.1. Waioli	.7
4	1.2. Waipā	. 8
4	1.3. Waikoko	. 8
4	1.4.   Wainiha Bridge 1   1	10
4	1.5.    Wainiha Bridge 2 & 3	10
4.2.	Terrestrial Fauna	12
4	2.1. Avifauna	12
4	2.2. Hawaiian Hoary Bat	14
4	2.3. Other Terrestrial Mammals	14
4	2.4. Insects and Other Invertebrates	4
4.3.	Aquatic Fauna	15
4	3.1. Freshwater and Estuarine Communities	15
4	.3.2. Marine Communities	1/
4.4.	Water Quality	18
5. D	iscussion and Recommendations2	21
5.1.	Flora	21
5.2.	Terrestrial Fauna	22
5.3.	Aquatic Fauna	24
5	3.1. Freshwater and Estuarine Communities	24
5	3.2. Marine Communities	24
5.4.	Water Quality	26
6. L	iterature Cited	28

#### FIGURES

Figure 1. Survey areas	2
Figure 2. Lawn (right side) and hau thicket (left side) at the Waioli Bridge survey area (looking	
mauka/ upstream)	8
Figure 3. Dense hau thicket at the Waipā Bridge survey area (looking mauka/ upstream)	9
Figure 4. Waikoko Bridge survey area ornamental landscaping and ruderal vegetation	9
Figure 5. Wainiha Bridge 1 survey area (makai/ downstream side).	11
Figure 6. Vegetation near the Wainiha Bridges 2 & 3 survey area (makai/downstream side)	11
Figure 7. Wainiha Bridges 2 & 3 survey area (mauka/upstream side)	12

#### TABLES

Table 1. Acreage of Bridge Survey Areas	1
Table 2. Field Equipment and Analytical Methods	6
Table 3. Birds Observed by SWCA in and near the Survey Area	13
<b>Table 4.</b> Life History Information for the Four Listed Waterbirds Observed or Likely to be Present	
in the Survey Area	14
Table 5. Aquatic Stream Species Reported in Wainiha, Waioli, and Waipā Watersheds	15
Table 6. HAR 11-54 Water Quality Standards	19
<b>Table 7.</b> Basic Water Quality Results for Parameters Field Measured In Situ using a Handheld YSI	
556 Multiparameter System Portable Meter	20
Table 8. Turbidity and TSS Results	21
Table 9. Hawai'i DOH Clean Water Branch Data for Waikoko and Waipā Estuaries	21

# 1. INTRODUCTION

The Federal Highway Administration, Central Federal Lands Highway Division (FHWA), in partnership with the Hawai'i Department of Transportation (HDOT), is proposing to reconstruct three bridges on Kūhiō Highway (Route 560) on the Island of Kaua'i. CH2M HILL contracted SWCA Environmental Consultants (SWCA) on behalf of FHWA to complete a biological resource survey for the project. The project involves improvements to six bridges along Kūhiō Highway between Hanalei and Wainiha (Figure 1). Three temporary bridges (referred to as Wainiha 1, 2, and 3) are scheduled to be replaced, and three load-restricted bridges that cross Waioli, Waipā, and Waikoko Streams may require temporary bridges or supplemental support for construction access. The proposed project is part of the environmental compliance process to provide permanent replacement bridges.

This report summarizes the findings of the biological resource survey conducted at the Wainiha Bridge survey area by SWCA Biologists Ling Ong (wildlife scientist), Tiffany Bovino Agostini (botanist), Bryson Luke (field technician), and Brian Nicholson (wetland specialist) between September 29, 2014, and October 2, 2014. The survey was conducted in support of the environmental compliance efforts for the project, including the National Environmental Policy Act (NEPA), Section 7 of the Endangered Species Act (ESA) of 1973 (as amended), Section 10 of the Rivers and Harbors Act of 1899, and Section 404 of the Clean Water Act of 1972.

# 2. DESCRIPTION OF THE SURVEY AREA

The survey area is on the west side of the Island of Kaua'i between Hanalei and Wainiha along Kūhiō Highway (Route 560) (see Figure 1). The survey area comprises five non-contiguous survey areas: Waioli, Waipā, Waikoko, Wainiha 1, and Wainiha 2 & 3 (as described below). In all, the whole survey area covers approximately 9.24 acres (3.74 hectares [ha]), as outlined in Table 1.

Mean annual rainfall at the survey areas is approximately 89.5 inches (2,275 millimeters [mm]). Rainfall is typically highest in March and lowest in June (Giambelluca et al. 2013). The closest rainfall gauge to the survey area (Wainiha [WNHH1]) experienced 7.78 inches (198 mm) of rain for 2014 through the end of October, which is slightly above average (National Oceanic and Atmospheric Administration (NOAA)/National Weather Service 2014). Waters passing under Waikoko, Waipā, and Waioli Bridges flow into Hanalei Bay, whereas waters passing under Wainiha 1, 2, & 3 flow into Wainiha Bay.

Each bridge survey area is discussed in further detail below.

Bridge Survey Area	Acres
Waioli	1.26
Waipā	1.45
Waikoko	1.46
Wainiha 1	1.60
Wainiha 2 & 3	3.47
Total	9.24



Figure 1. Survey areas.

## 2.1. Waioli

The Waioli Bridge survey area covers approximately 1.26 acres (0.51 ha). The existing bridge is approximately 100 feet (30.5 meters [m]) long and 15 feet (4.5 m) wide. The survey area encompasses parts of two residential parcels on the makai (seaward) side of the bridge and part of one residential parcel and an undeveloped parcel on the mauka (landward) side of the bridge. All four parcels were observed during the site visit.

Elevations in the survey area range from sea level to roughly 28 feet (8.5 m) above sea level. The Natural Resources Conservation Service (NRCS) identifies the following three soil types in the survey area: Mokuleia fine sandy loam; Mokuleia clay loam, poorly drained variant; and rock outcrop (Foote et al. 1972; NRCS 2013). The Mokuleia clay loam, poorly drained variant (Mta) soil type is listed as a hydric soil (NRCS 2012).

The National Wetlands Inventory (NWI) program identifies three wetlands or aquatic resource types in the survey area. These consist of Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded (R2UBH); Palustrine, Emergent, Persistent, Semipermanently Flooded (PEMF); and Palustrine, Forested, Seasonally Flooded (PFOC). The State of Hawai'i and the U.S. Geological Survey identify Waioli Stream traversing the survey area.

# 2.2. Waipā

The Waipā Bridge survey area is approximately 0.5 mile (0.8 kilometer [km]) west of Hanalei and covers approximately 1.45 acres (0.59 ha). The existing bridge is approximately 80 feet (24.4 m) long and 25 feet (7.6 m) wide. The survey area consists of wooded, undeveloped parcels on both the makai (seaward) and mauka (landward) side of the bridge. There is also a recreational area for Kamehameha Schools on the makai side. All four parcels were surveyed during the site visit, although small portions of the residential areas on the east side of the stream were not accessed.

Elevations in the survey area range from sea level to roughly 11 feet (3.4 m) above sea level. The NRCS identifies two soil types in the survey area: Mokuleia fine sandy loam and beaches (Foote et al. 1972; NRCS 2013). Neither is listed as a hydric soil (NRCS 2012).

The NWI program identifies two wetland and aquatic resource types in the survey area. These consist of Palustrine, Forested, Seasonally Flooded (PFOC) and Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded (R3UBH). The State of Hawai'i and the U.S. Geological Survey identify Waipā Stream traversing the survey area.

# 2.3. Waikoko

The Waikoko Bridge survey area is approximately 0.8 mile (1.3 km) west of Hanalei and covers approximately 1.46 acres (0.59 ha). The existing bridge is approximately 25 feet (7.6 m) long and 15 feet (4.6 m) wide. The survey area consists of a beach on the makai (seaward) side of the bridge and densely vegetated areas on the mauka (landward) side of the bridge. All four parcels were observed during the site visit.

Elevations in the survey area range from sea level to roughly 15 feet (4.5 m) above sea level. The NRCS identifies one soil type in the survey area, Mokuleia fine sandy loam, which is not listed as a hydric soil (NRCS 2012).

The NWI program identifies two wetland and aquatic resource types in the survey area. These consist of Marine, Intertidal, Unconsolidated Shore, Irregularly Flooded (M2USP) and Riverine, Upper Perennial, Rock Bottom, Permanently Flooded (R3RBH). The State of Hawai'i and the U.S. Geological Survey identify Waikoko Stream traversing the survey area.

## 2.4. Wainiha Bridge 1

The Wainiha Bridge 1 survey area covers approximately 1.60 acres (0.65 ha). The bridge itself spans an ephemeral drainage or backwater of the estuary. The survey area consists of an estuary on the makai (seaward) side of the bridge and undeveloped vegetated and residential parcels on the mauka (landward) side of the bridge. The Wainiha General Store is just northwest of the survey area. The entire area was surveyed during the site visit.

Elevations in the survey area range from sea level to roughly 26 feet (7.9 m) above sea level. The NRCS identifies the following four soil types in the survey area: Hanamaulu silty clay, Mokuleia fine sandy loam, beaches, and rough broken land (Foote et al. 1972; NRCS 2013). None of the soil types are listed as a hydric soil (NRCS 2012).

The NWI program does not identify any wetlands or aquatic habitats in the Bridge 1 study area. Adjacent to the study area is an estuarine resource (Estuarine, Subtidal, Unconsolidated Bottom, Subtidal [E1UBL]).

## 2.5. Wainiha Bridges 2 & 3

The Wainiha Bridges 2 & 3 survey area is adjacent to Wainiha Bay and spans the Wainiha Stream. The survey area covers approximately 3.47 acres (1.40 ha). The existing bridges are approximately 300 feet (91.4 m) long and 15 feet (4.5 m) wide. The survey area encompasses parts of residential parcels and heavily vegetated parcel on the makai (seaward) side of the bridge and part of residential parcels and agricultural area on the mauka (landward) side of the bridge. The agricultural area and associated residence were not accessible during the site visit.

Elevations in the survey area range from sea level to roughly 18 feet (5.4 m) above sea level. The NRCS identifies the following two soil types in the survey area: Mokuleia clay loam, poorly drained variant and Hanalei silt clay, 3%–8% slopes (Foote et al. 1972; NRCS 2013). Both soil types are considered hydric (NRCS 2012).

The NWI program identifies four wetland and water types in the survey area. These consist of Palustrine, Emergent, Semipermanently Flooded, Excavated (PEMFx); Palustrine, Forested, Seasonally Flooded (PFOC); Riverine, Tidal, Unconsolidated Bottom, Permanent-Tidal (R1UBV); and Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded (R2UBH).

The State of Hawai'i and the U.S. Geological Survey identify two segments of Wainiha Stream traversing the survey area. The total length of this stream, according to the *Atlas of Hawaiian Watersheds & Their Aquatic Resources* (Parham et al. 2008) is 1.1 miles (1.8 km).

# 3. METHODS

SWCA reviewed available scientific and technical literature regarding natural resources in and near the survey area. This literature review encompassed a thorough search of refereed scientific journals, technical journals and reports, environmental assessments and environmental impact statements, relevant government documents, and unpublished data that provide insight into the natural history and ecology of the area. SWCA also reviewed available geospatial data, aerial photographs, and topographic maps of the survey area.

Four SWCA biologists conducted a field reconnaissance of the survey area between September 29, 2014, and October 2, 2014. Representative portions of the area were driven or walked to describe vegetation types, fauna, and wetlands or streams, as well as known or suspected threatened, endangered, proposed or candidate wildlife or plant species. Basic water quality samples were also collected from each bridge.

## 3.1. Flora

A pedestrian survey was conducted in the survey area to record common plant species and vegetation types, as well as rare or listed plant species. Areas more likely to support native plants (e.g., rocky outcrops and shady areas) were more intensively examined. A comprehensive list of all plant species present in the survey area was not within the scope of this survey.

Plants recorded during the survey are indicative of the season ("rainy" vs. "dry") and the environmental conditions at the time of the survey. As environmental conditions change, it is likely that species and plant abundances also undergo temporal or seasonal changes.

# 3.2. Terrestrial and Aquatic Fauna

Fauna surveys consisted of a pedestrian survey *before* 11 am or *after* 4 pm when wildlife was most likely active. Field observations of birds were conducted using  $8 \times 30$ -mm binoculars. Visual and auditory observations were included in the survey. All observed birds, mammals, reptiles, amphibians, fish, and invertebrate species were noted during the survey.

Field surveys for the endangered Hawaiian hoary bat or 'ōpe'ape'a (*Lasiurus cinereus semotus*) were not conducted; however, areas of suitable habitat for foraging and roosting were noted when present.

# 3.3. Wetlands and Streams

Instream surveys (i.e., mask and snorkel) were not conducted by SWCA because heavy rains on September 29 resulted in high turbidity and low visibility. Aquatic species were visually observed from the surface. The description of aquatic species is supplemented with information from previous known stream surveys.

SWCA also conducted a survey for potential waters of the U.S. The methods and results of that survey are summarized in a separate report (SWCA in prep.).

## 3.4. Water Quality

Basic water quality samples were collected from each bridge survey area on October 2, 2014, between 08:10 and 10:30 am. Two sampling locations were established at each bridge survey area, one upstream of the bridge and one downstream of the bridge. Samples were analyzed for the following parameters: temperature, pH, turbidity, total suspended solids (TSS), salinity, and dissolved oxygen (DO) (Table 2). Water samples were collected at least 6 inches (152 mm) below the water surface, and two samples were collected in areas where water depth exceeded 6 inches.

Temperature, pH, conductivity, DO, and salinity were field measured in situ using a handheld YSI 556 Multiparameter System portable meter. Data were collected by submerging the meter's probe into the water until a stabilized value was measured. Turbidity was field measured on-site using a Hanna HI 93703 portable microprocessor turbidity meter. The meters were calibrated per manufacturer's specifications to ensure proper functioning.

For TSS, grab samples were collected by submerging a clean container into the water column and collecting a sample free of floating debris and sediment. The water was then poured into sample containers provided by the analytical laboratories. All samples were labeled with the sample identification number, date, time, and name of sampler, then placed in a cooler with ice and cooled to 4 degrees Celsius. A chain of custody form was completed for each set of samples. Samples were packaged and sent by Hawaiian Airlines Cargo to Food Quality Labs (FQ Labs) in Honolulu.

Parameter	Analytical Method	Laboratory
Temperature	YSI 556 Meter	Field measured
DO	YSI 556 Meter	Field measured
Salinity	YSI 556 Meter	Field measured
рН	YSI 556 Meter	Field measured
Turbidity	Hanna HI 93703	Field measured
TSS	SM 2540D	FQ Labs

 Table 2. Field Equipment and Analytical Methods

Samples for all parameters were collected on the same day for the purpose of describing the water quality for the NEPA document. Other information recorded at this time included tide height during sampling, weather conditions and recent weather events, and other activities that may have impacted water quality of the one-time water sample.

Field measurements and laboratory results were compared to the Water Quality Standards (WQS) listed in Hawai'i Administrative Rules, Title 11, Chapter 54 (HAR 11-54). WQS are based on a geometric mean for each parameter. A minimum of three samples must be collected to calculate the geometric mean; however, only one sample was collected at each sampling location on a single day. A single data set is not sufficient for determining compliance with WQS; however, comparison of data with WQS can provide some information about the waterbody. The water quality results were also compared to historic water quality results provided by the Hawai'i Department of Health (DOH), when available.

## 4. RESULTS

Several federally and state listed species were observed during the survey or are likely to occur in the survey area based on habitat or previous surveys. These species are the Hawaiian coot (*Fulica alai*), Hawaiian gallinule (*Gallinula galeata sandvicensis*), Hawaiian stilt (*Himantopus mexicanus knudseni*), and Hawaiian duck (*Anas wyvilliana*) (these four species are collectively referred to as waterbirds); nēnē or Hawaiian goose (*Branta* sandvicensis); Hawaiian petrel (*Pterodroma sandwichensis*), Newell's shearwater (*Puffinus auricularis newelli*), and band-rumped storm petrel (*Oceanodroma castro*) (these three species are collectively referred to as seabirds); Hawaiian hoary bat; Hawaiian monk seal (*Neomonachus schauinslandi*); and green sea turtle (*Chelonia mydas*) and hawksbill sea turtle (*Eretmochelys imbricata*) (these two species are collectively referred to as sea turtles). These species are discussed further in the sections below.

Portions of the survey area contain designated critical habitat for the endangered Hawaiian monk seal.

## 4.1. Flora

No state or federally listed threatened, endangered, proposed or candidate endangered plant species, or rare native Hawaiian plant species, were observed in the survey area during the survey. The survey area does not contain critical habitat for threatened or endangered plants. Six native Hawaiian plants—*Cyperus polystachyos*, hala (*Pandanus tectorius*), hau (*Hibiscus tiliaceus*), kou (*Cordia subcordata*), nanea (*Vigna marina*), and naupaka (*Scaevola taccada*)—were seen during the survey<sup>1</sup>. These species are indigenous, or are found in Hawai<sup>c</sup>i and elsewhere. None of these species are considered rare (Wagner et al. 1999).

The vegetation in the survey area is composed of five main vegetation types: 1) ruderal vegetation, 2) emergent wetland, 3) hau thicket, 4) mixed non-native forest, and 5) ornamental landscaping. Ruderal vegetation occurs in and along the highway right-of-way and in heavily disturbed areas. Emergent wetland is present adjacent to streams and is dominated by a dense mat of the non-native California grass (*Urochloa mutica*). Hau thicket also occurs adjacent to standing water; it is characterized by a dense stand of hau trees. The mixed non-native forest is composed of a mix of non-native trees and herbaceous understory. Ornamental landscaping is common adjacent to houses and buildings, where trees and shrubs are planted or lawns maintained. The vegetation in each bridge survey area is described in further detail below.

## 4.1.1. Waioli

Four vegetation types are present at the Waioli Bridge survey area: ruderal vegetation, ornamental landscaping, emergent wetland, and hau thicket. On the makai side of the bridge, the vegetation is dominated by ornamental landscaping, which is characterized by manicured lawns of wide-leaved carpetgrass (*Axonopus compressus*), interspersed with herbaceous plants (Figure 2). Ornamental plantings adjacent to residences on both sides of the bridge include Areca palm (*Dypsis lutescens*), mango (*Mangifera indica*), red ginger (*Alpinia purpurata*), ti (*Cordyline fruticosa*), and torch ginger (*Etlingera elatior*). Taro vine (*Epipremnum pinnatum*) is climbing on several trees, and umbrella sedge (*Cyperus involucratus*) is present along the stream's edge. On the mauka side, a dense mat of the non-native California grass is present on the western side of the stream. Ruderal vegetation occurs along the highway right-of-way and is primarily dominated by wedelia (*Sphagneticola trilobata*), Hilo grass (*Paspalum conjugatum*), java plum (*Syzygium cumini*), and giant reed (*Arundo donax*). The indigenous hau also forms small dense stands along the stream on both sides of the highway.

<sup>1</sup> The taxonomy and nomenclature of the flowering plants are in accordance with Wagner et al. (1999), Wagner and Herbst (2003), and Staples and Herbst (2005). Recent name changes are those recorded in Wagner et al. (2012). Common/Hawaiian names are provided first, followed by scientific names in parenthesis. If no common or Hawaiian name is known, only the scientific name is provided.

## 4.1.2. Waipā

At the Waipā Bridge survey area, the vegetation is dominated by a dense hau thicket on both sides of the bridge (Figure 3). Little to no other plants occur in this vegetation type. Along the stream's edge, in areas where hau is not present, umbrella sedge and California grass are common. The ruderal vegetation type at Waipā is dominated by Hilo grass, Guinea grass (*Urochloa maxima*), wedelia, elephant grass (*Cenchrus purpureus*), West Indian dropseed (*Sporobolus indicus*), and basketgrass (*Oplismenus hirtellus*). Maunaloa (*Canavalia cathartica*) is climbing throughout. Ironwood trees (*Casuarina equisetifolia*) and false kamani (*Terminalia catappa*) are also present, primarily on the makai side of the bridge. The native kou (*Cordia subcordata*) is planted just along the edge of the survey area near the recreation area.

## 4.1.3. Waikoko

The vegetation types in the Waikoko Bridge survey area are ruderal vegetation, mixed non-native forest, hau thicket, and ornamental landscaping. Hau thickets are present on the mauka side of the bridge, adjacent to standing water. The mixed non-native forest is dominated by ironwood trees (*Casuarina equisetifolia*) and large false kamani trees that create a dense canopy. Taro vine, maunaloa, and maile pilau (*Paederia foetida*) are climbing over trees, and patches of laua'e fern (*Phymatosorus grossus*) are present in the understory. The most common species in the ruderal vegetation along the highway are wedelia, wide-leaved carpetgrass, Guinea grass, Hilo grass, Dallis grass (*Paspalum dilatatum*), narrow-leaved plantain (*Plantago lanceolata*), and short-stature koa haole (*Leucaena leucocephala*) (Figure 4). Naupaka, ti, hala, and coconut trees (*Cocos nucifera*) are planted in the survey area. The native *Cyperus polystachyos* and nanea (*Vigna marina*) were also seen at this survey area.



Figure 2. Lawn (right side) and hau thicket (left side) at the Waioli Bridge survey area (looking mauka/ upstream).



Figure 3. Dense hau thicket at the Waipā Bridge survey area (looking mauka/ upstream).



**Figure 4.** Waikoko Bridge survey area ornamental landscaping and ruderal vegetation.

## 4.1.4. Wainiha Bridge 1

The vegetation types within the Wainiha Bridge 1 survey area are ruderal vegetation, mixed non-native forest, hau thicket, and ornamental landscaping. The hau thicket and mixed non-native forest are present on the mauka side of the bridge immediately adjacent to the stream. The mixed non-native forest is characterized by large, spreading false kamani trees, with only a few scattered seedlings and laua'e fern in the understory. The ruderal vegetation occurs in and along the highway right-of-way and in heavily disturbed areas (Figure 5). The water's edge is dominated by umbrella sedge and California grass. On the flatter, drier areas, this vegetation type is largely composed of elephant grass, wedelia, Guinea grass, Dallis grass, and short koa haole. *Neonotonia wightii*, maunaloa vine, and moon flower (*Ipomoea alba*) are climbing in trees and over shrubs. Ornamental trees and shrubs are planted adjacent to houses, including ti, hibiscus (*Hibiscus* spp.), Turk's cap (*Malvaviscus penduliflorus*), and beefsteak plant (*Acalypha wilkesiana*). Mowed lawns of wide-leaved carpetgrass and Bermuda grass (*Cynodon dactylon*) are interspersed with weedy grasses and low-growing herbaceous such as tick trefoil (*Desmodium triflorum*) and creeping indigo (*Indigofera spicata*).

## 4.1.5. Wainiha Bridge 2 & 3

The most dominant vegetation types in the Wainiha Bridges 2 & 3 survey area are emergent wetland and hau thicket. The emergent wetland is a dense mat of non-native California grass. It occurs in the portions of the survey area immediately adjacent to Wainiha Stream (Figure 6). Few other species occur in this mat, although Guinea grass, umbrella sedge, and Job's tears (*Coix lachryma-jobi*) are widely scattered. Hau thickets also cover large portions of the survey area. The most common grasses and herbaceous species found in the ruderal vegetation type in the Wainiha Bridges 2 & 3 survey area are basketgrass, wedelia, Guinea grass, California grass, Hilo grass, honohono (*Commelina diffusa*), and Spanish needle (*Bidens alba*) (Figure 7). Seedlings of koa haole, java plum, African tulip (*Spathodea campanulata*), and octopus tree (*Schefflera actinophylla*) are sparsely scattered within the right-of-way. Large false kamani trees are also in the survey area, often covered in climbing taro vines. Several other vines are present, including taro vine, maunaloa, *Neonotonia wightii*, and white thunbergia (*Thunbergia fragrans*). Pai'i'ihā (*Cyclosorus dentatus*) and young Chinese fan palm (*Livistona chinensis*) are common in the understory. Ornamental species planted in the survey area include white ginger (*Hedychium coronarium*), coconut trees, hala, hibiscus, snowbush (*Breynia disticha*), kukui (*Aleurites moluccana*), and *Acalypha* spp.



Figure 5. Wainiha Bridge 1 survey area (makai/ downstream side).



**Figure 6.** Vegetation near the Wainiha Bridges 2 & 3 survey area (makai/downstream side).



Figure 7. Wainiha Bridges 2 & 3 survey area (mauka/upstream side).

## 4.2. Terrestrial Fauna

### 4.2.1. Avifauna

In all, 16 bird species were documented (Table 3). Of these, four are federally and state listed: Hawaiian gallinule, Hawaiian coot, Hawaiian duck, and Hawaiian goose or nēnē. Endangered Hawaiian stilt are also likely to occur. Other birds observed during the survey are typical of coastal areas on Kaua'i.

Hawaiian gallinule were seen during the survey, and one resident (Mitch Haynie) reported seeing Hawaiian gallinule nests throughout the year near at Waioli Bridge. Hawaiian gallinule were also observed foraging near Wainiha Bridges 2 & 3. Nesting Hawaiian coot were observed at Wainiha Bridge 1. Residents near Wainiha Bridge 1 have seen all four listed waterbirds species (Hawaiian gallinule, Hawaiian coot, Hawaiian duck, and Hawaiian stilt) near the bridge. Hawaiian ducks flew over Wainiha Bridge 2 & 3 during the surveys. No listed waterbirds were observed at the Waipā or Waikoko Bridges.

Hawaiian gallinule, Hawaiian coot, and Hawaiian ducks could be present at any of the bridges at any time and could be breeding in or near the survey area. Breeding for these species is not restricted to a particular season (Table 4). Hawaiian stilt could also be present in any areas with shallow water. Most of the streambank slopes near the bridges are steep, though shallow water areas (preferred habitat for stilt) are present in sections. Thus, Hawaiian stilt may also occasionally be present.

Nēnē were only seen at one bridge survey area; a small flock of nēnē flew overhead at Waioli Bridge. Nēnē could also occasionally browse in the vegetation along the banks and in the ruderal vegetation.

Common Name	Scientific Name	Status*	МВТА
Black-crowned night heron	Nycticorax nycticorax	E	Х
Cattle egret	Bubulcus ibis	NN	Х
Common myna	Acridotheres tristis	NN	
Domestic chicken	Gallus gallus	NN	
Hawaiian coot	Fulica alai	E, End	Х
Hawaiian duck	Anas wyvilliana	E, End	Х
Hawaiian gallinule	Gallinula galeata sandvicensis	E, End	Х
House finch	Haemorhous mexicanus	NN	Х
Hwamei	Garrulax canorus	NN	
Japanese white-eye	Zosterops japonicus	NN	
Nēnē	Branta sandvicensis	E, End	Х
Northern cardinal	Cardinalis cardinalis	NN	Х
Nutmeg mannikin*	Lonchura punctulata	NN	
Pacific golden-plover	Pluvialis fulva	М	Х
Spotted dove	Streptopelia chinensis	NN	
Zebra dove	Geopelia striata	NN	
	Total species	16	9

Notes:

Status: E = Endemic, NN = non-native established species, M = migrant; End = Endangered.

MBTA = protected by the Migratory Bird Treaty Act

Seabirds, particularly the endangered Hawaiian petrel, threatened Newell's shearwater, and proposed endangered band-rumped storm-petrel, may fly over the survey area at night while travelling to and from their upland nesting sites to the ocean. These species nest inland in the mountainous interior of Kaua'i (Ainley et al. 1997; Mitchell et al. 2005). No suitable nesting sites for these species are present in the survey area.

Other migratory bird species that could occur in the survey area include the sanderling (*Calidris alba*), ruddy turnstone (*Arenaria interpres*), and wandering tattler (*Tringa incana*).

Common Name	Species	Breeding Season	Incubation	Fledgling	Incubation + Fledgling	Reference
Hawaiian duck	Anas wyvilliana	Year round, mostly from March to June	26–30 days	After 65 days	After 90 days	Engilis et al. (2002)
Hawaiian gallinule	Gallinula chloropus sandvicensis	Year-round, mostly from March to August	19–22 days	Several weeks	_	Mitchell et al. (2005), Bannor and Kiviat (2002)
Hawaiian coot	Fulica alai	Year-round, peaks in March and September	25 days	75 days (American coot)	100 days	Prat and Brisbin (2002), Brisbin et al. (2002), Mitchell et al. (2005)
Hawaiian stilt	Himantopus mexicanus knudseni	Mid-February through August	23–26 days	At least 27 days	50+ days	Robinson et al. (1999), USFWS (2011)

**Table 4.** Life History Information for the Four Listed Waterbirds Observed or Likely to be Present in the

 Survey Area

## 4.2.2. Hawaiian Hoary Bat

The endangered Hawaiian hoary bat is the only native terrestrial mammal species that is still extant within the Hawaiian Islands (USFWS 1998). Surveys for Hawaiian hoary bats were not conducted, but any areas of suitable habitat for roosting and foraging were noted during the survey.

Hawaiian hoary bats are insectivores and are regularly observed foraging over streams, reservoirs, and wetlands (U.S. Department of Agriculture 2009). Bats may be attracted to insects in riparian vegetation or emerging from water; therefore, portions of the survey area would be considered suitable bat foraging habitat.

Hawaiian hoary bats typically roost in dense canopy foliage or in the subcanopy when canopy is sparse, with open access for launching into flight (U.S. Department of Agriculture 2009). Hawaiian hoary bats have been observed roosting in coconut, mango, and ironwood trees and could roost in these tree species in the survey area. Trees commonly found along the banks of the survey area, such as hau and milo, also possess characteristics of roosting trees, and although not yet documented as a Hawaiian hoary bat roost trees, could be used as a day or night roost when bats are present.

## 4.2.3. Other Terrestrial Mammals

A dog (*Canis familiaris*) was observed during the survey, and cat (*Felis catus*) are also likely to enter the area due to the nearby residences. Other mammals that can be expected in the survey area include mouse (*Mus musculus*), and rat (*Rattus* spp.).

## 4.2.4. Insects and Other Invertebrates

Two species of terrestrial invertebrates were noted during the survey: the non-native giant African snail (*Achatina fulica*) and the native indigenous globe skimmer (*Pantala flavescens*).

## 4.3. Aquatic Fauna

## 4.3.1. Freshwater and Estuarine Communities

Although SWCA did not conduct instream surveys due to heavy rains, earlier surveys conducted within the streams are summarized by the Hawai'i Division of Aquatic Resources (DAR) (Parham et al. 2008). Table 5 lists the stream species recorded in the Wainiha, Waioli, and Waipā watersheds by the Hawai'i DAR Watershed Atlas (Parham et al. 2008). All five native species of 'o'opu, the two native 'ōpae, and three native species of snails have been recorded in Wainiha Stream (see Table 5). Waioli Stream contains at least two 'o'opu species and the two native 'ōpae. Waipā Stream contains at least one 'o'opu species and the two native 'ōpae. Waipā Stream contains at least one 'o'opu species and the two native 'ōpae. Of the native species DAR lists as occurring in the three streams, the following are likely to occur in the survey area because they are estuarine: āholehole (*Kuhlia* spp.), 'o'opu akupa (*Eleotris sandwicensis*), 'Ōpae 'oeha'a (*Macrobrachium grandimanus*), 'o'opu naniha (*Stenogobius hawaiiensis*), pipiwai (*Theodoxus cariosus*), and hapawai (*Theodoxus vespertinus*). Amphidromous species, which are noted in Table 5, may also migrate through the survey area.

No sampling results are provided for Waikoko Stream by Parham et al. 2008; however, during SWCA's surveys, āholehole (*Kuhlia* spp.) and tilapia (*Oreochromis* sp./ *Sarotherodon* sp.) were observed from the water's edge at the Waikoko estuary.

Common Name Scientific Name		Status	Wainiha	Waioli	Waipā
Amphibians					
American bullfrog	Rana catesbeiana	NN	Х		
Cane toad	Bufo marinus	NN	Х		
Japanese wrinkled frog	Glandirana rugosa	NN	Х		
Crustaceans					
Amphipod	Amphipod sp.	E/I	х		х
'Ōpae kala'ole*	Atyoida bisulcata	Е	Х	Х	Х
'Ōpae 'oeha'a*	Macrobrachium grandimanus	I	Х	Х	Х
Ostracod	Ostracod sp.				Х
Tahitian prawn	Macrobrachium lar	NN	Х	Х	
Fish					
Āholehole, Hawaiian flagtail	Āholehole, Hawaiian flagtail Kuhlia spp.		Х	Х	Х
'Ama'ama, uouoa, mullet	Mugil cephalus/Neomyxus leuciscus	I	Х		
Goby	Gobiid sp.		Х	Х	Х
Guppy	Poecilia reticulata	NN	Х		
ʻOʻopu akupa*	Eleotris sandwicensis	E	Х		
'O'opu alamo'o*	Lentipes concolor	E	Х		
'O'opu naniha*	Stenogobius hawaiiensis	E	Х		
'O'opu nākea*	Awaous stamineus	E	Х	Х	Х
'O'opu nōpili*	li* Sicyopterus stimpsoni		Х	Х	

**Table 5.** Aquatic Stream Species Reported in Wainiha, Waioli, and Waipā Watersheds

Common Name	Scientific Name	Status	Wainiha	Waioli	Waipā
Rainbow trout	Oncorhynchus mykiss	NN	Х		
Swordtail	Xiphophorus helleri	NN	Х	Х	
Tilapia	Oreochromis sp./ Sarotherodon sp.	NN			
Insects					
Adytum Megalagrion damselfly	Megalagrion adytum	E	X		
Anopheles mosquito	Anopheles nigerrimus	NN	Х		
Beachfly	Procanace sp.		Х		
Beetle	Coleoptera sp.		Х		
Blackfly	Simuliid sp.	NN	Х		
Brinefly	Ephydrid sp.		Х		
Caddisfly	Trichoptera sp.	NN	Х		
Caddisfly	Oxythira maya	NN	Х		
Crane fly	Tipulid sp.		Х		Х
Dragonfly	Anax sp.	I	Х		
Fly	Diptera sp.		Х		
Hawaiian aquatic midge	Calospectra hawaiiensis	E	Х		
Hawaiian damselfly, pinao	Megalagrion sp.	E	Х	Х	Х
Hawaiian damselfly	Megalagrion eudytum	E	Х		
Hawaiian damselfly	Megalagrion heterogamias	E	Х		
Hawaiian damselfly	Megalagrion oresitrophum	E	Х		
Hawaiian damselfly	Megalagrion vagabundum	E	Х		
Little sister sedge caddisfly	Cheumatopsyche analis	NN	Х		
Mayfly	Ephemeroptera sp.	NN	Х		
Microcaddisfly	Hydroptilidae sp.		Х		
Midge	Crictopus bicinctus	NN	Х		
Midge	Orthocladius grimshawi	E	Х		
Night mosquito	Aedes nocturnus	NN	Х		
Shorefly	Scatella sp.		Х		
Springtail	Collembola sp.		Х		
Torrential midge	Telmatogeton hirtus	E	Х		
Mollusks					
Hīhīwai*	Neritina granosa	E	X		
Hapawai*	Theodoxus vespertinus	E	X	<u> </u>	
Lymnaeidae	Lymnaeid sp.	NN	X		
Melanid snail	Melanoides tuberculata	NN		Х	
Pipiwai*	Theodoxus cariosus	E	Х		

#### **Table 5.** Aquatic Stream Species Reported in Wainiha, Waioli, and Waipā Watersheds

Common Name	Scientific Name	Status	Wainiha	Waioli	Waipā
Worms					
Asian tapeworm	Bothriocephalus acheilognathi	NN	Х		
Hirudinean	Hirudinea sp.		Х		Х
Namalycastis	Namalycastis sp.				Х
Oligochaete	Oligochaeta sp.		Х		

**Table 5.** Aquatic Stream Species Reported in Wainiha, Waioli, and Waipā Watersheds

Source: Parham et al. (2008)

\* amphidromous species (i.e., travel to and from the sea as part of their life cycle).

Notes: E = Endemic, I = Indigenous, NN = non-native.

## 4.3.2. Marine Communities

The Wainiha and Hanalei Bays and shorelines in or adjacent to the survey area contain habitats that may support algae, coral, invertebrates, fish, sea turtles, and monk seals.

#### 4.3.2.1. WAINIHA BAY

The Wainiha Bridge 1 and Wainiha Bridges 2 & 3 survey areas are approximately 300 m (1,000 feet) and 122 m (400 feet) upstream from the mouth of the Wainiha Stream, respectively. Most of Wainiha Bay is mapped as unknown habitat by NOAA. The shoreline intertidal area of Wainiha Bay just outside the mouth of the stream is classified as sand/unconsolidated sediment, and the shoreline intertidal along the southern portion is classified as hardbottom, uncolonized volcanic rock/boulders (Coyne et al. 2003). NOAA Nautical Charts report a coral reef on the northwestern portion of Wainiha Bay, roughly 171 m (560 feet) from the stream mouth (NOAA Nautical Charts 2002).

According to University of Hawai'i at Mānoa researchers, sharks and strong currents just outside the mouth of the Wainiha Stream have prevented many marine studies in that area (personal communication, Alan Friedlander, University of Hawai'i at Mānoa, April 2015). However, biologists from NOAA's Coral Reef Ecosystem Division did conduct a survey in Wainiha Bay in May 2013 in response to a potential coral disease, specifically focusing on *Montipora patula*. Although this survey was conducted more than 300 m (1,000 feet) from the shoreline, it did document a relatively high percentage of coral in the bay compared to other sites on Kaua'i (personal communication, Bernardo Vargas-Angel, NOAA, May 3, 2015).

Hawaiian monk seal sightings have been reported at Wainiha Bay (personal communication, Tracy Mercer, NOAA, August 19, 2015). Between 2005 and 2014, there were six reported sightings of monk seals at Wainiha Beach. No monk seal pups are known to have been born at Wainiha Beach (Mercer 2015).

In the main Hawaiian Islands, the Hawaiian monk seal critical habitat includes six specific areas; these include marine habitat from the 200-m depth contour line (including the seafloor and all subsurface waters and marine habitat within 10 m of the seafloor) through the water's edge, and the terrestrial environment to 5 m (15 feet) inland from the shoreline between identified boundary points on the Islands of Ka'ula, Ni'ihau, Kaua'i, O'ahu, Kaho'olawe, Lana'i, Maui, Moloka'i, and Hawai'i (NOAA 2015).

Two terrestrial and one marine essential feature have been identified for the Hawaiian monk seal critical habitat:

- Terrestrial areas and the adjacent shallow sheltered aquatic areas with characteristics preferred by Hawaiian monk seals for pupping and nursing.
- Marine areas from 0 to 200 m (0 to 656 feet) in depth that support adequate prey quality and quantity for juvenile and adult Hawaiian monk seal foraging.
- Significant areas used by Hawaiian monk seals for hauling out, resting, or molting.

The Wainiha Bridge 1 and Wainiha Bridges 2 & 3 survey areas are outside the Hawaiian monk seal critical habitat; however, the marine areas of Wainiha Bay (downstream of the survey area) are considered critical habitat.

The threatened green sea turtle and hawksbill sea turtle were not incidentally observed during the biological survey and have not been recorded by NOAA-Pacific Islands Fisheries Science Center as basking or nesting in Wainiha Bay (Parker et al. 2005); however, these animals may be found foraging in marine waters of Wainiha Bay, or potentially hauling out or basking on the beach.

## 4.3.2.2. HANALEI BAY

The benthic composition of Hanalei Bay, which Waipā, Waioli, and Waikoko Streams feed into, is classified as unknown by NOAA near the survey area (Coyne et al. 2003). The nearest coral reef, according to NOAA Nautical Charts, is approximately 780 feet (238 m) northwest of the Waikoko Bridge survey area (NOAA Nautical Charts 2002).

Hawaiian monk seal sightings have been reported at Waipā, and Waikoko. No sightings have been reported for Waioli (personal communication, Tracy Mercer, NOAA, August 19, 2015). According to the *Watershed Management Plan for Hanalei Bay Watershed*, Hawaiian monk seals have rarely been reported in Hanalei Bay (Sustainable Resources Group Intn'l, Inc. 2012). Portions of the Waikoko Bridge survey area fall within recently designated marine critical habitat for the Hawaiian monk seal. Terrestrial critical habitat is not designated along the Hanalei Bay shoreline.

The threatened green sea turtle and hawksbill sea turtle were not observed during the biological survey; however, these animals may be found foraging in marine waters of Hanalei Bay, or hauling out or basking on the beaches in the survey area. The green sea turtle has been recorded basking on the eastern side of Hanalei Bay, which is not in the immediate vicinity of the survey area (Sustainable Resources Group Intn'l, Inc. 2012). Both green sea turtles and hawksbill sea turtles have not been recorded nesting in Hanalei Bay, according to NOAA-Pacific Islands Fisheries Science Center (Parker et al. 2005).

# 4.4. Water Quality

HAR 11-54 classifies all ocean waters in the survey area (Hanalei Bay and Wainiha Bay) as Class AA Marine Waters and all streams in the survey area (Wainiha, Waikoko, Waipā, and Waioli) as Class 2 Inland Waters. Class AA Marine Waters are pristine waters that remain in their natural state with minimal pollution. Class 2 Inland Waters are protected for their use for recreational purposes, the support and propagation of aquatic life, agricultural and industrial water supplies, shipping, and navigation.

The Section 303(d) List is a list of waters that are determined to be impaired or threatened by the Hawai'i DOH Clean Water Branch. This list includes the estuaries for Waikoko, Waioli, and Waipā Streams for nonattainment of various parameters, as follows:

- Turbidity, *Enterococci*, total nitrogen, nitrate-nitrite, ammonia, and total phosphorus at Waikoko.
- Turbidity, *Enterococci*, nitrate-nitrite, and ammonia at Waioli.
- Turbidity, *Enterococci*, ammonia, and total phosphorus at Waipā.

Although Wainiha Stream remains on the list, recent monitoring results indicate attainment for all parameters. Potential sources of contamination at all streams include eroding landscapes, streambank collapse, landslides, and agricultural runoff.

Comparisons with the HAR 11-54 WQS are provided; however, as described in section 3.4, the single data set collected by SWCA can only provide background information about the waterbody and is not sufficient for determining compliance with the WQS. Different WQS are provided for streams (salinity below 0.5 part per thousand [ppt]) and estuaries (salinity above 0.5 ppt) (Table 6). Most collected samples had low salinity (less than 0.5 ppt); however, samples from Waikoko and Waipā range from 4.96 to 35.72 ppt. All samples collected for this project were collected on October 2; therefore, dry season values (rather than wet season values) are used for comparison purposes.

Parameter	Stream WQS	Estuary WQS
Temperature (C)	Shall not vary more than 1 degree Celsius from ambient condition	Shall not vary more than 1 degree Celsius from ambient condition
DO (%)	Not less than 80% saturation	Not less than 75% saturation
Salinity (ppt)	Less than 0.5 ppt	Shall not vary more than 10% from ambient conditions
рН	5.5–8.0	7.0–8.6
Turbidity (nephelometric turbidity unit [NTU])	2.0	1.5
TSS (milligrams/liter [mg/l])	10	n/a

Table 6. HAR 11-54 Water Quality Standards

The results of the water samples are provided in Tables 7 and 8. Ambient conditions have not been determined for temperature, but all waterbodies are relatively consistent and within expected ranges. pH values are within the range of 5.5–8.0 for streams and 7.0–8.6 for estuaries. The percentage saturation of DO was exceeded at two sampling locations at Wainiha Bridge 1 and at one sampling location at Waipā Bridge. Based off the data set collected, turbidity exceedances were noted at Wainiha Bridges 1 and 3, Waikoko, and Waipā. TSS values were below the WQS at all locations except upstream at Wainiha Bridge 3. There are no WQS for TSS for estuaries; therefore, exceedances were not noted for water samples collected at Waikoko and Waipā. However, TSS levels were elevated at Waikoko and exceeded the WQS noted for streams.

Bridge Name	Sample Location	Sample Depth (inches)	Time	Temperature (°C)	Salinity (ppt)	DO (%)	рН	Conductivity (mS/cm)	Tide Estimate (feet)
Wainiha Bridge 1	Downstream	6	9:10	22.68	0.32	38.1	6.05	0.661	1.8
	Downstream	24	9:11	22.65	0.31	26.7	6.30	0.637	1.8
	Upstream	6	9:15	22.54	0.28	24.1	6.35	0.574	1.9
Wainiha Bridge 2	Downstream	8	8:20	20.93	0.04	104.3	7.21	0.080	1.7
	Downstream	48	8:21	20.92	0.04	96.4	6.88	0.080	1.7
	Upstream	8	8:24	20.95	0.04	93.3	7.21	0.081	1.7
	Upstream	30	8:25	20.92	0.04	93.0	6.92	0.081	1.7
Wainiha Bridge 3	Downstream	12	8:10	20.92	0.04	95.1	5.85	0.081	1.6
	Downstream	60	8:11	20.87	0.04	91.9	6.17	0.800	1.7
	Upstream	12	8:15	20.93	0.04	91.1	6.91	0.810	1.7
	Upstream	48	8:16	20.88	0.04	92.0	6.39	0.920	1.7
Waikoko*	Downstream	6	9:39	28.12	35.72	98.2	8.16	54.200	2.0
	Upstream	6	9:45	27.68	32.4	102.2	8.04	48.190	2.0
Waipā*	Downstream	6	10:00	23.33	4.96	59.4	7.43	9.580	2.0
	Downstream	48	10:01	25.19	15.35	76.2	7.71	25.210	2.0
	Upstream	6	10:08	23.71	6.74	87.1	7.72	11.790	2.0
	Upstream	48	10:09	25.35	17.45	82.0	7.84	28.370	2.0
Waioli	Downstream	6	10:30	22.07	0.06	70.1	7.13	0.125	2.0
	Upstream	6	10:27	22.00	0.06	78.5	7.62	0.124	2.0
	Upstream	30	10:28	21.93	0.06	75.4	7.25	0.123	2.0

**Table 7.** Basic Water Quality Results for Parameters Field Measured In Situ using a Handheld YSI

 556 Multiparameter System Portable Meter

\*Salinity was above 0.5 ppt, Estuary WQS were used for comparison.

Bridge Name	Sample Location	Time	Turbidity (NTU)	TSS (mg/l)	Tide Estimate (feet)
Wainiha Bridge 1	Downstream	9:30	3.07	8.0	1.8
	Upstream	9:10	13.16	1.0	1.9
Wainiha Bridge 2	Downstream	8:50	0.86	2.0	1.7
	Upstream	8:45	0.36	2.0	1.7
Wainiha Bridge 3	Downstream	8:20	2.15	9.0	1.7
	Upstream	8:00	2.18	16.0	1.7
Waikoko*	Downstream	9:46	2.43	30.0 <sup>†</sup>	2.0
	Upstream	9:45	3.94	12.0 <sup>†</sup>	2.0
Waipā*	Downstream	10:15	1.8	4.0†	2.0
	Upstream	10:10	2.91	3.0 <sup>†</sup>	2.0
Waioli	Downstream	10:35	0.99	3.0	2.0
	Upstream	10:45	0.45	3.0	2.0

#### Table 8. Turbidity and TSS Results

\* Because salinity was above 0.5 ppt, estuary WQS were used for comparison.

<sup>†</sup> TSS not listed under estuary WQS.

Additionally, water quality data from the Hawai'i DOH Clean Water Branch were available for the Waikoko and Waipā estuaries. Data were collected from 2008 to 2014 for Waikoko and from 2012 to 2014 for Waipā. The geometric mean for all data is summarized in Table 9. These data also indicate elevated turbidity levels.

Parameter	Waikoko Estuary	Waipā Estuary
Temperature (C)	21.8	22.13
DO (%)	68.0	61.16
Salinity (ppt)	0.884	0.872
рН	7.48	7.49
Turbidity (NTU)	4.12	3.39

 Table 9. Hawai'i DOH Clean Water Branch Data for Waikoko and Waipā Estuaries

Source: Hawai'i DOH (2015).

# 5. DISCUSSION AND RECOMMENDATIONS

## 5.1. Flora

The vegetation types and species identified during the survey are not unique. Most of the plant species seen are not native to Hawai'i, and the six indigenous species observed are common throughout the Hawaiian Islands. No threatened or endangered plants were found, and no designated plant critical habitat

occurs nearby. Therefore, the proposed bridge project is not expected to have a significant, adverse impact on botanical resources.

If landscaping occurs as part of the project, SWCA recommends that native Hawaiian plants be employed for landscaping to the maximum extent possible. Potential native species that may be appropriate for landscaping at the survey area include naupaka, koa, and pōhinahina (*Vitex rotundifolia*).

Additional information on selecting appropriate (non-invasive) plants for landscaping can be obtained from the following online sources:

- <u>http://www.nativeplants.Hawaii.edu/</u>
- <u>http://www.plantpono.org/non-invasive-plants.php</u>
- <u>http://www.hear.org/alternativestoinvasives/pdfs/mcaac\_hpwra\_a2i\_list.pdf</u>
- http://www.hear.org/oisc/oahuearlydetectionproject/pdfs/oedposterwhatnottoplant.pdf

To avoid the unintentional introduction or transport of new terrestrial invasive species, all construction equipment and vehicles arriving from outside Kaua'i should be washed and inspected before entering the project area. In addition, construction materials arriving from outside Kaua'i should also be washed and/or visually inspected (as appropriate) for excessive debris, plant materials, and invasive or harmful non-native species (plants, amphibians, reptiles, and insects). When possible, raw materials (gravel, rock, and soil) should be purchased from a local supplier on Kaua'i to avoid introducing non-native species not present on the island. Inspection and cleaning activities should be conducted at a designated location.

## 5.2. Terrestrial Fauna

#### Waterbirds

The four endangered waterbirds could be present in the survey area at any time. Based on known distribution and habitat requirements, any of these species could also breed in or near the survey area. Breeding for Hawaiian ducks, Hawaiian coots, and Hawaiian gallinules is not restricted to a particular season. The breeding season for the Hawaiian stilt is between February and August (Robinson et al. 1999).

Habitat types used by the Hawaiian duck include natural and human-made lowland wetlands, flooded grasslands, river valleys, mountain streams, montane pools, forest swamplands, aquaculture ponds, and agricultural areas. On Kaua'i, many ducks nest along montane streams, but use lowland areas for feeding and loafing (Engilis et al. 2002; Hawaii Audubon Society 2005; USFWS 2011).

Hawaiian coots prefer freshwater ponds or wetlands, brackish wetlands, and human-made impoundments. They forage in water less than 12 inches (30 centimeters) deep, and nest in open water with emergent aquatic vegetation or heavy stands of grass (Brisbin et al. 2002; Schwartz and Schwartz 1949; USFWS 2011).

Hawaiian gallinules favor freshwater areas with dense stands of emergent vegetation near open water, slightly emergent vegetation mats, and water depths of less than 3.3 feet (1 m). They nest on open ground, wet meadows, and on banks of waterways and in emergent vegetation over water. Their nesting areas typically have standing water less than 24 inches (60 cm) deep (Bannor and Kiviat 2002; USFWS 2011).

Endangered Hawaiian stilt could also be present in any areas with shallow water. Hawaiian stilts mostly use open wetland habitats with minimal vegetative cover and water depths of less than 9.4 inches (24 cm),

as well as tidal mudflats (Robinson et al. 1999). Although this habitat is not common in the survey area, Hawaiian stilts may occasionally be present.

The following best management practices (BMPs) are recommended during construction to avoid impacts to listed waterbirds:

- In areas where vegetated streambanks would be disturbed, waterbird nest searches should be conducted by a qualified biologist before any work is conducted and after any subsequent delay in work of 3 or more days (during which birds may attempt nesting). The results of the pre-construction survey should be submitted to the USFWS.
- A biological monitor should be present during all construction activities to ensure birds and nests are not adversely impacted.
- If a nest with eggs or chicks/ducklings is discovered, work should cease within 100 feet (30 m) of the nest until the chicks/ducklings have fledged.
- Nests or broods found in the survey area before or during construction should be reported to the USFWS within 48 hours.
- If an endangered Hawaiian waterbird is present or flies into the area during ongoing activities, then all activities within 100 feet (30 m) of the bird should cease, and the bird should also not be approached. Work may continue after the bird leaves the area of its own accord.

#### Nēnē

Nēnē may also be present on occasion and could fly over the survey area. The nēnē is adapted to a terrestrial and largely non-migratory lifestyle in the Hawaiian Islands, with negligible dependence on freshwater habitat. Nēnē use various habitat types ranging from beach strand, shrubland, and grassland to lava rock (Banko 1988; Banko et al. 1999). Hydroseeding can attract nēnē to feed.

The following BMPs are recommended during construction to avoid impacts to nēnē:

- A qualified biologist should survey the area for nesting nēnē before construction (in coordination with the waterbird surveys), and after any subsequent delay in work of 3 or more days (during which birds may attempt nesting). The results of the pre-construction survey should be submitted to the USFWS.
- All regular on-site staff should be trained to identify nēnē, and they should know what appropriate steps to take if nēnē are present on-site. Training would not be necessary if a biological monitor is present for the duration of the construction.
- If a nēnē is found in the area during ongoing activities, then all activities within 100 feet (30 m) of the bird should cease, and the bird should also not be approached. If a nest is discovered, contact USFWS. If a nest is not discovered, work may continue after the bird leaves the area of its own accord.

#### <u>Seabirds</u>

Major threats to the endangered Hawaiian petrel, threatened Newell's shearwater, and proposed endangered band-rumped storm-petrel include the attraction of adults and newly fledged juveniles to bright lights while transiting between their nest sites and the ocean. Juvenile birds are particularly vulnerable to light attraction and are sometimes grounded when they become disoriented by lights (Mitchell et al. 2005). Many of these grounded birds are vulnerable to mammalian predators or being struck by vehicles. The following recommendations are provided to avoid and minimize light attraction of these seabirds to the survey area:

• Construction activity should be restricted to daylight hours as much as practicable during the seabird peak fallout period (September 15–December 15) to avoid the use of nighttime lighting that could attract seabirds.

- All outdoor lights should be shielded to prevent upward radiation. This has been shown to reduce the potential for seabird attraction (Reed et al. 1985; Telfer et al. 1987). A selection of acceptable seabird-friendly lights can be found online at the Kauai Seabird Habitat Conservation website (2013).
- Outside lights that are not needed for security and safety should be turned off from dusk through dawn during the fledgling fallout period (September 15–December 15).

#### Hawaiian Hoary Bats

Hawaiian hoary bats may forage or roost in the survey area. Direct impacts to bats would only occur if a juvenile bat that is too small to fly but too large to be carried by a parent was present in a tree that was cut down. Although the chances of adversely affecting Hawaiian hoary bats as a result of the proposed project are likely small, the following measures are recommended as conservative impact avoidance measures:

- Any fences that are erected as part of the project should have barbless top-strand wire to prevent entanglements of the Hawaiian hoary bat on barbed wire. No fences in the survey area were observed with barbed wire during the survey; however, if fences are present, the top strand of barbed wire should be removed or replaced with barbless wire.
- No trees taller than 15 feet (4.6 m) should be trimmed or removed as a result of this project between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

Implementation of these guidelines, which have been promulgated by the USFWS (1998), is expected to avoid all direct impacts to Hawaiian hoary bats.

## 5.3. Aquatic Fauna

### 5.3.1. Freshwater and Estuarine Communities

None of the species recorded in the lower or estuarine portions of the surveyed streams are state or federally listed threatened, endangered, proposed or candidate species. However, native fishes and aquatic invertebrates have been recorded in the stream, and the potential exists for project activities to impact these animals near and downstream of the construction activities. In-water construction, dewatering or diversion, siltation, and habitat alteration could all cause adverse impacts. The type and extent of these impacts depend on the final project design and plan.

Because the native amphidromous species travel to and from the sea as part of their life cycle, habitat alteration near the survey area should be minimized as much as possible; precautions should be taken not to impede upstream and downstream movement of these species. Appropriate recommendations to avoid and minimize impacts to aquatic resources will ultimately depend on final project designs and plans.

## 5.3.2. Marine Communities

Wainiha and Hanalei Bay and shorelines have the potential to support various marine communities, including algae, corals, invertebrates, fishes, sea turtles, and monk seals. The main threats to these species as a result of the project include increased loads of siltation, debris, contaminants, pollutants, and human interaction.

Wainiha Stream enters the bay across a sandy beach. The position of the stream mouth changes with changing sea and streamflow conditions. The intertidal and shallow sub-tidal portions of the Wainiha Bay

shoreline are sand. This unconsolidated material is a mixture of marine carbonate sand and sediments carried to the beach by the stream. As long as generation or suspension of sediment due to project activity is kept to a minimum, no impacts to the habitat seaward of the estuary are likely.

The much smaller Waikoko, Waipā, and Waioli Streams all enter Hanalei Bay across sandy beaches. Compared to Wainiha Bay, Hanalei Bay is more protected from ocean conditions. Also, the streams are much smaller than Wainiha in terms of flow. Therefore, the impact of these steams on the marine communities in the bay is smaller than the impact of Wainiha Stream on Wainiha Bay.

#### Hawaiian Monk Seal and Sea Turtles

The survey area contains habitat that could support Hawaiian monk seal pupping, nursing, and haul out. It also contains coastal habitat that could support nesting and shallow water habitat that could support foraging of green sea turtles and hawksbill sea turtles. The project has the potential to increase human interaction with these animals. Measures expected to reduce or eliminate impacts to these listed species include the following:

- All regular on-site staff would be trained to identify the Hawaiian monk seal and sea turtles, and trained on what appropriate steps to take if these species are present on-site. Construction activities would not begin if a Hawaiian monk seal or sea turtle is in the construction area or within 150 feet (46 m) of the construction area. Construction can only begin after the animal voluntarily leaves the area. If a monk seal/pup pair is present, a minimum 300-foot (91-m) buffer would be observed. If listed marine species are noticed within 150 feet after work has already begun, that work may continue only if, in the best judgment of the project supervisor, that there is no way for the activity to adversely affect the animal(s).
- Any construction-related debris that may pose an entanglement threat to Hawaiian monk seals and sea turtles should be removed from the construction area at the end of each day and at the conclusion of the construction project.
- Workers should not attempt to feed, touch, ride, or otherwise intentionally interact with any listed species.
- Shielded lighting should be considered to reduce direct and ambient light to potential nearby beach habitat.

The following BMPs to protect marine water quality are recommended by the National Oceanic and Atmospheric Administration. The applicability of these BMPs to the proposed project will depend on the site-specific construction means and methods chosen.

- A contingency plan to control toxic materials should be developed.
- Appropriate materials to contain and clean potential spills should be stored at the work site and be readily available.
- All project-related materials and equipment placed in the water should be free of pollutants.
- The project manager and heavy equipment operators should perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations should be postponed or halted should a leak be detected, and they should not proceed until the leak is repaired and the equipment is cleaned.
- Fueling of land-based vehicles and equipment should take place at least 50 feet away from the water, preferably over an impervious surface. Fueling of vessels should be done at approved fueling facilities.

- Turbidity and siltation from project-related work should be minimized and contained through the appropriate use of erosion control practices, effective silt containment devices, and the curtailment of work during adverse weather and tidal/flow conditions.
- A plan should be developed to prevent debris and other wastes from entering or remaining in the marine environment during the project.

## 5.4. Water Quality

Short-term impacts from ground disturbance during the project's construction phase have the potential to impact water quality; however, implementation of BMPs at the site would greatly reduce or eliminate these impacts.

Pollutant discharge into waters is regulated under the Clean Water Act and implemented under HAR 11-55 Water Pollution Control. The proposed project could require the following certifications and permits (and associated mitigation) from the Hawai'i DOH Clean Water Branch:

- Section 401, Water Quality Certification: The certification asserts that the proposed project would not violate water quality standards.
- Section 402, National Pollutant Discharge Elimination System (NPDES): If ground disturbance exceeds 1 acre, an NPDES permits must be obtained for point source discharges that may result from construction. The permit must include submittal of a Notice of Intent for General Permit Coverage under HAR 11-55 Appendix C NPDES General Permit Authorizing Discharges of Storm Water Related to Construction Activities. Additional permits may be required.

The following general construction management BMPs should be incorporated to reduce impacts to hydrology, drainage, and water features under the proposed project:

- Clearing and grubbing would be held to the minimum necessary for grading, access, and equipment operation.
- Erosion and sediment control measures would be in place before initiating earth-moving activities. Functionality would be maintained throughout the construction period.
- Soil stockpiles would be located away at least 50 feet from concentrated runoff and water features, covered with plastic or other waterproof material, and surrounded by silt fences or other erosion control BMPs.
- Concrete wash-outs would be located 50 feet from storm drain inlets, open drainage areas, and waterbodies, and would be maintained as needed.
- Solid waste and construction and demolition debris would be properly managed.
- Hazardous materials would be properly stored and managed.
- Spill kits would be available on-site at locations where hazardous materials are used. Spill kits would be inspected regularly and supplies replaced as needed. Staff would be trained on spill prevention and cleanup.
- Vehicles and equipment would be cleaned or serviced in designated locations.
- Construction would be sequenced to minimize the exposure time of the cleared surface area.

- Control measures (e.g., silt fences, sand bag barriers, sediment traps, geotextile mats, and other measures intended for soil/sediment trapping) would be inspected regularly (at least once every 2 weeks) during dry periods, and would be repaired as necessary.
- Control measures (i.e., silt fences, sand bag barriers, sediment traps, geotextile mats, and other measures intended for soil/sediment trapping) would be inspected and repaired as needed within 24 hours after a rainfall event of 0.25 inch or greater over a 24-hour period. During periods of prolonged rainfall, a daily inspection would occur, unless extended heavy rainfall makes access impossible or hazardous.
- Inspection would be documented, and records for all inspections and repairs would be maintained on-site.
- Permanent soil stabilization measures (i.e., graveling or re-planting of vegetation) would be applied as soon as practical after final grading.
- Portable toilets for sanitary waste management would be serviced regularly.

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Appendix E Final Archaeological Inventory Survey Report for the Wainiha Bridges Project

### Final

Archaeological Inventory Survey Report for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a, Halele'a District, Kaua'i, Federal Highway Administration/ Central Federal Lands Highway Division (FHWA/CFLHD) contract DTFH68-14-D-00012/0007 TMKs: [4] 5-5 (por.), [4] 5-6 (por.), [4] 5-7 (por.), and [4] 5-8 (por.)

Prepared for CH2M HILL and on behalf of the Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD)

> Prepared by Richard T. Stark, Ph.D., Missy Kamai, B.A., William H. Folk, B.A, and Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai'i, Inc. Kailua, Hawai'i (Job Code: WAINIHA 11)

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# Management Summary

Reference	Archaeological Inventory Survey Report for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a, Halele'a District, Kaua'i, Federal Highway Administration/ Central Federal Lands Highway Division (FHWA/CFLHD) contract DTFH68-14-D-00012/0007, TMKs: [4] 5-5 (por.), [4] 5-6 (por.), [4] 5-7 (por.), and [4] 5-8 (por.) (Stark et al. 2017)
Date	December 2017
Project Number(s)	Federal Highway Administration Central Federal Lands Highway Division (FHWA/CFLHD) contract code: DTFH68-14-D-00012/0007
	Cultural Surveys Hawaiʻi, Inc. (CSH) Job Code: WAINIHA 11
Investigation Permit Number	CSH completed the archaeological inventory survey (AIS) fieldwork under archaeological permit number 14-04, issued by the Hawai'i State Historic Preservation Division (SHPD) per Hawai'i Administrative Rules (HAR) §13-13-282.
Agencies	FHWA/CFLHD, SHPD, State Department of Transportation (HDOT)
Land Jurisdiction	HDOT
Land Owners	Multiple public and private land owners (see Appendix A)
<b>Project Proponent</b>	FHWA/CFLHD, HDOT
Project Funding	FHWA/CFLHD, HDOT
Project Location	The project areas are synonymous with the Areas of Potential Effect (APE) and will be designated project area/APE throughout this document. They encompass the three Wainiha Bridges (Wainiha Sream Bridge 1, Wainiha River Bridge 2, and Wainiha River Bridge 3) and the surrounding areas of the bridges which include portions of Kūhiō Highway—part of Kaua'i Belt Road, a National Register of Historic Places (National Register) site, public lands, and private lands. Also included as part of the proposed project are three one-lane bridges along Kūhiō Highway that access the project site located at Wai'oli, Waipā, and Waikoko Streams in the event temporary structures may be needed to accommodate loads during construction and two potential staging areas in Lumaha'i Ahupua'a.
	The project areas/APE exist within the following TMKs: Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.; Waikoko Stream Bridge: [4] 5-6-003:002, 999 por.; Wainiha Stream Bridge 1: [4] 5-8-002:002 por., [4] 5-8-006:030, 031, 032, 033, 046, 060, and 999 por.; Wainiha River Bridges 2 and 3: [4] 5-8-006:009, 011, 017, 018, 019, 030, 999 por.; [4] 5-8-007:023, 024, 031, 032, 999 por.; Wai'oli Stream Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por.; [4] 5-5-006:014, 888 por.; [4] 5-6-002:002, 004, 999 por.; Waipā Stream Bridge: [4] 5-6-004:014, 022, 023, 999 por.

Project	FHWA, CFLHD, and HDOT propose the replacement of three temporary
Description	pre-fabricated Acrow bridges on Kūhiō Highway (Route 560) on the north side of the island of Kaua'i. The bridges are located between mile posts 6.4 and 6.7 near the mouth of Wainiha Stream before it feeds into Wainiha Bay. The original bridges at these three locations were replaced with temporary Acrow bridges after the Wainiha River Bridge 2 suffered permanent damage and the Wainiha Stream Bridge 1 (the southernmost bridge) and Wainiha River Bridge 3 (the northernmost bridge) were determined to be structurally deficient. The Acrow bridges were installed as a temporary measure to keep the roadway open to residents and public traffic until environmental clearance and funding for the permanent structures could be secured. The three bridges are owned and maintained by HDOT.
	FHWA and HDOT propose the replacement of the temporary Acrow bridges with new one-lane bridges that closely match the existing alignment. Also included as part of the proposed project is the placement of temporary one-lane bridges adjacent to or crossing over three historic one- lane bridges along Kūhiō Highway that access the project site located at Wai'oli, Waipā, and Waikoko Streams. These historic bridges have low load capacities and temporary bridges would allow construction loads to access the project site without affecting the historic integrity of these bridges. The temporary bridges would be removed upon completion of the project. Two potential staging areas in Lumaha'i Ahupua'a are also included in the APE.
Project Acreage	Project area includes Potential Staging Area 1: 0.12 hectares (0.296 acres), Potential Staging Area 2: 0.09 hectares (0.221 acres), Wainiha Stream Bridge 1: 0.64 hectares (1.603 acres), Wainiha River Bridges 2 and 3: 1.40 hectares (3.466 acres), Wai'oli Stream Bridge: 0.51 hectares (1.256 acres), Waipā Stream Bridge: 0.59 hectares (1.449 acres), and Waikoko Stream Bridge: 0.29 hectares (0.715 acres) for a total of 3.65 hectares (9.006 acres).
Area of Potential Effect (APE)	The APE for the current project is defined as synonymous with the project area/APE consisting of Potential Staging Area 1 (0.296 acres), Potential Staging Area 2 (0.221 acres), Wainiha Stream Bridge 1 (1.603 acres), Wainiha River Bridges 2 and 3 (3.466 acres), Wai'oli Stream Bridge (1.256 acres), Waipā Stream Bridge (1.449 acres), and Waikoko Stream Bridge (0.715 acres).

Historic Preservation Regulatory Context	This AIS investigation was designed to comply with both Federal and Hawai'i State environmental and historic preservation review legislation. Due to federal funding, this project is a federal undertaking, requiring compliance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, and Section 4(f) of the Department of Transportation Act. The proposed project is also subject to Hawai'i State environmental and historic preservation review legislation (Hawai'i Revised Statutes [HRS] §343 and HRS §6E-8 and HAR §13-275, respectively).
	In consultation with the SHPD, this AIS investigation fulfills the requirements of HAR §13-276 and the <i>Secretary of the Interior's Standards for Archaeology and Historic Preservation</i> . It was conducted to identify, document, and make National Register and Hawai'i Register of Historic Places (Hawai'i Register) eligibility recommendations for any historic properties. This report is also intended to support any project-related historic preservation consultation with stakeholders such as State and County agencies and interested Native Hawaiian Organizations (NHOs) and community groups. At the request of CH2MHill, CSH completed an archaeological inventory survey investigation on behalf of HDOT, per the requirements of HAR §13-276. This archaeological inventory survey report was prepared to facilitate the proposed project's historic preservation review and any other project-related historic preservation.
Fieldwork Effort	CSH archaeologists Johnny Dudoit, B.A., Gerald Ida, B.A, Missy Kamai, B.A., William H. Folk, B.A., and principal investigator Hallett H. Hammatt, Ph.D., completed the archaeological inventory survey (AIS) fieldwork between 6 October 2014 and 9 October 2014 under archaeological permit number 14-04, issued by the SHPD per HAR §13- 282. Liborio and Hammatt (2015) provide the companion report to this document, a cultural consultation conducted by CSH for a cultural impact assessment (CIA). The pedestrian survey was conducted on 6 October 2014. Shovel testing within the project area was conducted on 7-8 October 2014. Recordation of historic properties for this AIS was conducted on 9 October 2014. Overall, a total of 11-person days were required to complete fieldwork for this AIS.

Historic Properties Identified	The Kaua'i Belt Road, is a National Register site (Reference # 03001048) and Hawai'i Register site (State Inventory of Historic Places [SIHP] # 50- 30-02-9396) within the APE boundary. All historic properties (or features of historic properties) identified within the project APE are all associated with the Kaua'i Belt Road (SIHP # 50-30-02-9396).
	A culvert feature of the Kaua'i Belt Road was identified within the project APE. In addition, three additional contributing elements of the historic property have been identified within the project APE:
	<ul> <li>SIHP # 50-30-03-2296, the Wai'oli Stream Bridge,</li> <li>SIHP # 50-30-03-2297, the Waipā Stream Bridge,</li> <li>SIHP # 50-30-03-2298, the Waikoko Stream Bridge</li> </ul>
	All historic properties encountered within the project area/APE are historic, and none of them are directly associated with traditional Hawaiian activities.
Significance Evaluations	The Kaua'i Belt Road (National Register # 03001048 and SIHP # 50-30- 02-9396) is listed in the National Register under Criteria A and C of the National Register of Historic Places Registration Form. The historic property is eligible for listing on the Hawai'i Register pursuant to HAR §13-198-8, under Criteria A and C. SIHP # 50-30-02-9396, the Kaua'i Belt Road, is assessed as significant under Criteria a, and c, of the State of Hawai'i significance criteria pursuant to HAR §13-275-6.
	SIHP # 50-30-03-2296, the Wai'oli Bridge, is assessed as significant under Criteria a, and c, of the State of Hawai'i significance criteria pursuant to HAR §13-275-6. The bridge crossing has also been previously evaluated (Fung Associates 2013:4) as eligible to the National Register and Hawai'i Register pursuant to 36 CFR 60.4 and HAR §13-198-8, under Criteria A and C
	SIHP # 50-30-03-2297, the Waipā Stream Bridge, is assessed as historically significant under Criteria a, and c, of the State of Hawai'i significance criteria pursuant to HAR §13-275-6. The bridge crossing has also been previously evaluated (Fung Associates 2013:4) as eligible to the National Register and Hawai'i Register pursuant to 36 CFR 60.4 and HAR §13-198-8, under Criteria A and C.
	SIHP # 50-30-03-2298, the Waikoko Stream Bridge, is assessed as historically significant under Criteria a, and c, of the State of Hawai'i significance criteria pursuant to HAR §13-275-6. The bridge crossing has also been previously evaluated (Fung Associates 2013:4) as eligible to the National Register and Hawai'i Register pursuant to 36 CFR 60.4 and HAR §13-198-8, with high preservation value eligibility status under Criteria A and C.

Project Effect	Pursuant to HAR §13-275-7 the project's effect recommendation is "effect, with proposed mitigation commitments." In accordance with 36 CFR 800.5, project effect recommendation is "No adverse effect."
Mitigation Recommendations	The AIS fieldwork documented sediments surrounding the six bridges within the project areas/APE which, although not found to contain historic properties, do have potential for buried historic properties to be encountered during the project.
	The three bridges that are historic properties and part of the National Register Kaua'i Belt Road (Wai'oli Stream Bridge, Waipā Stream Bridge, and Waikoko Stream Bridge) will be avoided during the project work of replacing the Wainiha bridges (Wainiha Stream Bridge 1, and Wainiha River Bridges 2 and 3). Avoidance will be accomplished by installation of temporary structures bypassing these properties during the project and removal of the temporary structures when the project is complete.
	This AIS report has documented the location, extent, function, and age of the reinforced-concrete pipe culvert on the westward bound approach to the middle Wainiha Bridge. The culvert should be considered a contributing feature of the National Register Kaua'i Belt Road, SIHP # 50-30-02-9396. If there is an unexpected impact to the reinforced-concrete pipe culvert or its revetments during the project, it is recommended that materials of the structure be recovered and the structure be reconstructed in the same style, manner, workmanship, and of course location. Although this AIS report has documented the reinforced-concrete pipe culvert, additional documentation will be needed in order to reconstruct the structure, should impact occur.
	There is potential to encounter subsurface archaeological deposits or human burials during the installation of temporary bridges over Wai'oli, Waipā, and Waikoko streams on the Kaua'i Belt Road, as well as during the installation of the three new permanent bridges in Wainiha. Based on these potential impacts, CSH recommends on-site archaeological monitoring during all ground disturbing activities for the project. Those parts of the Kaua'i Belt Road affected by the temporary bridge structures should be restored to their prior condition when the structures are removed.

# **Table of Contents**

Management Summary	i
Section 1 Introduction	1
1.1 Project Background 1.2 Historic Preservation Regulatory Context and Document Purpose	
1.3 Scope of Work	17
1.3.1 Consultation	
1.4 Environmental Setting	19
1.4.2 Built Environment	
Section 2 Methods	
2.1 Field Methods	
2.1.1 Pedestrian Survey	
2.1.2 Shovel Testing	
2.2 Laboratory Methods	
2.5 Disposition of Materials	
Section 3 Background Research	
3 1 Overview	32
3.2 Traditional and Historical Background	
3.2.1 Traditional and Legendary Accounts of Wai'oli	
3.2.2 Traditional and Legendary Accounts of Waipā and Waikoko	
3.2.3 Traditional and Legendary Accounts of Lumaha'i	
3.2.4 Traditional and Legendary Accounts of Wainiha	
3.3 1 Boundary Commission Testimonies (ca. 1873-1882)	
3 3 2 The Mābele and the Kuleana Act of Wai'oli	
3.3.3 The Māhele and the Kuleana Act of Wai on Waikoko	
3.3.4 The Māhele and the Kuleana Act of Wainiha	
3.3.5 The Māhele and the Kuleana Act of Lumaha'i	
3.4 Late 1800s to Modern Land Use	
3.4.1 Late 1800s to Modern Land Use in Wai'oli	
3.4.2 Late 1800s to Modern Land Use in Waipā and Waikoko	
3.4.3 Late 1800s to Modern Land Use in Lumana 1	
3.5 Previous Archaeological Research in the Project area/APE	
3.5.1 Previous Archaeological Research in Wai'oli	
3.5.2 Previous Archaeological Research in Waina and Waikoko	
3.5.3 Previous Archaeological Research in Lumaha'i	
3.5.4 Previous Archaeological Studies in Wainiha	91
3.6 Background Summary and Predictive Statements	
Section 4 Results of Fieldwork	100
4.1 Pedestrian Survey Results	
4.2 Shovel Testing Results (ST-1 through ST-6)	

4.2.1 Shovel Test 1 (ST-1) Stratigraphic Summary	
4.2.2 Shovel Test 2 (ST-2) Stratigraphic Summary	
4.2.3 Shovel Test 3 (ST-3) Stratigraphic Summary	
4.2.4 Shovel Test 4 (ST-4) Stratigraphic Summary	
4.2.5 Shovel Test 5 (ST-5) Stratigraphic Summary	
4.2.6 Shovel Test 6 (ST-6) Stratigraphic Summary	
Section 5 Historic Property Descriptions	134
5.1 SIHP # 50-30-02-9396 (50-30-03-9396), Kaua'i Belt Road	
5.2 SIHP # 50-30-03-2296, Wai'oli Stream Bridge	
5.3 SIHP # 50-30-03-2297, Waipā Stream Bridge	
5.4 SIHP # 50-30-03-2298, Waikoko Stream Bridge	
Section 6 Summary and Interpretation	168
Section 7 Significance Assessments and Eligibility Determinations	169
Section 8 Project Effect and Mitigation Recommendations	172
8.1 Project Effect 8.2 Mitigation Recommendations	172 172
Section 9 References Cited	173
Appendix A Table of Tax Map Keys (TMK) in Project areas/APE	182
Appendix B Makaihuwa'a (From <i>Kaua'i Tales</i> – Wichman 1985:35-42)	184
Appendix C Boundary Commission Testimonies ca. 1873-1882 [Waihona 'Aina].	191
Appendix D National Register of Historic Places Nomination Form for the Kaua Belt Road (Duensing 2002)	'i 193
Appendix E Historic Bridge District, Kaua'i Belt Road Map (North Shore Section) (Fung Associates 2103:3-13)	231

# **List of Figures**

Figure 1. Portion of the 1991 Haena and 1996 Hanalei USGS 7.5-minute series topographic quadrangles showing the location of the project areas/APE
Figure 2. Tax Map Key (TMK) [4] 5-5-05, showing a portion of the Wai'oli Stream Bridge
Figure 3. TMK: [4] 5-5-06, showing a portion of the Wai'oli Stream Bridge project area
(Hawai'i TMK Service 1984)4 Figure 4. TMK: [4] 5-6-02, showing the Wai'oli Stream Bridge project area (Hawai'i TMK
Figure 5. TMK: [4] 5-6-03, showing the Wai'oli Stream Bridge, Waipā Bridge, and
Waikoko Bridge project areas/APE (Hawai'i TMK Service 1984)
Waikoko Stream Bridge project areas/APE (Hawai'i TMK Service 1984)
and 2 (Hawai'i TMK Service 1984)
Figure 8. TMK: [4] 5-8-06, showing the Wainiha Stream Bridge 1, and Wainiha River Bridges 2 and 3 project areas/APE (Hawai'i TMK Service 1984)
Figure 9. TMK: [4] 5-8-07, showing the Wainiha River Bridges 2 and 3 project area (Hawai'i TMK Service 1984)
Figure 10. Aerial photograph (Google Earth 2013), showing the Wai'oli Stream Bridge
Figure 11. Aerial photograph (Google Earth 2013), showing the Waipā Stream Bridge
Figure 12. Aerial photograph (Google Earth 2013), showing the Waikoko Stream Bridge
Figure 13. Aerial photograph (Google Earth 2013), showing the project areas/APE of Potential Staging Areas 1 and 2
Figure 14. Aerial photograph (Google Earth 2013), showing the Wainiha Stream Bridge 1
Figure 15. Aerial photograph (Google Earth 2013), showing the Wainiha River Bridges 2 and 3 project area
Figure 16. Aerial photograph (Google Earth 2013), showing a portion of the Wainiha Bridges project areas/APE, with overlay of soil series (soil boundaries from Foote et al. 1972, data source SSURGO 2001)
Figure 17. Aerial photograph (Google Earth 2013), showing a portion of the Wainiha Bridges project areas/APE, with overlay of soil series (soil boundaries from Foote et al. 1972, data source SSURGO 2001)
Figure 18. Entrance to the Waipā Foundation and a portion of Kūhiō Highway, view to
Figure 19. The Wainiha General Store and a portion of Kūhiō Highway, view to west at the
Figure 20. CSH archaeologist conducting pedestrian survey of a portion of the project areas/APE
Figure 21. Potential Staging Area 1 within the project area/APE

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

Figure 22.	Potential Staging Area 2 within the project area/APE	30
Figure 23.	CSH archaeologist conducting Shovel Test 4 within the project area/APE	31
Figure 24.	Map showing population estimate for Kaua'i in 1853 (Coulter 1931:16)	47
Figure 25.	1914 Wall map of Wai'oli and Hanalei showing LCAs.	52
Figure 26.	Aerial photograph with <i>ahupua</i> 'a and LCA boundaries in the vicinity of the project area/APE (Google Earth 2013)	53
Figure 27.	Portion of 1906 Donn Hawaii Territory Survey Map of Kaua'i with land use	54
Figure 28.	Portions of the 1910 Hanalei and Kilauea USGS 7.5-minute series topographic quadrangles	58
Figure 29.	Portions of the 1963 Hanalei and 1965 Haena USGS 7.5-minute series topographic quadrangles	59
Figure 30.	Portion of a 1950 Hanalei Bay Coast aerial photograph of the Wai'oli Stream Bridge, Waipā Stream Bridge, and Waikoko Stream Bridge project area/APE (UH SOEST)	60
Figure 31.	Portion of a 1950 Hanalei Bay Coast aerial photograph of the Potential Staging Areas 1 and 2 (UH SOEST)	61
Figure 32.	Portion of a 1950 Hanalei Bay Coast aerial photograph of the Wainiha Stream Bridge 1 and Wainiha River Bridges 2 and 3 project area/APE (UH SOEST)	62
Figure 33.	Portions of the 1991 Haena and 1996 Hanalei USGS 7.5-minute series topographic quadrangles showing the locations of previous archaeological studies and Bennett sites; Barrera (1984) is not featured, since it lies outside	
Figure 34.	Aerial photograph (Google Earth 2013) showing locations of previous identified historic properties in portions of Hanalei, Wai'oli, Waipā, and Waikoko	71
Eiguro 25	Anupua a	/0 02
Figure 36.	Aerial photograph (Google Earth 2013) showing locations of previous identified historic properties in Luamaha'i and Wainiha Ahupua'a; note Bennett's (1931) sites 152 and 153, as well as SIHP # -01500 to -01502 (Barrera 1984), are	03
Figure 37.	beyond the scope of this map, further south within Wainiha Valley Portion of the 1991 Haena and 1996 Hanalei USGS 7.5-minute series topographic quadrangles showing the location of SIHP #s 50-30-03-2296, 50-30-03-2297, and 50-30-03-2298, as well as a new contributing element of	89
Figure 38	SIHP #50-30-02-9396 within the project areas/APE Portion of Kūhiō Highway Wainiha Stream Bridge 1 a non-contributing	.101
1.841000	structure within the historic bridges district, view to east	.102
Figure 39.	Portions of the Wainiha River downstream from Kūhiō Highway between Wainiha River Bridges 2 and 3, non-contributing structures within the historic	
Figure 40.	bridges district, panoramic view toward the Wainiha River mouth, to north Portion of the Kūhiō Highway, view to south of Wainiha River Bridge 2; note sign indicating the local custom of taking turns to cross the bridge allowing	.103
Figure 41.	5-7 cars across at a time	.103
	Wainiha River Bridge 2, a non-contributing structure within the historic bridges district, general location of ST-3 in the foreground	.104

Figure 42. A portion of the Kūhiō Highway at the Wainiha River Bridge 3, a non-	
contributing structure within the historic bridges district, general view to north	105
Figure 43. A portion of the Kūhiō Highway, Wainiha River Bridges 3 and 2 respectively,	
non-contributing structures within the historic bridges district, general view to	
southeast with Pu'uuahia in the background	106
Figure 44. 2013 aerial photograph showing the location of ST-1, ST-2, and ST-3 within	
the Wainiha River Bridges 2 and 3 project area/APE (Google Earth 2013)	109
Figure 45. Aerial photograph showing the location of ST-4 in relation to the Kūhiō	
Highway, within the Wainiha Stream Bridge 1 project area/APE (Google	
Earth 2013)	110
Figure 46. Aerial photograph showing the location of ST-5 in relation to SIHP #	
50-30-03-2296, the Wai'oli Stream Bridge on the Kūhiō Highway, within the	
Wai'oli Stream Bridge project area/APE (Google Earth 2013)	111
Figure 47. Aerial photograph showing the location of ST-6 in relation to SIHP #	
50-30-03-2297, the Waipā Stream Bridge on the Kūhiō Highway, within the	
Waipā Stream Bridge project area/APE (Google Earth 2013)	112
Figure 48. ST-1, general vicinity, view to southeast	113
Figure 49. ST-1 ground surface prior to excavation, view to north	114
Figure 50. ST-1, profile view to northwest	114
Figure 51. Illustrated stratigraphic profile of ST-1	115
Figure 52. ST-2, general vicinity, the ground surface prior to excavation, view to north	116
Figure 53. ST-2, profile view of the east wall, view to southeast	117
Figure 54. ST-2, profile view of the south wall, view to south	117
Figure 55. Illustrated stratigraphic profile of ST-2	118
Figure 56. General location of ST-3 in the foreground, east side of Wainiha River	
Bridge 2, view to south	120
Figure 57. Location of ST-3, prior to groundbreaking, plan view to northwest	121
Figure 58. ST-3 surface to the base of excavations, profile view to north	121
Figure 59. Illustrated stratigraphic profile of ST-3	122
Figure 60. General location of ST-4, on the <i>mauka</i> side of Kūhiō Highway on the eastern	
side of Wainiha Stream Bridge 1, view to west	123
Figure 61. ST-4 excavation in progress, view to north	124
Figure 62. ST-4, profile of the south wall; view to south	124
Figure 63. ST-4, profile of the south wall, view to the south; note base of excavation at 90 cr	nbs
	125
Figure 64. Illustrated stratigraphic profile of ST-4	126
Figure 65, ST-5, on the west side of the Wai'oli Stream, ground surface prior to	
excavation, plan view to north	128
Figure 66. ST-5 at 60 cmbs. profile view to north	129
Figure 67. Illustrated stratigraphic profile of Shovel Test 5	130
Figure 68. ST-6 ground surface prior to groundbreaking. view to west	131
Figure 69. ST-6. plan view to east	.132
Figure 70. ST-6. profile view to east at the BOE. 95 cmbs	
Figure 71. Illustrated stratigraphic profile of Shovel Test 6	133

Figure 72. Portion of the 1991 Haena and 1996 Hanalei USGS topographic quadrangles showing the extent of SIHP #s 50-30-02-9396 and 50-30-03-9396	.135
Figure 73. 2013 aerial photograph showing the location of ST-1, ST-2, and ST-3 in	
relation to a road culvert associated with Kūhiō Highway and a contributing	
element of SIHP #50-30-02-9396 (Kaua'i Belt Road), within the Wainiha	
River Bridges 2 and 3 project area/APE (Google Earth 2013)	.138
Figure 74. TMK: [4] 5-8-06, showing the location of a road culvert associated with Kūhiō	
Highway and assessed as a contributing element of SIHP # 50-30-02-9396	
(Kaua'i Belt Road) (Hawai'i TMK Service 1984)	.139
Figure 75. Road culvert and revetment (contributing element of SIHP # 50-30-02-9396,	
Kaua'i Belt Road) northeast of Wainiha River Bridge 2, outflow end on the	
west side of Kūhio Highway, view to northeast	.140
Figure 76. Portion of road culvert and revetment (contributing element of SIHP #	
50-30-02-9396, Kaua'i Belt Road) northeast of Wainiha River Bridge 2,	
outflow end (at lower right) on the west side of the road, view to south	.140
Figure 77. Intake portion of the road culvert and buttressing (contributing element of SIHP	
# 50-30-02-9396, Kaua'i Belt Road) northeast of Wainiha River Bridge 2, on	
the east side of Kūhiō Highway, view to southwest	.141
Figure 78. Road culvert (contributing element of SIHP # 50-30-02-9396, Kaua'i Belt	
Road) northeast of Wainiha River Bridge 2, portion of the intake revetment	
on the east side of Kūhiō Highway, view to southeast	.141
Figure 79. Illustrated plan view of intake culvert (contributing element of SIHP #	
50-30-02-9396. Kaua'i Belt Road)	.142
Figure 80. Illustrated plan view of outtake culvert (contributing element of SIHP #	
50-30-02-9396, Kaua'i Belt Road)	.142
Figure 81. Aerial photograph showing the location of SIHP # 50-30-03-2296, the Wai'oli	
Stream Bridge (Google Earth 2013)	.145
Figure 82. TMK: [4] 5-6-05, showing the location of SIHP # 50-30-03-2296, the Wai'oli	
Stream Bridge (Hawai'i TMK Service 1984)	.146
Figure 83. SIHP # 50-30-03-2296, Wai'oli Stream Bridge, profile view to north	.147
Figure 84. SIHP # 50-30-03-2296, the Wai'oli Stream Bridge, profile view to north	.148
Figure 85. SIHP # 50-30-03-2296, the Wai'oli Stream Bridge, profile view to west,	
showing concrete stamped "1912"	.148
Figure 86. Aerial photograph showing the location of SIHP # 50-30-03-2297, the Waipā	
Stream Bridge (Google Earth 2013)	.151
Figure 87. TMK: [4] 5-6-04, showing the location of SIHP # 50-30-03-2297, the Waipā	
Stream Bridge (Hawai'i TMK Service 1984)	.152
Figure 88. SIHP # 50-30-03-2297, the Waipā Stream Bridge, general view to northwest;	
note the 1912 bridge portion in the foreground	.153
Figure 89. SIHP # 50-30-03-2297, the Waipā Stream Bridge, view to southeast; note the	
1925-built concrete bridge extension in the foreground	.153
Figure 90. SIHP # 50-30-03-2297, the Waipā Stream Bridge, portion of the 1925	
extension, profile view to west	.154
Figure 91. SIHP # 50-30-03-2297, the Waipā Stream Bridge, view to north; note the 1912-	
built bridge portion in the foreground	.154

Figure 92. SIHP # 50-30-03-2297, the Waipā Stream Bridge, view to north; note the 19	12-
built bridge portion in the foreground	155
Figure 93. SIHP # 50-30-03-2297, the Waipā Stream Bridge, showing concrete stamped	l
"1912," view to west	155
Figure 94. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, general view to north	158
Figure 95. Aerial photograph showing the location of SIHP # 50-30-03-2298, the	
Waikoko Stream Bridge (Google Earth 2013)	159
Figure 96. TMK: [4] 5-6-03, showing the location of SIHP # 50-30-03-2298, the	
Waikoko Stream Bridge (Hawai'i TMK Service 1984)	160
Figure 97. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, general view to west of	the
bridge's makai face; note approximately eight courses of basalt boulders	
mortared on top of the concrete portion of the bridge damaged in the 1946 ts	unami
	161
Figure 98. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, profile view to west of the stream of th	the
southern terminus of the bridge's makai face; note the successive courses of	
stacked and mortared basalt (one through eight)	161
Figure 99. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, general view to northea	st
of the bridge's mauka face; note approximately five courses of basalt boulde	rs
mortared on top of the concrete portion of the bridge damaged in the 1946 ts	unami
Figure 100. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, general view to northy	vest 162
Figure 101. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, underneath profile vie	W
to south of the 1912 portion of the bridge undermined by the 1946 tsunami	163
Figure 102. SIHP # 50-30-03-2298, the Walkoko Stream Bridge, profile view to	
southwest; note the 1912 portion of the bridge undermined by the 1946	1.60
tsunami, with portions of the overlying basalt boulder and mortar repair	163
Figure 103. SIHP # 50-30-03-2298, the Walkoko Stream Bridge, profile view to	
southwest; note the 1912 portion of the bridge undermined by the 1946	
tsunami, with portions of the basalt base coarse and overlying basalt boulder	1.64
and mortar repair	164
Figure 104. Southern portion of SIHP # 50-30-03-2298, basalt boulder base course of th	le 165
Walkoko Stream Bridge, view to north	165
Figure 105. Illustrated stratigraphic profile of southern portion of SIHP # 50-30-03-2295	8,
basait boulder base course of the Walkoko Stream Bridge	166
Figure 106. Historic Bridge District, Kaua'i Belt Road Map (North Shore Section) (Fun	g 221
	14

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

## **List of Tables**

Table 1. Summary of LCAs in the Halele'a District	48
Table 2. Land Commission Awards along Kūhiō Highway in Wai'oli, from East to West	50
Table 3. Land Commission Awards along Kūhiō Highway in Waipā and Waikoko, East to W	est
	55
Table 4. Land Commission Awards along Kūhiō Highway in Lumaha'i	56
Table 5. Land Commission Awards at Coastal Wainiha, East to West	56
Table 6. Previous archaeological studies in Wai'oli Ahupua'a	74
Table 7. State Inventory of Historic Places (SIHP) sites in Wai'oli Ahupua'a	75
Table 8. Previous archaeological studies in Waipā and Waikoko Ahupua'a	80
Table 9. State Inventory of Historic Places sites in Waipā and Waikoko Ahupua'a	82
Table 10. Waipā Irrigation System as documented by Earle (1978:125)	84
Table 11. Previous archaeological studies in Lumaha'i Ahupua'a	88
Table 12. State Inventory of Historic Places (SIHP) sites in Lumaha'i Ahupua'a	88
Table 13. Previous archaeological studies in Wainiha Ahupua'a	94
Table 14. State Inventory of Historic Places (SIHP) sites in Wainiha Ahupua'a	95
Table 15. ST-1 stratigraphic summary	.115
Table 16. ST-2 stratigraphic summary	.119
Table 17. ST-3 stratigraphic summary	.122
Table 18. ST-4 stratigraphic summary	.127
Table 19. ST-5 stratigraphic summary	.130
Table 20. ST-6 stratigraphic summary	.133
Table 21. Historic properties within the project APE	.171

## Section 1 Introduction

### **1.1 Project Background**

At the request of CH2M HILL, Cultural Surveys Hawai'i, Inc. (CSH) has prepared this archaeological inventory survey (AIS) report for the Wainiha Bridges project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a, Halele'a District, Kaua'i, Federal Highway Administration/Central Federal Lands Highway Division (FHWA/CFLHD) contract DTFH68-14-D-00012/0007, TMKs: [4] 5-5 (por.), [4] 5-6 (por.), [4] 5-7 (por.), and [4] 5-8 (por.). The proposed project is located along Kūhiō Highway (Route 560), between mile posts 6.4 and 6.7 near the mouth of Wainiha Stream. The project area/APE encompass the Wainiha Bridges (Wainiha Stream Bridge 1, Wainiha River Bridge 2, and Wainiha River Bridge 3) and the surrounding areas of the bridges that include portions of Kūhiō Highway, public lands, and private lands (Appendix A). The project area/APE are depicted on a portion of a 1991 Haena and 1996 Hanalei U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle (Figure 1), tax map plats (Figure 2 through Figure 9), and 2013 aerial photographs (Figure 10 through Figure 15).

The proposed project includes the replacement of three bridges on Kūhiō Highway on the north side of the island of Kaua'i. The bridges are located between mile posts 6.4 and 6.7 near the mouth of Wainiha Stream before it feeds into Wainiha Bay (see Figure 14 and Figure 15). The original bridges at these three locations were replaced with temporary Acrow bridges after Wainiha River Bridge 2 suffered permanent damage and Wainiha Stream Bridge 1 (the southernmost bridge) and Wainiha River Bridge 3 (the northernmost bridge) were determined to be structurally deficient. The Acrow bridges were installed as a temporary measure to keep the roadway open to residents and public traffic until environmental clearance and funding for the permanent structures could be secured. The three bridges are owned and maintained by the State of Hawai'i Department of Transportation (HDOT). Also included as part of the proposed project are three one-lane bridges along Kūhiō Highway that access the project site (Wainiha Bridges) located at Wai'oli, Waipā, and Waikoko streams (Figure 1, Figure 10 through Figure 12) in the event temporary structures may be needed to accommodate loads during construction and two potential staging areas in Lumaha'i Ahupua'a (Figure 1 and Figure 13). The project areas/APE include approximately 3.65 hectares (9.006 acres); Potential Staging Area 1: 0.12 hectares (0.296 acres), Potential Staging Area 2: 0.09 hectares (0.221 acres), Wainiha Stream Bridge 1: 0.64 hectares (1.603 acres), Wainiha River Bridges 2 and 3: 1.40 hectares (3.466 acres), Wai'oli Stream Bridge: 0.51 hectares (1.256 acres), Waipā Stream Bridge: 0.59 hectares (1.449 acres), and Waikoko Stream Bridge: 0.29 hectares (0.715 acres). The project APE includes any visual, auditory, and/or other environmental impacts beyond the actual footprint of the proposed project. The APE for the current project is defined as only the entire 3.36 hectare (8.30 acre) project area.

### **1.2 Historic Preservation Regulatory Context and Document Purpose**

This AIS investigation was designed to be compliant with both Federal and Hawai'i State environmental and historic preservation review legislation. Due to federal funding, this project is a federal undertaking, requiring compliance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, and Section 4(f) of the Department of Transportation Act. The proposed project is also subject to Hawai'i State environmental and historic preservation

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 1. Portion of the 1991 Haena and 1996 Hanalei USGS 7.5-minute series topographic quadrangles showing the location of the project areas/APE

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 2. Tax Map Key (TMK) [4] 5-5-05, showing a portion of the Wai'oli Stream Bridge project area (Hawai'i TMK Service 1984)

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TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)
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Figure 3. TMK: [4] 5-5-06, showing a portion of the Wai'oli Stream Bridge project area (Hawai'i TMK Service 1984)

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 4. TMK: [4] 5-6-02, showing the Wai'oli Stream Bridge project area (Hawai'i TMK Service 1984)

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 5. TMK: [4] 5-6-03, showing the Wai'oli Stream Bridge, Waipā Bridge, and Waikoko Bridge project areas/APE (Hawai'i TMK Service 1984)

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TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)
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Figure 6. TMK: [4] 5-6-04, showing the Wai'oli Stream Bridge, Waipā Stream Bridge, and Waikoko Stream Bridge project areas/APE (Hawai'i TMK Service 1984)

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TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)
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Figure 7. TMK: [4] 5-7-03, showing the project areas/APE of Potential Staging Areas 1 and 2 (Hawai'i TMK Service 1984)

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 8. TMK: [4] 5-8-06, showing the Wainiha Stream Bridge 1, and Wainiha River Bridges 2 and 3 project areas/APE (Hawai'i TMK Service 1984)

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TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)
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Figure 9. TMK: [4] 5-8-07, showing the Wainiha River Bridges 2 and 3 project area (Hawai'i TMK Service 1984)

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TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)
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AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Legend Project Area Base Map: Google Earth Aerial Imagery (2013) Data Sources: CSH Data Sources: CSH Scale 0 15 30 Meters 0 50 100 Feet *Cultural Surveys Hawairi, Inc.* 

Figure 10. Aerial photograph (Google Earth 2013), showing the Wai'oli Stream Bridge project area

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 11. Aerial photograph (Google Earth 2013), showing the Waipā Stream Bridge project area

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 12. Aerial photograph (Google Earth 2013), showing the Waikoko Stream Bridge project area

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 13. Aerial photograph (Google Earth 2013), showing the project areas/APE of Potential Staging Areas 1 and 2

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 14. Aerial photograph (Google Earth 2013), showing the Wainiha Stream Bridge 1 project area

TMKs: Multiple

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i



Figure 15. Aerial photograph (Google Earth 2013), showing the Wainiha River Bridges 2 and 3 project area

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i

review legislation (Hawai'i Revised Statutes [HRS] §343 and HRS §6E-8/Hawai'i Administrative Rules [HAR] §13-275, respectively).

In consultation with the Hawai'i State Historic Preservation Division (SHPD), this AIS investigation was designed to fulfill the State requirements for an archaeological inventory survey per HAR §13-13-276. As well, all work pertaining to this AIS was consistent and conducted in accordance with the Department of the Interior's *Archaeological and Historic Preservation: Secretary of the Interior's Guidelines (Federal Register* 48[190]:44716ff and *Federal Register* 48[190]:44716ff; 29 September 1983). This archaeological investigation was also conducted to identify, document, and make National Register of Historic Places (National Register) and Hawai'i Register of Historic Places (Hawai'i Register) eligibility recommendations for any historic properties. This report is also intended to support any project-related historic preservation consultation with stakeholders such as State and County agencies and interested Native Hawaiian Organizations (NHOs) and community groups, if applicable.

### **1.3 Scope of Work**

The following archaeological inventory survey scope of work is designed to satisfy the Hawai'i state requirements for archaeological inventory surveys (HAR §13-276 and §13-275):

- 1. Historic and archaeological background research, including a search of historic maps, written records, Land Commission Award documents, and the reports from prior archaeological investigations. This research will focus on the specific project area's past land use, with general background on the pre-Contact and historic settlement patterns of the *ahupua'a* (traditional land division) and district. This background information will be used to compile a predictive model for the types and locations of historic properties that could be expected within the project area.
- 2. A complete (100 %) systematic pedestrian inspection of the project area to identify any potential surface historic properties. Surface historic properties will be recorded with an evaluation of age, function, interrelationships, and significance. Documentation will include photographs, scale drawings, and, if warranted, limited controlled excavation of select sites and/or features in addition to subsurface testing and core sampling to retrieve paleo environmental data. The fieldwork will comply with HAR §13-276.
- 3. As appropriate, consultation with knowledgeable individuals regarding the project area's history, past land use, and the function and age of the historic properties documented within the project area.
- 4. As appropriate, laboratory work to process and gather relevant environmental and/or archaeological information from collected samples.
- 5. Preparation of an inventory survey report, which will include the following:
  - a) A project description;
  - b) A section of a USGS topographic map showing the project area boundaries and the location of all recorded historic properties;
  - c) Historical and archaeological background sections summarizing prehistoric and historic land use of the project area and its vicinity;

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

- d) Descriptions of all historic properties, including selected photographs, scale drawings, and discussions of age, function, laboratory results, and significance, per the requirements of HAR §13-276. Each historic property will be assigned a Hawai'i State Inventory of Historic Places (SIHP) number;
- e) If appropriate, a section concerning cultural consultations (per the requirements of HAR §13-276-5(g) and HAR §13-275-8(a)(2)).
- f) A summary of historic property categories, integrity, and significance based upon the Hawai'i Register of Historic Places and Hawai'i state historic property significance criteria;
- g) A project effect recommendation;
- h) Treatment recommendations to mitigate the project's adverse effect on any historic properties identified in the project area that are assessed as significant.

This scope of work includes full coordination with the SHPD and Kaua'i County relating to historic preservation matters. Part of the SHPD mandated scope of work for an archaeological inventory survey includes specific documentation of identified historic properties. This documentation includes recording their geographic location with a GPS on project area maps and written descriptions and may include, as appropriate, sampling, section drawings and profiles, plan views, and photographs. For traditional Hawaiian deposits, this may include analysis of recovered artifacts and midden. It often also includes radiocarbon dating of samples from well-defined cultural contexts. If historic-era deposits are located, then analysis of associated historic artifacts is often required.

#### **1.3.1** Consultation

The Wainiha Bridges project is a HDOT and FHWA/CFLHD partnership project. No historic properties in the project area have been assessed as having significance under HAR §13-275-6 Criterion e. National Historic Preservation Act Section 106 consultation with community, agency, and Native Hawaiian Organizations was conducted by FHWA and by CSH to provide a cultural impact assessment (CIA) addressing HRS §343 (Liborio and Hammatt 2015):

We begin our consultation efforts with utilizing our previous contact list to facilitate the interview process. We then review an in-house database of  $k\bar{u}puna$  (elders), *kama 'āina* (native born), cultural practitioners, lineal and cultural descendants, Native Hawaiian Organizations (NHOs; includes Hawaiian Civic Clubs and those listed on the Department of Interior's NHO list), and community groups. We also contact agencies such as SHPD, OHA, and the appropriate Island Burial Council where the proposed project is located for their response on the project and to identify lineal and cultural descendants, individuals and/or NHO with cultural expertise and/or knowledge of the study area. CSH is also open to referrals and new contacts...CSH seeks  $k\bar{o}kua$  (assistance) and guidance on identifying past and current traditional cultural practices of the study area. Those aspects include: general history of the *ahupua'a*; past and present land use of the study area; knowledge of cultural sites (for example, *wahi pana*, archaeological sites, and burials); knowledge of traditional gathering practices (past and present) within the study area; cultural associations (*ka'ao* and *mo'olelo*); referrals; and any other

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i
cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the study area. [Liborio and Hammatt 2015:15]

# **1.4 Environmental Setting**

## **1.4.1 Natural Environment**

The project sites, the study areas and the potential staging areas are located in five *ahupua* 'a on the north side of Kaua'i: Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha (see Figure 1). Kūhiō Highway traverses many types of terrain including the large stream of Wai'oli, stretches of coastal sands in the *ahupua* 'a of Waipā, Waikoko, Lumaha'i, and Wainiha, along precipitous cliffs on the boundaries of Waikoko and Lumaha'i and Wainiha and Hā'ena. Modern vegetation is extremely diverse, including hala trees (Pandanus tectorius), naupaka (Scaevola taccada), koa (Acacia koa), melastoma (Melastoma malabathricum), bamboo (Bambuseae), yellow foxtail (Setaria geniculata), hau (Hibiscus tiliaceus), lantana (Lantana camara), false staghorn fern (Gleichenia linearis), lace fern (Sphenomeris chusana), spathoglottis (Spathoglottis sp.), paspalum (Paspalum sp.), puhala (Pandanus odoratissimus), rhodomyrtus (Rhodomyrtus tomentosa), silver oak (Greviliea robusta), guava (Psidium guajava), Java plum (Syzygium cumini), and scrubby 'ōhi'a lehua (Metrosideros collina). The nearest temperature tracking station, located in Kīlauea (317 feet [ft] elevation) records an average (mean) minimum of 66 degrees Fahrenheit to an average maximum of 84 degrees Fahrenheit (Armstrong 1983). Given the project sites' and study areas' proximity to the coast, the average temperature ranges may be a few degrees higher. Rainfall averages around 80 inches per year (Juvik and Juvik 1998:56). Earle (1978) describes the Halele'a District surrounding the project area in terms of the natural topography and stream catchments as they relate to *ahupua'a*:

Halelea is divided into nine *ahupua* '*a*, the boundaries of which were determined by topographic features. The four largest *ahupua* '*a*—Wainiha, Lumahai, Hanalei, and Kalihiwai—are each based on the catchment basin of a single large stream. The catchment areas of these streams are separated from each other by the dramatic ridges which form the political boundaries between ahupua'a . . . these boundaries deviate from the dominant, natural divisions so as to divide sections of critical resources between ahupua'a. The five smaller ahupua'a—Ha'ena, Waikoko, Waipā, Wai'oli, and Kalihikai—are based on the catchment areas of one or more smaller, permanent streams. [Earle 1978:25]

Reef structure and a related sand bar at the mouth of the Wai'oli Stream creates a small estuary, naturally backing water *mauka* (inland, toward the mountains) of the Wai'oli Stream Bridge. The surf break off the sand spit at the mouth of the Wai'oli Stream is known as "Grandpa's." Manolau is the name of the inhabited first terrace *mauka* of Grandpa's and the steep ridgeline of Makaihuwa'a Ridge marks the boundary of Wai'oli and Waikoko. Headed westerly along Kūhiō Highway toward the Waipā Stream Bridge and Waikoko Stream Bridge, one enters Waipā Ahupua'a, just seaward of Makaihuwa'a Ridge, and passes over the western portion of the Hanalei Plain at elevations of 6 meters (m) (20 ft), or less, above sea level, to the border with Waikoko Ahupua'a to the west. Figure 16 and Figure 17 indicate the soils series present within the project areas/APE. Earle (1978) provides the following summation of Waipā Ahupua'a:

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

The *ahupua* 'a of Waipā is relatively small (6.8 square kilometers) but it includes several good areas for irrigated agriculture. Waipā has a coastal strip on Hanalei Bay, but no coral reefs. The boundaries extend inland to include the catchment area of the Waipā stream. This stream travels through a narrow valley until, 0.8 kilometers (km) from the sea, it enters a flat alluvial plain about 1.2 km across. The westerly 0.2 km of this plain is divided off as part of the *ahupua* 'a of Waikoko. In addition to the dominant stream called Kīwa'a which empties into the same alluvial flat. Discharge from this second stream has made the central and eastern parts of the flatland quite marshy . . . [Earle 1978:33]

The Waikoko Stream Bridge crossing exists immediately *mauka* of the Pohakuopio reefs, also known as the surf break "Waikokos" at the foot of Pohakuopio Ridge. The portions of the project area identified as Staging Areas 1 and 2 exist as switchback pull-out areas along Kūhiō Highway on Pohakuopio Ridge, a *makai* (seaward) extension of Pu'u Ka Manu, "the bird hill," or Pu'u Hinihini at an elevation of 210 m (690 ft) above sea level. The broad expanse of Lumaha'i Beach exists downslope *makai* and to the west of these staging areas, punctuated by Kolokolo Point, where the mouth of the Lumaha'i River creates an estuary similar to that of Wai'oli. Earle (1978) provides the following overview for Lumaha'i Ahupua'a:

Lumaha'i is a large *ahupua 'a* (36.9 square kilometers) including the catchment area of the major stream, Lumaha'i. Like Wainiha, the Lumaha'i Stream starts in a deep valley thrusted into the central mountains of Kaua'i. The upper part of the stream is joined by numerous tributaries, which rush down the steep valley slopes. About 1.5 kilometers (km) from the sea, the stream enters a compact alluvial plain bounded on either side by the valley ridges and on the sea by low sand dunes. The coast is 1.2 km long with no significant reefs. [Earle 1978:32]

Continuing westward on Kūhiō Highway, crossing Kolokolo Point to Wainiha Valley and the portion of the project area at Wainiha Stream Bridge 1 and Wainiha River Bridges 2 and 3. These portions of the project area cross the mouth of the Wainiha River at the Wainiha Beach Park, where a substantial sand bar extends across the river mouth to create a small estuary similar to those found at Wai'oli and Lumaha'i. Although there is some rock outcrop (rRO) where Waipā meets Wai'oli Ahupua'a, the majority of the soil within this portion of the project area consists of Hihimanu silty clay loam with occasional slopes of 40 to 70% (HMMF) (Foote et al. 1972). Soils underlying the highway are as diverse as the landscapes it traverses. Beginning in Wai'oli, the soils are identified as Mokuleia series and distinct variants stretch through Wai'oli and along the entire plain of Waipā into Waikoko, only interrupted once by the volcanic ridge of Makaihuwa'a that borders the highway just west of Wai'oli Stream. The soils of this area are typical of the Hihimanu series. This soil underlies the highway until just after the Lumaha'i Lookout where it again descends into the coastal flats and the associated Mokuleia sands. Beyond the Lumaha'i Bridge, the highway ascends into soils identified as Rough Broken Lands (rRR) that extend to just west of Wainiha. According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Foote et al. (1972), Mokuleia soils are described as follows:

... well-drained soils along the coastal plains on the islands of Oahu and Kauai. These soils formed in recent alluvium deposited over coral sand. They are shallow

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

and nearly level. Elevations range from nearly sea level to 100 feet. The annual rainfall amounts to 15 to 40 inches on Oahu and 50 to 100 inches on Kauai. The mean annual soil temperature is 74° F. Mokuleia soils are geographically associated with Hanalei, Jaucas, and Keaau soils. The soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of *kiawe*, *klu*, *koa haole*, and Bermuda grass in the drier areas and napier grass, guava, and *joee* in the wetter areas. [Foote et al. 1972:95]

Hihimanu soils are described as follows:

... well-drained soils on uplands on the island of Kauai. These soils developed in material weathered from basic igneous rock and colluvium at the base of slopes. They are very steep. Elevations range from 100 to 2,000 feet. The annual rainfall amounts to 70 to 120 inches. The mean annual soil temperature is 69° F. Hihimanu soils are geographically associated with Hanalei and Hanamaulu soils. These soils are used for water supply, pasture, wildlife habitat, and woodland. The natural vegetation consists of *koa*, melastoma, yellow foxtail, lantana, false staghornfern, paspalum, *hala*, guava, *ohia*, and associated shrubs and grasses. [Foote et al. 1972:40]

Rough Broken Lands (rRR) are described as follows:

... consists of very steep land broken by numerous intermittent drainage channels. In most places it is not stony. It occurs in gulches and on mountainsides on all the Islands except Oahu. The slope is 40 to 70 percent. Elevations range from nearly sea level to about 8,000 feet. The local relief is generally between 25 and 500 feet. Runoff is rapid, and geologic erosion is active. The annual rainfall amounts to 25 to more than 200 inches. These soils are variable. They are 20 to more than 60 inches deep over weathered rock. In most places some weathered rock fragments are mixed with the soil material. Small areas of rock outcrop, stones, and soil slips are common . . . This land type is used primarily for watershed and wildlife habitat. In places it is used also for pasture and woodland. The dominant natural vegetation in the drier areas consists of guava, lantana, Natal redtop, bermuda grass, *koa haole*, and molasses grass. *Ohia, kukui, koa*, and ferns are dominant in the wetter areas. Puakeawe, *aalii*, and sweet vernal grass are common at the higher elevations. [Foote et al. 1972:119]

Soil types in the project areas/APE are shown in Figure 16 and Figure 17.

#### 1.4.2 Built Environment

The overall project area includes project sites, potential staging areas, and environmental study areas in Wai'oli, Waipā, Waikoko and Wainiha. All these locales are sections of Kūhiō Highway (Route 560, also a National Register and Hawai'i Register site known as the Kaua'i Belt Road), a stretch of highway from the vicinity of the Hanalei Valley overlook in the east to Kē'ē in the west.

Kuhio Highway is the only link to the main urban facilities of Kauai for residents westward beyond the project area on the north shore. Residents, the community and businesses depend entirely on the highway for access for the transportation of

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

goods, visitors, travel to and from schools, stores, the airport, hospitals and places of work. [Hawai'i Department of Transportation 2011:3]

Kūhiō Highway enters Waipā Ahupua'a on the east just seaward of Makaihuwa'a Ridge (just west of Wai'oli Stream) and passes over the western portion of the Hanalei Plain at elevation below 20 ft to the border with Waikoko Ahupua'a (to the west). On the eastern banks of the Waipā Stream crossing, *mauka* of Kūhiō Highway, the Waipā Foundation has built its facilities for a non-profit organization working to restore Waipā as a Native Hawaiian learning and community center (Figure 18). At the Wainiha River crossing is the Wainiha Beach Park and a small community of single family residences, vacation rentals, and the Wainiha General Store, a small family-owned grocery store (Figure 19). Generally speaking, the entire project area exists in a relatively undeveloped and serene portion of the north shore of Kauai'i, between the extensive preserves of Kamehameha School, Hono'Onapali Natural Reserve, the Alaka'i Wilderness Preserve and the Halelea Forest Reserve.

After crossing Waipā Bridge, the road follows the beach along the west shore of Hanalei Bay. The road then winds up and around the mountain ridge as it proceeds to Lumaha'i Valley. As it winds over the ridge, the road reaches an elevation of nearly 16' above sea level. Descending into Lumaha'i Valley, the road again follows the beach before crossing Lumaha'i Bridge and leaving the valley. Another mountain ridge is traversed before entering Wainiha Valley, where the road crosses the three Wainiha Bridges and passes through the small village of Wainiha. [Fung Associates 2013:10]

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 16. Aerial photograph (Google Earth 2013), showing a portion of the Wainiha Bridges project areas/APE, with overlay of soil series (soil boundaries from Foote et al. 1972, data source SSURGO 2001)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 17. Aerial photograph (Google Earth 2013), showing a portion of the Wainiha Bridges project areas/APE, with overlay of soil series (soil boundaries from Foote et al. 1972, data source SSURGO 2001).

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 18. Entrance to the Waipā Foundation and a portion of Kūhiō Highway, view to west immediately east of the Waipā Stream Bridge



Figure 19. The Wainiha General Store and a portion of Kūhiō Highway, view to west at the western terminus of the Wainiha Stream Bridge 1 portion of the project area

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple

# Section 2 Methods

CSH archaeologists Johnny Dudoit, B.A., Gerald Ida, B.A, Missy Kamai, B.A., William H. Folk, B.A., and principal investigator Hallett H. Hammatt, Ph.D., completed the fieldwork for this AIS, conducted in compliance with HAR §13-276, under state archaeological permit number 14-04, issued by the SHPD, per HAR §13-282. 11 person-days were required to complete fieldwork for this archaeological inventory survey.

# **2.1 Field Methods**

# 2.1.1 Pedestrian Survey

With the exceptions of the streams, a 100% pedestrian survey of the project areas/APE, including the potential staging areas was undertaken for the purpose of identification, documentation and site significance assessment of significant historic properties. (Figure 20 through Figure 22). The following methods were used to complete the pedestrian inspection of the current project area:

- 1. The boundary of the project area/APE was identified and maintained during the course of the pedestrian survey using a Garmin GPSMap 60CSx handheld GPS unit with the project area data uploaded and visible on the map screen;
- 2. The pedestrian survey of the project area/APE was accomplished through systematic transects at 2 to 5 m (6.5 to 16 ft) intervals, paralleling the long axis of each project area, the environmental study areas, and the potential staging areas.

Any historic properties identified within the project area/APE were documented with:

- 1. A detailed written description and evaluation of function, interrelationships, and significance;
- 2. Digital photographs;
- 3. Drawings and site profiles to scale using standard tape-and-compass mapping procedures; and
- 4. Locations were recorded using a Garmin GPSMap 60CSx handheld GPS unit and/or Trimble Pro XH mapping grade GPS unit with a real-time differential correction. This unit provided sub-meter horizontal accuracy in the field. GPS field data was postprocessed, yielding horizontal accuracy between 0.5 and 0.3 m. GPS location information was converted into GIS shape files using Trimble's Pathfinder Office software, version 2.80, and graphically displayed using ESRI's ArcGIS 9.1.

# 2.1.2 Shovel Testing

All shovel tests (ST) measured at least 0.5 m by 0.5 m and were excavated and documented according to the following methods (Figure 23):

- 1. The location of each ST was plotted on a plan view map;
- 2. Excavation occurred according to stratigraphy, with sediments from each identified stratum; and
- 3. Recording of soil stratigraphy was made by scale drawing of at least one profile per ST, as well as soil descriptions for each unit using standard USDA Soil terminology.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

# 2.2 Laboratory Methods

No cultural material was collected during the AIS. No laboratory analysis was conducted.

# 2.3 Disposition of Materials

No cultural material was collected during this AIS. All data generated during the course of the AIS is stored at the CSH offices. Final disposition in an agreed upon archive of any non-burial materials associated with this investigation will be determined in consultation with the landowner.

# **2.4 Research Methods**

Background research included a review of previous archaeological studies on file at the SHPD; review of documents at Hamilton Library of the University of Hawai'i at Mānoa, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library and the Bishop Museum Archives; study of historic photographs at the Hawai'i State Archives and the Bishop Museum Archives, Kaua'i Historical Society and the Kauai Museum; and study of historical maps at the Survey Office of the Department of Land and Natural Resources. Historical maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona 'Aina database (Waihona 'Aina 2000) and the Office of Hawaii Affairs (OHA) Papakilo Database (OHA 2014). This research provided the environmental, cultural, historical, and archaeological background for the project areas/APE. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project areas/APE.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 20. CSH archaeologist conducting pedestrian survey of a portion of the project areas/APE



Figure 21. Potential Staging Area 1 within the project area/APE

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 22. Potential Staging Area 2 within the project area/APE

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 23. CSH archaeologist conducting Shovel Test 4 within the project area/APE

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

# Section 3 Background Research

# 3.1 Overview

The Island of Kaua'i, affectionately described as "*Kaua'i nui moku lehua pane'e lua i ke kai*" (Great Kaua'i of the lehua groves which seem to move two-by-two to the shore), is the oldest of the larger main Hawaiian Islands (Maly and Maly 2003:5). Historically, it was divided into several districts and political units which in ancient times were subject to various chiefs—sometimes independently, and at other times, in unity with the other districts; these early *moku o loko* or districts included Halele'a, Kona, Ko'olau, Nāpali, and Puna (Maly and Maly 2003:5). The lands of the Halele'a-Nāpali districts were highly valued by the *maka'āinana* (commoner) because of the streams and fresh water resources that could be diverted into extensive *lo'i kalo* (taro pond field systems). The wealth of these lands was further enhanced by the sheltered bays and rich fisheries fronting them (Maly and Maly 2003:6).

The APE, consisting of the project sites, environmental study areas, and potential staging areas is located in the traditional *ahupua* 'a of Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha in the ancient district of Halele'a (see Figure 1), one of five ancient districts on Kaua'i (King 1935:228). This report examines legends and myths in the Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a for information regarding traditional Hawaiian customs and practices. Legendary accounts for these five *ahupua'a* are included from the eastern *ahupua'a* of Wai'oli to the western *ahupua'a* of Wainiha. For the purpose of this study, Waipā and Waikoko Ahupua'a are treated together because of their size and the relatively modest recorded traditions.

# 3.2 Traditional and Historical Background

With extensively cultivated *kalo* (taro) regions and fishing areas that provided an abundant food supply, the North Shore of Kaua'i was well populated in ancient times. Traditionally, Hawaiians relied on their well-developed navigational skills and would have traveled along the coast by canoe. The Hawaiian population living in the north shore valleys may have also traveled along an ancient foot trail that connected communities between Hanalei and Ha'ena (Fung Associates 2013:11).

## 3.2.1 Traditional and Legendary Accounts of Wai'oli

3.2.1.1 Ka-nē-loa Seeks a Bride, the Kapa of Wai'oli

A romantic narrative of unknown origin called "Wai'oli" is retold by Frederick B. Wichman in *Kauai Tales* (1985:44–60). This legend tells of the god Ka-nē-loa coming to Kaua'i and landing at Manolau/Monolau, a place where Wai'oli Stream enters the ocean and where canoes would be moored, to seek a bride. This visit brings the rainbow to Kaua'i. The legend describes the making of different colored tapa associated with specific place names in Wai'oli. Specific reference is made to a number of things used for tapa making including *noni*, '*alani wai*, '*ōlena*, *mamaki*, '*uki'uki* berries, sea urchins, *hala*, *kalili*, burned sugarcane, coconut milk, and *maile*.Wai'oli was a center of tapa arts. Charles Wilkes, Commander of the United States exploring expedition who attended Rev. William Alexander's church in Wai'oli in 1840 remarked,

They were all much struck with the dress of the native women, its unusual neatness and becoming appearance. It seemed remarkable that so many of them should be

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

clothed in foreign manufacture, and that apparently of an expensive kind; but on closer examination, the dressed proved to be *tapas*, printed in imitation of merino shalls, ribands . . . [Riznik 1987:10]

#### 3.2.1.2 Laka and the Heiau of Nakikoniawaiaau (SIHP # 50-30-03-145) in Wai'oli

Thomas Thrum in his 1907 Annual describes the *heiau* of Nakikoniawaiaau (SIHP # 50-30-03-145) in Wai'oli uka as "An open paved space, not large, dedicated to Laka, to which offerings at the annual festivities were brought" (Thrum 1907:43).

#### 3.2.1.3 Lonoikamakahiki

Kamakau and Fornander tell of Lono-i-ka-makahiki, a son of Keawe-nui-a-'Umi who goes crazy and wanders for a long time on Kaua'i and when he regains sanity, his faithful attendant sings a song reminding him of the places they wandered, especially on Kaua'i, and one of the lines recalls "Ka ua ho'opala 'ohi'a o Wai'oli—The rain that ripened the mountain apples of Wai'oli" (Fornander 1919:4[2]:358–359; Kamakau 1961:52)

Fornander's account of Keawe-nui-a-'Umi, who lived sometime in the sixteenth century, in the "Story of Lonoikamakahiki" gives the same interpretation (Fornander 1917-1918:4[2]:358–359).

## 3.2.1.4 Menehune Lighthouse at Makaihuwa'a

Makaihuwa'a Ridge, the steep prominence overlooking the Waipā Stream Bridge and Waikoko Stream Bridge includes three excavated pits on its ridgeline, a nearby village where tapa was traditionally produced, a taro *lo'i* and *heiau* (non-Christian place of worship) at its base. These significant cultural properties are discussed briefly below and further in Section 3.5. The Menehune Lighthouse at Makaihuwa'a is a reference to excavated pits in the steep ridgeline face on the western margin of Wai'oli, just *mauka* of Kūhiō Highway (Wheeler et al. 2013b). The possibility that these excavated pits are connected with traditional and legendary accounts of this location is explored more in Section 3.5.

Manolau/Monolau where Wai'oli Stream enters the ocean was inhabited and is a place where tapa was traditionally produced. Kupakoili Heiau, once at the northwest base of Makaihuwa'a Ridge, is also likely related to this traditional village and a canoe mooring in the estuary created by the sand bar at the mouth of the Waipā Stream. It is at Manolau/Monolau that canoes were moored and, in the Wai'oli story, tapa is beaten. It seems probable the area where Wai'oli Stream enters the ocean was a preferred landing and staging area and that, at least at times, fires would burn on Makaihuwa'a Ridge to guide canoes into this estuary.

Makaihuwa'a is translated, *maka-ihu-wa'a*, eye (prominence or mark)-nose-canoe, perhaps a reference to the signal fires discussed by Wichman (1998) in Appendix B, or even referring to phosphorescent glowing water at night. It is possible that from the ridgeline one could view phosphorescent algae glow seen in the water at night. Or it may be that the name references the vision one may have had when paddling near shore looking at the nose of one's canoe and seeing these reflections of glowing signal fires or of the phosphorescent algae in the water. That is, the lights in the water were seen at the nose of the canoe because the canoe was breaking the water and agitating the algae, causing it to glow. Regarding Makaihuwa'a Ridge, Wichman (1998:113) relates the following:

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Makaihuwa'a, 'eyes for the canoe prow,' is a ridge rising from the Wai'oli River. Menehune fishermen complained that on dark nights they could not find their way back to land when fishing on the deep ocean. Their chief devised a plan. He ordered his men to dig out a platform halfway up the ridge and place large torches there. On a dark night the light from these torches could easily be seen from outside the bay. In this way the first lighthouse in Hawai'i was built. [Wichman 1998:113]

The original source for this account is cited as Joseph A. Akina's "The Story of the Menehune People" from 1904 (translated by Frances Frazier). A longer account is provided in Wichman's (1985:35–42) "Ma-Ka-Ihu-Wa'a" chapter of *Kauai Tales* (presented in full in present Appendix B). This account provides details that fishermen operating out of Hanalei Bay scattered from Hā'ena to Kīlauea. An undercurrent of the story is that *menehune* (legendary small people) proverbially had to complete their work at night which would require *menehune* fishermen getting back to shore in the pre-dawn in order to "feed all the Menehune at their daily feast that finished just before daybreak" (Wichman 1985:36). In the Wichman (1985) account it is the concern of a *menehune* chief for the welfare of his people that leads him to ponder a solution to the *menehune* fishermens' problem. As he moves about at night, his attendants carry torches and *lamakū* (*kukui* nuts strung on a midrib; signal fires). He gets the idea to use such *kukui* nut torches as an aid to navigation and in the pre-dawn set "a line of *lamakū* burning and sputtering along the beach." The experiment helped a little but the light could not be seen from far off shore. The leader of the fishermen (described as owl-like) said, "The idea is good. The lights are good. But they need to be higher." (Wichman 1985:40). Thus:

The chief . . . climbed up the ridge. When he could look out over the treetops and the clouds swirled just above his head, the chief ... [said] 'Here we must dig out a platform from the edge of the ridge, large enough to place all the *lamak* $\bar{u}$  we need to light our fishermen home again.' The Menehune went about the chore with their usual good sense, sound engineering, and the knowledge that many hands working together make any chore easier and quicker. A small platform dug out of the side of a hill was a simple chore compared to many others they had done in years past. . . One group dug away the dirt and formed the platform. Another group formed a line reaching to the river beds of Waipa'a and Waikoko and passed smooth stones hand to hand to the work site. Before half the night was gone the platform was finished and paved with stones. All that time the torchbearers were busy trying to keep their torches lit . . . the rain sometimes fell so hard that the flames sputtered and danced away so far they became lost and went out. The chief sat father up the ridge where he could see the work, and his voice shouting instructions could be heard. 'Build a roof over the platform' he yelled into the stormy night. 'It must be higher in front than in back. It must protect the torches from the rain. It must also be high enough so the roof won't catch on fire.' No sooner said than the work started. One group cut logs for uprights and the roof frame. Another group went for banana leaves which, laid down carefully, made a waterproof cover. Soon a flat roof with no walls had been built over the platform. The *lamak* $\bar{u}$  were set in place and lit. For the rest of the night the flames sputtered and danced and poured a beacon of light into the dark and stormy night. [Wichman 1985:41–42]

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

As a result of the development of the effective aid to navigation, the fishermen have a great catch, the chief is adored, and Halele'a is a house of joy.

#### 3.2.1.5 Mo'o Accounts

The hill Ka-mo'o-kolea-ka was once a dangerous *mo* 'o (dragon) who lured the unwary to their deaths with a show of friendliness (Wichman 1985:49).

3.2.1.6 'Ōlelo No'eau (Sayings and Proverbs)

When Kamehameha dreamed of conquest of Kaua'i, he mentioned the southernmost boundary of Wai'oli, Namolokama, as one of the places he wished to enjoy:

E holo a inu i ka wai o Wailua, a hume i ka wai o Nāmolokama, a'ai i ka 'anae 'au of Kawaimakua i Hā'ena, a lei ho'i i ka pahapaha o Polihale, a laila, ho'i mai a O'ahu, 'oia ka 'āina e noho ai

Let [us] go and drink the water of Wailua, wear a loincloth in the water of Nāmolokama, eat the mullet that swim in Kawaimakua at Hā'ena, wreathe [ourselves] with the seaweed of Polihale, then return to O'ahu, the land to dwell upon. [Pukui and Elbert 1986:271]

Another saying is, "'*U*'*ina ka wai o Nāmolokama*" (The water of Nāmolokama falls with a rumble) because Nāmolokama Falls, Kaua'i is famous in chants and songs (Pukui 1983,:313:Proverb 2860).

3.2.1.7 Rain Names of Wai'oli

The rain that ripened the mountain apples of Wai'oli (*Ka ua ho'opala 'ohi'a o Wai'oli*) is referred to in the Lonoikamakahiki traditions (Fornander 1919:4(2):358–359; Kamakau 1961:52). Wichman's (1985:49) account of "Waioli" associates Lani-huli, with the yellow rain called Ualena. Wichman (1998:113) relates that the wind associated with the massif Nāmolokama is "Ualani-pili," "rain of the near heavens."

3.2.1.8 Wind Names of Wai'oli

Accounts of the "Legend of Kuapaka'a" name the wind of Wai'oli as "Waiamau" (*He waiamau ko Wai'oli*) (Fornander 1917-1918:5[1]:96–97). Wichman (1998:113) relates that the wind associated with the massif Nāmolokama is "Ua-lani-pili," "rain of the near heavens."

#### 3.2.2 Traditional and Legendary Accounts of Waipā and Waikoko

Waipā Ahupua'a is located on the north shore of the island of Kaua'i between the *ahupua'a* of Wai'oli (east) and Waikoko (west). The relationship between these *ahupua'a* is shown on Figure 1. Place names mentioned in this section are compiled from a few sources (Land Commission Awards [LCA]; Pukui et al. 1974; Wichman 1985):

3.2.2.1 Waipā and Waikoko Place Names

Awaa	'Ili (land section; subdivision of an ahupua'a) of
	Waipā (LCA 10663:1)
Haaheo	<i>'lli</i> of Waipā (LCA 10076:2; 10171)
Haako	<i>'lli</i> of Waipā (LCA 9832)
Halaloa	<i>'lli</i> of Waipā (LCA 235-N:1)

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Halulu	Wichman (1985:114) cites this as a place in Waipā named after a fabulous bird
Hanalei Bay Kahalahala Kahihiilu	USGS map, coastal frontage of Waipā and eastern Waikoko; literally "crescent bay" (Pukui et al. 1974:40–41); Wichman (1985:108) traces the name to "wreath making" and " <i>lei</i> valley" relating "The wreaths are the rainbows that appear in the upper valley from the constant rain showers." Wichman (1985:115) cites this as a beach near Makahoa Point named after the "young stage of the <i>kāhala</i> ( <i>Seriola dumerilii</i> ) fish." ' <i>Ili</i> of Waipā (LCA 7918:3)
Kahula'ana	Wichman (1985:116) cites this as "a cliff-point at the seashore where one must swim around to the beach on the other side of the cliff" near Makahoa Point.
Kaluanono	<i>'lli</i> of Waipā (LCA 10171)
Kamani	USGS map, 1,002-ft high peak on west boundary of
	Waipā with Lumaha'i
Kaooa	USGS map, area on east boundary ridge where
Kapailu	Waikoko, Waipā, and Lumaha'i come together USGS map, area on west boundary of Waipā with
	Lumaha'i at approximately 2,000 ft elevation
Kapalikea	USGS map, approximately 1,000-ft high peak, east boundary of Waipā and Wai'oli
Kapuhae	<i>'lli</i> of Waipā (LCA 7918:2)
Kawahine	<i>'Ili</i> of Waipā (LCA 7918:1)
Kīwa'a	Wichman (1985:114) cites this as a place in Waipā
	named after a fabulous bird.
Kolopua	USGS map, 1,270-ft high peak on west boundary of Wainā with Lumaha'i
Kuahua	USGS map flats back from coast shared by Waikoko
Trainau	and Wainā
Kuhihiilu	( $IIi$ of Waipā (LCA 7918.3)
Mahina Kēhau	USGS man approximately 1 600-ft high neak on
	west boundary with Lumaha'i
Makahoa Point	Point Hanalei Bay: ridge and <i>heigu</i> near Kaunalewa
Wakanoa I onit	Kaua'i; literally, "friendly point" (Pukui et al.
	19/4:140
Makaihuwa <sup>*</sup> a	with Wai'oli
Māmalahoa Peak	USGS maps, 3,745-ft high peak where Lumaha'i, Waipā, and Wai'oli come together; peak, Hanalei District, Kaua'i (Pukui et al. 1974:144); perhaps named after a wife of the god, Kāne (Wichman 1985:113)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Papahoiki Pu'a'anui	<i>'Ili</i> of Waipā (LCA 10661) <i>'Ili</i> of Waipā (LCA 235-N <sup>.</sup> 2)
Pu'u Ka Manu	USGS map, 690-ft high hill on east boundary with
	Waikoko; literally, "the bird hill" (Pukui et al.
	1974:198)
Waiakaaka	Mo'o (narrow strip of land, smaller than an 'ili) of
	Waipā (LCA 3917:4)
Waipā	Land division and stream; literally, "touched water"
	(Pukui et al. 1974:227); Wichman (1998:114) relates
	the meaning "to request to the gods in prayer"
Waiokihi	USGS map, 947-ft high peak on east boundary of
	Waipā with Wai'oli
Waioli	<i>'Ili</i> of Waipā (LCA 10663:2)
Waipa'a	Given by Wichman (1985:114) as a variant of Waipā,
-	"dammed-up water" referring to the frequent building up of
	a sand bar at the stream mouth

#### 3.2.2.2 Damming of the Waters of Waipā

Wichman (1998) refers to a tradition behind the periodic damming of the waters of Waipā by a sand bar at the coast:

This, according to legend, was caused by a chief named Lauhaka. His mother left her husband, Kalākānehina, the ruling chief of Waimea, during the time of the kona kingdom because of his cruelty. Lauhaka was raised in the mountains by his uncle, a bird catcher. Learning that two bird catchers were catching the forbidden *'ua 'u*, the dark-rumped petrel, Kalākānehina sent some warriors to kill them. Lauhaka stationed himself on the steep path where only one man at a time could come toward him. As Lauhaka killed the soldiers the bodies fell into the stream and dammed up the river. [Wichman 1998:114]

Wichman (1998) also connects the naming of Waikoko to this story:

When Lauhaka was damming up the neighboring stream, the blood from the soldiers flowed into this stream and colored it red. In Ancient times, however, an aquatic plant grew in this stream that dyed the water red, but these plants disappeared when rice began to be grown here. [Wichman 1998:115]

3.2.2.3 Fabulous birds: Halulu and Kīwa'a

Wichman (1998) relates traditions of fabulous birds (both particularly associated with the Legend of Aukele) associated with two places at Waipā, Halulu, and Kīwa'a:

Halulu was the bird that the great god Kāne sent to the four directions of chaos to announce that he was about to create the world. *Halulu* was also the man-eating bird that could take on human form when he wished . . . Kīwa'a was Halulu's sister . . . The  $K\bar{i}wa'a$  is also the pilot bird that leads a navigator through the surf to the canoe shed at the landing place. [Wichman 1998:114]

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

## 3.2.2.4 '*Ōlohe*

Wichman (1998) retells a tale of brigands associated with Makahoa Point and an adjacent beach Kahalahala:

Ka-pu'a'a-pilau and two friends lived here, robbers well trained in the art of lua (bone-breaking). They were ' $\bar{o}lohe$  (robbers who removed all the hair from their head and body and kept their skin well-oiled and slippery). An ' $\bar{o}lohe$  inherited a fearsome reputation, usually well deserved. One of his friends watched from the ridge. If several travelers came together, the lookout called out, 'High tide!' and they were not attacked. However, if a single traveler, well-laden with goods came along, the look-out called, 'Low tide!' and the traveler was attacked, killed, and his body placed in a hole in the tongue of lava at the foot of Makahoa Ridge. In time, the body was taken out to sea by the waves and brought ashore onto the sands. The *konohiki* of Wainiha was disturbed that so many bodies were coming ashore and sent a man to spy on the situation. This man saw and heard what was happening and reported back to his chief. The chief and his warriors successfully killed the three robbers, and their bodies were thrown into the pit where they had disposed of their own victims. [Wichman 1998:115–116]

#### 3.2.2.5 Mo 'o Accounts

Wichman (1998) tells a traditional tale of Ka-hula'ana—''a cliff point at the seashore where one must swim around to the beach on the other side of the cliff' which is probably related to the following Hi'iaka account:

When Hi'iaka and Wahine-'ōma'o came, Ho'ohila, the *mo 'o* who guarded the cave sent large waves to see what Hi'iaka would do. Wahine-'ōma'o scooped up a handful of sand and flung it into the *mo 'o*'s eyes. Ho'ohila retreated into her cave, her spell forgotten. The waved died down and Hi'iaka and her friend continued on their way. [Wichman 1998:115–116]

This path washed out anytime there was a storm, which meant a traveler had to return home to wait until the path had been repaired or swim around it in dangerous waters.

## 3.2.2.6 'Ōlelo No 'eau

Pukui et al. (1974:227) explains the name "Waipā" as meaning "touched water" but no explanation of derivation is given. Pukui et al. (1974:223) explain the name "Waikoko" as meaning "blood water" but again no explanation of derivation is given. Waipā is the name of a wind and location on Kaua'i. Pukui (1983) explains that *Waipā* is a reference to one who cannot refrain from touching or pawing and relates the saying:

Ho 'opāpā i Waipā ka Lūpua. The Lūpua wind touches at Waipā. [Pukui 1983:118]

## 3.2.2.7 Legend of Paka'a

Given by his mother "a finely polished calabash containing the bones of his grandmother Loa, who in her life had controlled the winds of every district from Hawaii on the east of Kaula on the west of the group . . . [and taught] how to open the calabash and call the name of whatever wind he desires" (Beckwith 1970:86). Paka'a passed this lore on to his son, Kuapaka'a, who had

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

occasion to use it when the chief Keawenuiaumi came to Moloka'i in search of Paka'a (Dye 2004:6). In order to bring about a storm that will drive Keawenuiaumi's canoes ashore, Paka'a tells Kuapaka'a to call for the winds of Kaua'i and Ni'ihau:

... He luha ko Hanalei He waiamau ko Waioli He puunahele ko Waipa He haukolo ko Lumahai He lupua ko Wainiha ...

[Translation] ... The luha is of Hanalei The waiamau is of Waioli The puunahele is of Waipa The haukolo is of Lumahai The lupua is of Wainiha ... [Fornander 1918:96–97]

3.2.2.8 Lono-i-ka-makahiki

Although not mentioned specifically, Waipā was likely visited by Lono-i-ka-makahiki while he wandered through the wilderness of Kaua'i with his companion, Kapa-'ihi-a-hilina, out of his mind with grief for having killed his wife, Ka-iki-lani-kohe-panai'o (Dye 2004:7). Kapa-'ihi-a-hilina composed a chant of affection for the chief, recounting their wanderings in the wilderness of Kaua'i:

He kaʻupu e Lono e,	A friend [was I] O Lono,
He kanaka au no ka ua iki,	A server was I in the light rain,
Ina hoʻi ha he hoa au no ka ua iki	I was your companion in the light
la pa'ia,	rain of the forest,
He hoa i ka nahele lauhala loloa,	A companion in the long-leafed panadanus groves,
Mai Kilauea a Kahili la,	[That extend] from Kilauea to Kalihi,
O ka hala i 'aina kepa 'ia e ka	The pandanus [whose fruit] is
manu	pecked by the birds,
O Poʻoku i Hanalei la.	[The pandanus] of Po'oku in Hanalei.
Hala ia mao a ka ua e ka hoa e,	There we were till the rain ceased falling,
He hoa i ka makani lauwili	O my companion, My companion in the hurrying
Poʻaihele,	whirlwind,
Mauka o Hanalei iki a Hanalei nui,	In the uplands of lesser Hanalei,
	of greater Hanalei,
Mauka mai hoʻi kekahi ua,	[In] the rain that came from the uplands,
Makai mai hoʻi kekahi ua,	Rain that came from the lowlands,
Ma naʻe mai hoʻi kekahi ua,	Rain that came from the east,
Malalo mai hoʻi kekahi ua,	Rain that came from the south,
Maluna iho hoʻi kekahi ua,	Rain that came from the above,
Malalo aʻe hoʻi kekahi ua,	Rain that came from below,
Ma ka lae hala o Pu'upaoa,	Along the cape of Pu'upaoa, over-grown with pandanus,
Ilaila ka ua kike hala,	There was the rain that pelted the

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	pandanus fruit,
Hoʻowalea ike oneʻai a ke kinaʻu,	Drenching the sand where the sand eels fed,
He kiaʻuʻai hala o Mahamoku,	The eels that ate the pandanus of
	Mahamoku,
Ka ua hoʻopala ʻohiʻa o Waiʻoli	The rain that ripened the mountain apples of Wai'oli
[Kamakau 1992:48–51]	

3.2.3 Traditional and Legendary Accounts of Lumaha'i

Wichman (1998:116) notes a difference of opinion on the spelling and pronunciation of this *ahupua* '*a* citing the opinion of Lyle A. Dickey that the name is "Lumahai" (without a glottal stop) and that it is "so named for a medicinal plant and also a string figure (cat's cradle)." Pukui et al. (1974:136) offer no explanation for the name "Lumaha'i."

3.2.3.1 Ka'alele of the red rocks

Rice (1923) gives the following account:

One day as the Menehunes were bathing at Lumaha'i, one of them caught a large *ulua*. The fish tried to escape, but the little man struggled bravely, and finally killed it. The man was so badly wounded, however, that his blood flowed over the spot and turned the earth and stones red. This place is still called Ka-'a-le-le, from the name of the wounded man. [Rice 1923:44–45]

Wichman (1998:117) indicates the "Rocks called *Ka'alele*, 'messenger,'" near the river mouth are noted for their redness.

3.2.3.2 Ka-hala-o-Māpuana "Pandanus of Māpuana"

Wichman (1998) retells the story Ka-hala-o-Māpuana "Pandanus of Māpuana":

*Ka-hala-o-Māpuana*, 'Pandanus of Māpuana,' was a grove of pandanus trees beside the beach. One tree, the transformed body of Māpuana, bore red fruit instead of the usual yellow and was famed for its fragrance. Māpuana was the youngest sister of 'Aiwohikupua. They came to Kaua'i from Tahiti during the time of Ka'ililauokekoa. Their older sisters were Maile-ha'i-wale, 'easily broken maile,' Maile-kaluhea, 'fragrant maile,' Maile-lau-li'i, 'small-leafed maile,' and Maile-lepa-kaha, 'maile of the striped flag marker.' 'Aiwohikupua tried to win Lā'ieikawai as his wife with the aid of his sisters, but when they chose to become her guardians and refused to let her marry him, he deserted them on Hawai'i. After Lā'ieikawai married a Kaua'i chieftain, the sisters returned to Kaua'i with her. [Wichman 1998:121]

3.2.3.3 Ka-'ī-li-o-pā-'ia Heiau

Rice (1923) gives the following account:

On the plain above the Lumahai River the Menehunes made their homes for a time. There one of the small men began to build a *heiau* which he called Ka-'ī-li-o-pā-'ia. As he was working, the big owl of Kāne came and sat on the stones. This bird was large enough to carry off a man, and, naturally, it frightened away the little

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workman. He returned next day, only to see the huge bird flying over the spot croaking. He also saw the great monster dog Kū-'ilio-loa, My-Long-Dog, running about the *heiau*. These evil omens caused the Menehune to believe that the *heiau* was polluted, so he gave up his work. [Rice 1923:44–45]

Regarding the construction of this *heiau*, Wichman (1998) tells of an omen which is interpreted as a fear that the people of the *ahupua* 'a might be punished by a chief for some real or imaginary offense by imposing a tax so heavy as to be almost impossible to pay:

The *heiau* that a Menehune named Mā'ihi-lau-koa began soon after the Menehune arrived at Lumaha'i. First he marked the edges of the *heiau* with stakes of *hau* wood. Then he began to construct rock walls around a platform of coral. Before the work could be finished, a huge owl named Pueo-nui-o-Kāne, also known as Ka-'ā-'aia-nu'u-nui-a-Kāne, flew overhead. This was a fearful omen and gave rise to a saying: *Papapau kākou he 'ā'aia kō ka hale* The Legendary bird strikes at everyone. [Wichman 1998:120]

#### 3.2.3.4 Kealahula Point

Rice (1923) gives the following account:

At the point of Kealahula, at Lumaha'i, these wonderful men made a small hill on the seashore, by cutting off part of the point. You can still see the bare place on the ridge, where the earth was sliced off. At the base of this small hill the Menehunes placed a large stone, which they used as a jumping-off place. The hill is called Maka-ihu-wa'a, the Landing Place of the Canoes. [Rice 1923:44–45]

Rice (1923) also provides an account of Hi'iaka and her companions traveling from Hanalei past a place called Ke-ala-hula at Lumaha'i:

Coming to Kealahula [Lumaha'i] they saw Ho'ohila combing her hair. She, too, tried to delay their journey by making the sea break over the cliff. Wahine-omao threw sand into the eyes of the *akua*, and this difficulty was overcome. [Rice 1923:10]

3.2.3.5 Ke-alelo-o-Pilikua "tongue of Pilikua"

Wichman (1998) indicates,

*Ke-alelo-o-Pilikua*, 'tongue of Pilikua,' is the lava leaf on the west bank of the [Lumaha'i] river mouth jutting into the sea. Pilikua was a giant noted both for his size and his loud voice. He would stop every traveler to relate the beauties of Kaua'i before letting them continue. But the people of Lumaha'i, able to hear every word and unable to leave, got so tired of hearing the same things over and over again that they killed the giant and threw his body in the ocean. The birds and fish consumed all of his body except the tongue, which had grown so tough it could not be eaten, and so it remains to this day. [Wichman 1998:117–119]

3.2.3.6 Ke-hau-o-Mā'ihi "hau tree belonging to Mā'ihi"

Wichman (1998) connects Ke-hau-o-Mā'ihi with a menehune heiau:

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

*Ke-hau-o-Mā'ihi*, *'hau* tree belonging to Mā'ihi' or 'coolness of Mā'ihi' was a grove of *hau* trees. This grove is all that is left of the *heiau* that a Menehune named Mā'ihi-lau-koa began soon after the Menehune arrived at Lumaha'i. First he marked the edges of the *heiau* with stakes of *hau* wood . . . The *hau* stakes sprouted and became a grove of trees that cast a cool shade, welcoming weary travelers on hot days. [Wichman 1998:120–121]

#### 3.2.3.7 Ma'ina-kēhau Rock

Rice (1923) gives the following account:

During their stay at Lumahai one of the Menehunes who was skilled in stone carving tried to escape by climbing up the cliffs toward Wai'ale'ale. The *konohiki* sent his men to capture him. They overtook him at about the middle of the cliff, and the usual punishment was meted out to him—his body was turned into stone in the form of a man with a gray body and a white head. The path the pursuers followed zigzags up the steep *pali* to the stone, which is called *Ma-i-na-ke-ha-u*, the Man-Out-of-Breath. [Rice 1923:44–45]

Wichman (1998) relates the following account of the same feature:

*Waipi'o'ina-kēhau* is a boulder high in the cliffs. A Menehune stone carver was tired of his job. When he could not get his chief to let him change to something else, he decided to leave and started for the mountains. The *konohiki* Weli sent his men to bring him back. They overtook him at about the middle of the cliff and he was turned to stone. It is a huge boulder in the form of a man with a gray body and a white head. The name, which may be translated as 'sickening of the dews,' has come to figuratively mean 'man out of breath.' [Wichman 1998:119]

3.2.3.8 Nā 'ulu o Weli "breadfruit trees of Weli"

Weli, a bow-legged, deep-voiced *menehune konohiki*, king's sheriff or executor, is remembered as an agriculturalist. On the plain of Lumaha'i he planted breadfruit trees, which are there to this day. They were called *Nā-ulu-a-Weli*, after the *menehune*. Pukui et al. (1974:136) note "Breadfruit trees here are said to have been planted by a Menehune named Weli":

The grove *Nā 'ulu o Weli*, 'breadfruit trees of Weli,' was planted by Weli, the first Menehune *konohiki* of the *ahupua'a*, described as bow-legged and deep voiced. The hole in which the shoot was planted was dug by *Oha-ka-leo*, 'loving is the voice,' who instructed the tree so well on how to grow that it became famous for its huge fruit, which contained lots of meat. The branches also grew close to the ground and gave rise to a saying: *Nā 'ulu o Weli pūnohu mai ana*. 'The breadfruit trees of Weli spread out their low branches like clouds.' [Wichman 1998:121]

#### 3.2.3.9 Pā-na'ana'a Rock

Rice (1923) gives the following account of Pā-na'ana'a Rock:

The small explorers soon found their way to the head of Lumaha'i Valley, whence they crossed over to Wainiha. There they found an immense rock, one side of which was gray and the other black. This they hewed out into the shape of a *poi* board and

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

placed near the falls of the Lumaha'i River. To this day, the *wī*, or fresh-water shellfish, come out on the gray side in the daytime, and on the black side at night. Even now, no woman can successfully fish there unless she wears a certain *lei* of shredded *ti* leaves or breaks off two *lehua* branches, crying to the Kupua as she throws one to the *mauka* side, or toward the mountains, and one to the *makai* side, or toward the sea, '*Pa-na-a-na-a*, give us luck!' If a man fishes there, he first throws two small stones into the water, asking for success. [Rice 1923:44–45]

Wichman (1998) relates the following account of the same feature:

*Pā-na 'ana 'a*, 'protruding dish,' is a large, flat below a waterfall in the river. The rock was moved here by the Menehune from Wainiha. It was hewed out in the shape of a *poi* board and placed near the falls of the river. Half of the rock was gray and the other half black. To this day, the  $w\bar{i}$  (freshwater shellfish) come out on the gray side in the daytime and on the black at night. No woman can successfully fish there unless she ears a certain *lei* of shredded  $k\bar{i}$  leaves or breaks off two ' $\bar{o}hia$  *lehua* branches, crying to the *kupua* as she throws one to the *mauka* side and one to the makai: 'Eia he mohai a he alana na'u (e ha'i i ka inoa), ia 'oe e ka ho'olu'e a hoʻolaupaʻi wī o uka nei la, e noa hoʻi iau ka mana nui, mana iki o ke kahawai nei, a ho'i au me ka ho'opilikia ole ia, me ka nui ho'i ka'u wī ke ho'i, i ole ho'i au e hilahila i ka 'ōlelo ia mai he lawa 'a paoa e.' 'Here is an offering from (she must give her name) to bring forth an abundance of  $w\bar{i}$ , from the small mana and the large mana of this stream, grant that I do not get into difficulty and that the wi will not be shy.' When a man comes to fish for  $w\bar{i}$ , he must take two stones and throw one on the *mauka* side of the stream and one on the *makai* side. He also must break off two branches of lehua while saying:

E noa ia 'u ke kahawai nei e nā Menehune, Kini, Lau a lau ka 'oukou kokua ia 'u, i nui ka 'u wī e ho 'i ai i hau 'oli ko kauhale a pa 'a no ho 'i ka waha o ka po 'e waha 'a a leoleo 'a ho 'omahuakala ia 'u.

'Free me this stream, O Menehune, bring happiness to my house and confound those sharp-tongued, loud people who do not believe me.' If the rules are followed the  $w\bar{i}$  are abundant and easily caught.

The next nocturnal enterprise of these little men was to span the river with a bridge of flat stones, but freshets have since removed all traces of this work. [Wichman 1998:119]

3.2.3.10 Winds and shells of Lumaha'i

Accounts of the "Legend of Kuapaka'a" name the wind of Lumahai as "Haukolo" (Fornander 1917-1918:5[1]:96–97). Wichman (1998) reports that at Lumaha'i:

A special wind was *Kalena ka makani lawe pua hala'ai a ke kīna'u*, '*Kalena* is the wind that strews the pandanus fruit eaten by  $k\bar{n}a'u$  eels.' The  $k\bar{n}a'u$ , a small white eel, ate the *hala* fruit and in turn were eaten themselves. [Wichman 1998:117]

3.2.3.11 Pūpū o Lumaha'i

Pukui (1983) mentions the importance of a particular type of sea shell found at Lumaha'i:

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Waime'a O'ahu and Lumaha'i Kaua'i were the two places where the shells that were made into hat bands were found. Those on O'ahu were predominantly white and those on Kaua'i, brown. Not now seen. [Pukui 1983:191]

#### 3.2.4 Traditional and Legendary Accounts of Wainiha

3.2.4.1 Hi'iaka Traditions

When Hi'iaka arrives at Hā'ena in search of Lohi'au she meets Malae-ha'a-koa, a lame fisherman whom she greets:

*O Malae-ha'a-koa, Lawa'i'a o ka pali.* I hail thee Malae-ha'a-koa, thou fisherman of the cliffs.

*Keiki lawaia oe a Wainiha*. As a youth you fished at Wainiha.

[Emerson 1915:110]

Perhaps fishing from the cliffs was a well-known practice at Wainiha, as indicated by this chanted line:

I malenalena i Wainiha i ka'u makau. Peace, wave

Peace, waves, for my hook at Wainiha is less than clear.

[Emerson 1915:110]

3.2.4.2 Menehune Accounts

Perhaps the most popular mention of Wainiha in the folklore of Hawai'i is as the home of the legendary *menehune* and *mū* people. Described as shy and small in stature, some say they were the original inhabitants of Kaua'i, driven to the interior of the island by the arrival and flourishing of the Hawaiians. A census of Wainiha taken by the *konohiki* of the *ahupua'a* during the time of Kaumuali'i lists (in part) 65 men of Lā'au as *menehune* (Lydgate 1913:126). J.H. Kaiwi, Thrum's informant for the "Story of the Race of Menehunes," says his grandparents became familiar with the *menehune* while spending time collecting sandalwood in an area called Waineki in the Alaka'i Swamp, overlooking Wainiha (Thrum 1923:219).

The upper reaches of the valley were also where the bird catchers or *po'e hahai manu* practiced their skill at collecting the colorful feathers of forest birds which adorned capes, helmets, *lei(s)* and other objects usually associated with the *ali'i* class. In "A maiden from the Mu," Pukui (1951:67–75) relates the tribulations of Kiamanu, a bird catcher of Wainiha who marries a  $m\bar{u}$  girl. Wainiha bird catchers also figure in the tales of "Kanaloa-huluhulu" and "Lau-haka" by Wichman (1985:114–124). Many of these stories mention a well-traveled trail from Waimea on the southwest coast of the island, up through Kōke'e and across the Alaka'i Swamp, finally dropping down into Wainiha. In historic times, politician and outdoorsman Eric Knudsen (1946:202) traversed the island along this ancient trail on an annual basis. Knudsen describes an 1895 passage from Hanalei to Hā'ena as following little more than a trail (Fung Associates 2013:12).

3.2.4.3 Pele, Hi'iaka, and Malaeha'akoa

Wainiha is briefly mentioned in the epic myth of Pele and Hi'iaka as the place where Malaeha'akoa, the lame fisherman and seer, was raised. When Hi'iaka arrived on Kaua'i during

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

her mission to bring Pele's lover Lohi'au back to the island of Hawai'i, it was Malaeha'akoa who met her at Hā'ena and eventually told her of Lohi'au's death (Emerson 1978:109–131). Hi'iaka:

... met Malaeha'akoa at Naue as he was fishing. He was crippled and unable to walk. He recognized Hi'iaka and prepared a feast for her. The fisherman and his wife led the dancing and chanting of a long song recounting Pele's story, much to Hi'iaka's delight, and in return she restored his ability to walk. [Wichman 1998:124]

### 3.2.4.4 Kalauhe'e

Wichman (1998) retells an account associated with the place known as Ka'aluhe'e ("sagging one") (known also as Kalauhe'e, "slippery leaf"), a tributary stream on the east side of the Wainiha River:

On its banks, a lonely young woman beat her *kapa*. She was disfigured with birthmarks and people teased her by saying she was really a *loli* (seaslug). One day, as she beat her *kapa*, a *he* '*e mākoko* (deep ocean octopus) swam up the stream and settled on a rock near her. She was so lonely that she began to talk to the octopus. After many days the *he* '*e* revealed that he was a demi-god who could assume the form of a man. He assumed his human form and his face too, was marked as hers. Loli fell in love. She left her *tapa* soaking too long in the stream while they dallied. Her scandalized parents tried to separate the lovers, but Loli jumped off the nearby cliff. She was changed into a *he* '*e mākoko* to be united forever with her lover. [Wichman 1998:123]

#### 3.2.4.5 Ka'umaka (Kaūmaka)

Another storied place at Wainiha is Ka'umaka (also known as Kaūmaka). Wichman (1998) describes two accounts both involving a pair of fishermen and a shark's eye(s):

Ka'umaka-a-Mano's grandfather had united the island into one kingdom and his father Mano-kalani-pō, had been able to enlarge the cultivated lands. Hunting for the man-eating shark along Nāpali was popular. Ka'umakaamano went shark fishing, and that episode became the basis of the tales told of this point that bears his name.

Two brothers, Wa'awa'a-iki-na'auao and Wa'awa'a-iki-na'aupō, were fishing. The older, who didn't want to clean fish, said that all fish with two eyes belonged to the younger brother, while he, the older, owned all the fish with only one eye. A shark with only one eye (the other was blind and bulged out like a nipple, hence Kaūmaka, 'nipple,' a variation on the name) was caught by the younger brother, who immediately turned the line over to his older brother. The shark towed Wa'awa'aikina'auao out to sea where, with great difficulty, he escaped from the shark and returned to land.

Another story of this point concerns two male *kupua* named Ka'u-maka, 'my eye,' and Ka'u-weke 'my weke fish.' They were fishing at this cape, but all the small fish had disappeared. They saw a shark and Ka'umaka jumped into the water and fought with it. Ka'umaka was very strong and killed the shark. Ka'uweke was able

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

to catch *weke* (goatfish) from the headland once the shark was gone. The two feasted that evening. Ka'uweke on his favorite fish and Ka'umaka enjoying dining on the shark's eyes. [Wichman 1998:123]

In the Legend of Kuapaka'a, Kuapaka'a chants the names of the winds of Kaua'i and Lūpua is given as the wind of Wainiha (Fornander 1918-1919:96). Literary sources give an incomplete picture of the aboriginal settlement of Wainiha, but a degree of insight may be gained from their examination. Lydgate (1913), as mentioned before, reported on a census taken by the *konohiki* of Wainiha during Kaumuali'I's time. Kaumuali'i was the reigning chief of Kaua'i from 1794-1825 (Kamakau 1961:169, 265). At this time "upward of 2,000 souls" resided in the valley in the villages of (listed *makai* to *mauka*) Naue, Pā'ie'ie, Maunaloa, Pali'ele'ele, Maunahina, Pōhakuloa, Opaikea, Hōmaikalani, and Lā'au. Lydgate (1913) goes on:

Laau, the hamlet farthest *mauka* in the depths of the mountains, where the valley contracts to a narrow gorge, with a brawling stream running white in the bottom . . . All along up the river, wherever the encroaching *palis* on either side leave the least available space, the land has been terraced and walled up to make '*lo'is*.' And so the whole valley is a slowly ascending stairway of steps, broad in tread and low in the rise, all the way to Laau, where the last available space was won, if not by dwarfs, at least by someone who understood this kind of agricultural engineering. These artificial lands have long since reverted to the wilderness from which they came, and it is only by chance that the traveler stumbles upon them, beating his way through the jungle. But they bear witness to a large population . . . [Lydgate 1913:126]

Bennett (1931:136), during his survey of Kaua'i in 1928-1929, observed the remains of many terraced house sites and irrigated fields at Maunahina Ridge (Site 153), about  $4\frac{1}{2}$  miles from the sea. Interestingly, Maunahina is said to be the location of the ancient trail (Wichman 1985:114) which leads out of Wainiha, up to Kilohana at the north edge of the Alaka'i Swamp, through Kōke'e and down to Waimea on the southwest side of the island. Undoubtedly, the trail was used to take advantage of the resources of Alaka'i and as a shorter (however, more difficult) overland alternative route to Waimea. The use of this trail tempers the perception of Wainiha as simply a high-walled valley, open only at the shoreline, and perhaps was at least part of the incentive for habitation and development in the valley's upper reaches.

# 3.3 The Māhele and the Kuleana Act

In the mid-1800s (1845 and 1846), through the Organic Act, Kamehameha III decreed a division of lands called the Māhele which introduced private property into Hawaiian society (Chinen 1958). In 1848, lands were divided into three portions: crown lands, government lands, and lands set aside for the chiefs. Individual plots, called *kuleana* (Native Hawaiian land rights) awards, were granted within these divided lands to native inhabitants who lived on and farmed these plots and came forward to claim them. The population during this time period is unknown. A population distribution map by Coulter (1931) (Figure 24) indicates estimates for the population of Kaua'i ca. 1853, "was concentrated chiefly on the lower flood plains and delta plains of rivers where wet land taro was raised on the rich alluvial soil" (Coulter 1931:14). Table 1 summarizes the LCAs in the Halele'a District. Figure 25 and Figure 26 illustrate the locations of LCAs in the project areas/APE

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 24. Map showing population estimate for Kaua'i in 1853 (Coulter 1931:16)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

A list of konohiki (land manager) in Halele'a district (Earle 1973:274-277) includes

- James Kanehoe the son of John Young, foreign advisor to Kamehameha I, Kanehoa accompanied Liholiho to England and was his translator. He was *konohiki* of Waipā at about 1839.
- Koukou *konohiki* under Kanehoa in the 1840s; and
- Kamokuhina *konohiki* at the time of LCAs.

Maly and Maly (2003) provide information regarding Māhele 'Āina of Waipā Ahupua'a:

DISPOSITION OF LANDS: THE MAHELE 'AINA AND DEVELOPMENT OF FEE-SIMPLE PROPERTY AND FISHERY RIGHTS (CA. 1846-1855) By the middle 1840s, the Hawaiian system of land tenure was undergoing radical alteration, and the Hawaiian system of land and fishery rights being defined and codified. The laws set the foundation for implementing the Māhele 'Āina of 1848, which granted fee-simple ownership rights to the hoa'āina (common people of the land, native tenants). The records of the Māhele are of great importance, as they identify families associated with lands; describe practices on the land; and some, also identify fishery resources. During the Māhele at least 251 claims were registered for *kuleana* (by native tenants) and *ahupua'a* (by *ali'i* or *konohiki*) in the Halele'a District; of those claims, 194 were awarded. Thus, 57 applicants either withdrew their claims (many died in the process), or had their claims rejected as not being justified (Hawaii State Archives (HAS) Interior Department digitized records of claims in the collection of Kumu Pono Associates LLC and Hawaii Board of Commissioners Indices of Awards 1929). Only two claims were located for land in the Nāpali District. One being made by Hawele, for a parcel at Wailaulau (not awarded), the *ahupua'a* name not being given; and the other, being one-half of the ahupua'a of Hanakoa, awarded to Mokuohai (Buke Mahele 1848:76); who was also a resident landlord in the Kē'ē vicinity. [Maly and Maly 2003:6, 8, 18, 20, and 27–28]

Of the lands in the Halele'a District, the following list identifies the *ahupua'a*, number of claims made; and number of awards issued in each *ahupua'a*:

Ahupua'a	Number of Claims	Number of Award	<i>Ali'i</i> Claimant
Ha'ena	34	25	A. Paki
Hanalei	75	57	Kamehameha III/ Government
Kalihikai	15	14	A. Kealiiahonui
Lumaha'i	2	1	L. Konia
Waikoko	2	1	M. Kekauonohi
Wainiha	43	33	M. Kekauonohi
Waiʻoli	66	51	Kamehameha III/ Government
Waipā	14	12	R. Ke'elikolani and J.Y. Kanehoa

Table 1. Summary of LCAs in the Halele'a District

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Researching the claims and testimonies that were given in the mid-1800s can sometimes assist in forming a settlement pattern for the region at that time and possibly earlier. Thus, it is through records for Land Commission Awards generated during the Māhele that specific documentation of traditional life in Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a comes to light. Fisheries, as well as land uses, are described in the Māhele 'Āina of M. Kekuanaoa; to Keoni Ana:

I, M. Kekuanaoa, make known the prohibited fish of the lands of V. Kamamalu, and Ruta Keelikolani, on the island of Kauai . . . R. Keelikolani Apana 5: Waipa Hee. [Hawai'i State Archives Interior Department–Lands Document]

#### 3.3.1 Boundary Commission Testimonies (ca. 1873-1882)

Following the Māhele, there arose a need to define the boundaries and rights of *ahupua'a* awarded or sold to large private owners (Waihona 'Aina 2000). As a result, a Commission of Boundaries was formed, and testimonies from elder native residents taken. A thorough review of all records of the Boundary Commission was made as a part of this study. Narratives describing boundaries of the lands of Lumaha'i, Wai'oli, Waipā (Waipaa), and Hanalei are included as Appendix C. These narratives include testimonies describing land features, *wahi pana* (storied places), and the original notes of survey for the named lands. In the period leading up to, or as a part of the proceedings, maps were also produced in conformance with the testimonies and Certificate of Boundaries.

#### 3.3.2 The Māhele and the Kuleana Act of Wai'oli

From the LCA testimony it seems that by 1850 the people in the district had a tradition of shared resources, and functioned as part of the larger district entity rather than maintaining a separate *ahupua* 'a status. Even though neighboring *ahupua* 'a would have had their own resources, LCAs show some persons had agricultural land in Wai'oli but lived elsewhere, and some people living in Wai'oli had agricultural land elsewhere. During early historic times Wai'oli served as a nucleus of not only the new western culture and religion, but also as a resource garden for imported cultigens in the vicinity of the Wai'oli Mission.

The Land Commission Awards describe at least 154 taro *lo'i* along the Wai'oli Stream, the '*auwai* (ditch) systems, and Waikonono Stream, another small stream leading eventually down to the floodplain on the Nāpali side of Wai'oli Stream. There are 26 claims for house lots in Wai'oli with 12 persons claiming they live in Hanalei (LCAs 4109, 9139, 9261, 9274, 9275, 9276, 9278, 9280, 10593, 10594, 10915, and 11059) but have their *lo'i* in Wai'oli. Another claimant has a house lot in Wai'oli but the rest of his land is in Hā'ena (LCA 7949). Various other claimants mention they live in Wai'oli but do not claim a house lot. There are claims for 27 *kula* (pasture) in Wai'oli. There are no specified crops listed for any of the *kula*, but based on traditional *kula* lands, there would be sweet potatoes, yams, bananas, and sugarcane. One claimant mentions a *muliwai* (brackish water pond behind the sand dunes used for fishing; LCA 3781), and two mention a fishpond (LCAs 4109, 10309). The Land Commission Awards also include one for the Wai'oli Mission, where claim is for a framed schoolhouse, pasture land and cultivated grounds, a 4-acre taro patch, a Native Church on 1/2 acre, and pasture land on the narrow strip on the western side of the Wai'oli River.

Wai'oli, with 3,350 acres has 154 claims for *lo'i*, which works out to .046 *lo'i* per acre for the entire *ahupua'a* or probably 1.5 per acre on the 100 acres of floodplain. *Lo'i* represent 74% of

possessions claimed, kula 13%, house lots 12.6%, and other less than 1%. A scant 14% of the awardees claimed to have held the land prior to 1824. A quarter of the claimants received their land during the time Davida Papohaku, konohiki (land overseer) of Wai'oli from 1834-1837. Davida Papohaku or David Stonewall was one of the five members who came with Rev. Whitney to help organize the Wai'oli Mission and it was his duty to correct and help Mr. Alexander translate his sermons into Hawaiian. He came with 75 of his own retainers and they formed the little village of thatched huts known as Kalema or Bethlehem (Damon 1931:325). Perhaps these claimants' families came with Papohaku to the Hanalei area and were part of his train. Another fifth of the claimants received their land from Daniela Oleloa, a konohiki in the 1840s. Oleloa did not have a very high genealogy but he held four lands prior to the Mahele (Kame'eleihiwa 1992:280). There are 88 names mentioned in the LCAs as neighboring land cultivators or house lot holders and some of these persons such as Emelia received grants to the land but have no LCA listed for them. Others like Lewi and Kalili are shown in the LCA index as receiving land, but no maps show them as having title to the land (at least by 1912). We might assume they have died, perhaps intestate, or perhaps they have passed the land to someone else. In any case, someone else is shown occupying the land they claimed. Table 2 summarizes the LCAs along the highway in and around the environmental study area of Wai'oli for the current proposed project.

LCA # TMK or maps	Awardee	<i>Ahupua'a</i> and ' <i>Ili</i>	Land Use	Landscape Features	Amount
387 Lydgate 1912 map	ABCFM SIHP # 50-30- 03-9300	Waiʻoli	Wai'oli Mission residence, church schoolhouse, pasture land, and cultivated land	On the narrow strip of land on the western side of the Wai'oli River	9.79 acres
10305	Nahau, D.	Waiʻoli	House lot	Government road, jail house	2 acres 3 roods 2 rods
3781 5-5 Lydgate 1912	Opio	Wai'oli Manuakepa	House lot	road	2 acres 15 rods
9833B 5-5 Lydgate 1912	Ререе	Waiʻoli, Kapanoa, Kuloko, Nanipoa, Nanipoa	house lot	Government road, <i>muliwai</i>	2 acres 17 rods
4075 5-5 Lydgate 1912 map	Koi and Kapela	Waoili Kapuoa	House lot	Government road, <i>muliwai</i>	1 rood 1 rod
10663:2 5-6-04	Puaiki	Waiʻoli	Five <i>loʻi</i> in Waiʻoli	Five <i>loʻi</i>	Unknown

Table 2. Land Commission Awards along Kūhiō Highway in Wai'oli, from East to West

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

## 3.3.3 The Māhele and the Kuleana Act of Waipā and Waikoko

Waipā Ahupua'a was awarded to Ruta Ke'elikōlani, great-granddaughter of Kamehameha I, during the Māhele, LCA 7716:1, TMK: [4] 5-6-004, which became part of the Bishop Estate. It was one of 12 lands she retained, the majority of which were located on the islands of Hawai'i and Maui (Dye 2004). Eleven individuals were awarded lands in Waipā Ahupua'a (Figure 25). Table 3 summarizes the LCAs along the highway in and around the study area of Waipā for the current project. There were only two names mentioned in the Waikoko Ahupua'a but only one was awarded. LCA 11216 was given to M. Kekau'ōnohi, great-granddaughter of Kekaulike, King of Maui, and granddaughter of Kamehameha the Great. No land use or landscape features were given.

## 3.3.4 The Māhele and the Kuleana Act of Wainiha

Wainiha is part of a larger LCA (#11216.5) of M. Kekau'ōnohi. A study of all the claims and their supporting testimony for Wainiha shows a well-developed land system was in place. The overall settlement pattern, dating to the mid-1800s, exhibited habitation near the coast and agricultural undertakings in the well-watered interior areas. During his island-wide survey of Kaua'i in 1928-1929, Bennett (1931:136) observed the remains of many terraced house sites and irrigated fields at Maunahina Ridge (Site 153), about 7.2 km (4.5 miles) from the sea. Maunahina is said to be the location of the ancient trail (Wichman 1985:114), as mentioned above, which leads out of Wainiha, up to Kilohana at the north edge of the Alaka'i Swamp, through Kōke'e and down to Waimea on the southwest side of the island, used to take advantage of the resources of the Alaka'i and as an overland alternative route to Waimea. Earle's (1978:58–67, 126) analysis of the Land Commission Awards of 1850 shows that by that time, sites far inland were already abandoned and active use of the valley extended only about 2.4 km inland from the sea. At Wainiha, Earle's field survey identified six separate irrigation systems. Table 5 summarizes the LCAs along the highway in and around the proposed project area/APE of Wainiha, also illustrated in Figure 25.

## 3.3.5 The Māhele and the Kuleana Act of Lumaha'i

Basic *kuleana* documentation specifies that the entire *ahupua* 'a was awarded to L. Konia Wahine (Table 4, Figure 25, Figure 26). No individual *kuleana* are indicated by the Māhele data. In addition to the irrigated fields of *kalo*, it can be assumed that all the common Hawaiian agricultural crops were raised in Wainiha. Handy and Handy (1972) state the following:

There were, of course, house sites all through the valley on ground not suitable for irrigation. On such land sweet potatoes were planted. Bananas flourished: in 1931 *mai 'a Poloapola* (Borabora banana, *musa pehi*) was found in gulches. This Tahitian banana, which bears its fruit on an upright stalk, is said by local Hawaiians to be indigenous to Wainiha. *'Awa* of several varieties was growing there also, and undoubtedly the economic staples *wauke* and *olona* were planted. Specimens of yams were collected in 1931. [Handy and Handy 1972:420]

The *Foreign Testimony* (1850) presented before the Land Commission indicates Hawaiians were also raising more recently introduced crops such as oranges and coffee. The cultivation of rice came to Wainiha like many other *kalo*-growing areas in Hawai'i, during the late 1800s (Figure 27). Immigrant Chinese rice growers took over former *lo'i* devoted to *kalo* and founded a major cash crop industry catering to Hawai'i's growing Asian population (Coulter and Chun 1937:21).

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 25. 1914 Wall map of Wai'oli and Hanalei showing LCAs

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 26. Aerial photograph with *ahupua* 'a and LCA boundaries in the vicinity of the project area/APE (Google Earth 2013)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 27. Portion of 1906 Donn Hawaii Territory Survey Map of Kaua'i with land use

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i
LCA # TMK or maps	Awardee	<i>Ahupua'a</i> and ' <i>Ili</i>	Land Use	Landscape Features	Amount
3781:3 5-6-04	Opio	Waipā	Fishpond and <i>loʻi</i>	Public road and <i>pali</i>	Two <i>'āpana</i> ; 2 acres 15 rods
10171 5-6-04	Mana (not Waiʻoli Mission and not 1071)	Waipā Haʻaheo	House lot (TMK gives 0.25 acres)	Public road and Makanui	One <i>'āpana</i> ; 1 rood
10076:2 5-6-04	Makanui	Waipā Kiwaa, Haʻaheo	Four <i>lo 'i,</i> <i>kula,</i> and house lot (TMK gives 0.25 acres)	Government road, <i>muliwai,</i> hau	One <i>'āpana</i> ; 3 roods 14 rods
9118:2 5-6-04	Koukou	Waipā	House lot (TMK gives 0.25 acres)	<i>Makai</i> by beach, government road	Two <i>'āpana</i> ; 1 rood 33 rods
9832:3	Kupukupu	Waipā Haako	House lot	<i>Mauka</i> foot path; <i>makai</i> beach	No amount given
7918:2 5-6-04	Kanohokou	Waipā Kapuhae, Kuhihiilu, Kawaihine	House lot in Kapuhae	<i>Mauka</i> public road; <i>makai</i> sea beach	One <i>'āpana</i> ; 1 rood 8 rods
235N:2 5-6-04	Nuuanu	Halaloa, Puaanui	<i>Kula</i> and two <i>loʻi</i>		One <i>'āpana</i> ; 6 acres 1 rood 31 rods
10663:2 5-6-04	Puaiki	Waipā Wai'oli	House lot in Waipā		No amount given
7716:1 5-6-03	R. Keelikolani	Waipā Ahupua'a			No amount given
11216:4 5-6-03	M. Kekauonohi	Waikoko Ahupua'a			476 acres

Table 3 Land Commission	Awards along Kuhid	5 Highway in Wa	inā and Waikoko	East to West
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AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

LCA # TMK or maps	Awardee	<i>Ahupua'a</i> and ' <i>Ili</i>	Land Use	Landscape Features	Amount
5224:7 5-7-01	L. Konia Wahine	Lumahaʻi Ahupuaʻa			No amount given

LCA # TMK	Awardee	<i>Ahupua'a</i> and ' <i>Il</i>	Land Use	Landscape Features	Amount
9169:2 5-8-11	Kealai	Wainiha Kaili, Naue	House lot, <i>loʻi</i> , and <i>kula</i>	2) Napali by water course; Koʻolau by rook Laukalo	No amount given
11216:5 5-8-11 and 12	M. Kekauonohi	Wainiha Ahupua'a			No amount given
9171:1 5-8-07	Keaka	Wainiha Kapaloa, Puhalanui, Kapaele, Ulukea	<ol> <li>house lot and farming pasture (TMK is 3.575 acres)</li> <li><i>kula</i></li> <li>three <i>lo</i> 'i</li> <li>one <i>lo</i> 'i</li> <li>one <i>lo</i> 'i</li> </ol>	Bounded <i>makai</i> and Koʻolau by Wainiha River	Five <i>'āpana</i>
9184:2 5-8-06	Kamoolehua	Wainiha Kapohaku	1) house lot 2) two <i>lo</i> 'i (TMK is 0.217 acres)	2) Napali by ditch, Koʻolau by Wainiha River	Two <i>'āpana</i> , 1 acre 34 rods
9267:2 5-8-06	Pumaia	Wainiha Kaeleele, Paulihu	<ol> <li>house lot in Paulihu</li> <li>three <i>lo</i> 'i and <i>kula</i> in Kaeleole</li> </ol>	No. 2 bounded by <i>lo'i</i> , watercourse, and <i>konohiki kula</i>	No amount given
9271:1 and :2 5-8-06	Kapuumaka	Wainiha Kaeluku, Umi	1) house lot in Kaaluhee 2) four <i>lo 'i</i> in Umi		Two <i>'āpana</i> in Umi 2.25 acres
9270:1 5-8-06	Kiwaa	Wainiha Kaeleele, Kaluhea	House lot in Kaelieli, two <i>loʻi</i>	<i>Mauka</i> church yard and road; Napali, church <i>makai</i> Wainiha river; Koʻolau Kaahoku brook	One <i>ʿāpana</i> , 1 rood 28 rods

Table 5. Land Commission Awards at Coastal Wainiha, East to West

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

# 3.4 Late 1800s to Modern Land Use

## 3.4.1 Late 1800s to Modern Land Use in Wai'oli

Karol Haraguchi (1987) brackets the rice-growing period from the mid-1860s at the end of the whaling industry, until the 1920s, when California rice began to take over the Hawaiian rice market. The Hanalei Valley of Kauai led all other single geographic units in the amount of acreage planted in rice. "The development and maintenance of the Kūhiō Highway facilitated the export of surplus crops grown in Halele'a [Figure 28 and Figure 29]. The valley was one of the first areas converted to this use and continued to produce well into the 1960s" and she notes that Chinese immigrants, who first arrived as contract laborers in 1852, worked most of the rice fields. It was not until after 1882, that Japanese workers supplanted the Chinese labor force in Hawai'i. Haraguchi documents revivals of the Hawai'i rice industry in 1906, 1933, and 1934, which was especially fruitful in the remote Hanalei Valley where there were at that time no competing demands for the land. Aerial photographs of the project area/APE in the 1950s show the predominance of agricultural oriented land use in (Figure 30 through Figure 32). By 1985 there is no trace left of the rice fields (Haraguchi 1987:xiii-xv). The production fell off rapidly by 1927 when the stem borer appeared (Territory of Hawaii 1939:95).

## 3.4.2 Late 1800s to Modern Land Use in Waipā and Waikoko

As with Lumaha'i, the historical records for Waipā were briefly examined and no modern historic details have been written for this *ahupua'a*. However, Waipā Ahupua'a most likely took part in the broad changes that swept Halele'a after 1850. Early missionary census records for Waipā Ahupua'a indicate the population was declining in the decades before the *Māhele*. The 1835 census records show 85 people (73 adults and 12 children) living in Waipā Valley. By 1847, the population of Waipā had declined to 66 people. Between 1853 and 1896, population statistics collected by the Hawaiian Kingdom indicated a population in Hanalei and Ko'olau that fluctuated between a low of 1,558 people in 1872 and a high of 2,775 people in 1896 (Dye 2004:14). In the first half of the twentieth century, the United States census indicated a relatively stable population with a high of 2,630 people in 1900 and a low of 2,065 people in 1940 with a rapid population decline in 1960 falling to 1,312 people (Dye 2004:14).

## 3.4.2.1 Historic Taro Production in Waipā

Handy and Handy (1972:420) briefly discuss taro production in Waipā: "Below Hanalei and a little to the west of it on the bay is a compact area of terraces watered by Waipā stream." However, they reprint a reminiscence of an early resident (Lydgate 1913:125-127) concerning the terraces of Wainiha Ahupua'a, in the same district.

All along the river, wherever the encroaching *palis* on either side leave the least available space, the land has been terraced and walled up to make '*lois*.' And so the whole valley is a slowly ascending stairway of steps, broad in the tread and low in the rise, all the way to Laau. [Lydgate 1913:125–127]

Like Lumaha'i, Waipā was a taro-growing area, and using LCAs records, Earle (1973 and 1978) has been able to pinpoint four irrigation systems along Waipā Stream in 1850 which was used for taro cultivation (Hoffman 1980:15). Waipā Valley followed similar patterns to that of Lumaha'i, shifting from taro to rice:

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 28. Portions of the 1910 Hanalei and Kilauea USGS 7.5-minute series topographic quadrangles

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 29. Portions of the 1963 Hanalei and 1965 Haena USGS 7.5-minute series topographic quadrangles

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 30. Portion of a 1950 Hanalei Bay Coast aerial photograph of the Wai'oli Stream Bridge, Waipā Stream Bridge, and Waikoko Stream Bridge project area/APE (UH SOEST)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 31. Portion of a 1950 Hanalei Bay Coast aerial photograph of the Potential Staging Areas 1 and 2 (UH SOEST)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 32. Portion of a 1950 Hanalei Bay Coast aerial photograph of the Wainiha Stream Bridge 1 and Wainiha River Bridges 2 and 3 project area/APE (UH SOEST)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

By the 1860s Chinese and later Japanese laborers imported en masse for plantation bottom lands, large areas of old taro pond fields were converted to rice. From 1880 to 1930 rice became an extremely important export industry for Halelea, and taro was virtually abandoned except in Haena, the most isolated *ahupua'a*. Technologically, water buffalos with associated harrowing and leveling implements were introduced to prepare planting surfaces. The increased effectiveness of the individual farmer coupled with a growing market in the western United States resulted in a rapid expansion of the area in production. This was possible only with extensive use of flumes, wood and cement dams, and perhaps more intricate drainage channels. The cleaning of these expanded ditch systems was in turn greatly facilitated by the use of sickles, pitchforks, and shovels. It is highly likely, therefore, that irrigation systems in operation after 1880 were both altered and expanded for rice production. [Earle 1973:183–184 in Dye 2004:14]

The 1938 Territory tax records indicate several dwellings and other buildings in the vicinity of the rice mill in Waipā held by Hiramoto (Dye 2004:15). These Territory tax records list the family names of Takabayashi, Hiramoto, Okazaki, Koga, Morimoto, and Azeka. Hoffman (1980:15) reported the lands in the survey area were Bishop Estate lands entirely used for cow pasture, although the more marshy sections were not well suited for this use. According to Kinichi Shikawa, a Waikoko farmer, the land had been overgrown for a long period of time and some years previously Bishop Estate demanded the lessee, the Robinson family, to make improvements that resulted in massive clearing operations; large areas were chained and bulldozing eliminated sections of irrigation systems east of Waipā Stream (Hoffman 1980:15). In 1986, Bishop Estate leased the land to the Hawaiian Farmers of Hanalei, Inc., a community-based, not-for-profit corporation that manages the *ahupua* 'a of Waipā (Dye 2004:15).

Waipā Ahupua'a is currently managed by the Waipā Foundation, a communitybased 501c3 nonprofit that evolved from an original community initiative in the 1980s. The Waipā Foundation serves as a Native Hawaiian learning center and community center where all who visit can renew ties to the 'aina (land and resources), and learn about traditional values and lifestyle through *laulima* (many hands working together). As stewards of the *ahupua'a*, we are intently focused on our *kuleana* (responsibility) to establish and perpetuate a thriving *ahupua'a* as an example of healthy interdependent relationships between people and earth's natural resources. We strive to be a leader in demonstrating a Hawaiian approach to watershed-scale natural resource management. [Waipā Foundation 2012]

## 3.4.3 Late 1800s to Modern Land Use in Lumaha'i

Earle (1978) provides the following overview regarding Lumaha'i:

Very little is known about the land use of this *ahupua* 'a. Around the turn of this century, there were extensive rice plantations in the alluvial area near the sea. For the earlier historic period (1850), only limited information is available because no land awards were granted to commoners in Lumaha'i *ahupua* 'a. The reason for this absence is unclear but it was not for want of a community population (see Schmitt 1966, 1973 for nineteenth century census data). Perhaps the *ahupua* 'a chief and/or *konohiki* (headman of an *ahupua* 'a land division under the chief) were instrumental

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

in discouraging awards. Extensive bulldozing for pasturage has destroyed all archaeological evidence of pond-fields in the lower section of the valley, but numerous small terrace sites are to be found in the interior. One such site was identified 2.5 km from the sea, during a rapid reconnaissance survey, and others have been described by local hunters. [Earle 1978:33]

#### 3.4.3.1 Historic Taro and Rice Farming in Lumahai

By the 1860s, taro production was being replaced by rice cultivation in all the valleys of the district except Hā'ena, frequently reworking the irrigation systems previously used for taro pond fields (Hoffman 1980:4). This shift from taro to rice production included the import of Asian laborers for the plantation as well as the introduction of eastern technology developed for irrigation and cultivation of rice. Rice production flourished from 1890 to 1930 in the Halele'a District, at which point prices dropped due to increased rice production in California and most Hawaiian rice fields were abandoned (Earle 1973:183). The growth of rice cultivation is documented by a population shift suggested by tax records and by a lease between the Bishop Estate and Chulan and Company in 1882 which rented parts of Lumaha'i Valley's alluvial plain for rice production (Hoffman 1980:4). The 1865 tax records documented 25 Hawaiians and one Chinese paying taxes. By the time Chulan and Company had been growing rice for three years, the 1890 tax records documented only one Hawaiian and 34 Chinese. The Sing Tai Wai Company also rented lands for rice growing in the Lumaha'i Valley (Kelly et al.1978).

George Bowser, editor of *The Hawaiian Kingdom Statistical and Commercial Directory and Tourists Guide* (1880) wrote about various statistics and places of interest around the Hawaiian Islands (Maly and Maly 2003). In the following excerpts from "An Itinerary of the Hawaiian Islands," Bowser's narratives offer descriptions of the communities and various attractions of the Halele'a region:

The next place, about two miles further on, is Lumahai. The valley here is about twenty miles long, and is on the average about a mile and a half wide. It is nearly all under cultivation. Messrs. Chulan & Co. have about 100 acres of it under cultivation for a rice crop. The supply of water is abundant at all seasons of the year. The scenery here is extremely grand, the mountain tops being cut into every imaginable shape of crag and peak, and their sides clothed with evergreen trees. In the gulches and ravines the wild banana grows to perfection, and the awa is found in profusion. This part of the island will grow any description of vegetable. When there I tasted at the table of my host, Mr. Robinson, some most delicious green peas, the seeds of which had only been sown six weeks before. The weather was delightful when I was there, and, although the rains are sometimes very heavy, the climate as a whole is exceedingly fine and enjoyable. Whilst here I climbed to the top of the dividing range between the Wainiha and Lumahai valleys. The views thus obtained are exceedingly grand. The massive mountain peaks running up to 3,000 feet high, are covered almost to their summits with forests, with occasional intervals of splendid grass. In the distance was the sea with scarcely a ripple on its surface, and the fine beach of brown sand. In the valleys the winding streams pursuing their course to the sea, hidden sometimes by the overhanging trees, with the rice fields in various stages of growth, some covered with water, others

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

beautifully green and laid out in the most perfect order. Add to this a lovely Italian sky and a pleasant temperature of about 70°, a gentle breeze to make riding no exertion, and you have the scene as I saw it, as charming as any I have seen in the islands . . . [Maly and Maly 2003:36]

The exact date these companies' discontinuation of rice cultivation in Lumaha'i is unknown but oral reports indicate they were gone by 1925 when six Japanese families moved into Lumaha'i Valley to grow rice (Hoffman 1980). One family "lived on the eastern side of the stream, about a mile *mauka* [inland] of the highway; the other families lived on the western (Wainiha) side, and their houses still stand today" (Kelly et al. 1978). Four families left the valley as rice prices dropped, while two others converted to taro cultivation (Hoffman 1980). The lease was taken over by Lester Robinson for cattle grazing in Lumaha'i Valley. Robinson offered the two remaining Japanese families land in neighboring Wainiha Valley and all cultivation in the valley ceased (Hoffman 1980). Handy and Handy (1972) states,

Lumahai must have had many *lo'i* areas in old Hawaiian days, but in 1935 most of it was used for ranch lands, which obliterates the evidences of Hawaiian farming. It could not have supported a population as large as Wainiha or Hanalei. [Handy and Handy 1972:420]

## 3.4.4 Late 1800s to Modern Land Use in Wainiha

#### 3.4.4.1 Agriculture and fishing in Wainiha

Agriculture and fishing endeavors continued as the mainstay for Wainiha Ahupua'a. By the early 1900s Wainiha had its own Chinese community that included not only the rice farmers, but also merchants and other business people (Coulter and Chun 1937). The rice industry eventually went into decline due to disease, pests, and competition from outside Hawai'i, and rice lands reverted to *kalo*. Rice cultivation probably served the unintended purpose of keeping the ancient irrigation systems and *lo'i* operational throughout this period. In the 1930s Handy (1940:73) reported both crops being cultivated simultaneously in Wainiha with actually more land seemingly devoted to *kalo* is ongoing today, and is the most active agricultural undertaking in the still rural Wainiha Valley.

#### 3.4.4.2 The Wainiha Hui

No history of Wainiha is complete without at least a mention of the Wainiha Hui. A detailed and sometimes colorful account of the *hui*'s (group or club) origins and dealings is given by Lydgate (1913) and continued by Thrum (1924). The story provides an understanding of the changing socio-economic aspects of land ownership in Wainiha following the Māhele and entering into the twentieth century. A greatly abbreviated version follows. Sometime after the Māhele, Kekau'ōnohi, a chief, held the *konohiki* lands of Wainiha, those being all of the remaining lands in the valley not awarded to the tenant farmers as *kuleana*.

Seeking a quick profit on a sandalwood deal, Kekau'ōnohi convinced Aldrich & Company of Honolulu to back the venture in the amount of \$10,000. Kekau'ōnohi purchased a schooner, the *Manuokawai*, hired a captain and crew, filled the ship with sandalwood and sent it off to the Far East. Whether the ship was wrecked at sea or as Lydgate implies, was stolen by the captain who had less than a pristine reputation, she was never seen in Hawai'i again. Able to raise \$1,000,

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Kekau'ōnohi still needed \$9,000 to pay off Aldrich & Company. The plan was to sell the land to the Wainiha *kuleana* owners. The residents agreed to the plan although most of them were still basically subsistence farmers and did not have the cash to close the deal. Kekau'ōnohi gave them one year to raise the capital. By the time the year ended, 71 Wainiha residents had convinced Princeville Plantation of Hanalei to underwrite their venture at \$100 each with the residents signing notes for the future delivery of agricultural goods, services, and labor to the plantation. This only amounted to \$7,100 but Kekau'onohi persuaded his creditor to let the residents assume the rest of the debt with interest (Lydgate 1913). Thus, in 1877 the Hui Kū'ai 'Āina O Wainiha, the "group to purchase the land of Wainiha" was officially formed. The Wainiha Hui, as it was commonly called, now owned approximately 15,000 acres of the valley (*The Garden Island* 1947). A plan was instituted to give each shareholder 10 acres of arable land—5 acres *mauka* and 5 acres *makai*. The land was never formally surveyed nor legally partitioned and disputes were settled by an executive committee. In the coming years the *hui* members, in debt and paying property taxes, found that being large landowners was not at all like what Kekau'ōnohi had promised, as shares in the *hui* had essentially become a liability (Lydgate 1913).

Around the turn of the century, McBryde Sugar Company was looking for a source of electrical power to run its irrigation pumps and mill operations at 'Ele'ele on the southwest side of the island. They proposed to build a hydro-electric power plant at Wainiha and to pay the *hui* \$1,500 a year for the water rights (Thrum 1924:95–112). The Kauai Electric Company was formed to construct and operate the power plant, which was completed in 1908. They built a landing and warehouse on Wainiha Bay with a light rail system to carry materials up the valley, along with roads, trails, and laborers' camps, as well as the plant itself and the transmission line that traversed the island (Gartley 1908:141–146). While there were other similar groups formed on Kaua'i, most notably at Hā'ena and Moloa'a, the Hui Kū'ai 'Āina O Wainiha remained a singular success story. The lands of Wainiha were finally partitioned and the *hui* dissolved in 1947 after legal action was initiated by McBryde Sugar Company. Each of the original 71 shares was then worth about \$5,000. Through the years McBryde had bought up most of the shares and owned 48. The Robinson brothers, Aylmer and Sinclair, held 10 and  $6\frac{1}{3}$  shares respectively. Only the remaining few shares were still in the hands of the heirs of the original *hui* members (Circuit Court of the Fifth Judicial Circuit 1947).

3.4.4.3 The Kūhiō Highway, Tsunamis, and Historic Flooding in Wainiha

The Kūhiō Highway, completed in 1917 and listed as site 03001048 on the National Register (as the Kaua'i Belt Road), runs throughout the project area/APE. As mentioned previously, in 1895, traveler Eric Knudsen described the route from Hanalei to Hā'ena as a trail, the wagon road ending at Hanalei. "West of Waikoko Stream, Knudsen related that the trail climbed over the bluff and then descended straight down to the ocean before turning back and running along the beach again" (Fung Associates 2013:12).

According to historian Ralph Kuykendall, nineteenth century Hawai'i roads, 'or what were called roads,' came into existence by a familiar historical process, 'the trail became a road.' Many roads, especially in the rural districts like Kaua'i's North Shore, were little more than cleared rights-of-way. [Fung Associates 2013:12]

By the end of the nineteenth century, each of the major Hawaiian Islands dreamed of building a "belt" road system. The idea for belt roads dated to the early Hawaiians, who built and maintained

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

networks of traditional trails on all of the islands. Belt roads that circumvented the islands played an important role in Hawai'i's transportation history, connecting isolated communities to their island's economic, political, and social centers.

In 1911, the territorial legislature established a 'loan fund,' which provided the bonding needed for each island to build its belt roads and bridges. A Loan Fund Commission (LFC) was appointed for each island . . . By 1917, Kaua'i considered its belt road complete, a feat that was accomplished earlier than any other island. [Fung Associates 2013:14–15]

Kūhiō Highway, Route 560 (National Register # 03001048, and HRHP SIHP # 50-30-02-9396) was completed in 1917:

Route 560 is a 10-mile rural road that was part of the first completed belt road in the Hawaiian Islands (constructed in early 1900s), and has retained a significant portion of its original characteristics and features. In recognition of Route 560's historic stature, a Rural-Historic Road Corridor Plan was drafted to provide design guidelines for the DOT-HWY that reflect a community consensus for future work on the highway. [Hawai'i Department of Transportation 2011:12–13]

The highway westward from and including the Hanalei Valley overlook on Kūhiō Highway is identified as a scenic roadway and historic district corridor:

The historic district begins at Mile Marker 0 on Route 560 and continues to its termination at Mile Marker 10 at Ha'ena State Park . . . The Kaua'i Belt Road between Princeville and Ha'ena traverses ten miles along the island's north shore and is coterminous with its historic right-of-way. This portion of Kaua'i's 'belt road' was part of Kaua'i's original belt-road system, which extended from Ha'ena on the north shore to Mana on Kaua'i's west shore. Although belt-road systems in the Hawaiian Islands were intended to circumvent each island, Kaua'i's road, like the Hawai'i Belt Road, never completely encircled the island due to the rugged topography of Na Pali Coast. The north shore section of the Kaua'i Belt Road begins at State Route 560's Mile Marker 0 at Princeville and passes through the communities of Hanalei, Wainiha and Ha'ena, ending at Mile Marker 10 at Ha'ena State Park. The . . . historic district includes the road, the Hanalei Valley Scenic Overlook, and thirteen historic bridges and culverts. The period of significance for the north shore section of the Kaua'i Belt Road is from 1900 when the Territory of Hawai'i Superintendent of Public Works began roadway improvements until 1957 when the Wainiha Bridges were rebuilt after a tidal wave. The Kaua'i Belt Road between Princeville and Ha'ena retains historic significance and character in its location, alignment, design, setting, and association. The Kaua'i Belt Road between Princeville and Wainiha was built during the 1910s, and from Wainiha to Ha'ena circa 1928. Most of the roadway alignment is unaltered and predates the road's construction. The road passes through rural areas along Kaua'i's North Shore, connecting communities much as it did in the early twentieth century when it was built. In many areas, the road was built over a trail used by Hawaiians and nineteenth-century travelers. There is no shoulder along most of the roadway, except near Princeville. The road has been widened since its construction, but is

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

still narrow in many locations. The roadbed varies between 18' and 20' wide, being narrower as it hugs the sea cliffs and wider as it passes through valleys and residential communities. Near Princeville and Hanalei, the road is 22' wide. For most of the road's length, there are no guardrails, which contributes to the road's historic feeling. Lava-rock guardwalls, some dating to the 1920s, remain along the road in many locations, although many have been undermined by soil erosion. In a few locations, timber guardrails remain along the road. Only a few steel w-beam guardrails have been installed along the road in recent years. [Fung Associates 2013:6]

Maintaining the aesthetics of this scenic and historic highway, the bridges along the Kūhiō Highway of Kauai'i's north shore are all one-lane bridges listed on the National Register as Historic Bridge Districts on the Kaua'i Belt Road (North Shore Section) (Fung Associates 2013). The one-lane bridges require a local courtesy of taking turns, five to seven cars crossing at a time.

Most of the bridges and culverts on the Kaua'i Belt Road are one-lane wide and date to the early 1900s. The bridges represent two popular types of construction in early twentieth century Hawai'i: steel truss and reinforced-concrete flat slab. The reinforced concrete bridges feature solid concrete parapets. In addition, there are also several pipe culverts with masonry rock headwalls that were probably constructed in the first half of the twentieth century. [Fung Associates 2013:10]

Improvements to Kūhiō Highway and specifically to Kauai'i's north shore bridges became a high priority in the early twentieth century:

Kaua'i's bridge-building program was extensive in 1912. During a special meeting in May, the LFC decided to build 'a number of bridges' near Hanalei, including Waikoko, Waipa, and Wai'oli. The LFC instructed Moragne to prepare plans and specifications for concrete structures, and he designed three flat-slab bridges with solid concrete parapets. Within months of Moragne's assignment, contracts were authorized for George Mahikoa to build the Wai''oli and Waikoko bridges; and George Ewart to build Waipa Bridge. Work on the new bridges began almost immediately and was none too soon. In August 1912, three of the timber bridges that were to be replaced collapsed under the strain of wagons delivering crushed rock for the new concrete bridges. [Fung Associates 2013:16]

Wainiha is vulnerable to inundation by tsunamis originating in the North Pacific Ocean. The tsunami of 1946 greatly impacted the northern shore of Kaua'i. Shepard et al. (1950:415) detail the following disturbing account of the damage at the coast in the vicinity of the current project area/APE:

Half a mile east of Haena Bay the water swept inland 1,600 feet, knocking over trees, and a little further east it smashed through a dense grove of pandanus, laying the trees over in parallel rows . . . Fishes were carried inland, as at many other places; and 11 days after the wave, small fish were found still alive in a pool 1,000 feet inland . . . At the head of Wainiha Bay the water rose 24 to 27 feet above normal sea level. . . several houses were wrecked and some loss of life occurred. [Shepard et al. 1950:415]

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

This destruction included stripping the sediment from the beach areas, which was washed varying distances inland and deposited. Coral blocks, up to 12 ft in diameter, were picked up and carried as much as 500 ft inland (Shepard et. al. 1950:414–415). Another account reports, "The 1946 tsunami hit with two powerful waves, with a maximum run-up of forty-five feet in elevation. All the bridges at Wainiha were washed out, and the tiny village of Wainiha itself was flattened" (Pacific Worlds & Associates 2001)

The 1957 tsunami caused a 38 ft rise in sea level at Wainiha and low-lying areas as far as 4,000 ft inland were inundated (DLNR 1975). Flooding due to heavy rainfall is also a frequent occurrence in Wainiha and results in stream-channel overflow. The valley has recorded rainfall as high as 24 inches in 24 hours. Since 1956 there have been at least eight damaging floods in Wainiha, one of which caused loss of life (DLNR 1975). As previously mentioned, the flooding of Wainiha is referred to in folklore (Pukui 1951:67). Perhaps it is this natural characteristic of the valley which explains the origin of the name "unfriendly water."

Thus, navigating the streams of Kauai'i's north shore, the bridges within the project area/APE have historically had to contend with periodic flash floods and tsunami storms. Indicating the severe natural elements that the bridges are exposed to, the stream crossings within the project area/APE periodically require seasonal reworking or replacement:

In January 1921 the Wainiha River cut a new channel during a storm, which necessitated another bridge, as flooding had carved a 'long slim island out of the agricultural land of the valley.' The Garden Island reported that the new bridge would 'make three bridges in the valley, in within [*sic*] a distance of about 500 yards.' This third structure at Wainiha became known as Wainiha Bridge #2. Plans for a new single-span bridge of 75' were drawn in 1922. The design was a timber-truss structure that complemented the adjacent timber-truss bridge (Wainiha #3). Even though the plans were drawn in February 1922, a construction date was not determined. The Territorial Highway Department records state that the bridge was constructed in 1931.No information was located to indicate when the original Wainiha Bridge #2 was built, although it may have been built as early as the first decade of the twentieth century. [Fung Associates 2013:40-41]

Wainiha Stream Bridge 1 and Wainiha River Bridge 3 were originally constructed in 1904 with wooden trusses and by 1921 an additional bridge was built to cross a new stream channel that formed during flooding. This middle Wainiha Bridge, referred to as Wainiha River Bridge 2, was completed in 1931, however, successive storms in 1946, 1957, and 1966 destroyed or damaged all three of the original wooden Wainiha Bridges which were subsequently replaced.

Natural disasters struck the Wainiha bridges on two occasions in 1957. On March 9, three tidal waves struck Wainiha Valley, destroying the west span and small approach span of Wainiha Bridge #3 as well as Wainiha Bridges #1 and #2. The only span that remained after the tidal wave was the east (Hanalei side) span of Wainiha #3. In December, flooding from Hurricane Nina damaged Wainiha Bridge #3 again, making it impassable to traffic until it was repaired. [Fung Associates 2013:22]

Storms in 2004 and 2007 further damaged the replacement bridges, which were then demolished and replaced with the modular steel truss bridges currently in place.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Raw materials used in the construction of the stream crossings along the Kūhiō Highway of Kauai'i's north shore have included timber, steel, concrete, and basalt. The bridges were likely originally constructed from locally milled timber and were ultimately replaced with steel and concrete bridges. As discussed further in Section 6, the 1946 repair of the Waikoko Stream Bridge involved utilizing the fallen concrete structure in place with basalt boulders and concrete used to stabilize and level the feature.

The earliest bridges on Kaua'i were constructed of wood and steel. Wood was a prevailing construction material throughout the Hawaiian Islands during the nineteenth century; it was widely available, relatively inexpensive, and fairly durable. By the end of the nineteenth century, steel represented the latest in industrial technology and was a preferred construction material for its strength. Although steel bridges had to be imported from the United States or Great Britain, the strength of steel provided a feasible solution for spanning Kaua'i's wide rivers. Steel was also used throughout the islands to erect the substantial bridges required to carry railroads over Hawaii's rivers and rugged gulches . . . By 1904 timber bridges spanned the rivers at Wainiha, Waikoko, and Waipā, and plans were made for a steel bridge over the Lumaha'i River. [Fung Associates 2013:13]

## 3.5 Previous Archaeological Research in the Project area/APE

Approximately 30 previous archaeological studies have been conducted near the current proposed project areas in the Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a (Figure 33). Previous archaeological studies are described below for each *ahupua'a*. Previous archaeological studies in the Wai'oli Ahupua'a are summarized in Table 6 and the identified historic properties are summarized in Table 7. Waipā and Waikoko previous archaeological studies are summarized in Table 8 and the identified historic properties iare summarized in Table 9. Figure 34, shows the location of historic properties identified during the previous studies in Wai'oli, Waipā, and Waikoko. The previous archaeological studies in Lumaha'i are summarized in Table 11 and the identified historic properties are summarized in Table 12. Wainiha previous archaeological studies are summarized in Table 13 and include two of Bennett's (1931) sites, Sites 152 and 153, described as taro terraces and a house site respectively, are within the Wainiha Valley:

This interesting taro section is high on the side of the valley utilizing a little stream and a small flat area. The hill is on one side and the stream and a bluff on the other, leaving a fairly steep section in between. At one place above the terraces stones are built across the stream as an intake, which could, with the addition of a few more stones, shunt the water into a ditch which runs between large rocks and dirt walls. All along the edge of the stream is a wall built to keep the water from running back. The terraces are from 6 inches to 3 feet high . . . Site 153. House sites, on Mauna Hina ridge in Wainiha Valley. Remains of many old house sites and much irrigated land. The house sites are mostly of the terraced type and 10 to 15 feet wide. [Bennett 1931:135, 136]

Earle's (1978:59) documentation of irrigated taro systems in Wainiha is shown on a USGS map of the valley (Figure 35). Earle's System 14, one of Halele'a district's modern taro irrigation systems, extends along Wainiha River to just southeast of Powerhouse Road. Earle (1978:32)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 33. Portions of the 1991 Haena and 1996 Hanalei USGS 7.5-minute series topographic quadrangles showing the locations of previous archaeological studies and Bennett sites; Barrera (1984) is not featured, since it lies outside the bounds of this map

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TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)
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AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

observed that the lower portion of Wainiha Valley was extensively used for taro cultivation through the 1850s.

Historic properties identified within Wainiha are summarized in

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

Table 14. Historic properties identified during previous studies in Lumaha'i and Wainiha are illustrated in Figure 36. The tables and figures are followed by discussions of the type of research and historic properties, if identified.

## 3.5.1 Previous Archaeological Research in Wai'oli

The following two tables outline the archaeological research (Table 6) and historic properties (Table 7) identified within Wai'oli Ahupua'a. These tables are followed by discussion of the research and historic properties. Table 6 provides a list of archaeological research conducted within Wai'oli, including columns for source, location, nature of study, and results. The locations of these archaeological studies are shown in Table 7 is a list of known historic properties within the *ahupua'a* and includes columns for state site numbers, site type, location and reference. The locations of identified historic properties within Wai'oli and eastern end of Hanalei Ahupua'a are shown in Figure 34.

## 3.5.1.1 Thomas G. Thrum (1906)

The earliest archaeology of Wai'oli is described by Thomas G. Thrum (1906) in his article *Heiaus* and *Heiau Sites Throughout the Hawaiian Islands* where he lists two *heiau* in Wai'oli:

Nakikoniawaiaau Wai'oli uka - An open paved space, not large, dedicated to Laka, to which offerings at the annual festivities were brought.

Mamalahoa Wai'oli - A small *heiau* 24x60 feet in size, paved with walls 3 to 5 feet high. Of husbandry class. Kanehekili its deity; Kapihi its priest. [Thrum 1906:43]

Thrum lists Kupakoili *Heiau* (State Site 50-30-03-144), "Reported as a small *heiau*; probably simply a place of offering" as in Waipā but it appears to be in Wai'oli.

## 3.5.1.2 Wendell Bennett (1931)

Wendell Bennett, in *The Archaeology of Kaua* 'i (1931:135), lists Nakikoniawalaau Heiau (State Site 50-30-03-145), but furnishes only Thrum's description for it and does not give a specific location for it. The Tax Map Key 5-6 shows the site of Nakikoniawalaau Heiau on the east side of Wai'oli Stream far inland of Kūhiō Highway. Bennett locates Kupakoili Heiau: "on the west side of the *pali* west of Wai'oli Stream, not far from the sea." The Tax Map Key 5-6 shows the site of "Kupaloili Unu" just *mauka* of Kūhiō Highway on the west side of Wai'oli Stream seemingly in Wai'oli Ahupua'a. Bennett does not mention Mamalahoa Heiau and its location is unknown. Bennett notes that the Hanalei section of the island was known for its "ease of cultivation" (1931:5).

## 3.5.1.3 Timothy K. Earle (1978)

Timothy K. Earle (1978) did the first in-depth study of the Halele'a District, in *Economic and Social Organization of a Complex Chiefdom: The Halele 'a District, Kaua 'i.* This work is a seminal piece of research within the vicinity of the project area/APE and a classic archaeological study of traditional irrigations systems. Earle (1978) showed that the taro *lo 'i* in Wai'oli had been replaced by the cultivation of coffee and rice before the turn of the 20<sup>th</sup> century. Earle's Systems 22, 23 and 24 describe the Wai'oli valley systems. However, within Wai'oli Ahupua'a all of these documented taro systems lie 200 m or more *mauka* of Kūhiō Highway.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Source	Location	Nature of Study	Results (SIHP # 50-30-03)
Earle 1978	Halele'a District: Wai'oli	Economic and social organization study	Describes Wai'oli Valley irrigation systems 22 and 23
Hammatt 1979	Waiʻoli Mission Hall	Archaeological surface examination and subsurface testing	Documents SIHP # -00601, pre- Contact and early historic cultural layer
Hammatt and Folk 1979	Waiʻoli Mission Hall	Archaeological excavations	Discusses findings and conclusion for SIHP # -00601, pre-Contact and early historic cultural layer
Pantaleo and Williams 1991	Transmission line corridor	Archaeological reconnaissance	No historic properties identified in Wai'oli
Spear 1992	St. Williams Church, TMK: [4] 5-5-002:037	Archaeological inventory survey	SIHP # -06028, pre-Contact and early historic cultural layer
Hammatt and Folk 1994a	30 acres (TMK: [4] 5-5- 006:009)	Burial treatment plan	SIHP # -01877, single burial
Hammatt and Folk 1994b	30 acres (TMK: [4] 5-5- 006:009)	Archaeological inventory survey	Identified SIHP #s -06031, a marsh deposit; -06032, buried cultural deposit; and -06028, a human burial
Jourdane 1995	5-5496C Kūhiō Hwy, TMK: [4] 5-5-006:012	Inadvertent burial report	SIHP # -03014, inadvertent skeletal remains
McMahon 1995a, b	Malolo Road, Hanalei, TMK: [4] 5-5-003:035	Inadvertent burial report	SIHP # -01982, three burials described
Masterson et al. 1997	Hanalei School lot, <i>mauka</i> of Kūhiō Hwy, TMKs: [4] 5-5-006: por. 009, 018	Archaeological monitoring	SIHP # -01988, three burials and five isolated human remains
McGerty and Spear 1999	Waiʻoli Town Park, <i>mauka</i> of Kūhiō Hwy, TMK: [4] 5-6-002:005	Archaeological inventory survey	No historic properties identified
Yorck and Hammatt 2004	Coastal Residence, TMKs: [4] 5-5- 004:009and 010	Archaeological monitoring	Three discrete features identified; historic to modern layer, three historic bottles, and two cow teeth, no SIHP # given
Fong et al. 2006	Approx. 10-mile stretch of Kūhiō Hwy, Princeville to Ha'ena	Archaeological monitoring	No historic properties identified

Table 6. Previous archaeological studies in Wai'oli Ahu	pua'a
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AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

SIHP # 50-30-03-	Site Type/Name (if any)	Location	Reference
B004	Wai'oli Hui'ia Church Cemetery	South of Kūhiō Hwy, between Wai'oli Park and Hanalei School, TMK: [4] 5-5-006:019	Kikuch and Remoaldo 1992:13– 14
00601	Pre-Contact and early historic cultural layer	Waiʻoli Mission Hall	Hammatt 1979; Hammatt and Folk 1979
01877	Pre- and post-Contact deposits	Waiʻoli	Spear 1992
01982	Burial	Malolo Rd, Hanalei	McMahon 1995a
01988	Burials	Hanalei School	Masterson et al. 1997
03014	Burial	Kobayashi Subdivision, Wai'oli	Jourdane 1995
06028	Burial	Kobayashi Subdivision, Waiʻoli	Hammatt and Folk 1994; Hammatt 1994
06031	Marsh deposit	Kobayashi Subdivision, Wai'oli	Hammatt and Folk 1994
06032	Cultural deposit	Kobayashi Subdivision, Wai'oli	Hammatt and Folk 1994
09300	Waioli Mission District	Waiʻoli	SHPD files
09374	Mahamoku (Wilcox Hanalei Beach House)	5344 Weke Rd, Hanalei, Kaua'i, TMK: [4] 5-5- 003:010	Historic Hawai'i Foundation (2015-2016)
09386	Douglas Baldwin Beach House	5242 Weke Rd, Hanalei, Kauaʻi, TMK:[4] 5-5- 002:107	Historic Hawai'i Foundation (2015-2016)
09388	Say Dock House	Hanalei	Historic Hawai'i Foundation (2015-2016)
none	Excavated pits	75 m southwest of Site 144	Wheeler 2013b
none	Irrigation system 22	East of Wai'oli Stream	Earle 1978:67–68
none	Irrigation system 23	West of Wai'oli Stream	Earle 1978:69–70

Table 7. State Inventory of Historic Places (SIHP) sites in Wai'oli Ahupua'a

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 34. Aerial photograph (Google Earth 2013) showing locations of previous identified historic properties in portions of Hanalei, Wai'oli, Waipā, and Waikoko Ahupua'a

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TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)
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AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

3.5.1.4 Hammatt (1979); Hammatt and Folk (1979) and William K. Kikuchi (1987)

In 1979, a rare opportunity in Hawaiian archaeology occurred in which data were collected from testing within the Wai'oli Mission Hall. Archaeological testing, revealed a stratigraphic sequence beneath the floor of the Mission Hall, which was followed up by full-scale excavation (Hammatt 1979; Hammatt and Folk 1979). The excavations of the missionary church at Wai'oli helped document the entire history of the mission hall from 1832 to the twentieth century.

William K. Kikuchi (1987:11–12) in an article called *Kaua'i Fishponds*, describes six *loko-i-a-kalo* ponds that grew both taro and fresh water crustacean, fish, shellfish, and certain aquatic plants (1987:11) in Wai'oli:

- B1a Name Ahau, of unknown acreage,
- B1b Name unknown, of unknown acreage,
- B1c Name unknown, of unknown acreage,
- B6A Named Kaiulu, of unknown acreage,
- B25a Name unknown, of 10.3 acres, and
- B25b Name unknown, of .12 acres.

Kikuchi (1987) notes that the loko-i-a-kalo were difficult to document, since the use of these fields could change from that of a taro field to that of a fishpond in just a season's time. Since many ponds grew fish as well as taro, the percentage of fish to taro at which a pond is considered a fishpond rather than a taro pond is debatable. Therefore, data for this type of fishpond will always be suspect—hence, the incomplete information for several of the ponds listed above.

He also lists five other "unknown type" fishpond sites at Wai'oli:

- B6b Name Kaaikahala, of 1.34 acres,
- B10b Name Kuloko, of 1.06 acres,
- B16a Name Maikai, of unknown acreage,
- B16b Name Momona, of unknown acreage, and
- B18a Name Opahale, of 0.25 acres.

These unknown types of ponds are mentioned in the LCAs as being in the upland above the big bend in the river. These fishponds were in use in 1848 but already by 1852 some of them had disappeared (cf. Native Register 1847-1853 and Foreign Testimony 1848-1850).

3.5.1.5 Pantaleo and Williams (1991)

In 1991, an archaeological reconnaissance survey was conducted in selected portions of a Port Allen to Wainiha transmission line corridor. The purpose of the study was to determine the presence and/or absence of historic properties. Portions of this survey were conducted on the north side of Kaua'i including Wai'oli, Waipā, Waikoko, Lumaha'i, and stops in Wainiha Valley at the Wainiha Valley Hydro-electric Plant. No new historic properties were identified during this study in Wai'oli Ahupua'a.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

## 3.5.1.6 Spear (1992)

In 1992, Robert Spear conducted an archaeological inventory survey of St. Williams Church. Results of this archaeological inquiry included documentation of SIHP # -06028, a pre-Contact and early historic cultural layer.

## 3.5.1.7 William Kikuchi and Susan Remoaldo (1992)

In 1992, William Kikuchi and Susan Remoaldo printed their first volume of their inventory of Kaua'i cemeteries. There is only one site inventoried in detail, the Wai'oli Hui'ia Church Cemetery (their Site 50-30-03-B004). They catalogued 48 gravesites with markers giving the range of known dates of death from 1842 through 1980. The family names were Aaron, Deverill, Doiron, Doso, Haumea, Johnson, Kapu, Kaukaha, Kawika, Kekauoha, Lota, Mahinai, Maka, Pauole, Peters, Rindt, Waiuli, Werner, and Willis (Kikuchi and Remoaldo 1992:13–17). A historical study of Wai'oli Mission House, Hanalei, Kaua'i, Grove Farm Homestead and Wai'oli Mission House, Kaua'i was also done by Barnes Riznik (1987). The Hawai'i Register of Historic Places lists the Mission House as State Site 50-30-03-9300. Riznik documents the families who lived there and the process of restoring the Mission House. Designare Architects report a recent assessment of damage done by Hurricane 'Iniki to the Wai'oli Hui'ia Church and Meeting Hall (1992).

#### 3.5.1.8 Hammatt and Folk (1994a, b)

Within the central area of the Wai'oli Ahupua'a just *mauka* of the highway, CSH conducted a couple of archeological studies. Three historic properties were identified during an AIS of a 30-acre proposed subdivision. SIHP #s -6031, a marsh deposit, -6032, a buried A horizon with few scattered flakes and sparse charcoal, and -6028, a flexed human burial were identified (Hammatt and Folk 1994a). Another AIS including subsurface testing was conducted at Hanalei School. Pond field sediments were observed in test trenches. Based on radiocarbon date of the sediments, the pond fields date to the 1960s (Hammatt and Folk 1994b), however, radiocarbon dates for the 1960 period are not reliable.

3.5.1.9 Jourdane (1995), McMahon (1995a, b), and Masterson et al. (1997)

In 1995, SHPD staff investigated inadvertent burial finds near the project area/APE (Jourdane 1995; McMahon 1995a, b). Burials were also identified by CSH during monitoring at Hanalei School in 1997. They consist of SIHP # -01988, three burials and five isolated human remains, were identified (Masterson et al. 1997).

#### 3.5.1.10 McGerty and Spear (1999)

In 1999, SCS conducted an AIS with limited subsurface testing to document stratigraphy. A total of seven test units were excavated. No historic properties were identified.

#### 3.5.1.11 Yorck and Hammatt (2004)

In 2004, CSH conducted archaeological monitoring during renovation and relocation of a house site along the Wai'oli coastal area. Three historic to modern discrete features were observed. The monitoring findings include a layer containing modern to historic refuse, three historic bottles, and two cow teeth (Yorck and Hammatt 2004:21).

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

## 3.5.1.12 Fong et al. (2006)

In 2006, CSH monitored an approximate 10-mile stretch from Princeville to Ha'ena for the Kūhiō Highway, Route 560 Shoulder Improvements project (Fong et al. 2006). Monitoring identified only disturbance due to previous road construction. No historic properties were observed (Fong et al. 2006).

## 3.5.2 Previous Archaeological Research in Waipā and Waikoko

Table 8 and Table 9 summarize the archaeological research and historic properties identified in Waipā and Waikoko Ahupua'a, followed by discussion of the research and historic properties. The locations of these archaeological studies are shown in Figure 33. The locations of identified historic properties within Waipā and Waikoko Ahupua'a are shown in Figure 34.

## 3.5.2.1 Thrum (1906)

Thrum (1906:43) lists the *heiau* of Kupakoili, in the *ahupua* 'a of Waipā, and says it is "reported as a small *heiau*; probably simply a place of offering." While Hoffman (1980) places the *heiau* just *mauka* of Kūhiō Highway in Waipā, Thrum also lists Halaloa Heiau in the *ahupua* 'a of Waipā. He relates it as located "at Waipā Stream. A square *heiau* of about 80 feet in size, with low walls, Kāne its deity," noting that it was destroyed years ago for a mill site.

## 3.5.2.2 Bennett (1931)

Bennett (1931) describes no sites in Waikoko and Halaloa *heiau* at Waipā. Hoffman places the location of this historic property more than 500 m inland of the highway (Bishop Museum site KA-D8-1; SIHP # 50-30-03-146) (see Figure 33 and Figure 34) more than 500 m inland of the highway.

Site 146: Halaloa *heiau*, at the end of a little road running up on the east side of Waipā stream, at the site of an old rice mill. Thrum describes it as 'A square *heiau* of about 80 feet in size, with low walls. Kāne its deity. Destroyed years ago for mill site.' Nothing remains now but a few stones scattered about. [Bennett 1931:135]

## 3.5.2.3 Earle (1978)

Earle (1978) describes four wetland taro irrigation systems at Waipā as System Number(s) 18, 19, 20, and 21 (Figure 35 and Table 10) with one of these systems extending into Waikoko. None of these agricultural systems extends as far seaward. Wetland taro irrigation "System 18" is the only one of the four *lo 'i kalo* irrigation systems of Waipā that Earle describes in detail under the heading of "Halelea's Modern Taro Irrigation" (perhaps because it was the only one in active use at the time of the 1971/1972 fieldwork). Earle (1978) indicates that:

In 1850, System 18 irrigated a major section of the ahupua'a of Waipa but now it is used only to irrigate one taro farm in the neighboring ahupua'a of Waikoko. The primary ditch of System 18 taps the Waipa stream in the narrow valley just before the stream enters the broad alluvial plain. The intake is placed at a natural bend in the stream so that the main ditch line continues the direction of stream flow above the dam. The head dam, itself, is a standard stone mound percolation dam using in situ boulders. River cobbles (15-30 cm) are heaped between the boulders to create a mound wall 8 m long, 1 m wide, and 0.6 m high. The primary ditch, then, channels

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Source	Location	Nature of Study	Results (SIHP # 50-30-03)
Thrum 1906	Island-wide	Island-wide survey	Nakikoniawaiaau, Mamalahoa, and Kupakoili <i>heiau</i> (SIHP # -144)
Bennett 1931	Waipā and Waikoko	Island-wide survey	SIHP #s -144, Kupakoili Heiau; -146, Halaloa Heiau; and -147, Kailiopaia Heiau
Hoffman 1980	Alluvium plains of Waipā Valley	Archaeological survey, limited test excavations	Confirmed Earle's irrigation systems
Pantaleo and Williams 1991	Transmission line corridor	Archaeological reconnaissance survey	No historic properties identified in Waipā and Waikoko
Sullivan and Dega 2003	0.25-acre property in Waipā, TMK: [4] 5-6- 004:015	Burial treatment plan	SIHP # -00355, two burials and isolated skeletal remains
Dye 2004	KSBE lands, leased to Hawaiian farmers of Hanalei, TMKs: [4] 5-6- 004:022, 023, and 025	Archaeological inventory survey	Two previously identified historic properties: SIHP #s -00146, rice mill at the site of Halaloa Heiau and -00484, irrigation system described by Earle as System 18 and three newly identified historic properties in project area/APE: SIHP #s-01040, a cave shelter; -01041, <i>'auwai</i> , and -01042, an <i>'auwai</i> system
Chafee and Dega 2005	0.25-acre property in Waipā, TMK: [4] 5-6- 004:015	Archaeological monitoring	Two historic properties identified: SIHP #s -00355, two burials and isolated skeletal remains, and -00361, a cultural layer containing pre- and post-Contact artifacts
Fong et al. 2006	Approx. 10-mile stretch of Kūhiō Hwy, Princeville to Ha'ena	Archaeological monitoring	No historic properties identified in Waipā and Waikoko
Kamai and Hammatt 2013	KSBE land; TMK: [4] 5- 6-004:023	Burial site component of an archaeological preservation plan	SIHP # -2196, an inadvertent burial discovery

Table 8. Previous archaeological studies in Waipā and Waikoko Ahupua'a

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Source	Location	Nature of Study	Results (SIHP # 50-30-03)
Wheeler et al. 2013b	KSBE land, TMK: [4] 5- 6-003:001 por.	Archaeological reconnaissance survey and literature review	One historic property identified: three excavated pits on Makaihuwa'a Ridge; no SIHP # assigned

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

SIHP # 50-30-03-	Site Type/Name (if any)	Location	Reference
144	Kupakoili Heiau	West of Wai'oli Stream	Thrum 1906:43; Bennett 1931:135; Hoffman 1980
146	Halaloa Heiau	East side of Waipā	Bennett 1931:135
147	Kailiopaia Heiau	Western portion of Makahoa Point	Bennett 1931:135
00355	Burials and isolated skeletal remains	0.25-acre property in Waipā, TMK: [4] 5-6-004:015	Chafee and Dega 2005
00361	Cultural deposit containing pre- and post-Contact artifacts	0.25-acre property in Waipā, TMK: [4] 5-6-004:015	Chafee and Dega 2005
00433	Irrigation system 21	Eastern edge of Waipā Ahupua'a	Earle 1978:234; Hoffman 1980:25; Dye 2004
00434	Irrigation system 20	Eastern boundary of Waipā Ahupuaʿa, at the base of the hills	Earle 1978:234; Hoffman 1980:25; Dye 2004
00436	Irrigation system 19	Southwest of Waipā Stream	Earle 1978:223; Hoffman 1980:25; Dye 2004
00484	Irrigation system 18	Northwest of Waipā Stream	Earle 1978:33, 67; Hoffman 1980:24; Dye 2004
01040	Cave shelter	Mauka end of a natural depression	Dye 2004:21–24
01041	'Auwai section	East side of Waipā Stream	Dye 2004:25
01042	'Auwai system	East side of Waipā Ahupua'a	Dye 2004:26–27
02196	Inadvertent burial	KSBE land, TMK: [4] 5-6-004:023	Kamai and Hammatt 2013
No # assigned	Excavated pits	Makaihuwa'a Ridge	Wheeler et al. 2013b:47–56

Table 9. State Inventory of Historic Places sites in Waipā and Waikoko Ahupua'a

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 35. Lo'i systems of Waipā as documented by Earle (1978:196a)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

System #	Туре	e Source	Length in Meters of Irrigation Ditch		Area in Hectares of Irrigation System		Number of Farmers on Irrigation System	
			Total	Initial Segment	Net	Gross	Net	Gross
18 (SIHP # 50-30- 03-484)	Alluvial Coastal Plain	Main stream	1,095	400	2.56	5.18	6	8
19 (SIHP # 50-30- 03-436)	Alluvial Coastal Plain	Main stream	875	745	1.80	1.80	5	9-10
20 (SIHP # 50-30- 03-434)	Alluvial Bottom	Small independent stream	0	0	0.33	0.33	2	2
21 (SIHP # 50-30- 03-433)	_	Ground water	0	0	0.36	0.36	1	1

Table 10. Waipā Irrigation System as documented by Earle (1978:125)

the water around a small hill and through the alluvial plain. This ditch is a simple earth channel about 1.1 m wide by 0.5 m deep at natural ground level. Along much of the ditch's length, roots of the *hau*, which grows exuberantly, clog the ditch and present a major maintenance problem. Excess water is hand-led simply by a spillway to the Waikoko stream. The primary ditch is now about 1.32 km long, The ditch follows the line of an old ditch for the first 0.84 km and then it turns at right angles to the west where it is flumed across the Waikoko stream to water a farm with twelve pond fields. This westerly extension of the system is apparently recent, dating after the introduction of rice. The system is presently operated by a single oriental farmer. [Earle 1978:67]

The Waipā systems are clearly small for Halele'a District as a whole. Earle (1978:127) notes the mean net area for these Halele'a District systems was calculated to be 1.93 ha (range 0.1-16.38). This may be compared to the mean net area for the Waipā systems of 1.26 (range 0.33-2.56). On the basis of "receiving grants," Earle (1978:127) concludes, "The mean number of farmers within an irrigation system [of Halele'a] was 4.7 (range 1 - 43)." The corresponding mean for the farmers of Waipā appears to be 3.5 (range 1-6). It appears Earle's estimate of the total number of farmers likely to have been working on the Waipā *lo*'i systems was approximately 20 to 21.

## 3.5.2.4 Hoffman (1980)

The Hoffman study notes previous massive clearing operations in the coastal flats of Waipā. No sites were newly identified but seven previously located sites are briefly summarized. The only two sites Hoffman discusses are Kupakoili Heiau previously discussed and Earle's agricultural system 21, BPBM # KA-D8-7, SIHP # -433, which is located along Kūhiō Highway. Hoffman

notes this later site included a fishpond as indicated in 1850 land records. Neither of these sites was investigated in the Hoffman study.

3.5.2.5 Panteleo and Williams (1991)

In 1991, an archaeological reconnaissance survey was conducted in selected portions of Port Allen to Wainiha transmission line corridor. The purpose for the study was to determine the presence and/or absence of any inclusive historic properties. Portions of this survey were conducted on the north side of Kaua'i including Wai'oli, Waipā, Waikoko, Lumaha'i, and stops in Wainiha Valley at the Wainiha Valley Hydro-electric Plant. No new historic properties were identified in Waipā and Waikoko Ahupua'a.

3.5.2.6 Sullivan and Dega (2003), Dye (2004), and Chafee and Dega (2005)

In 2003, SCS wrote a burial treatment plan for two inadvertently disturbed human remains discovered during excavation of a structure foundation and a leach field of a single family residence (Sullivan and Dega 2003). Tom Dye conducted an archaeological inventory survey with subsurface testing for Waipā Foundation in 2004. Further information regarding two previously identified historic properties and three newly identified historic properties were documented. Previously identified historic properties consists of SIHP # -146, a rice mill at the site of Halaloa Heiau and SIHP # -484, an 'auwai system first identified by Tim Earle who labeled it as "System 18." Dye describes the current condition of the mill, and notes that some of the waterworn cobbles used in the concrete mill construction might have been taken from the *heiau*. The newly identified historic properties include SIHP # -01040, a cave shelter and SIHP # -01041, "likely associated with the heiau ceremonial complex in pre-Contact times" (Wheeler 2013b:39-40). Additionally, Dye (2004) identifies a previously documented section of 'auwai along the east bank of Waipā Stream, SIHP # -484, and documents newly identified SIHP # -01042 (Dye 2004:22, 26), both parts of an 'auwai system on the east side of the Waipā Ahupua'a. Archaeological monitoring was conducted after the discovery of inadvertent burials. The burials and isolated finds were given SIHP # -00355; SIHP # -00361 was identified as a cultural layer (Chaffee and Dega 2005).

## 3.5.2.7 Fong et al. (2006)

In 2006, CSH monitored an approximate 10-mile stretch from Princeville to Ha'ena for the Kūhiō Highway, Route 560 Shoulder Improvements project (Fong et al. 2006). Monitoring of subsurface activities indicated the area was previously disturbed by road construction. No historic properties were identified (Fong et al. 2006).

## 3.5.2.8 Kamai and Hammatt (2013) and Wheeler et al. (2013b)

In 2013, CSH wrote a burial site component of an archaeological preservation plan for the Waipā Foundation Community Cultural Center project. The plan addressed an inadvertent discovery of human remains identified during the excavation of an electrical trench. The burial was given SIHP # -2196 (Kamai and Hammatt 2013).

Also in 2013, CSH conducted a reconnaissance survey and literature review for a portion of Waipā for Kamehameha Schools. One historic property was identified, a *lo* '*i* (SIHP # -00434) and three excavated pit features were documented on the Makaihuwa'a Ridge. The pit features may relate to a traditional account of an aid to navigation on the ridge (Wheeler et al. 2013b). The pits were not assigned an SIHP number.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

The central of the three pit features is by far the largest. This central pit is roughly circular, measuring between 2.5 and 3.0 m in diameter and having a maximum depth of 1.7 m below the brow of the ridge on the south side. The walls of this pit are nearly vertical on the southeast, south, and southwest sides. The north side is somewhat sloping, seemingly due to collapse. The floor is roughly level and of the nature of a shallow bowl, perhaps the result of deliberate excavation into the relatively soft saprolitic, decomposing basalt of the ridge summit. This pit was observed to be located in an area with a particularly good view of the sweep of Hanalei Bay to the northwest, north, and northeast; Waipā Valley extending back to the southwest; and Wai'oli Valley extending back to the southeast. (Wheeler et al. 2013b:47–56)

Wheeler et al. (2013b) note the following preliminary points in comparing the Wichman (1985) account to the archaeological evidence observed:

- The aid to navigation is deliberately placed "higher . . . over the treetops and [below where] the clouds swirled just above . . . the chief . . ." on Makaihuwa'a Ridge (Wichman 1985:40–41). This fits the location of the observed historic property very well. The tradition and the archaeology both command the ideal location.
- The chief said "Here we must dig out a platform from the edge of the ridge . . . A small platform dug out of the side of a hill" (Wichman 1985:41). This is what was observed: a larger excavation with seemingly two smaller excavations with relatively level bottoms.
- "Another group formed a line reaching to the river beds of Waipa'a and Waikoko and passed smooth stones hand to hand to the work site" (Wichman 1985:41). This was a proverbial way of thinking about how *menehune* worked. No water-rounded cobbles and boulders were observed. There would have been no clear need for the transport of such stones for the story to be basically true.
- The chief sat father up the ridge where he could see the work, and his voice shouting instructions could be heard. A minor mystery was the evidence of two smaller constructions spaced above and below the main pit feature. The upper one, which is certainly close enough for a chief to shout instructions, could have been a supervisory position.
- The account relates a roof over the platform, higher in front than in back in order to protect the torches from the rain and also high enough so the roof wouldn't catch on fire. No archaeological remnant of a roof would be expected with the passage of time in such an exposed, open, wet (approximately 100 inches of rain a year) location. The 1.7-m deep hole was a surprise in that it initially was not obvious why anyone would dig such a deep hole for a signal fire. The concept that the construction/excavation was a response to the extraordinary rain and wind does, however, make perfect sense. While remnants of a roof support system were not observed, more careful analysis might develop details of what this would have looked like.
- The nature of the fire is consistently indicated to be "*lamakū*." The concept is presented as if the lights were akin to chiefly torches understood as *kukui* nut kernels strung on a midrib, woven into cylinders and bundled with dried banana

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

leaves. *Lamaku* does, however, also mean "signal fires" which more prosaically might be of dried wood. No charcoal was observed in the archaeological properties. After the passage of two centuries it would seem likely that even a meter-thick charcoal deposit might entirely disappear from such an exposed, open, wet location. It may be that the preferred fuel would leave less trace than a bonfire [Wheeler et al. 2013b:55–56].

Accounts of pre-Contact Hawaiian aids to navigation are few. Love Dean's *The Lighthouses of Hawai'i* is somewhat dismissive, asserting that:

Before Western contact, Hawaiians did not need permanent navigational aids. Those who set out in boats to fish or to travel to neighboring villages or islands knew the coastlines and all the landmarks well. An open fire to guide them safely to shore was used only at night or during storms. [Dean 1991:1]

We do however, have an account of a trade agreement made between the planters at Kukuiolono ("Light of Lono"; Kalāheo, Kaua'i) and the fisherman of the Kona District that required that a huge torch be kept burning at night atop Kukuiolono cinder cone. It is said that fisherman relied on this light for navigation as it could be seen along the whole south coast of Kaua'i, from Kōloa to Ni'ihau (Sandison 1956). Clark (1977:41) relates another popular derivation from "*lei*" and "*ahi*" or "wreath of fire" which may have been related to the tradition of signal beacon fires lit on the crater rim—either for special occasions and/or as a beacon for canoes. Clark also notes the probability that the prominent Leahi cape (lae) was used as a reference point in locating the deep sea fishing grounds or *ko'a* for *ahi* fish.

## 3.5.3 Previous Archaeological Research in Lumaha'i

The following two tables outline the archaeological research (Table 11) and historic properties (Table 12) identified in Lumaha'i Ahupua'a. These tables are followed by discussion of the research and historic properties. Table 11 provides a list of archaeological research conducted within Lumaha'i, including columns for source, location, nature of study, and findings. The locations of these archaeological studies are shown in Figure 33

Table 12 is a list of known historic properties within the *ahupua* 'a and includes columns for state site numbers, site type, location and reference. The locations of identified historic properties within Lumaha'i Ahupua'a are shown in Figure 36.

3.5.3.1 Bennett (1931)

Pu'uohewa and Pu'uomama were not found during Bennett's survey. Bennett (1931) lists one archaeological site at Lumaha'i:

Site 147. Kailiopaia *heiau*, shoreward of the government road, to the east of Lumaha'i stream on a raised coral point. [Bennett 1931:135]

## 3.5.3.2 Earle (1978)

Earle (1978) discusses Lumaha'i in a general way but develops no detailed information regarding the agricultural systems of Lumaha'i. He notes the following:

Extensive bulldozing for pasturage has destroyed all archaeological evidence of pond fields in the lower section of the valley, but numerous small terrace sites are

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Source	Location	Nature of Study	Results (SIHP # 50-30-03)
Bennett 1931	Lumahaʻi	Island-wide survey	Site -147, Kailiopaia Heiau
Earle 1978	Halele'a District: Lumaha'i	Study of economic and social organization	No historic properties identified in Lumaha'i
Kelly et al. 1978	Lumahaʻi Valley	Historical survey	Traditional and historical literature review; identified one historic properties, SIHP # -00445, Chinese Camp
Cordy 1978	Lumahaʻi Valley	Archaeological survey	Two historic propertie areas identified: Area 1, enclosures and a wall and Area 2, terrace lines
Hoffman 1980	Alluvium plains of Lumahaʻi Valley	Archaeological survey	Confirmed three previously identified historic properties and identified five new historic properties: SIHP #s -00440 through -00444
Pantaleo and Williams 1991	Transmission line corridor	Archaeological reconnaissance survey	No historic properties identified in Lumaha'i
Fong et al. 2006	Approx. 10-mile stretch of Kūhiō Hwy, Princeville to Ha'ena	Archaeological monitoring	No historic properties identified
McIntosh et al. 2011	Vicinity of Lumaha'i: old loop road and bypass road corridor, TMK: [4] 5-7-003	Archaeological inventory survey	No historic properties identified
Wheeler et al. 2013a	99-acre portion of Lumaha'i Ahupua'a, TMK: [4] 5-7-002:001 por.	Field inspection and literature review	No historic properties identified

Table 11. Previous archaeological	studies in Lumaha'i	Ahupua'a
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Table 12. State Inventory of Historic Places (SIHP) sites in Lumaha'i Ahupua'a

SIHP # 50-30-03-	Site Type/Name (if any)	Location	Reference
00445	Chinese Camp	Lumahaʻi Valley	Kelly and Hee 1978:35

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 36. Aerial photograph (Google Earth 2013) showing locations of previous identified historic properties in Luamaha'i and Wainiha Ahupua'a; note Bennett's (1931) sites 152 and 153, as well as SIHP # -01500 to -01502 (Barrera 1984), are beyond the scope of this map, further south within Wainiha Valley

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

to be found in the interior. One such site was identified 2.5 km from the sea, during a rapid reconnaissance survey, and others have been described by local hunters. This identified terrace site was given Bishop Museum site number 50-Ka-D7-3 and subsequently SIHP # 50-30-03-450.

## 3.5.3.3 Cordy (1978) and Kelly and Hee (1978)

Cordy surveyed a large portion of the floor of Lumaha'i Valley but notes the limitations of his work (1978:48) which may better be understood as a reconnaissance study. His work identified two dryland agricultural site areas: 1) enclosures and a wall (Bishop Museum site number 50-Ka-D7-4; SIHP # -449) and 2) terrace lines (Bishop Museum site number 50-Ka-D7-6; SIHP # -447) both located over a mile inland of Kūhiō Highway. These sites are suggested to be pre-Contact or early historic in date. A companion historical survey by Marion Kelly and Clayton Hee (1978:29–33) identified another site(s) (two dams and a tunnel) in Lumaha'i also located over a mile inland of Kūhiō Highway and given Bishop Museum site number 50-Ka-D7-6 and 50-Ka-D7-7 (SIHP #s -446 and -447). These appear to be remnants of a rice irrigation system and were recorded on a 1920 survey map. They also identified houses of Japanese farmers who entered the valley in the late 1920s (Bishop Museum site number 50-Ka-D7-8; SIHP # -445).

## 3.5.3.4 Hoffman (1980)

Hoffman (1980) performed a survey of approximately 300 acres along the floor of Lumaha'i Valley overlapping the Cordy (1978) and Kelly and Hee (1978) study areas but extending farther to the west. The Hoffman study confirmed three previously reported sites and identified five previously unrecorded sites, Bishop Museum sites 50-KA-D7-9 through -13; SIHP #s -440 through -444. All of these sites are 1.3 km inland or more. She notes the "massive earth-moving operations of historic times" and confirms earlier work: as Earle (1973:233) suggests, "no sites remain in the coastal plain; all located sites are above the 6-meter contour line" (Hoffman 1980:6). Hoffman (1980) does plot the location of Kaliopaia Heiau, just east of the mouth of Lumaha'i River but notes the site was "not located by survey team."

#### 3.5.3.5 Pantaleo and Williams (1991)

In 1991, an archaeological reconnaissance survey was conducted in selected portions of a Port Allen to the Wainiha transmission line corridor. The purpose of the study was to determine the presence and/or absence of any inclusive historic properties. Portions of this survey were conducted on the north side of Kaua'i including Wai'oli, Waipā, Waikoko, Lumaha'i, and stops in Wainiha Valley at the Wainiha Valley Hydro-electric Plant. No historic properties were newly identified in the Lumaha'i Ahupua'a (Pantaleo and Williams 1991).

## 3.5.3.6 Fong et al. (2006)

In 2006, CSH monitored an approximate 10-mile stretch from Princeville to Ha'ena for the Kūhiō Highway, Route 560 Shoulder Improvements project (Fong et al. 2006). Monitoring of subsurface activities indicated the area was disturbed by previous road construction. No historic properties were observed (Fong et al. 2006).

## 3.5.3.7 McIntosh et al. (2011)

In 2011, Pacific Legacy, Inc. conducted an archaeological inventory survey in the vicinity of Lumaha'i along the highway for a proposed bypass road and emergency repair work. No historic properties were identified (McIntosh et al. 2011).

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i
# 3.5.3.8 Wheeler et al. (2013a)

In 2013, CSH conducted an archaeological field inspection and literature review for an approximately 99-acre portion of Lumaha'i Ahupua'a for Kamehameha Schools. The purpose of the study was to provide the landowner (or their representative) with an overview of existing archaeological conditions, to facilitate planning, and to inform them about appropriate archaeological considerations on land use for planning (Wheeler et al. 2013a:1).

# 3.5.4 Previous Archaeological Studies in Wainiha

Table 13 outlines previous archaeological research in Wainiha and

Table 14 summarizes the historic properties identified. Two of Bennett's (1931) sites, 152 and 153, described as taro terraces and house site respectively, are within Wainiha Valley:

This interesting taro section is on the high side of the valley utilizing a little stream and small flat area. The hill is on one side and the stream and a bluff on the other, leaving a fairly steep section in between. At one place above the terraces stones are built across the stream as intake, which could, with the addition of a few more stones, shunt the water into a ditch which runs between large rocks and dirt walls. All along the edge of the stream is a wall built to keep the water from running back. The terraces are from 6 inches to 3 feet high . . . Site 153. House sites, on Mauna Hina ridge in Wainiha Valley. Remains of many old house sites and much irrigated land. The house sites are mostly of the terraced type and 10 to 15 feet wide. [Bennett 1931:135–136]

Table 13 provides a list of archaeological research conducted within Wainiha, including columns for source, location, nature of study, and findings. The locations of these archaeological studies are shown in Figure 33.

Table 14 is a list of known historic properties within the *ahupua* 'a and includes columns for state site numbers, site type, location and reference. The locations of identified historic properties within Wainiha Ahupua'a are shown in Figure 36.

# 3.5.4.1 Bennett (1931)

Bennett (1931) in his systematic, but not exhaustive, survey of archaeological sites on Kaua'i, describes six sites in Wainiha, all of which appear to be adjacent to or near Wainiha River. Two of Bennett's sites (148, 149) are on or close to the coast, and the four remaining sites are all upstream and include two *heiau* (Site 150 - Laumaki Heiau, Site 151 - Apaukalea Heiau), taro terraces (Site 152), and house sites on Mauna Hina Ridge (Site 153). Bennett describes the sites:

Site 148. *heiau* on Popoki knoll. Popoki knoll is located next to the road (inland side) in front of Site 149 near the Wainiha river. It is said to have been a *heiau* site, but nothing remains to mark it. [Bennett 1931:135]

Site 149. Kaunupepeiao Heiau, back of the first house on the first *pali* east of the mouth of the Wainiha River. A flat place about 30 feet wide and 20 feet deep with stones along the front edge meet the description given by Thrum: 'A 12-foot open-paved *heiau* of husbandry class; probably simply a place of offering.' [Bennett 1931:135]

Site 150. Laumaki *heiau*, on a knoll west of the 'Power Hous' road—about one mile from the government road, in Wainiha valley. Thrum describes this *heiau* as

Source	Location	Nature of Study	Results (SIHP # 50-30- 02)
Bennett 1931	Island-wide	Archaeological survey	Lists three <i>heiau</i> in Wainiha: Laumiki, Apaukalea, and Kaunupepeiao
Earle 1978	Halelea'a District: Wainiha	Archaeology and socio-economics	Identifies extensive <i>loʻi</i> systems along Wainiha Stream
Barrera 1984	Wainiha Valley, Kauai	Archaeological studies (survey, mapping, and selective excavations)	SIHP #s -01500 (agricultural system), -01501 (basalt flake scatter), and -01502 (charcoal concentration and two pits)
Pantaleo and Williams 1991	Transmission line corridor	Archaeological survey	No historic properties identified in Lumaha'i
Ida et al. 1993	West side Wainiha Valley back from river mouth, TMK: [4] 5-8-002:003	Archaeological survey	No historic properties identified
Hammatt and Ida 1995	West side of Wainiha valley back from mouth, TMK: [4] 5-8-002: por. 003	Archaeological investigation	No historic properties identified
Rechtman and Dougherty 2001	Two parcels at Wainiha, TMK: [4] 5-8-012:005, 011	Archaeological inventory survey with subsurface testing	No historic properties identified
Fong et al. 2006	Approx. 10-mile stretch of Kūhiō Hwy, Princeville to Ha'ena	Archaeological monitoring	No historic properties identified
Dye and Dye 2008	Chew residence, Wainiha, TMK: [4] 5-8-006:024	Archaeological assessment	No significant historic properties identified
Dye 2009	Residential property at Wainiha, TMK: [4] 5-8- 006:065	Archaeological assessment	No historic properties identified
Groza et al. 2010	Proposed Wainiha Well, TMK: [4] 5-8-002:003	Archaeological assessment	No historic properties identified

Table 13. Previous archaeological studies in Wainiha Ahupua'a

SIHP #	Site Type/Name (if any)	Location	Reference
148	Heiau	On Popoki knoll	Bennett 1931:135
149	Kaunupepeiao Heiau	First <i>pali</i> east of mouth of Wainiha River	Bennett 1931:135
150	Laumaki Heiau	1 mile in Wainiha Valley from hwy	Bennett 1931:135
151	Apaukalea Heiau	Wainiha Valley, inland from Site 150	Bennett 1931:135
152	Taro terraces	Wainiha Valley, high on the side of the valley	Bennett 1931:135
153	House site	Mauna Hina Ridge	Bennett 1931:136
50-30-02- 01500	Agricultural system	Wainiha Valley	Barrera 1984
50-30-02- 01501	Basalt flake scatter	Wainiha Valley	Barrera 1984
50-30-02- 01502	Charcoal concentration and two pits	Wainiha Valley	Barrera 1984
None	System 14	West side of Wainiha Stream	Earle 1978:58-63
None	System 15On an island between two major channels of Wainiha Stream		Earle 1978:59, 63– 66
None	System 16	On the east side of Wainiha Stream	Earle 1978:59
None	System 17	On flat alluvial soils west of Wainiha Earle 1978:66–67 Stream	

Table 14. State Inventory of Historic Places (SIHP) sites in Wainiha Ahupua'a

'A small, open platform, paved heiau, 2 feet high, of husbandry class.' The platform measures 20 feet wide and 10 feet deep and faces the sea. It is paved with river stone. [Bennett 1931:135]

Site 151. Apaukalea *heiau*, adjoins the "Power House" road on the east side, inland from Site 150 in Wainiha valley:

The remains of recent occupation together with modern stone platforms, walks, graves with tombstones and other such work, make the distinction of this heiau difficult. The *heiau* consists of a small, square, paved area about 35 feet on a side. The east wall is 15 feet wide, and badly tumbled on the outside, though 3 feet high on the inside. The north wall is irregular, about 15 feet wide, and 2 feet high. A projection inwards forms a platform 10 by 15 feet. The west wall is just a trace of stone, but seems to have been 15 feet wide. The south wall is of varying width and runs from the road to the bluff, a distance of 130 feet. It is about 3 feet high. To the

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

west of this enclosure is a flat space with two lines of stone traversing it, while on the east are two paved house sites about 10 feet square. [Bennett 1931:135]

Two of Bennett's (1931) sites, Sites 152 and 153, described as taro terraces and house site respectively, are within the Wainiha Valley:

This interesting taro section is high on the side of the valley utilizing a little stream and a small flat area. The hill is on one side and the stream and a bluff on the other, leaving a fairly steep section in between. At one place above the terraces stones are built across the stream as an intake, which could, with the addition of a few more stones, shunt the water into a ditch which runs between large rocks and dirt walls. All along the edge of the stream is a wall built to keep the water from running back. The terraces are from 6 inches to 3 feet high . . . Site 153. House sites, on Mauna Hina ridge in Wainiha Valley. Remains of many old house sites and much irrigated land. The house sites are mostly of the terraced type and 10 to 15 feet wide. [Bennett 1931:135, 136]

# 3.5.4.2 Earle (1978)

Earle's documentation of irrigated taro systems in Wainiha is shown on a USGS map of the valley (Earle 1978:59). Earle's System 14 extends along Wainiha River to just southeast of Powerhouse Road. Earle observed that the lower portion of Wainiha Valley was extensively used for taro cultivation through the 1850s (Earle 1978:32)

#### 3.5.4.3 Barrera (1984)

Chiniago Inc. was contracted to perform archaeological investigations as part of an environmental study for a proposed hydroelectric power house and access road. The report describes three archaeological sites: SIHP #s 50-30-02-01500, -01501, and -01502. SIHP # -1500 is a complex of agricultural features located between Wainiha Stream on the east and the steep valley slope on the west. Barrera (1984:23) concludes that "the remains [of SIHP # -01500] have provided valuable insights into the study of aboriginal Hawaiian agricultural practices." Although Hawaiian archaeologists have traditionally classified Hawaiian agricultural systems as either dry/non-irrigated or irrigated pondfields, Barrera (1984:24) describes SIHP # -01500 as "irrigated dry terraces." SIHP # -01501 is a scatter of basalt artifacts situated within thick vegetation between two sidestreams. Most of the specimens consist of 'waste flakes' associated with the manufacture of implements. SIHP # -01502 consists of three features exposed in the side of the pioneer roadcut through the nose of the ridge adjacent to SIHP # -01500. The features comprise a concentration of charcoal fragments and two pits of indeterminate function. No specific conclusions could be drawn regarding SIHP # -01502; however, Barrera (1984:24) asserts that the features "almost certainly have relevance to shifting cultivation practices."

#### 3.5.4.4 Pantaleo and Williams (1991)

In 1991, an archaeological reconnaissance survey was conducted in selected portions of a Port Allen to Wainiha transmission line corridor. The purpose for the study was to determine the presence and/or absence of any inclusive historic properties. Portions of this survey were conducted on the north side of Kaua'i including Wai'oli, Waipā, Waikoko, Lumaha'i, and stops in Wainiha Valley at the Wainiha Valley Hydro-electric Plant. No historic properties were newly identified in the Wainiha Valley area (Pantaleo and Williams 1991).

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

#### 3.5.4.5 Ida et al. (1993)

In 1993, CSH conducted an archaeological inventory survey for a 50-ft by 50-ft parcel for a GTE Hawaiian Tel telecommunications hut (Ida et al. 1993) adjacent to an existing water pump. The old Wainiha Powerhouse Road and water pump access road cut through the eastern portion of the parcel, providing a maximum stratigraphic profile of 90 cmbs (cm below surface). No cultural material was found during the pedestrian survey or during a review of the exposed stratigraphy within the road cuts. No further work was recommended and the project area was observed to be too steeply sloped for agricultural cultivation or habitation.

## 3.5.4.6 Hammatt and Ida (1995)

In 1995, CSH conducted an archaeological investigation (Hammatt and Ida 1995) in the same general area as the Ida et al. (1993) project described above. The field survey included an area designated as Lot 1 that consisted of a 6,000-sq-ft area with a water tank, and a 15,769-sq-ft utility easement that extended from a pump station on Powerhouse Road to the Lot 1 water tank. No cultural material was observed during the field survey or during a review of the exposed stratigraphic profile within the road cuts. The same stratigraphic profile observed during the Ida et al. (1993) project was also present within this project area.

# 3.5.4.7 Rechtman and Dougherty (2001)

In 2001, Rechtman Consulting conducted an archaeological inventory survey for two noncontiguous parcels (TMKs: [4] 5-8-012:005, 011) within Wainiha Ahupua'a (Rechtman and Dougherty 2001), one of which is approximately 500 m north and the other 500 m northeast of the current project area. Subsurface testing included a total of three trenches within Parcel 5 and four trenches within Parcel 11. No further work was recommended based on the lack of findings during the pedestrian survey and subsurface testing.

# 3.5.4.8 Fong et al. (2006)

In 2006, CSH monitored an approximate 10-mile stretch from Princeville to Ha'ena for the Kūhiō Highway, Route 560 Shoulder Improvements project (Fong et al. 2006). Monitoring indicated the soils were disturbed by previous road construction. No historic properties were observed (Fong et al. 2006).

#### 3.5.4.9 Dye (2008)

In 2008, T.S. Dye and Colleagues, Archaeologists, Inc. performed an archaeological assessment for the proposed construction of a residential structure in Wainiha. The property is located on the bank of the stream mouth, across from Wainiha Beach Park. A backhoe excavated the foundation footings for the structure, as well as 15 test pits. Although historical records indicate that the parcel was uzsed in traditional Hawaiian times, evidence of this former use was limited to isolated occurrences of artifacts or small amounts of marine shell.

# 3.5.4.10 Dye (2009)

In 2009, T.S. Dye and Colleagues, Archaeologists, Inc. performed an archaeological assessment of a 1.156-acre residential parcel, located off Ananalu Road on the slope of a small hill south of Wainiha Stream. The purpose of the assessment was to determine the presence or absence of surface features in order to assess the likelihood of subsurface cultural deposits. An investigation

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

of the land use history of Wainiha, a review of previous archaeological research in the vicinity, and a field check all failed to produce evidence of historic properties; therefore, Dye (2009) concludes that there are no properties present within the parcel.

3.5.4.11 Groza et al. (2010)

In 2010, CSH (Groza et al. 2010) conducted an archaeological inventory survey with shovel testing for a proposed Wainiha well. No historic properties were identified.

# **3.6 Background Summary and Predictive Statements**

Background research emphasizes the traditional importance of the Halele'a District in pre-Contact times. Historical documentation indicates the traditional settlement pattern for Wai'oli, Waipā, Lumaha'i, and Wainiha was a combination of intensive agriculture, predominantly taro cultivation, some fishponds, and a scatter of houses, particularly along the shoreline. With the exception of SIHP #s -00484, -147, and -00445, little is known of the traditional history of Lumaha'i and Waikoko (Earle 1978). That said, one of the classic archaeological/anthropological studies undertaken in the Hawaiian Islands concerns irrigated taro cultivation systems in the Halele'a District and their implications for traditional social structure (Earle 1978).

LCAs and previous archaeology provide corroborating evidence that the coastal areas and valleys of the project areas/APE were used for irrigated cultivation. Dams and irrigation ditches are common features on flat areas. Handy and Handy (1972:420) have stated there was a compact area of terraces near the coast watered by Waipā Stream. In nearby Wainiha, in all available space the land was terraced in steps into the higher valleys. The LCA documents describe at least 154 taro lo 'i along Wai'oli Stream and 27 unspecified kula, but based on traditional kula lands, there would have also been sweet potatoes, yams, bananas, and sugarcane. Only 14% of the awardees claimed to have held the land prior to 1824. Eleven individuals were awarded lands in Waipā Ahupua'a which included taro lo'i and house lots. The house lots were generally located along the coast, although there has been evidence of habitation and agricultural structures discovered as far inland as 1.5 km from the coast. Kuleana documentation specifies that the entire ahupua'a of Lumaha'i was awarded to L. Konia, granddaughter of Kamehameha I, wife of Paki and mother of Bernice Pauahi Bishop, and that the ahupua 'a of Waikoko was awarded to M. Kekauonohi, greatgranddaughter of Kekaulike, King of Maui and granddaughter of Kamehameha the Great. A study of all the claims and their supporting testimony for Wainiha shows a typically well-developed land system in place. Ahupua'a-based settlement patterns should be visible archaeologically with habitation near the coast and agricultural concerns in the well-watered interior areas.

In the mid- to late 1800s, the shift from taro to rice production was a direct response to the importation of Asian laborers as sugar plantation workers in the Hawaiian Islands as well as the introduction of eastern technology developed for irrigation and cultivation of rice. This transition in land use patterns may be visible archaeologically within the vicinity of the project areas/APE. Kelly and Hee 1978 document a historic Chinese Camp in the Lumaha'i Valley. The shift to rice cultivation in Waipā and Lumaha'i is further documented by leases between the Bishop Estate (owners of the former Kōnia Lumaha'i lands), and Chulan and Company (Hoffman 1980:4) and the Sing Tai Wai Company (Kelly and Hee 1978). The peak of rice cultivation was between 1890 and 1930, but decreased when local production could not compete with cheaper prices of imported California rice (Earle 1973:183). By the early 1900s areas in the Halele'a District had their own

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Chinese community that included not only the rice farmers, but also merchants and other business people (*The Garden Island*, 12 January 2015). That said, traditional Hawaiian agricultural practices have been locally reestablished, with cultivation of *kalo* ongoing throughout the lands surrounding the project areas/APE and representing the largest active agricultural activity in the Halele'a District. This reinvigorated appreciation for—and efforts to teach and perpetuate—Hawaiian ways of knowing is also represented by the activities of the Waipā Foundation. Archaeological inquiry within this setting should be in the context of appreciation for the ongoing revitalization of Hawaiian traditions, historic properties and traditional historic properties in the vicinity of the project areas/APE.

Human remains have been found within coastal Wai'oli, Waipā, and Wainiha archaeological studies, with two burial sites documented in the vicinity of the Waipā and Waikoko project areas/APE and four traditional burial sites plus a church cemetery documented in Wai'oli. Three *heiau*, including Kupakoili, Halaloa, and Kailiopaia are documented in Waipā and Waikoko Ahupua'a. Four *heiau* are documented in the vicinity of the Wainiha project areas/APE: Kaunupepeiao, Laumaki, Apaukalea, and a *heiau* on Popoki knoll. Traditional Hawaiian house sites, *kalo* terraces, and other agricultural infrastructure have also been documented (Earle 1978).

In the mid-twentieth century, portions of the lands within and surrounding the project areas/APE were utilized as cattle pasture. In referencing this time period, Earle (1978) indicated extensive bulldozing for pasturage destroyed many archeological sites within the project area vicinity. Hoffman also documents the obliteration of traditional agricultural lands changed into pasture lands (Hoffman 1980:4). Halaloa Heiau was a casualty of rice cultivation as described by Thrum (1907): "At Waipa stream.- A square heiau of about 80 feet in size, with low walls. Kane its deity. Destroyed years ago for a mill site" (Thrum 1907:43).

Archaeological studies in the vicinity of the project area typically note extensive bulldozing and land modifications in both the coastal and inland sections of the vicinity surrounding the project areas/APE, particularly along the more developed coastal plain. In fact, Earle (1973:233) has suggested no sites remain in the Lumahai'i coastal plain.

In inland areas, historic and pre-Contact taro agricultural terrace remnants are found along the major rivers, in addition to later features associated with rice irrigation and water control. Ranching infrastructure features are also noted. Previous archaeological surveys have found pre-Contact sites in areas difficult to access such as ridges and gulches.

In summary, the probability of identifying pre-Contact habitation and agricultural sites in the project areas/APE is moderated by the subjection of these lands to 150 years of historic land modification by farmers, ranchers, and residential developers. In the twentieth century, bulldozing to create cattle pasture lands destroyed many former pre-Contact sites. Previous archaeological surveys have found pre-Contact sites in areas difficult to access such as ridges and gulches. Based on background research and previous archaeological studies, the probability of encountering in situ buried historic properties exists. Evidence of pre-Contact land use may include, but not be limited to, human burials, midden deposits, artifacts, and trail alignments. Evidence of post-Contact land use could include agricultural infrastructure, human burials, trash pits, privies, roadways, and historic building foundations.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

# Section 4 Results of Fieldwork

Fieldwork conducted for the AIS included a 100% pedestrian inspection and subsurface testing. The pedestrian inspection included identification and documentation of historic properties within the project area/APE and a description of the overall project area/APE including ground visibility, modern use or disturbance, and vegetation. Subsurface testing consisted of six shovel tests (ST-1 through ST-6). The pedestrian survey was conducted on 6 October 2014. Shovel testing within the proposed project area/APE and the study areas was conducted on 7-8 October 2014. Recordation of historic properties for this inventory survey was conducted on 9 October 2014.

# **4.1 Pedestrian Survey Results**

Archaeologists took numerous photographs to illustrate the terrain and dense vegetation. No surface pre-Contact habitation or agricultural sites and no early historic rice agricultural or ranching features were identified. Ground visibility during the pedestrian inspection was good. Vegetation in undeveloped areas within the project area/APE included tall invasive grasses (Megathyrus and Urochloa) and dense *naupaka* (*Scaevola* sp.). Portions of the project include mowed grass, wedelia, and ironwood (*Casuarina* sp.). A pattern exists in the building of palatial estate residences *makai* of Kūhiō Highway with predominantly farmland and farm residences *mauka* of Kūhiō Highway.

Four historic properties are identified within the project areas/APE including SIHP # 50-30-03-2296 (Wai'oli Stream Bridge), SIHP # 50-30-03-2297 (Waipā Stream Bridge), SIHP # 50-30-03-2298 (Waikoko Stream Bridge), and a concrete culvert and supporting basalt and mortar revetments at both ends beneath Kūhiō Highway approaching the Wainiha River Bridge 2, northbound, which is considered a contributing element of SIHP #50-30-02-9396 (Kaua'i Belt Road) (Figure 37 through Figure 43).

The Kaua 'i Belt Road extended through all of the project areas/APE. The road is typically two lanes and asphalt-paved with modern painted lines and reflectors. At the locations of the bridges, the road narrows to one lane. Within the exception of repaving, replacement of or improvements to some bridges/culverts, and installation of various safety measures, the road appears to have been relatively unchanged.

The project areas/APE include the Kaua'i Historic Bridge District, within the Kaua'i Belt Road (North Shore Section) Historic District, on the National and State Registers of Historic Places. Contributing structures to the Kaua'i Historic Bridge District include the Wai'oli Stream Bridge, the Waipā Stream Bridge, and the Waikoko Stream Bridge (Appendix D, Figure 106). The portions of the project areas/APE that cross the Wainiha River include three steel bridges built less than 50 years ago, deemed non-contributing structures within the Kaua'i Belt Road--North Shore section (National Register of Historic Places Information System ID: 03001048) and thus not included in the inventory of historic properties identified:



Figure 37. Portion of the 1991 Haena and 1996 Hanalei USGS 7.5-minute series topographic quadrangles showing the location of SIHP #s 50-30-03-2296, 50-30-03-2297, and 50-30-03-2298, as well as a new contributing element of SIHP #50-30-02-9396 within the project areas/APE



Figure 38. Portion of Kūhiō Highway, Wainiha Stream Bridge 1, a non-contributing structure within the historic bridges district, view to east

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 39. Portions of the Wainiha River downstream from Kūhiō Highway between Wainiha River Bridges 2 and 3, non-contributing structures within the historic bridges district, panoramic view toward the Wainiha River mouth, to north



Figure 40. Portion of the Kūhiō Highway, view to south of Wainiha River Bridge 2; note sign indicating the local custom of taking turns to cross the bridge, allowing 5-7 cars across at a time

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 41. A portion of the Kūhiō Highway, view to south from the east side of the Wainiha River Bridge 2, a non-contributing structure within the historic bridges district, general location of ST-3 in the foreground



Figure 42. A portion of the Kūhiō Highway at the Wainiha River Bridge 3, a non-contributing structure within the historic bridges district, general view to north

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 43. A portion of the Kūhiō Highway, Wainiha River Bridges 3 and 2 respectively, non-contributing structures within the historic bridges district, general view to southeast with Pu'uuahia in the background

By 1921, three bridges were required to carry the road over the Wainiha River. At least one bridge crossed the Wainiha River between 1904 and 1918, a two-span timber truss structure located on the site of what is today known as Wainiha Bridge #3... [Fung Associates 2013:18]

All vestiges of these earlier bridges at Wainiha were most likely removed or have been totally obscured by flooding and replacement in 2004. The bridges have all been recently replaced by steel frame and panel bridges (see Figure 38 through Figure 43). The Wainiha Stream Bridge 1 and Wainiha River Bridges 2 and 3 are described as follows: "This bridge is a non-contributing feature of the Kauai Belt Road (North Shore section) district due to the complete replacement of the original 1931 bridge in 2004. It was replaced with a temporary modular prefabricated steel truss bridge" (Fung Associates 2013:3-74-82). No remnants of the historic Wainiha Bridge features were observed by CSH archaeologists.

In January 1921 the Wainiha River cut a new channel during a storm, which necessitated another bridge, as flooding had carved a 'long slim island out of the agricultural land of the valley.' The Garden Island reported that the new bridge would 'make three bridges in the valley, in within a distance of about 500 yards.' This third structure at Wainiha became known as Wainiha Bridge #2. Plans for a new single-span bridge of 75' were drawn in 1922. The design was a timber-truss structure that complemented the adjacent timber-truss bridge (Wainiha #3). Even though the plans were drawn in February 1922, a construction date was not determined. The Territorial Highway Department records state that the bridge was constructed in 1931. [Fung Associates 2013:19]

# 4.2 Shovel Testing Results (ST-1 through ST-6)

CSH archaeologists Johnny Dudoit, B.A., Gerald Ida, B.A, Missy Kamai, B.A., William H. Folk, B.A., and principal investigator Hallett H. Hammatt, Ph.D., completed the archaeological shovel testing fieldwork on 7 and 8 October 2014. A total of six shovel test units were excavated; four in the Wainiha area (ST-1 through ST-4), one in the Wai<sup>o</sup>li area (ST-5), and one in the Waipā area (ST-6):

ST-1: Located on the *mauka* side of the highway north of Wainiha River Bridge 3; contained all natural sediments and large boulders located at bottom of excavation at a depth of 70 cmbs;

ST-2: Located on the south section of road segment between Wainiha River Bridges 2 and 3; sand is present at a depth of 55 cmbs continuing below the bottom of excavation at 120 cmbs;

ST-3: Located on the *makai* side of the highway in the approach to Wainiha River Bridge 2 northbound; road fill material from the surface and continuing below the bottom of excavation at 85 cmbs;

ST-4: Located on *mauka* side of the highway at the east approach to Wainiha Stream Bridge 1; sand is present at a depth of 37cmbs and continues below the bottom of excavation at 93 cmbs;

ST-5: Located on the *mauka* side of the highway in a gravel bar of the west flood terrace of Wai'oli Stream Bridge; sand is present from 25 cmbs; and continues below the bottom of excavation at 95 cmbs;

ST-6: Located on the *mauka* side of the highway on the west side of Waipā Stream Stream Bridge 2; sand is present at 60 cmbs and continues to the bottom of excavation at 95 cmbs.

The following stratigraphic summaries describe the location and situation of each shovel test prior to excavation. Subsequent excavation is documented according to stratigraphy, with sediment descriptions for each identified stratum. Soil stratigraphic profile illustrations, one profile per shovel test, are shown, correlating with descriptions for each shovel test using standard USDA soil terminology. The locations of ST-1 through ST-6 are depicted on Figure 45 and Figure 47, and see Figure 81 and Figure 73.



Figure 44. 2013 aerial photograph showing the location of ST-1, ST-2, and ST-3 within the Wainiha River Bridges 2 and 3 project area/APE (Google Earth 2013)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 45. Aerial photograph showing the location of ST-4 in relation to the Kūhiō Highway, within the Wainiha Stream Bridge 1 project area/APE (Google Earth 2013)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)





Figure 46. Aerial photograph showing the location of ST-5 in relation to SIHP # 50-30-03-2296, the Wai'oli Stream Bridge on the Kūhiō Highway, within the Wai'oli Stream Bridge project area/APE (Google Earth 2013)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 47. Aerial photograph showing the location of ST-6 in relation to SIHP # 50-30-03-2297, the Waipā Stream Bridge on the Kūhiō Highway, within the Waipā Stream Bridge project area/APE (Google Earth 2013)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

# 4.2.1 Shovel Test 1 (ST-1) Stratigraphic Summary

ST-1 is located in the far western portion of the project area/APE, on the northern *mauka*, side of the highway north of Wainiha River Bridge 3 (see Figure 44). ST-1 measures 0.7 m deep by 0.5 m in diameter. The stratigraphic profile of ST-1 consists of dark grayish brown silty loam, A horizon (Stratum I, 0–35 cmbs), dark yellowish brown silt loam, B horizon alluvium (Stratum II, 35–60 cmbs), yellowish red, C horizon silt loam with oxidized waterworn pebbles and cobbles (Stratum III, 60–70 cmbs), and at 70 cmbs large boulders form the base of excavation (Stratum IV). The water table was not observed in ST-1. Zero artifacts were recovered from ST-1. Figure 48 through Figure 51 depict the ST-1 situation and stratigraphic profile and Table 15 provides a stratigraphic summary. The natural sediments observed in ST-1 indicate an upper portion of the present flood plain of the Wainiha Stream, with alluvium marked by lag stream gravels and terminating in waterworn stream boulders.



Figure 48. ST-1, general vicinity, view to southeast



Figure 49. ST-1 ground surface prior to excavation, view to north



Figure 50. ST-1, profile view to northwest



Figure 51. Illustrated stratigraphic profile of ST-1

Stratum	Depth (cmbs)	Description
Ι	0–35	Natural; 10YR 3/2, dark grayish brown; silt loam; medium to fine size grains with crumb structure; moist, slightly sticky with firm consistence; weak cementation; plastic; terrigenous origin; many, medium size roots; abrupt, smooth lower boundary
II	35-60	Natural; 10YR 4/6. dark yellowish brown; silt loam; medium to coarse size grains with crumb structure; moist, slightly sticky with firm consistence, medium cementation; slightly plastic, terrigenous origin; few fine to medium sized roots, abrupt, smooth lower boundary
III	60–70	Natural; 5YR 5/8, yellowish red; silt loam; medium to coarse size grains with crumb structure; moist, slightly sticky with firm consistence, medium cementation; slightly plastic, terrigenous origin; few fine to medium sized roots, abrupt, rocky lower boundary

# 4.2.2 Shovel Test 2 (ST-2) Stratigraphic Summary

ST-2 is located on the south section of road segment between Wainiha River Bridges 2 and 3 (see Figure 73). ST-2 measures 1.2 m deep by 0.5 m in diameter. The stratigraphic profile of ST-2 consists of dark brown loamy sand (Stratum Ia, 0–4 cmbs), dark brown loamy sand (Stratum Ib, 4–15 cmbs), dark yellowish brown sandy loam (Stratum II, 15–55 cmbs), and grayish brown sandy loam (Stratum III, 55–120 cmbs). The water table was not observed in ST-2. Zero artifacts were recovered from ST-2. Figure 52 through Figure 55 depict the ST-2 situation and stratigraphic profile and Table 16 provides a stratigraphic summary.



Figure 52. ST-2, general vicinity, the ground surface prior to excavation, view to north



Figure 53. ST-2, profile view of the east wall, view to southeast



Figure 54. ST-2, profile view of the south wall, view to south



Figure 55. Illustrated stratigraphic profile of ST-2

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

Stratum	Depth (cmbs)	Description
Ia	0-4	Natural; 10YR 3/3, dark brown; loamy sand; weakly structured with medium size and blocky structure; moist, very friable, slightly sticky consistence; weak cementation; terrigenous origin; many fine size roots; abrupt, smooth lower boundary; 30% quarry gravel; modern A horizon in fill
Ib	4–15	Fill; 10YR 3/3; dark brown; loamy sand; weakly structured with medium size and blocky structure; moist, very friable, slightly sticky consistence; weak cementation; terrigenous origin; many fine size roots; abrupt, smooth lower boundary
II	15–55	Natural; 10YR 3/6; dark yellowish brown; sandy loam; weakly structured with fine size and blocky structure; moist, friable, with weak cementation; terrigenous origin; many fine size roots; abrupt, smooth lower boundary; quarry gravel inclusions
III	55–120	Natural; 5YR 3/2, grayish brown; sandy loam; weakly structured with fine size and blocky structure; moist, friable, with weak cementation; terrigenous origin; many fine size roots; lower boundary not visible

Table 16. ST-2 stratigraphic summary

# 4.2.3 Shovel Test 3 (ST-3) Stratigraphic Summary

ST-3 is located on the *makai* side of the highway in the approach to Wainiha River Bridge 2 northbound (see Figure 44). ST-3 measures 0.85 m deep by 0.5 m in diameter. The stratigraphic profile of ST-3 consists of dark brown gravelly silt loam, A horizon formed on fill (Stratum Ia, 0– 25 cmbs) and dark reddish silt loam fill (Stratum Ib, 25–85 cmbs). The water table was not observed in ST-3. Zero artifacts were recovered from ST-3. Figure 56 through Figure 59 depict the ST-3 situation and stratigraphic profile and Table 17 provides a stratigraphic summary.



Figure 56. General location of ST-3 in the foreground, east side of Wainiha River Bridge 2, view to south



Figure 57. Location of ST-3, prior to groundbreaking, plan view to northwest



Figure 58. ST-3 surface to the base of excavations, profile view to north



Figure 5	9. I	llustrated	stratigraph	ic prof	ïle of	ST-3
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Table 17.	ST-3	stratigraphic	summary
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Stratum	Depth (cmbs)	Description
Ia	0–25	Natural; 10YR 3/3, dark brown; silt loam; weakly structured with medium size and crumb structure; moist, very friable, slightly sticky consistence; strong cementation; terrigenous origin; many fine size roots; abrupt, smooth lower boundary; 20% quarry gravel; modern A horizon on road fill
Ib	25–85	Fill; 5YR 3/3, dark reddish brown silt loam; moderately structured with fine to medium size and blocky structure; moist, very friable, slightly sticky consistence; strong cementation; terrigenous origin; lower boundary not visible; road fill

# 4.2.4 Shovel Test 4 (ST-4) Stratigraphic Summary

ST-4 is located on the *mauka* side of the highway, on the eastern side of Wainiha Stream Bridge 1 (see Figure 45). ST-4 measures 0.93 m deep by 0.5 m in diameter. The stratigraphic profile of ST-4 consists of grayish brown sandy clay loam (Stratum I, 0–19 cmbs), grayish brown sandy clay loam (Stratum II, 19–37 cmbs), dark brown sandy loam (Stratum III, 37–60 cmbs) and a dark yellowish brown loamy sand (Stratum III, 60–93 cmbs). The water table was not observed in ST-4. Zero artifacts were recovered from ST-4. Figure 60 through Figure 64 depict the ST-4 situation and stratigraphic profile and Table 18 provides a stratigraphic summary. Strata II and III in ST-4 are the deepest terrestrial sand deposits found during subsurface testing. Although no artifacts were observed, Strata II and III in ST-4 also display characteristics of soil development suggesting significantly less disturbance, greater antiquity, and thus greater probability of encountering historic properties within these deposits.



Figure 60. General location of ST-4, on the *mauka* side of Kūhiō Highway on the eastern side of Wainiha Stream Bridge 1, view to west



Figure 61. ST-4 excavation in progress, view to north



# Figure 62. ST-4, profile of the south wall; view to south



Figure 63. ST-4, profile of the south wall, view to the south; note base of excavation at 90 cmbs



Figure 64. Illustrated stratigraphic profile of ST-4
Stratum	Depth (cmbs)	Description
Ι	0–19	Natural; 5YR 3/2, grayish brown; sandy clay loam; moderately structured with medium to coarse size and blocky structure; moist, firm, slightly sticky consistence; strong cementation; plastic; terrigenous origin; many fine size roots; clear, smooth lower boundary
II	19–37	Natural; 5YR 3/2.5, grayish brown; sandy clay loam; weakly structured with medium size and blocky structure; moist, friable, slightly sticky consistence; weak cementation; slightly plastic; terrigenous origin; few fine size roots; clear, smooth lower boundary
III	37–60	Natural; 7.5YR 4/4, dark brown; sandy loam; weakly structured with fine size and blocky structure; moist, very friable; non-plastic; mixed origin; few very fine size roots; diffuse, smooth lower boundary; sandy loam grading to loamy sand
IV	60–93	Natural; 10YR 3/6, dark yellowish brown; loamy sand; massive structure; loose consistence; non-sticky; non-plastic; mixed origin; few very fine roots; lower boundary not visible

Table 18. ST-4 stratigraphic summary

#### 4.2.5 Shovel Test 5 (ST-5) Stratigraphic Summary

ST-5 is located on the *mauka* side of the highway in a gravel bar of the west flood terrace of Wai'oli Stream Bridge (see Figure 46). ST-5 measures 0.95 m deep by 0.5 m in diameter. The stratigraphic profile of ST-5 consists of very dark brown sandy loam (Stratum I, 0–25 cmbs) and dark yellowish brown sand (Stratum II, 25–95 cmbs), dark brown sandy loam (Stratum III, 37–60 cmbs) and a dark yellowish brown loamy sand (Stratum III, 60–93 cmbs). The water table was not observed in ST-5. Zero artifacts were recovered from ST-5. Figure 65 through Figure 67 depict the ST-5 situation and stratigraphic profile and Table 19 provides a stratigraphic summary. The marine sand sediments in ST-5 have been reworked by the stream and mixed with alluvium and are a significant distance for the modern shoreline, suggesting these sediments have been here for a long time. This could increase the potential for historic properties to be encountered in any disturbance to existing vegetation and sediments in the vicinity of ST-5.



Figure 65. ST-5, on the west side of the Wai'oli Stream, ground surface prior to excavation, plan view to north



Figure 66. ST-5 at 60 cmbs, profile view to north



Figure 67. Illustrated stratigraphic profile of Shovel Test 5

Table 19.	ST-5	stratigraphic	summary
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Stratum	Depth (cmbs)	Description
I	0–25	Natural; 10YR 2/2, very dark brown; sandy loam; moderately structured with fine size and granular structure; wet, non-sticky consistence; weak cementation; non-plastic; mixed origin; many fine to coarse size roots; very abrupt, smooth lower boundary; fine-grain organic content; A horizon
Π	25–95	Natural; 10YR 4/6; dark yellowish brown; sand; single-grain, structureless; wet, non-sticky consistence; non-plastic; marine origin; common medium to coarse roots; lower boundary not visible; C horizon, beach sand; no cultural materials and yet sensitive area for potential archaeology

### 4.2.6 Shovel Test 6 (ST-6) Stratigraphic Summary

ST-6 is located on the *mauka* side of the highway on the west side of Waipā Stream Bridge 2 (see Figure 47). ST-6 measures 0.95 m deep by 0.5 m in diameter. The stratigraphic profile of ST-5 consists of very dark brown sandy loam fill (Stratum I, 0–27 cmbs), dark reddish brown sandy loam fill (Stratum II, 27–60 cmbs) and a very dark brown; natural sandy loam (Stratum III, 60–95 cmbs). The water table was not observed in ST-6. Zero artifacts were recovered from ST-6. Figure 68 through Figure 71 depict the ST-6 situation and stratigraphic profile and Table 20 provides a stratigraphic summary.



Figure 68. ST-6 ground surface prior to groundbreaking, view to west



Figure 69. ST-6, plan view to east



Figure 70. ST-6, profile view to east at the BOE, 95 cmbs



Figure 71. Illustrated stratigraphic profile of Shovel Test 6

Table 20.	ST-6	stratigraphic	summary
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Stratum	Depth (cmbs)	Description
Ι	0–25	Fill; 10YR 2/2, very dark brown; loam; moderately structured with fine size and granular structure; wet, non-sticky consistence; weak cementation; non-plastic; terrigenous origin; many fine to coarse size roots; abrupt, smooth lower boundary; loam with gravel, road-related fill
II	15-60	Fill; 5YR 3/3, dark reddish brown; sandy loam; moderately structured with coarse size and sub-angular blocky structure; wet, non-sticky firm, consistence; weak cementation; plastic; mixed origin; very few, very fine size roots; abrupt, wavy lower boundary; loam with 5% gravel, road-related fill
III	60–95	Natural; 10YR 2/2; very dark brown; sandy loam; moderately structured with fine size blocky structure; wet, non-sticky consistence; weak cementation; non-plastic; mixed origin; few micro size roots; lower boundary not visible; natural sandy loam

# Section 5 Historic Property Descriptions

Four historic properties have been identified within the project APE, including SIHP # 50-30-02-9396 (The Kaua'i Belt Road), and three contributing elements to SIHP # 50-30-02-9396: SIHP # 50-30-03-2296 (Wai'oli Stream Bridge), SIHP # 50-30-03-2297 (Waipā Stream Bridge), and SIHP # 50-30-03-2298 (Waikoko Stream Bridge).

NAME:	Kaua'i Belt Road
FORMAL TYPE:	District
FUNCTION:	Transportation
NUMBER OF FEATURES:	15 contributing elements, two non-contributing elements and one feature (culvert)
AGE:	1900 to present
TAX MAP KEY:	[4] 5-8-006
LAND JURISDICTION:	State Department of Transportation (HDOT)
PREVIOUS DOCUMENTATION:	Duensing 2002 (Appendix D)

# 5.1 SIHP # 50-30-02-9396 (50-30-03-9396), Kaua'i Belt Road

SIHP # 50-30-02-9396 consists of the Kaua'i Belt Road, which extends from Mile Marker 0 on Route 560 and continues to its termination at Mile Marker 10 at Ha'ena State Park (Figure 72). On the Hawai'i Register, the Kaua'i Belt Road is listed under two numbers (50-30-02-9396 and 50-30-03-9396). While both of the quad numbers (02 and 03) extend into the project APE, for the purposes of this report, the historic property will be referred to as SIHP # 50-30-02-9396. According to the National Register of Historic Places Registration Form:

This section of roadway is relatively unaltered and is the most spectacular portion of Kaua'i's historic belt road system, both in its historic character and its scenery. It is the only portion of the Kaua'i Belt Road that retains historic integrity. Elsewhere, the Kaua'i Belt Road has been significantly altered with new alignments and widened roadways and bridges. The boundaries of the proposed historic district include thirteen contributing historic bridges and culverts that date to 1912. [Duensing 2002:6]

The proposed historic district includes the road, the Hanalei Valley Scenic Overlook, and thirteen historic bridges and culverts. The period of significance for the north shore section of the Kaua'i Belt Road is from 1900 when the Territory of Hawai'i Superintendent of Public Works began roadway improvements until 1957 when the Wainiha Bridges were rebuilt after a tidal wave.

The Kaua'i Belt Road between Princeville and Ha'ena retains historic significance and character in its location, alignment, design, setting, and association. The Kaua'i Belt Road between Princeville and Wainiha was built during the 1910s, and from Wainiha to Ha'ena circa 1928. Most of the roadway alignment is unaltered and

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 72. Portion of the 1991 Haena and 1996 Hanalei USGS topographic quadrangles showing the extent of SIHP #s 50-30-02-9396 and 50-30-03-9396

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

predates the road's construction. The road passes through rural areas along Kaua'i's North Shore, connecting communities much as it did in the early twentieth century when it was built. In many areas, the road was built over a trail used by Hawaiians and nineteenth-century travelers. There is no shoulder along most of the roadway, except near Princeville. The road has been widened since its construction, but is still narrow in many locations. The roadbed varies between 18' and 20' wide, being narrower as it hugs the sea cliffs and wider as it passes through valleys and residential communities. Near Princeville and Hanalei, the road is 22' wide. For most of the road's length, there are no guardrails, which contributes to the road's historic feeling. Lava-rock guardwalls, some dating to the 1920s, remain along the road in many locations, although many have been undermined by soil erosion. In a few locations, timber guardrails remain along the road. Only a few steel w-beam guardrails have been installed along the road in recent years. [Duensing 2002:8-9]

Most of the bridges and culverts on the Kaua'i Belt Road are one-lane wide and date to the early 1900s. The bridges represent two popular types of construction in early twentieth century Hawai'i: steel truss and reinforced-concrete flat slab. The reinforced concrete bridges feature solid concrete parapets. In addition, there are also several pipe culverts with masonry rock headwalls that were probably constructed in the first half of the twentieth century. [Duensing 2002:10]

According to historian Ralph Kuykendall, nineteenth century Hawai'i roads, 'or what were called roads,' came into existence by a familiar historical process, 'the trail became a road.' Many roads, especially in the rural districts like Kaua'i's North Shore, were little more than cleared rights-of-way. [Duensing 2002:12]

During its first year of operation in 1900, the territorial public works department purchased a steel bridge for the Hanalei River from the Wilson & Whitehouse firm. Built by the Missouri River Bridge Company, the steel bridge had a span of 110' with a 14'-wide roadbed constructed of wood. The bridge probably replaced the structure mentioned in Knudsen's journal, which most likely was built of wood and had washed away in a storm. The Territory of Hawai'i Superintendent of Public Works' (SPW) annual report noted that the new steel bridge for Hanalei was to be built on stone abutments at an elevation above the river's flood stage. Building bridges to withstand floods was an important consideration in areas like Kaua'i's North Shore, which was prone to storms and flash floods.

By 1904 timber bridges spanned the rivers at Wainiha, Waikoko, and Waipa, and plans were made for a steel bridge over the Lumaha'i River. The Department of Public Works probably built both the Wainiha and Waipa bridges in 1904. The Waipa Bridge was a simple wood structure, and the Wainiha a wood through-truss bridge. A. A. Wilson finally began construction on the new steel bridge at Lumaha'i in 1905. Other public works projects along the North Shore provided for relocating and reconstructing the road between Ha'ena and Hanalei. [Duensing 2002:13-14]

After the concentrated efforts to complete the Kaua'i Belt Road, Moragne and his successor, R.L. Garlinghouse, continued the program of bridge construction and maintenance. Bridges were built at Wainiha and Ha'ena, the Waipa Bridge was

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

extended, and the Lumaha'i Bridge was reinforced. In addition, the belt road was improved and extended to Ha'ena.

By 1921, three bridges were required to carry the road over the Wainiha River. At least one bridge crossed the Wainiha River between 1904 and 1918, a two-span timber truss structure located on the site of what is today known as Wainiha Bridge #3. [Duensing 2002:18]

Various disasters struck some of the North Shore bridges between 1946 and 1968, necessitating repairs and replacements of the structures. In 1946 and 1957 tidal waves destroyed or damaged bridges at Wainiha and Waikoko. In 1966 and 1968 old age affected bridges at Wainiha and Lumaha'i, causing them to collapse. [Duensing 2002:21]

With the exception of the 1968 Lumaha'i Bridge and the rebuilt Ha'ena Bridge #2, the Kaua'i Belt Road from Princeville to Ha'ena maintains a great measure of historic integrity. The remaining bridges are unaltered. Although most historic bridges in Hawai'i have been altered with the addition of w-beam guardrail approaches, the bridges on Kaua'i's North Shore have not been marred by guardrails. The road's construction materials have changed over the decades, with the original roadbed being dirt. Sections of the road near Hanalei were first paved with macadam circa 1916. In recent decades the road was repaved with asphalt. Although the road itself no longer features original construction materials, other aspects of the route, especially the original alignment, location, rural coastal setting, and narrow width are important features that contribute to the road's integrity as a historic site. For most of the length of the road, there are no guardrails. A few concrete-post and timber-beam guardrails remain, most notably at the Hanalei Valley Scenic Overlook and near Mile Marker 5.6. The road also retains many historic lava-rock walls built to protect motorists along the road's precipitous dropoffs. Many of these rock walls have been undermined by collapsing soil or through the additional layers of asphalt that reduce the wall height. In early 2002, the state DOT installed w-beam guardrails in a few areas. In several locations, several grated drop inlets and concrete gutters have also been installed. [Duensing 2002:26]

A new feature of SIHP # 50-30-02-9396 was identified within the project APE. The feature is a concrete culvert and supporting basalt boulder and mortar revetments at both ends beneath Kūhiō Highway (Route 560) east of Wainiha River Bridge 2 (Figure 73 through Figure 80). The function of this road culvert, which includes intake and outtake portions, is to aid in rainwater runoff drainage underneath Kūhiō Highway. The exact age of this feature is unknown; however, as it exists to aid in drainage of the Kūhiō Highway, its construction most certainly post-dates 1917.

The culvert is considered a contributing element of SIHP # 50-30-02-9396, the Kaua'i Belt Road, which is listed on both the National Register and the Hawai'i Register. On the National Register of Historic Places Nomination Form it states that:

Numerous reinforced-concrete pipe culverts are located between Mile Marker 8.9 near H $\bar{a}$ 'ena Beach County Park and the end of the road at Mile Marker 10. Although unable to date the structures' construction, the culverts appear to be of

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 73. 2013 aerial photograph showing the location of ST-1, ST-2, and ST-3 in relation to a road culvert associated with Kūhiō Highway and a contributing element of SIHP #50-30-02-9396 (Kaua'i Belt Road), within the Wainiha River Bridges 2 and 3 project area/APE (Google Earth 2013)

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TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)
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Figure 74. TMK: [4] 5-8-06, showing the location of a road culvert associated with Kūhiō Highway and assessed as a contributing element of SIHP # 50-30-02-9396 (Kaua'i Belt Road) (Hawai'i TMK Service 1984)

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TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)
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Figure 75. Road culvert and revetment (contributing element of SIHP # 50-30-02-9396, Kaua'i Belt Road) northeast of Wainiha River Bridge 2, outflow end on the west side of Kūhiō Highway, view to northeast



Figure 76. Portion of road culvert and revetment (contributing element of SIHP # 50-30-02-9396, Kaua'i Belt Road) northeast of Wainiha River Bridge 2, outflow end (at lower right) on the west side of the road, view to south

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 77. Intake portion of the road culvert and buttressing (contributing element of SIHP # 50-30-02-9396, Kaua'i Belt Road) northeast of Wainiha River Bridge 2, on the east side of Kūhiō Highway, view to southwest



Figure 78. Road culvert (contributing element of SIHP # 50-30-02-9396, Kaua'i Belt Road) northeast of Wainiha River Bridge 2, portion of the intake revetment on the east side of Kūhiō Highway, view to southeast



Figure 79. Illustrated plan view of intake culvert (contributing element of SIHP # 50-30-02-9396, Kaua'i Belt Road)





historic significance. The structures are simple in construction and feature a small concrete headwall on both sides of the road . . . In addition, several pipe culverts (near Mile Marker 1.3 and 1.4) along the Hanalei River feature headwalls constructed of rubble masonry. [Duensing 2002:23]

The intake portion of this road culvert exists on the west side of Kūhiō Highway, east of Wainiha River Bridge 2 and includes two pre-formed concrete drainage pipes approximately 80 cm in diameter. Approximately 50% of the opening of the intake is obscured with standing water, vegetation, debris, and in-filled sediments. The concrete intake pipes are framed and supported by roughly shaped basalt boulders averaging approximately 30 cm by 12 cm, stacked, mortared, and overlying the concrete intake pipes in four courses and extending approximately 50 cm above the opening and on both sides of the two concrete intake pipes. An active steel irrigation pipe, approximately 20 cm in diameter, extends parallel along and beyond the intake face of this feature.

The outtake portion of this road culvert exists on the east side of Kūhiō Highway, east of Wainiha River Bridge 2 and includes the two pre-formed concrete drainage pipes approximately 80 cm in diameter framed and supported by stacked and mortared basalt with at least five courses on both sides of the concrete outtake pipes. Standing water, vegetation, debris, and in-filled sediments obscure over 50% of this portion of the feature. The basalt stones used in framing the concrete outtake pipes are roughly shaped basalt boulders averaging approximately 30 cm by 12 cm, stacked, mortared, and extending on both sides of the concrete outtake pipes.

The culvert identified during the current project is consistent with those described above, because it appears to date to the early twentieth century and conveys a feeling of association with the time of road construction, it is assessed here as a contributing element of the Kaua'i Belt Road (SIHP # 50-30-02-9396).

Although this single culvert is not called out in the National Register Registration Form *Inventory List of Contributing and Non-contributing Overlooks, Bridges, and Significant Culverts* (Duensing 2002:19-20) it is similar in material and workmanship evident in the revetments at both ends as those described elsewhere in the nomination Narrative Description (Duensing 2002:15). This reinforced-concrete pipe culvert has an appearance and conveys a feeling of association with the time of road construction.

The Kaua'i Belt Road, comprising 15 contributing and two noncontributing elements, was evaluated as meeting significance criteria A and C for National Register eligibility and placed on the National Register in 2003 (National Register Reference # 03001048). The historic property is listed on the Hawai'i Register and has been designated with two SIHP #s 50-30-02-9396 and 50-30-03-9396. It was evaluated as eligible to the Hawai'i Register per HAR 13-198-8 under Criteria A and C. SIHP # 50-30-02-9396, The Kaua'i Belt Road, is assessed as significant under Criteria a, and c, of the State of Hawai'i significance criteria pursuant to HAR §13-275-6.

Wai'oli Stream Bridge
Structure
Transportation
1
1912
Shovel Test 5 (ST-5) on the mauka side of the highway in a gravel bar of the west flood terrace of Wai'oli Stream
[4] 5-5-005:005, 007, 021, 028; [4] 5-5-005; [4] 5-5-006:014, [4] 5-5-006; [4] 5-6-002:002, 004; [4] 5-6-002
State Department of Transportation (HDOT)
Fung Associates 2013

## 5.2 SIHP # 50-30-03-2296, Wai'oli Stream Bridge

SIHP # 50-30-03-2296, Wai'oli Stream Bridge, Hawai'i State Bridge # 007005600500343, located on the western boundary of Hanalei Town, 0.21 km (0.13 miles) west of Anae Road, is the oldest concrete girder bridge in Hawai'i (Fung Associates 2013:8-10) (Figure 81 through Figure 85). Designed by Joseph Hughes Moragne and built by George W. Mahikoa, the Wai'oli Stream Bridge was built in 1912 and was determined eligible to the National Register in 1978 with high preservation value eligibility status. "This bridge is a contributing [structure] to the Kaua'i Belt Road (North Shore section) district." (Fung Associates 2013:3-85)

According to the National Register nomination form (p.23) this district SIHP # 50-30-02-9396, the Kaua'i Belt Road, is listed on both the National Register and the Hawai'i Register. The historic district begins at Mile Marker 0 on Route 560 and terminates at Mile Marker 10 at H $\bar{a}$ 'ena State Park. The historic district includes the road, the Hanalei Valley Scenic Overlook, and historic bridges and culverts.

The Wai'oli Stream Bridge features a concrete flat slab, concrete parapet with square concrete rail cap, three spans with a concrete through girder superstructure, a concrete abutment wall and concrete wall pier substructure, a solid concrete parapets/railings with a concrete cap, a total length of 27.4 m (90 ft) and width of 4.7 m (15.4 ft). The date of the bridge's construction, 1912, is incised in the bridge concrete on the interior of the southern parapet.

The Wai'oli Stream Bridge, the easternmost stream crossing in the project area/APE, essentially marks the western terminus of single-family residences of Hanalei. Headed west from Hanalei, the Wai'oli Stream Bridge is the first in a series of one-lane bridges along the 6 miles of Kūhiō Highway from Hanalei to its eastern terminus at Ha'ena State Park. West of the Wai'oli Stream Bridge the Kūhiō Highway takes on the bucolic serenity of intensively traditionally farmed basins amidst relatively undeveloped "luxuriant vegetation, coral sand beaches and mountain ridges" (Earle 1978:21).

SIHP # 50-30-03-2296, the Wai'oli Stream Bridge, is assessed as significant under Criteria a, and c, of the State of Hawai'i significance criteria pursuant to HAR §13-275-6. The bridge crossing has also been previously evaluated (Fung Associates 2013:4) as eligible to the National Register



Figure 81. Aerial photograph showing the location of SIHP # 50-30-03-2296, the Wai'oli Stream Bridge (Google Earth 2013)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 82. TMK: [4] 5-6-05, showing the location of SIHP # 50-30-03-2296, the Wai'oli Stream Bridge (Hawai'i TMK Service 1984)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 83. SIHP # 50-30-03-2296, Wai'oli Stream Bridge, profile view to north



Figure 84. SIHP # 50-30-03-2296, the Wai'oli Stream Bridge, profile view to north



Figure 85. SIHP # 50-30-03-2296, the Wai'oli Stream Bridge, profile view to west, showing concrete stamped "1912"

and Hawai'i Register pursuant to 36 CFR 60.4 and HAR §13-198-8, under Criteria A (associated with events that have made a significant contribution to the broad patterns of our history) and C (embodies the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction) for its associations with the development of the Kaua'i Belt Road Historic District, the Kūhiō Highway system, and the significant role the bridge played in general to "engineering, society history, transportation and commerce" (Fung Associates 2013:3-66) and specifically the history of the Wai'oli Ahupua'a.

	-
NAME:	Waipā Stream Bridge
FORMAL TYPE:	Structure
FUNCTION:	Transportation
NUMBER OF FEATURES:	1
AGE:	1912
TEST EXCAVATIONS:	Shovel Test 6 (ST-6) on the mauka side of the highway on the west side of Waipā Stream Bridge
TAX MAP KEY:	[4] 5-6-004:014, 022, 023; [4] 5-6-004
LAND JURISDICTION:	State Department of Transportation (HDOT)
PREVIOUS DOCUMENTATION:	Fung Associates 2013

# 5.3 SIHP # 50-30-03-2297, Waipā Stream Bridge

SIHP # 50-30-03-2297, Waipā Stream Bridge, Hawai'i State Bridge # 007005600500396, was designed by Joseph Hughes Moragne (Figure 86 through Figure 93). Originally built in 1904 as a timber bridge by the Department of Public Works, the Waipā Stream Bridge, 0.79 km (0.49 miles) west of Kumu Road, was rebuilt in 1912 as a reinforced concrete T-beam bridge and extended in 1925. The Waipā Stream Bridge built by George R. Ewart, Jr. in 1912 features a concrete flat slab, a concrete T-beam superstructure, a concrete abutment and concrete wall pier with solid concrete parapets/railing with a concrete cap, including three spans with a total length of 13.7 m (45 ft) and width of 4.7 m (15.4 ft). The date of the bridge's construction, 1912, is incised in the bridge concrete on the interior of the southern parapet. An extension was added to the Waipā Stream Bridge in 1925, designed by Ralph L. Garlingouse, a five-span, cast-in-place feature, adding 27.4 m (90 ft) to the previous length with a width of 4.9 m (16 ft). The total length of the Waipā Stream Bridge is currently 41 m (134.5 ft). Both portions of the bridge's parapets are slightly different heights:

According to Territorial Highway Department reports, the Waipa Bridge was modified and assumed its unusual design of two different bridges in 1925. The original design plans for the Waipa Bridge indicated there was an existing 'old' timber bridge over the river in 1912. In addition . . . the 1912 concrete bridge served as an extension of the timber bridge and was probably built to span a widened river channel . . . one of the timber bridge spans had collapsed, so the second concrete bridge at Waipa apparently became a replacement for the timber bridge. The Waipa Bridge collapsed in 1919 and a temporary trestle of 'light construction' was built to span the washout. No plans were found for the new concrete bridge extension, although County Engineer R.L. Garlinghouse drew a similar concrete-slab bridge design for another structure in 1925. The Waipa extension bridge had five spans for a total length of 90'. It was an unusual structure as it did not match the original bridge's width, wall design, or wall height. [Fung Associates 2013:21]

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 86. Aerial photograph showing the location of SIHP # 50-30-03-2297, the Waipā Stream Bridge (Google Earth 2013)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 87. TMK: [4] 5-6-04, showing the location of SIHP # 50-30-03-2297, the Waipā Stream Bridge (Hawai'i TMK Service 1984)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 88. SIHP # 50-30-03-2297, the Waipā Stream Bridge, general view to northwest; note the 1912 bridge portion in the foreground



Figure 89. SIHP # 50-30-03-2297, the Waipā Stream Bridge, view to southeast; note the 1925built concrete bridge extension in the foreground

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 90. SIHP # 50-30-03-2297, the Waipā Stream Bridge, portion of the 1925 extension, profile view to west



Figure 91. SIHP # 50-30-03-2297, the Waipā Stream Bridge, view to north; note the 1912-built bridge portion in the foreground



Figure 92. SIHP # 50-30-03-2297, the Waipā Stream Bridge, view to north; note the 1912-built bridge portion in the foreground



Figure 93. SIHP # 50-30-03-2297, the Waipā Stream Bridge, showing concrete stamped "1912," view to west

The Waipā Stream Bridge was nominated to the National Register of Historic Places in 1978 with high preservation value. The bridge is a contributing structure to the Kaua'i Belt Road (North Shore section) district (Fung Associates 2013:3-88).

SIHP # 50-30-03-2297, the Waipā Stream Bridge, is assessed as significant under Criteria a, and c, of the State of Hawai'i significance criteria pursuant to HAR §13-275-6. The bridge crossing has also been previously evaluated (Fung Associates 2013:4) as eligible to the National Register and Hawai'i Register pursuant to 36 CFR 60.4 and HAR §13-198-8, under Criteria A (associated with events that have made a significant contribution to the broad patterns of our history) and C (embodies the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction) for its associations with the development of the Kaua'i Belt Road Historic District, the Kūhiō Highway system, and the significant role the bridge played in general to "engineering, society history, transportation and commerce" (Fung Associates 2013:3-66) and specifically the history of the Waipā Ahupua'a.

NAME:	Waikoko Stream Bridge
FORMAL TYPE:	Structure
FUNCTION:	Transportation
NUMBER OF FEATURES:	1
AGE:	1912; 1946
TEST EXCAVATIONS:	none
TAX MAP KEY:	[4] 5-6-003:002; [4] 5-6-003; [4] 5-6-004
LAND JURISDICTION:	State Department of Transportation (HDOT)
<b>PREVIOUS DOCUMENTATION:</b>	Fung Associates 2013

### 5.4 SIHP # 50-30-03-2298, Waikoko Stream Bridge

SIHP # 50-30-03-2298, Waikoko Stream Bridge, Hawai'i State Bridge # 007005600500427, originally built in 1904 as a timber bridge, was replaced 1912-1913 as a concrete flat slab, one-span bridge, with a concrete through girder superstructure, a concrete abutment wall substructure and masonry/rock parapets/railings, with a total length of 13.7 m (45 ft) and a width of 4.7 m (15.4 ft) (Fung Associates 2013:13) (Figure 94 through Figure 105). Located 1.3 km (0.8 miles) west of Kumu Road, the Waikoko Stream Bridge was designed by Joseph Hughes Moragne and built by George Mahikoa.

The 1912 construction utilized a solid concrete parapet with rail cap. In 1946, the east abutment was undermined by a tidal wave, requiring its parapets to be rebuilt with basalt (Fung Associates 2013:28). The bridge was determined eligible to the National Register in 1978, with high preservation value eligibility status. The bridge is a contributing structure to the Kaua'i Belt Road (North Shore section) district (Fung Associates 2013:3-65).

Currently the Waikoko Stream Bridge abuts the shoreline, with large basalt boulders piled, as a base course, approximately 2 m high to create the road bed approaching both sides of the bridge. After the southeast end of the 1912 concrete bridge collapsed in the 1946 tsunami event, it was repaired with approximately eight courses of mortared basalt boulders on the *makai* face and approximately five courses of stacked stones atop the original concrete bridge on the *mauka* bridge face, both sides utilizing a smoothed concrete cap. A portion of the original concrete bridge now supports the road and the stacked and mortared basalt boulder repair at an approximately 30 degree angle to the ground and stream surface below, extending into the beach sands on the southeastern portion of the bridge.

The basalt boulders used in the *makai* face of the 1946 tsunami repair include a basalt boulder base course of unprepared and unmortared basalt boulders averaging 1 m by 0.5 m. The second through fourth courses of stacked stone in the *makai* face of the 1946 repair include unprepared, mortared basalt boulders averaging 0.75 by 0.50 m, approximately 1 m high at the southeast bridge corner tapering to zero approximately 2 m south of the northeastern bridge terminus. The fifth through eighth courses include stacked and mortared basalt boulders with roughly prepared faces, averaging 25 cm by 15 cm on both the *makai* and *mauka* faces of the bridge. The first through fourth courses of stacked basalt boulders do not appear on the *mauka* bridge face.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 94. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, general view to north



Figure 95. Aerial photograph showing the location of SIHP # 50-30-03-2298, the Waikoko Stream Bridge (Google Earth 2013)

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)



Figure 96. TMK: [4] 5-6-03, showing the location of SIHP # 50-30-03-2298, the Waikoko Stream Bridge (Hawai'i TMK Service 1984)

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TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)
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Figure 97. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, general view to west of the bridge's *makai* face; note approximately eight courses of basalt boulders mortared on top of the concrete portion of the bridge damaged in the 1946 tsunami



Figure 98. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, profile view to west of the southern terminus of the bridge's *makai* face; note the successive courses of stacked and mortared basalt (one through eight)



Figure 99. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, general view to northeast of the bridge's *mauka* face; note approximately five courses of basalt boulders mortared on top of the concrete portion of the bridge damaged in the 1946 tsunami



Figure 100. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, general view to northwest


Figure 101. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, underneath profile view to south of the 1912 portion of the bridge undermined by the 1946 tsunami



Figure 102. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, profile view to southwest; note the 1912 portion of the bridge undermined by the 1946 tsunami, with portions of the overlying basalt boulder and mortar repair



Figure 103. SIHP # 50-30-03-2298, the Waikoko Stream Bridge, profile view to southwest; note the 1912 portion of the bridge undermined by the 1946 tsunami, with portions of the basalt base coarse and overlying basalt boulder and mortar repair



Figure 104. Southern portion of SIHP # 50-30-03-2298, basalt boulder base course of the Waikoko Stream Bridge, view to north



Figure 105. Illustrated stratigraphic profile of southern portion of SIHP # 50-30-03-2298, basalt boulder base course of the Waikoko Stream Bridge

Hawaii's well-known April Fool's Day tidal wave of 1946 inflicted Kaua'i's most severe damage in the Hanalei region . . . Waikoko Bridge was . . . damaged when the tidal wave undermined its eastern abutment, which caused the bridge to sink on one side. The bridge settled to rest at an angle of nearly 30 degrees. Several days after the tidal wave, the County Board of Supervisors instructed the county engineer to make plans to rebuild the Wainiha and Waikoko bridges . . . Waikoko Bridge was repaired by filling the collapsed end of the bridge to a level grade and laying a new roadbed on the bridge. The original bridge still rests on an angle . . . [Fung Associates 2013:22]

SIHP # 50-30-03-2298, the Waikoko Stream Bridge, is assessed as significant under Criteria a and c, of the State of Hawai'i significance criteria pursuant to HAR §13-275-6. The bridge crossing has also been previously evaluated (Fung Associates 2013:4) as eligible to the National Register and Hawai'i Register pursuant to 36 CFR 60.4 and HAR §13-198-8, with high preservation value eligibility status under Criteria A (associated with events that have made a significant contribution to the broad patterns of our history) and C (embodies the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction) for its associations with the development of the Kaua'i Belt Road Historic District, the Kūhiō Highway system, and the significant role the bridge played in general to "engineering, society history, transportation and commerce" (Fung Associates 2013:3-66) and specifically the history of the Waikoko Ahupua'a.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

# Section 6 Summary and Interpretation

At the request of CH2M HILL, CSH has prepared this AIS report for the Wainiha Bridges project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a, Halele'a District, Kaua'i, Federal Highway Administration/Central Federal Lands Highway Division (FHWA/CFLHD) contract DTFH68-14-D-00012/0007, TMKs: [4] 5-5 (por.), [4] 5-6 (por.), [4] 5-7 (por.), and [4] 5-8 (por.). The proposed bridge replacement project is located along Kūhiō Highway (Route 560), between mile posts 6.4 and 6.7 near the mouth of Wainiha Stream. The project areas/APE encompasses the Wainiha Bridges (Wainiha Stream Bridge 1, and Wainiha River Bridges 2 and 3) and the surrounding areas in Halelea District at the Wai'oli Stream Bridge, Waipā Stream Bridge, and Waikoko Stream Bridge along Kūhiō Highway.

CSH archaeologists Johnny Dudoit, B.A., Gerald Ida, B.A., Missy Kamai, B.A., William H. Folk, B.A., and principal investigator Hallett H. Hammatt, Ph.D, completed the AIS fieldwork between 6 October 2014 and 9 October 2014.

The pedestrian inspection of the entire project APE was conducted. Four historic properties were identified within the project APE consisting of the Kaua'i Belt Road (SIHP # 50-80-02-9396 and 50-80-03-9396) and three contributing elements: SIHP # 50-30-03-2296 (Wai'oli Stream Bridge), SIHP # 50-30-03-2297 (Waipā Stream Bridge), and SIHP # 50-30-03-2298 (Waikoko Stream Bridge). A culvert, determined to be a feature of the Kaua'i Belt Road, was also identified and designated as part of SIHP # 50-30-02-9396.

Subsurface testing in the form of six shovel tests provides evidence of potentially undisturbed natural terrestrial or marine sand deposits on either side of each of the bridges at about 50 cm and below. Although no historic properties were identified within the deposits, these sediments have been shown on numerous occasions to contain human burial sites and various other dispersed historic features such as fire pits or house floor deposits. Two areas of greatest archaeological sensitivity are believed to be the following:

- Wainiha Stream Bridge 1. Strata II and III in ST-4, in addition to being the deepest terrestrial sand deposits found, display characteristics of soil development suggesting significantly less disturbance, greater antiquity, and thus there is greater probability of encountering historic properties within these deposits.
- Wai'oli Stream Bridge. The marine sand sediments in ST-5 have been reworked by the stream and mixed with alluvium; they are a significant distance from the modern shoreline which suggests these sediments have been here for a long time. This could increase the potential for this area to have been used as a living surface and for historic properties to be encountered in any disturbance to existing vegetation and sediments.

## Section 7 Significance Assessments and Eligibility Determinations

Historic properties identified within the project APE were assessed for significance and eligibility for listing on the National Register and Hawai'i Register was determined. shows summarized the results of the significant assessments and eligibility determinations.

Under HRS §6E, for a historic property to be significant under HAR §13-275-6, the historic property should possess integrity of location, design, setting, materials, workmanship, feeling, and/or association, and meet one or more of the following criterion:

- a Be associated with events that have made an important contribution to the broad patterns of our history;
- b Be associated with the lives of persons important in our past;
- c Embody the distinctive characteristics of a type, period, or method of construction, 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; or
- 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.

Under Section 106, historic property significance is evaluated as eligibility for listing on the National Register pursuant to 36 CFR 60.4. An evaluation of eligibility for listing on the Hawai'i Register pursuant to HAR §13-198-8 is also included in this section. To be considered eligible for listing on the National Register and/or Hawai'i Register, a historic property should possess integrity as described above, and meet one or more of the following broad significance criteria:

- A that are associated with events that have made a significant contribution to the broad patterns of our history;
- B that are associated with the lives of persons significant in our past;
- C that embody the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction;
- D that have yielded, or may be likely to yield, information important in prehistory or history;

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

The current investigation was tasked with the identification of historic properties in the vicinity of six bridge locations between mile marker 3 and mile marker 7, a 4-mile stretch along the 10-mile long National Register site (Reference # 03001048) and Hawai'i Register site (SIHP #s 50-30-02-9396 and 50-30-03-9396) know as the Kaua'i Belt Road—North Shore section (a.k.a. Kuhiō Highway, Hawai'i Route 560). As a National Register site the Kaua'i Belt Road, comprising 15 contributing and two noncontributing elements, was evaluated as meeting significance criteria A and C for National Register eligibility and placed on the National Register in 2003. The historic property is listed on the Hawai'i Register and has been designated with two SIHP #s 50-30-02-9396 and 50-30-03-9396. It was evaluated as eligible to the Hawai'i Register per HAR §13-198-8 under Criteria A and C. SIHP # 50-30-02-9396, The Kaua'i Belt Road, is assessed as significant under Criteria a and c of the State of Hawai'i significance criteria pursuant to HAR §13-275-6. This is based on the role the road played in general to engineering, society history, transportation and commerce and substantially changed the future of the North Shore area.

All six bridges in the approximate 4-mile section of Kaua'i Belt Road, including the three Wainiha temporary bridge structures scheduled for replacement, are listed in *the Inventory of Contributing and Non-contributing Overlooks, Bridges, and Significant Culverts* of the Kaua'i Belt Road National Register Registration Form (Duensing 2002:Sect. 7; 19–20). However, only three of the bridges and the culvert feature beneath the road on the westward approach to the central Wainiha Bridge are determined significant under HAR §13-275-6. A summary of the identified historic properties for this project and their assessed significance is found in Table 21.

SIHP # 50-30-03-2296, the Wai'oli Stream Bridge, is assessed as significant under Criteria a and c of the State of Hawai'i significance criteria pursuant to HAR §13-275-6. The bridge crossing has also been previously evaluated (Fung Associates 2013:4) as eligible to the National Register and Hawai'i Register pursuant to 36 CFR 60.4 and HAR §13-198-8, under Criteria A (associated with events that have made a significant contribution to the broad patterns of our history) and C (embodies the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction) for its associations with the development of the Kaua'i Belt Road Historic District, the Kūhiō Highway system, and the significant role the bridge played in general to "engineering, society history, transportation and commerce" (Fung Associates 2013:3-66) and specifically the history of the Wai'oli Ahupua'a.

SIHP # 50-30-03-2297, the Waipā Stream Bridge, is assessed as significant under Criteria a and c of the State of Hawai'i significance criteria pursuant to HAR §13-275-6. The bridge crossing has also been previously evaluated (Fung Associates 2013:4) as eligible to the National Register and Hawai'i Register pursuant to 36 CFR 60.4 and HAR §13-198-8, under Criteria A (associated with events that have made a significant contribution to the broad patterns of our history) and C (embodies the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction) for its associations with the development of the Kaua'i Belt Road Historic District, the Kūhiō Highway system, and the significant role the bridge played in general to "engineering, society history, transportation and commerce" (Fung Associates 2013:3-66) and specifically the history of the Waipā Ahupua'a.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

SIHP # 50-30-	Name	Formal Type	Functional Interpretation	Year of Construction	Significance Criteria	Register Eligibility*
03-2296	Wai'oli Stream Bridge	Structure	Transportation	1912	a, c	A, C
03-2297	Waipā Stream Bridge	Structure	Transportation	1912	a, c	A, C
03-2298	Waikoko Stream Bridge	Structure	Transportation	1912; 1946	a, c	A, C
02-9396; 03-9396	Kauaʻi Belt Road	District	Transportation	1900 to Present	a, c	A, C

Table 21. Historic properties within the project APE

\* Register eligibility refers to both the National and Hawai'i Registers

SIHP # 50-30-03-2298, the Waikoko Stream Bridge, is assessed as significant under Criteria a and c of the State of Hawai'i significance criteria pursuant to HAR §13-275-6. The bridge crossing has also been previously evaluated (Fung Associates 2013:4) as eligible to the National Register and Hawai'i Register pursuant to 36 CFR 60.4 and HAR §13-198-8, with high preservation value eligibility status under Criteria A (associated with events that have made a significant contribution to the broad patterns of our history) and C (embodies the distinctive characteristics of a type, period, or method of construction, or that represent that work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction) for its associations with the development of the Kaua'i Belt Road Historic District, the Kūhiō Highway system, and the significant role the bridge played in general to "engineering, society history, transportation and commerce" (Fung Associates 2013:3-66) and specifically the history of the Waikoko Ahupua'a.

# Section 8 Project Effect and Mitigation Recommendations

## 8.1 Project Effect

Pursuant to HAR §13-13-275-7 the project's effect recommendation is "effect, with proposed mitigation commitments". In accordance with 36 CFR 800.5, project effect recommendation is "No adverse effect."

## **8.2 Mitigation Recommendations**

The AIS fieldwork documented sediments surrounding the six bridges within the project areas/APE which, although not found to contain historic properties, do have potential for buried historic properties to be encountered during the project.

The three bridges that are historic properties and part of the National Register Kaua'i Belt Road (Wai'oli Stream Bridge, Waipā Stream Bridge, and Waikoko Stream Bridge) will be avoided during the project work of replacing the three Wainiha bridges (Wainiha Stream Bridge 1, and Wainiha River Bridges 2 and 3). Avoidance will be accomplished by installation of temporary structures bypassing these properties during the project and removal of the temporary structures when the project is complete.

This AIS report has documented the location, extent, function, and age of the reinforcedconcrete pipe culvert on the westward bound approach to the middle Wainiha Bridge. The culvert should be considered a contributing feature to the National Register Kaua'i Belt Road, SIHP # 50-30-02-9396. If there is an unexpected impact to the reinforced-concrete pipe culvert or its revetments during the project, it is recommended that materials of the structure be recovered and the structure be reconstructed in the same style, manner, workmanship, and of course location. Although this AIS report has documented the reinforced-concrete pipe culvert, additional documentation will be needed in order to reconstruct the structure, should impact occur.

There is potential to encounter subsurface archaeological deposits or human burials during the installation of temporary bridges over Wai'oli, Waipā, and Waikoko Streams on the Kaua'i Belt Road, as well as during the installation of the three new permanent bridges in Wainiha. Based on these potential impacts, CSH recommends on-site archaeological monitoring during all ground disturbing activities for the project. Those parts of the Kaua'i Belt Road affected by the temporary bridge structures should be restored to their prior condition when the structures are removed.

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# **Appendix A** Table of Tax Map Keys (TMK) in Project areas/APE

ТМК	Major Owner	Bridge
4 5-5-005:005	Watari	Waiʻoli Stream Bridge
4 5-5-005:007	Angulo Family Trust	Waiʻoli Stream Bridge
4 5-5-005:021	Govt. State	Waiʻoli Stream Bridge
4 5-5-005:028	Bendele	Waiʻoli Stream Bridge
4 5-5-005 (Kuhio	Govt. State	Waiʻoli Stream Bridge
Highway ROW)		
4 5-5-006:014	Ching Family Partnership	Waiʻoli Stream Bridge
4 5-5-006 (Kuhio	Govt. State	Waiʻoli Stream Bridge
Highway ROW)		
4 5-6-002:002	Kobayashi et al.	Waiʻoli Stream Bridge
4 5-6-002:004	Kobayashi et al.	Waiʻoli Stream Bridge
4 5-6-002 (Kuhio	Govt. State	Waiʻoli Stream Bridge
Highway ROW)		
4 5-6-003:002	Waikoko Land Corp.	Waikoko Stream Bridge
4 5-6-003 (Kuhio Hwy	Govt. State	Waikoko Stream Bridge
ROW)		
4 5-6-004 (Kuhio	Govt. State	Waikoko Stream Bridge
Highway ROW)		
4 5-6-004:014	Blair Family Trust	Waipā Stream Bridge
4 5-6-004:022	BP Bishop Trust	Waipā Stream Bridge
4 5-6-004:023	BP Bishop Trust	Waipā Stream Bridge
4 5-6-004 (Kuhio	Govt. State	Waipā Stream Bridge
Highway ROW)		
4 5-7-003:003	BP Bishop Trust	Potential Staging Area 1-2
4 5-7-003 (Kuhio	Govt. State	Potential Staging Area 1
Highway ROW)		
4 5-8-002 (Kuhio	Govt. State	Wainiha Stream Bridge No. 1
Highway ROW)		
4 5-8-002:002	Robinson	Wainiha Stream Bridge No. 1
4 5-8-006:030	Govt. County of Kauai	Wainiha Stream Bridge No. 1
4 5-8-006:031	Kennelly Trust	Wainiha Stream Bridge No. 1
4 5-8-006:032	Fireweed Trust, LLC	Wainiha Stream Bridge No. 1
4 5-8-006:033	Pfeffer	Wainiha Stream Bridge No. 1
4 5-8-006:046	March	Wainiha Stream Bridge No. 1
4 5-8-006:060	Howard/Patey	Wainiha Stream Bridge No. 1

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

ТМК	Major Owner	Bridge
4 5-8-006 (Kuhio	Govt. State	Wainiha Stream Bridge No. 1
Highway ROW)		
4 5-8-006:009	Ching Family Partnership and	Wainiha River Bridge No. 2-3
	Estate of Lawrence Ching	
4 5-8-006:011	Foster & Barbanell	Wainiha River Bridge No. 2-3
4 5-8-006:017	Branowicki	Wainiha River Bridge No. 2-3
4 5-8-006:018	Mahuiki	Wainiha River Bridge No. 2-3
4 5-8-006:019	Gelman	Wainiha River Bridge No. 2-3
4 5-8-006:030	County of Kauai	Wainiha River Bridge No. 2-3
4 5-8-006 (Kuhio	Govt. State	Wainiha River Bridge No. 2-3
Highway ROW)		
4 5-8-007:023	Hannah Meyer and others	Wainiha River Bridge No. 2-3
4 5-8-007:024	Ching Family Trust	Wainiha River Bridge No. 2-3
4 5-8-007:031	Rohn	Wainiha River Bridge No. 2-3
4 5-8-007:032	Rohn	Wainiha River Bridge No. 2-3
4 5-8-007 (Kuhio	Govt. State	Wainiha River Bridge No. 2-3
Highway ROW)		

# Appendix B Makaihuwa'a (From *Kaua'i Tales* – Wichman 1985:35-42)

## MA-KA-IHU-WA'A

E very night Menehune fishermen took their canoes from sheds under the hala trees and carried them across the beach at Hanalei. They launched their outrigger canoes and paddled swiftly across the bay and over the reef to the ocean beyond.

Once safely out to sea, some fishermen scattered west to Hā'ena or east to Kilauea to secret fishing grounds. Here they tossed overboard their weighted lines tied with many hooks. A good fisherman knew where the fish lived and what it ate and baited his hooks with the right foods. Leaving their lines firmly tied to a float, these off-shore fishermen moved from place to place. Here they dropped off other lines, each hook baited with cooked sweet potato, a favorite food of the 'opelu fish. There they caught squid by dancing a shiny cowry shell in the dark waters, a lure no squid could resist. Then the fishermen would return and gather up their lines. If the fisherman was skillful, every hook would hold a fish. At last these fishermen rode the waves into Hanalei bay and added their catch to the store of food that would feed all the Menehune at their daily feast that finished just before daybreak.

The deep-sea fleet searched for schools of fish which the fishermen caught in basket traps. They would dump basket after basket of glittering fish into their canoes until the canoes were so full they sank dangerously close to the water line. Often, following the schools of fish, the Menehune fleet would sail far out to sea where the fishermen could no longer see the dim outline of the island. Then they used the stars to guide them back to shore. They knew where the traveling stars were at any time of year, those stars, like Nā-holoholo that moved about the skies and appeared just before dawn in the east, warning the fishermen of the coming sun. The Menehune also used the fixed stars, like the seven stars of Nā-hiku that walked the same path night after night.

Even during cloudy nights the Menehune launched their canoes to fish. They were careful not to paddle so far out they could not find their way back. The clouds hid the stars and often hid the land from them.

But it was the stormy nights that were worst, those nights when the wind blew strongly, driving the waves like frightened birds in front of it. The rain would pour down in a never-ending sheet that hid the island from the Menehune. The wind-driven waves would climb taller and taller, sending the canoes on wild rides

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up and down those mountainous walls that seemed alive with all the dangerous demons of the ocean. There was no time to look for the land then. The fisherman had to concentrate on the waves to keep his canoe from swamping or from getting caught by a breaking wave that would upset the canoe and send it to the bottom. The waves and wind roared and only when it was almost too late the roar changed tone when the wave angrily smashed on the reef, and the fishermen had to paddle frantically to stand farther out to sea. In the middle of the waves, wind and rain, it was hard to remember how to find one's way back to shore, for there was nothing to be seen of the dark island. Yet the Menehune went out to catch what fish they could on such nights. There was never enough fish to satisfy the great appetites of the Menehune people.

After one such terrible night as the fishermen cleaned their meager catch, their chief came to visit them. Before him walked two men carrying torches. Behind him came two more torchbearers. The chief was still young, his beard bushy and brown, but he was wise. He saw the skimpy catch. He saw the frustration in his fishermen's eyes. He saw them shivering in the misty rain that still blew down from the cold mountains. He knew his fishermen were proud of their skills and of their cunning, proud to bring much food to the common table.

The chief gestured to the heavy clouds overhead, to the ocean muttering along the reef, to the canoes empty of fish. "A good catch, considering the night," he said.

One of the fishermen, an owl-eyed, bow-legged man who was afraid of no shark or man either for that matter, refused the kindly words.

"No, it isn't a good catch," he said boldly. "There's not enough fish for us all. We'll have to eat some dried fish tonight. We can't catch fish on such a night as this."

To mark his words, the rain goddess Ka-hale-lehua threw down a burst of heavy rain drops that put out one of the torches surrounding the chief. Its bearer attempted to relight his torch at another, but his clumsiness only managed to extinguish another torch.

"The night grows dim indeed," the chief joked, trying not to laugh at the antics of his torchbearers.

The owl-eyed fisherman had not finished. "The farther from shore, the darker the night. We can't go out to where the fish are. There is nothing to guide

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us back when the sky is covered with rain-filled clouds."

"That is the problem of these stormy nights," the chief agreed. "We must find a way for you to fish on cloudy nights. Or you must not go out at all."

The fishermen groaned at the suggestion that they not fish at all.

"I will think about this," the chief promised. "Perhaps the gods will help me find an answer."

Just then the rain goddess emptied her water bowls. Heavy, fat drops of water fell like a river directly from the sky to the earth. The remaining two torches that lit the chief's way went out.

"Like us," the fishermen laughed, "you must return home in the dark."

"Nevertheless, you have done well," the chief said, "to go out at all on such a night. Each mouthful will be more delicious because we know the courage it took to bring back even this much from the sea."

The fishermen cheered him and finished their chores with lighter spirits.

The chief strained his eyes to see the path on this dark, rainy night, and stumbled over roots and stones. His torchbearers followed him, tripping over vines, banging into branches, and stumbling over each other, trusting their chief to lead them back to safety again.

The rest of that night the chief thought deeply about his fishermen's problems. He understood their pride to provide enough fish to feed their friends and family. He understood that some nights were stormy. That is why he had, long ago, ordered that fish be dried and set aside under cover so that there would be seafood in times of need. He could simply order the men to stay ashore on stormy nights when the clouds covered the sky and most of the mountains, too. In that case, he would need something for them to do. The difficulty was that dark and stormy nights weren't very useful to anybody. Rain and wind made all work more difficult to do.

There was no question of waiting for daylight and returning to shore then. Sunlight was fatal to a Menehune. A ray of sunshine could turn him to stone instantly. There were many stones scattered over Kauai that had once been living people.

What about ropes? One canoe would stop while the land could still be seen. A rope would be tied to that canoe and passed to a second one which would paddle

38

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

farther out, pass a new rope to a third canoe, and so on. No, the chief decided, that would not do either. The canoes would not be free to follow the fish. Windy and stormy nights brought large waves that would break the ropes. Would it even be possible for ropes to be made long enough and strong enough?

As darkness came again and the fishermen were gathering their nets and baiting their hooks, the chief still continued to think. The night was dark again and the clouds hid the stars and mountains. A lamakū was set ablaze and stuck in the sand beside the chief. A lamakū is made of strings of oily kukui nuts tied together with a twine made of dried banana leaves. Ten strings are woven around a short pole, forming a cylinder six inches across and four feet tall. The bottom kukui is set on fire and, like a candle, feeds on oil released by the heat. The flame slowly passes from nut to nut, giving off bright light and dense smoke.

The chief twisted the ends of his beard and stared at the lamakū with unfocused eyes. Suddenly his eyes widened and he began laughing, a deep booming laugh that brought his torchbearers eager to share in the joke. As the chief saw their puzzled faces, he laughed all the harder. He had suddenly realized that, even in the dark night, he could see. It was night. It was dark. The flames gave a light. Many lamakū would give a lot of light.

"There will be lights to guide our fishermen to shore," the chief told his torchbearers. "If we prepare a lot of lamakū, we can stick them in the sand. The fishermen will see the light and know where their landing place is."

The chief called all his people together who were not directly farming or gathering food. He ordered them—old women, old men, young mothers and younger children—to gather every kukui nut of the right size from the trees and to cut off leaves from banana plants and braid them into cord. Once these were gathered, the kukui nuts were shelled and woven into the cylinders that became lamakū. A lamakū burned for several hours, so in the early hours of the morning, the chief ordered all the lamakū that were ready to be placed on the beach and set afire.

The clouds still covered sky and mountain. Ka-hale-lehua was busy emptying out her water bowls. There was nothing to guide the fishermen back to shore except their own sense of direction and the changeable currents of the sea. But now there was also a line of lamakū burning and sputtering along the beach.

When the canoes returned before dawn, the chief was waiting beside the

39

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por), 6 (por), 7 (por), and 8 (por).

cluster of torches. Eagerly he questioned them, "Did this light help you?"

The fishermen nodded, but there was no outburst of enthusiasm, which the chief had expected. He looked at his fishermen one by one, his stern eye causing them to drop their heads and shuffle their feet in the sand.

At last the owl-eyed fisherman spoke up. "Chief," he said, "the light does help. A little. A very little. When we saw the light, we paddled farther out. But we still cannot go where the deep sea fish swim in great schools."

"That is too bad," the chief said, unhappy and discouraged.

The owl-eyed fisherman, who was afraid of no shark or man for that matter, spoke up again. "The idea is good. The lights are good. But they need to be higher."

"Higher?" asked the chief. "You mean, put the lamakū on top of the coconut trees?"

Everyone laughed at the silly idea. The coconut trees themselves would flame up in giant torches. In one night the trees would be lost. So would a supply of food.

"Higher than that," answered the fisherman, quite unworried that people were laughing at him. "Much higher than tree tops." He pointed his hand toward the west.

Everyone turned to look. They saw the beach, the line of coconut and hala trees, and beyond that there was the flat plain of Hanalei through which Waioli stream and Hanalei river cut meandering paths to the sea. Beyond that, there were the ridges that stretched taller and taller until they melted into the great mountains of Maunahihi and Nā-molokama. But most of the view beyond the trees was out of sight, behind clouds and mist and fog. Only the lowest ridge could be seen where it started up from the edge of Waioli stream.

The chief nodded, delighted with the suggestion made by his owl-eyed fisherman. "Yes, we shall place lamakū there on that ridge," he said. "Just below the clouds, far above the trees."

There was almost no time left before the sun would climb over the Anahola mountains, so the chief ordered the Menehune to finish up what chores they could and rest. He slept soundly that day, knowing the night would be a busy one.

Once again the night was stormy and dark. Clouds scudded low over Hana-

40

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lei. The rain goddess sent a steady rain that the wind blew this way and that, as though pulling aside curtains to peer through a window at the busy Menehune. But the fishermen pushed out to sea with lighter hearts than usual. The chief ordered lamakū to be made and brought to him. With a crew of workers, including his torchbearers, he climbed up the ridge. When he could look out over the tree tops and the clouds swirled just above his head, the chief struck the ground with his heel. "Here we must dig out a platform from the edge of the ridge, large enough to place all the lamakū we need to light our fishermen home again."

The Menehune went about the chore with their usual good sense, sound engineering, and the knowledge that many hands working together make any chore easier and quicker. A small platform dug out of the side of a hill was a simple chore compared to many others they had done in years past. There was no trouble organizing work groups. One group dug away the dirt and formed the platform. Another group formed a line reaching to the river beds of Waipa'a and Waikoko and passed smooth stones hand to hand to the worksite. Before half the night was gone, the platform was finished and paved with the stones. All that time the torchbearers were busy trying to keep their torches lit. The wind was strong but the flames were stronger, enjoying their dance. However, the rain sometimes fell so hard that the flames sputtered and danced away so far they became lost and went out.

The chief sat farther up the ridge where he could see the work, and his voice shouting instructions could be heard. He listened to the songs that the workers sang as they worked. He laughed at his torchbearers as they ran here and there trying to relight their torches as their torches were put out by the goddess Kahale-lehua as she emptied out the water that always collected in her bowls. He laughed but he realized that the lamakū that would guide the fishermen would also be put out by the rain.

"Build a roof over the platform," he yelled into the stormy night. "It must be higher in front than in back. It must protect the torches from the rain. It must also be high enough so the roof won't catch on fire."

No sooner said than the work started. One group cut logs for the uprights and the roof frame. Another group went for banana leaves which, laid down carefully, made a waterproof cover. Soon a flat roof with no walls had been built over the platform. The lamakū were set in place and lit. For the rest of the night the

41

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

flames sputtered and danced and poured a beacon of light into the dark and stormy night.

The canoes came swooping into shore on the backs of waves that threatened to swamp the small canoes that were so deeply filled with fish. As the owl-eyed fisherman lifted his paddle, all the fisherfolk gave a great cheer. "We have caught enough fish for two nights," the owl-eyed fisherman said. "With this light we can sail far out to sea and find our way back, no matter what the weather."

The Menehune lifted their chief onto their shoulders and paraded back to their eating house, cheering and laughing happily. The fishermen saw to it that the chief got the tastiest bits from their catch, those treats they usually held back for themselves or ate while still in the canoes. Just as delighted, the chief ordered that the next night would be spent in games and enjoyment.

That is how the Menehune invented a lighthouse. The platform they had made for the lamakū was named Ma-ka-ihu-wa'a, "At the canoe's prow." The platform is gone now, like the Menehune, but the ridge where it had been is still named Ma-ka-ihu-wa'a and the ridge still dips its toes into the happy waters of Waioli stream.

# Appendix C Boundary Commission Testimonies ca. 1873-1882 [Waihona 'Aina]

## No. 13

Boundary of the Ahupuaa of Waipaa [Waipā]

Received the following petition Honbl. D. McBryde Comm of Boundaries for the Island of Kauai Wahiawa August 21st 1873

Sir: For and on behalf of Her Excellency, R. Keelikolani, I beg to apply to you for the rectification of the boundaries of Ahupuaa of Waipaa, District of Hanalei on said Island. Waipaa is bounded on the south by the Govrn. land of Waioli, and on the North by the *Ahupuaa* of Waikoko, now owned by Mr. Albert Wilcox.

I have the honor to be Your Most obedient servant H.A. Widemann

Thereupon appointed the 7th day of October A.D. 1873 at the Court house Hanalei for the hearing of said petition and caused notice to be served on the Owners of the adjoining lands or their agents to appear and attend to their interests.

Court opened at 10 AM. Mr. James Gay appeared for the petitioner and called the following witness and others.

#### Pupu Sworn

The Eastern boundary commences at the sea there at a stone called Kalapa thence to a place on river bank called Kapuoa thence across river to stone at bottom of ridge, Makaihuoa " to top of ridge same named Makaihuoa " up ridge to peak Peapea Kapalikea to junction with Lumahai at Neki " to hill or peak, Puuhoonauwekia down to Kolopuu continuing down ridge to Kaooa down small ridge along Waikoko boundary to a small hill called Kuahua and thence down the east side of the bank of the stream to sand beach at Keahu and thence to a stone in sand beach called Pohakuopio, and thence round to place of commencement. From the above evidence and that of several other natives which

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was precisely similar, the following decision was rendered.

#### Decision

The Northeastern Boundary of this land commences in the sea at a stone called Kalapa and from thence runs to a place on the river bank called Kapuoa, thence across stream to a stone at foot of ridge called Makaihuoa; thence to top of ridge at a place called by the same name, Makaihuoa, thence up ridge to a peak called Peapea. Thence up ridge to a place called Kapalakea, thence up ridge to junction with Lumahai at a place called Neki and thence to spur or peak, Puuhoonauwikia and thence down to Kolopuu continuing down ridge to Kaooa, where there is an Orange tree, the Junction of Waipaa with Waikoko, thence following down a branch ridge along the boundary of Waikoko to a place called Kuahua, from thence down the east side of the Waikoko stream to sand beach at Kuahu, thence along the beach to a large stone on the sand called Pohakuopio and from thence to place of commencement. [Waihona 'Aina. Duncan McBryde, Commission of Boundaries, Island of Kauai:60-61]

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

# Appendix D National Register of Historic Places Nomination Form for the Kaua'i Belt Road (Duensing 2002)

		1048
NPS Form 10-900 (Rev. 10-90)	OMB No. 1024-0018	RECEIVED 2280
United States Department of the National Park Service	Interior	SEP - 5 2003
NATIONAL REGISTER OF HIS REGISTRATION FORM	STORIC PLACES	NAT REGISTER OF HISTORIC PLACES NATIONAL PARK SERVICE
This form is for use in nominatin instructions in How to Complete Register Bulletin 16A). Complet information requested. If any ite applicable." For functions, archii categories and subcategories fron continuation sheets (NPS Form 1 items.	g or requesting determinations for individual the National Register of Historic Places Regi te each item by marking "x" in the appropriat m does not apply to the property being docur tectural classification, materials, and areas of n the instructions. Place additional entries an 0-900a). Use a typewriter, word processor, of	properties and districts. See istration Form (National e box or by entering the nented, enter "N/A" for "not significance, enter only and narrative items on or computer, to complete all
1. Name of Property		
historic name <u>Kaua'i Belt Road</u> other names/site number <u>Kūhið</u>	l (North Shore section) Highway, Hawai'i Route 560	
2. Location street & number <u>Hawai'i Route</u>	560 not for publication	
city or town		
vicinity <u>Princeville, Hanalei, V</u> state <u>Hawai'i</u>	<u>Vainiha, Hā'ena</u> code <u>HI</u> county <u>Kaua'i</u> code <u>00</u>	07 zip code
3. State/Federal Agency Certifica As the designated authority under certify that this <u>&gt;</u> nomination standards for registering properti- professional requirements set for not meet the National Register CI nationally <u>&gt;</u> statewide <u>loca</u>	ation r the National Historic Preservation Act of 15 request for determination of eligibility es in the National Register of Historic Places th in 36 CFR Part 60. In my opinion, the pro riteria. I recommend that this property be con ally See continuation sheet for addition	986, as amended, I hereby meets the documentation and meets the procedural and perty <u>K</u> meets <u>does</u> nsidered significant <u>nal</u> comments.)
TALIX	X 1/20/2003	
Signature of certifying official	Date	
State or Federal agency and but	reau	
In my opinion, the property continuation sheet for additional	_meets does not meet the National Regi comments.)	ister criteria. (See
Signature of commenting or oth	her official Date	
State or Federal agency and but	reau	
	1	
	C.	

*	
	NPS Form 10-990-aCMR No. 1024-0018
	Hawai'i - Kana'i Relt Road Kana'i County
	4. National Park Service Certification
	Then have the driven of the Charles Drive Charles
	I, nereby certify that this property is: Signature of Keeper Date of Action
	entered in the National Register ( ) all Bolly of plus of
	See continuation sheet Detra 1) of and A/11/07
	dataseties delivity of ends Netheral Devices
	See continuation sheet
	determined not eligible for the National Register
	removed from the National Register
	other (explain):
	5. Classification
	(Check as many boxes as annly)
	(
	private
	nuklia lagal
	X public-State
	public-Federal
A	Category of Property
	(Check only one box)
	huilding(a)
	ounding(s)
	<u>X</u> district
*	
	site
	structure
	object
	Name of related multiple property ligting
	(Enter "N/A" if property is not part of a multiple property listing.)
	2
	<u>N/A</u>
	<i>x</i> .
	2
	-
,	

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County
Number of Resources within Property
Contributing Noncontributing
buildings
_2
<u>13</u> <u>2</u> structures (bridges and culverts)
objects
<u>15</u> Z Total
Number of contributing resources previously listed in the
National Register <u>N/A</u>
6. Function or Use
Historic Functions (Enter categories from instructions)
Cat: TransportationSub: road-related
Current Functions (Enter categories from instructions)
Cat: TransportationSub: road-related
7. Description
Architectural Classification (Enter categories from instructions)
Other: roadways; bridges: steel, reinforced concrete, girder, flat slab,
wood, masonry (basalt or lava rock)
Materials (Enter categories from instructions)
foundation
roof
walls
other asphalt, concrete, steel, wood, masonry (basalt or lava rock)
3
-

NPS Form 10-900-aOMB No. 1024-0018
riawai i - Kaua i belt Koad, Kaua i County
8. Statement of Significance
Applicable National Register Criteria (Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)
X A Property is associated with events that have made a significant contribution to the broad patterns of our history.
B Property is associated with the lives of persons significant in our past.
$\underline{X}$ C Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
D Property has yielded, or is likely to yield information important in prehistory or history.
Criteria Considerations
(Mark "X" in all the boxes that apply.)
Property is:
A owned by a religious institution or used for religious purposes.
B removed from its original location.
C a birthplace or a grave.
D a cemetery.
E a reconstructed building, object, or structure.
F a commemorative property.
<u>X</u> G less than 50 years of age or achieved significance within the past 50 years.
Areas of Significance (Enter categories from instructions)
Engineering
Social History
Transportation
Commerce
4

4	
х.	
	NPS Form 10-900-aOMB No. 1024-0018
	Hawai'i - Kaua'i Belt Road, Kaua'i County
	Significant Dates
	<u>1900 to 1957</u>
	Significant Person (Complete if Criterion B is marked above)
,	
	Cultural Affiliation
	· · · · · · · · · · · · · · · · · · ·
	Architect/Builder
	Designers and builders were County Engineers, including J. H. Moragne and R. L. Garlinghouse, Builders were county employees and private contractors, including George Mahikoa. Designers also included Hamilton and Chambers of New York.
	9. Major Bibliographical References Bibliography (Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)
	Previous documentation on file (NPS)
	preliminary determination of individual listing (36 CFR 67) has been requested
	previously listed in the National Register
	<u>X</u> previously determined eligible by the National Register <u>1978: Hanalei Bridge, Wai oli Bridge, Waipā Bridge</u>
	designated a National Historic Landmark
	recorded by Historic American Buildings Survey
	#
	recorded by Historic American Engineering Record
	#
	5

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County Primary Location of Additional Data \_\_\_\_ State Historic Preservation Office X Other State agency \_\_\_\_ Federal agency X Local government \_\_\_\_ University \_\_\_ Other Name of repository: State of Hawai'i Department of Transportation; County of Kaua'i Department of Public Works. 10. Geographical Data Acreage of Property \_\_\_\_54\_ **UTM References** (Place additional UTM references on a continuation sheet) Zone Easting Northing Zone Easting Northing 104 451000 2456460 304 449820 2456220 204 450980 2456220 404 449280 2455500 X See continuation sheet. Verbal Boundary Description (Describe the boundaries of the property on a continuation sheet.) The boundaries of the nominated district are delineated by the course of Route 560, the Kaua'i Belt Road. The right-of-way is variable along the entire length of the road. The boundaries are coterminus with the road's historic right-of-way. The historic district begins at Mile Marker 0 on Route 560 and continues to its termination at Mile Marker 10 at Hā'ena State Park. **Boundary Justification** (Explain why the boundaries were selected on a continuation sheet.) The beginning and end points were selected to encompass the portion of the Kaua'i Belt Road that retains the greatest historic integrity and character. This section of roadway is relatively unaltered and is the most spectacular portion of Kaua'i's historic belt road system, both in its historic character and its scenery. It is the only portion of the Kaua'i Belt Road that retains historic integrity. Elsewhere, the Kaua'i Belt Road has been significantly altered with new alignments and widened roadways and bridges. The boundaries of the proposed historic district include thirteen contributing historic bridges and culverts that date to 1912. 6


	NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County
14 1	11. Form Prepared By
	name/title <u>Dawn E. Duensing, historian</u> organization <u>on behalf of the Hanalei Roads Committee</u> date <u>4/8/02</u> street & number <u>P.O. Box 888</u> telephone <u>808)572-6583</u> city or town <u>Makawao</u> state <u>HI</u> zip code <u>96768</u>
	Additional Documentation. Submit the following items with the completed form:
	Continuation Sheets
	Maps A USGS map (7.5 or 15 minute series) indicating the property's location.
	A sketch map for historic districts and properties having large acreage or numerous resources.
	Photographs
	Representative black and white photographs of the property.
	Additional items (Check with the SHPO or FPO for any additional items)
	Property Owner(Complete this item at the request of the SHPO or FPO.)
	name <u>State of Hawai'i, Department of Transportation</u> street & number <u>869 Punchbowl Street</u> telephone <u>(808)587-2150</u> city or town <u>Honolulu</u> state <u>Hawai'i</u> zip code <u>96813</u>
	8

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

NPS Form 10	-900-aOMB No. 1024-0018
Hawai'i - Kau	ia'i Belt Road, Kaua'i County
United State	as Department of the Interior
National Pa	rk Service
NATIONA	L REGISTER OF HISTORIC PLACES
CONTINUA	ATION SHEET
Section	7 Page1
Nama afaa	
Name of pro	state Kaua'i County Hawai'i
county and	State Reduit County, Trawari
Narrative D	escription
(Describe u	e instorie and current condition of the property on one of more continuation sneets.)
The Kaua'i	Belt Road between Princeville and Hā'ena traverses ten miles along the island's north
shore and i	s coterminous with its historic right-of-way. This portion of Kaua'i's "belt road" was
part of Kav	a'i's original belt-road system, which extended from Hā'ena on the north shore to
• Mānā on K	aua'i's west shore. Although belt-road systems in the Hawaiian Islands were intended
to circumv	ent each island, Kaua'i's road, like the Hawai'i Belt Road, never completely encircled
the island o	lue to the rugged topography of Nä Pali Coast. The north shore section of the Kaua'i
Belt Road h	begins at State Route 560's Mile Marker 0 at Princeville and passes through the
communiti	es of Hanalei, Wainiha and Hā'ena, ending at Mile Marker 10 at Hā'ena State Park.
The proper	and historia district includes the good the Hanalei Valley Coopie Overlack, and thistoph
historic bri	dage and sulverts. The period of significance for the porth shore section of the Kaus'i
Belt Road i	s from 1900 when the Territory of Heural's Superintendent of Public Works becom
roadway is	s from 1900 when the Territory of Hawai I Superintendent of Public Works began
Toauway II	nprovements until 1957 when the Walning bridges were rebuilt after a fidal wave.
The Kaua'i	Belt Road between Princeville and Hā'ena retains historic significance and character
in its locati	on, alignment, design, setting, and association. The Kaua'i Belt Road between
Princeville	and Wainiha was built during the 1910s, and from Wainiha to Hā'ena circa 1928.
Most of the	roadway alignment is unaltered and predates the road's construction. The road
nasses thro	uigh rural areas along Kaua'i's North Shore, connecting communities much as it did in
the early ty	wantieth contury when it was built. In many areas, the read was built over a trail used
the early to	ventient century when it was built. In many areas, the foat was built over a train used
by riawaiia	ins and nineteenth-century travelers. There is no shoulder along most of the roadway,
except near	Princeville. The road has been widened since its construction, but is still narrow in
many locat	ions. The roadbed varies between 18' and 20' wide, being narrower as it hugs the sea
cliffs and w	rider as it passes through valleys and residential communities. Near Princeville and
Hanalei, th	e road is 22' wide. For most of the road's length, there are no guardrails, which
contributes	to the road's historic feeling. Lava-rock guardwalls, some dating to the 1920s,
remain alo	ng the road in many locations, although many have been undermined by soil erosion.
In a few loc	cations, timber guardrails remain along the road. Only a few steel w-beam guardrails

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

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NPS Form 10-900-aOMB No. 1024-0018
Hawai'i - Kaua'i Belt Road, Kaua'i Courty
United States Department of the Interior
National Park Service
NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET
Section <u>7</u> Page <u>2</u>
Name of property Kaua'i Belt Road
County and State Kaua'i County, Hawai'i
Narrative Description (continued)
The Hanalei Valley Scenic Overlook has been a feature on the Kaua'i Belt Road since the early
1900s. This scenic site, located near Mile Marker 0 in Princeville, provides a stunning view of the
Gartley documented this scenic view in 1912, and R. J. Baker photographed the site in 1915.
Mart of the heider and a depart on the Konst P department of the second state of the second
1900s. The bridges and culverts on the Naua 1 belt koad are one-lane wide and date to the early
Hawai'i: steel truss and reinforced-concrete flat slab. The reinforced concrete bridges feature
solid concrete parapets. In addition, there are also several pipe culverts with masonry rock
headwalls that were probably constructed in the first half of the twentieth century.
Physical description: The Kaua'i Belt Road, State Route 560, begins near Princeville at Mile
Marker 0. The Hanalei Valley scenic overlook is located at the east end of State Route 560 near
Mile Marker 0. Just west of Mile Marker 0 at Princeville, the Kaua'i Belt Road winds around a
large hairpin curve and then begins its descent (approximately 6 percent grade) to the Hanalei Bridge After crossing the Hanalei Bridge, the road follows the Hanalei Biver west to Hanalei
town. The road traverses through the commercial district and historic heart of Hanalei, then
continues through residential areas between Wai'oli Bridge and Waipā Bridge. After crossing
Waipā Bridge, the road follows the beach along the west shore of Hanalei Bay. The road then
winds up and around the mountain ridge as it proceeds to Lumaha'i Valley. As it winds over the ridge the read reaches an elevation of pearly 160' above see level. Descending into Lumaha'i
Valley, the road again follows the beach before crossing Lumaha'i Bridge and leaving the valley.
Another mountain ridge is traversed before entering Wainiha Valley, where the road crosses the
three Wainiha Bridges and passes through the small village of Wainiha. From Wainiha, the
thoroughfare traverses a level plain between the mountains and ocean as it proceeds through the
the landmark Hā'ena "Dry Cave" before a slight ascent up the mountain ridge as it follows a
narrow strip of coast. The road follows along the narrow base of the mountains until it ends at
Kē'ē Beach in Hā'ena State Park at Mile Marker 10.
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NPS Form 10-900-aOMB No. 1024-0018 Hawaii - Kaua'i Belt Road, Kaua'i County	
United States Department of the Interior National Park Service	
NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET	
Section <u>7</u> Page <u>3</u>	
Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u>	
Narrative Description (continued)	
EARLY TRANSPORTATION ALONG KAUA'I'S NORTH SHORE	
With extensively cultivated <i>kalo</i> (taro) regions and fishing areas that provided an abundant food supply, the North Shore of Kaua'i was well populated in ancient times. <sup>1</sup> Traditionally, Hawaiians relied on their well-developed navigational skills and would have traveled along the coast by canoe. The Hawaiian population living in the north shore valleys may have also traveled along an ancient foot trail that connected communities between Hanalei and Hā'ena.	
Foreigners, among them American missionaries, were the first to travel primarily by land and introduced horses to the Hawaiian Islands in 1803. <sup>2</sup> The journal of William DeWitt Alexander provides an early written account of a day-long excursion along Kaua'i's North Shore in 1849. Alexander's destination was Hā'ena and its "celebrated caves." His party departed from Wai'oli near Hanalei, "all mounted on good horses and in high spirits." Their six-mile journey was through beautiful scenery and crossed three river valleys. Rivers were crossed by canoes or by fording. <sup>3</sup>	
In 1865, William T. Brigham's account of his sightseeing journey to Hā'ena noted several improvements in river crossings, including scows on the Hanalei and Lumaha'i rivers. Other rivers still had to be forded and were difficult to cross. The trip to Hā'ena took the entire day, much as it had for Alexander in 1849. <sup>4</sup>	
<ul> <li><sup>1</sup> E. S. Craighill Handy and Elizabeth Green Handy, <i>Native Planters in Old Hawai'i: Their Life, Lore, and Environment.</i> (Honolulu: Bishop Museum Press, 1972), 269.</li> <li><sup>2</sup> Ralph Kuykendall, <i>The Hawaiian Kingdom, 1854-1874.</i> V. 2 (Honolulu: University of Hawai'i Press, 1953), 23.</li> <li><sup>3</sup> Kaua'i Historical Society, <i>The Kaua'i Papers.</i> (Līhu'e, Hawai'i: Kaua'i Historical Society, 1991), 126-127.</li> <li><sup>4</sup> <i>The Kaua'i Papers</i>, 138.</li> </ul>	
14	

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County

United States Department of the Interior National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 7 Page 4

Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i

Narrative Description (continued)

By 1893, a number of transportation improvements had been built in the Hanalei District, including a bridge across the Hanalei River. Traveler Eric Knudsen detailed his 1895 trip, describing the road and hill above the Hanalei River, "The road in those early days almost dived straight down to the bridge. It was steep and in wet weather very slippery. No wonder that when any one took a trip in a carriage they had to be escorted by a couple of cowboys on strong horses to help pull the carriage up the steep grades or hold them back while descending."<sup>5</sup> An 1893 Hawaiian Government Survey map illustrated this section of road as a series of switchbacks descending the hill.<sup>6</sup>

Knudsen's journal is valuable for its description of the historical alignment of the trail/road from Hanalei Hill (above the Hanalei Bridge) to Kë'ë Landing at the end of the road in Ha'ena. After crossing the Hanalei Bridge, Knudson reported that the road followed the winding course of the Hanalei River for "quite a distance." He noted that the wagon road ended after Hanalei, and travelers followed the beach in order to ford the rivers where they entered the ocean. West of Waikoko Stream, Knudsen related that the trail climbed over the bluff and then descended straight down to the ocean before turning back and running along the beach again. After the valley, the winding trail proceeded "up and out and over" the narrow hogback into Lumaha'i Valley, where there was no difficulty fording the stream. Knudsen did not describe how travelers crossed the next ridge into Wainiha Valley. The trail then proceeded over the flat lands of Wainiha and Ha'ena, passing both the dry and wet caves before reaching Ke'e Landing.<sup>7</sup>

According to historian Ralph Kuykendall, nineteenth century Hawai'i roads, "or what were called roads," came into existence by a familiar historical process, "the trail became a road." Many roads, especially in the rural districts like Kaua'i's North Shore, were little more than cleared rights-of-way.<sup>8</sup>

<sup>&</sup>lt;sup>5</sup> The Kaua'i Papers, 153-154.

<sup>&</sup>lt;sup>6</sup> W. A. Wall, Map of Hanalei, Makai, Kaua'i. (Honolulu: Hawaiian Government Survey Registered Map No. 1833, 1893).

<sup>&</sup>lt;sup>7</sup> The Kaua'i Papers, 154-155.

<sup>&</sup>lt;sup>8</sup> Kuykendall, The Hawaiian Kingdom, 1854-1874. V. 2, 25-26.

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section \_7 Page \_5 Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i Narrative Description (continued) Early Transportation Improvements on Kaua'i's North Shore The earliest bridges on Kaua'i were constructed of wood and steel. Wood was a prevailing construction material throughout the Hawaiian Islands during the nineteenth century; it was widely available, relatively inexpensive, and fairly durable. By the end of the nineteenth century, steel represented the latest in industrial technology and was a preferred construction material for its strength. Although steel bridges had to be imported from the United States or Great Britain, the strength of steel provided a feasible solution for spanning Kaua'i's wide rivers. Steel was also used throughout the islands to erect the substantial bridges required to carry railroads over Hawai'i's rivers and rugged gulches.

During its first year of operation in 1900, the territorial public works department purchased a steel bridge for the Hanalei River from the Wilson & Whitehouse firm. Built by the Missouri River Bridge Company, the steel bridge had a span of 110' with a 14'-wide roadbed constructed of wood. The bridge probably replaced the structure mentioned in Knudsen's journal, which most likely was built of wood and had washed away in a storm. The Territory of Hawai'i Superintendent of Public Works' (SPW) annual report noted that the new steel bridge for Hanalei was to be built on stone abutments at an elevation above the river's flood stage.<sup>9</sup> Building bridges to withstand floods was an important consideration in areas like Kaua'i's North Shore, which was prone to storms and flash floods.

By 1904 timber bridges spanned the rivers at Wainiha, Waikoko, and Waipā, and plans were made for a steel bridge over the Lumaha'i River. The Department of Public Works probably built both the Wainiha and Waipā bridges in 1904. The Waipā Bridge was a simple wood structure, and the Wainiha a wood through-truss bridge.<sup>10</sup> A. A. Wilson finally began construction on the

<sup>&</sup>lt;sup>9</sup> Superintendent of Public Works, Report for 1900, 209.

<sup>&</sup>lt;sup>10</sup> Photograph Album 43, "Public Works Projects, 1904-1905," 24, 26; Superintendent of Public Works, *Report for 1904*, 38.

NPS Form 10-900-aOMB No. 1024-0018
Hawai'i - Kaua'i Belt Road, Kaua'i County
United States Department of the Interior
National Park Service
NATIONAL REGISTER OF HISTORIC PLACES
CONTINUATION SHEET
Section _7_ Page _6
Name of property Kaua'i Belt Road
County and State Kaua'i County, Hawai'i
Narrative Description (continued)
new steel bridge at Lumaha'i in 1905 <sup>11</sup> Other nublic works projects along the North Shore
provided for relocating and reconstructing the road between H $\bar{a}$ ena and Hanalei. <sup>12</sup>
Providen for reconning and reconnecting the row of the connection and random
In its 1904 annual report, the SPW emphatically advised against the construction of steel bridges.
He observed that steel bridges were inappropriate for Hawai'i's coastal areas and expensive to
maintain. The SPW noted that several steel bridges, including Wailua Bridge on Kaua'i, were in
"exceedingly bad condition" with corrosion that materially affected the strength of the bridge
components. He strongly advocated that concrete-arch rather than steel bridges be built
wherever the span was not too great. <sup>13</sup> Despite the strong recommendations to use concrete or
wood, Kaua's wide rivers required long spans, and the steel bridge over the Lumaha's River was
completed as planned." Other improvements were also made, which included relocating some
that the trip to Ha and removing excessive grades. The assistant superintendent commented
mai me mp to ma ena would' be made easy and much more enjoyable man at present.
Building Kaua'i's Belt Road
By the end of the nineteenth century, each of the major Hawaiian Islands dreamed of building a
"belt" road system. The idea for belt roads dated to the early Hawaiians, who had built such
roads on the islands of Maui and O'ahu. Belt roads that circumvented the islands played an
important role in Hawai'i's transportation history, connecting isolated communities to their
island's economic, political and social centers. In 1911, the territorial legislature established a
"loan fund," which provided the bonding needed for each island to build its belt roads and
bridges. A Loan Fund Commission (LFC) was appointed for each island, and Kauai's board
wasted no time in getting down to business. During its first five years, it engaged in a number of
construction projects that quickly improved the north shore portion of the belt road as tar as the
<sup>11</sup> Superintendent of Public Works, Report for 1905 31
<sup>12</sup> Superintendent of Public Works, <i>Report for 1904</i> 66
<sup>13</sup> Superintendent of Public Works, <i>Report for 1904</i> , 3-5.
<sup>14</sup> Superintendent of Public Works, <i>Report for 1905</i> , 79, 65, 75.
<sup>15</sup> Superintendent of Public Works, <i>Report for 1906</i> , 23.
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14

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section 7 Page 7 Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i Narrative Description (continued) distant community of Hā'ena. By 1917, Kaua'i considered its belt road complete, a feat that was accomplished earlier than any other island.<sup>16</sup> In 1911 the Loan Fund Commission initiated several major projects for Hanalei, including a new steel bridge over the Hanalei River and improvements to "Hanalei Hill".<sup>17</sup> A major goal in advancing overland travel on Kaua'i was to eliminate sharp curves and steep grades. The new grades replaced steep inclines that had been suitable for carriage roads, but could not be easily negotiated by the automobiles that were introduced to island roads in the early 1900s. Although newspaper accounts provide only a general description of the "Hanalei Grade," the project probably realigned the road by replacing the steep switchbacks that descended to the Hanalei River (as described by Knudsen in 1895) with a new section of road built on an easier grade. Construction of the new Hanalei Hill grade most likely realigned the road to its current route between the Hanalei Bridge and Princeville. The Hanalei Grade was constructed in two sections, the first of which was completed by December 1911.<sup>18</sup> The second section was expected to be ready by March 1912 if the weather cooperated.<sup>19</sup> Concurrent with the construction of the new grade descending to the Hanalei River was the plan to build a new steel bridge at Hanalei. Although the SPW had strongly recommended that concrete be used in new construction, the LFC authorized \$3,500 for a steel bridge over the Hanalei River.<sup>20</sup> Commissioners had approved funding for a number of concrete bridges for Kaua'i, but did not explain why the new bridge at Hanalei would be constructed of steel. In all likelihood, a steel bridge was chosen due to the long span required to cross the Hanalei river. In addition, the bridge was built on high abutments in order to keep the structure above the flood stage. A concrete bridge over the Hanalei River would have required the construction of high piers, which would have been more expensive and more technically difficult. <sup>16</sup> "A Happy Day In Sight," *Garden Island*, July 10, 1917. <sup>17</sup> "County Fathers in Busy Meeting," Garden Island, June 13, 1911. <sup>18</sup> "Loan Fund Meets," Garden Island, December 11, 1911. <sup>19</sup> "Loan Fund Members Hold Monthly Meet," Garden Island, January 16, 1912. <sup>20</sup> "Loan Commission Holds Meeting," Garden Island, July 25, 1911. 15

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section \_\_7\_\_\_ Page \_\_8\_\_\_\_ Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u> Narrative Description (continued)

The advertisement for bids on the Hanalei Bridge called for a Pratt truss steel bridge with "all necessary bolts and rivets for erecting." The 16'-wide structure was to have a floor system of steel beams, wooden stringers, and a wooden floor. The bridge was designed to carry a "16-ton traction engine trailing three 10 ton wagon [sic] on 10 foot wheel bases." The commission demanded that the bridge be delivered "entirely free of rust."<sup>21</sup> The LFC purchased the bridge, which was prefabricated in New York by Hamilton and Chambers, from the Honolulu Iron Works Company.<sup>22</sup> Records do not indicate who installed the bridge; it may have been constructed by LFC or territorial laborers. The new Hanalei Bridge was 113'-feet long with a span of 106' and a horizontal clearance of 17'.<sup>23</sup> The bridge opened to traffic at the end of 1912.<sup>24</sup>

Kaua'i's bridge-building program was extensive in 1912. During a special meeting in May, the LFC decided to build "a number of bridges" near Hanalei, including Waikoko, Waipā, and Wai'oli. The LFC instructed Moragne to prepare plans and specifications for concrete structures, and he designed three flat-slab bridges with solid concrete parapets.<sup>25</sup> Within months of Moragne's assignment, contracts were authorized for George Mahikoa to build the Wai'oli and Waikoko bridges; and George Ewart to build Waipā Bridge.<sup>26</sup> Work on the new bridges began almost immediately and was none too soon. In August 1912, three of the timber bridges that were to be replaced collapsed under the strain of wagons delivering crushed rock for the new concrete bridges.<sup>27</sup>

- <sup>26</sup> "Loan Fund Meets," Garden Island, July 16, 1912.
- <sup>27</sup> "Bridges Collapse," Garden Island, August 6, 1912.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

<sup>&</sup>lt;sup>21</sup> "Tenders, Steel Bridge," Garden Island, August 8, 1911.

<sup>&</sup>lt;sup>22</sup> "Meeting of the Loan Fund Commission," *Garden Island*, September 12, 1911; "Loan Com. In Busy Meeting," *Garden Island*, September 26, 1911; original bridge plaque notes Hamilton & Chambers as designers.

<sup>&</sup>lt;sup>23</sup> "Loan Com. In Busy Meeting," Garden Island, September 26, 1911; "Hamilton and Chambers" noted on plaque on Hanalei Bridge.

<sup>&</sup>lt;sup>24</sup> "Kaua'i Loan Fund Meets," Garden Island, January 21, 1913.

<sup>&</sup>lt;sup>25</sup> "Loan Fund Commission," *Garden Island*, May 29, 1912.

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section 7 Page 9 Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i Narrative Description (continued) In November 1912, Moragne reported that bridge construction in the Hanalei District was progressing satisfactorily. Waipā Bridge was completed. Wai'oli and Waikoko, along with the Hanalei Bridge, were expected to be completed by the end of the year.<sup>28</sup> With the completion of another bridge at Kilauea, the Hanalei District had five new bridges in 1912. The local newspaper, the Garden Island, remarked that Hanalei's new concrete bridges stood out in comparison to the unsatisfactory roads in the area.29 Despite the charge of bad roads in the Hanalei area, the LFC had also appropriated small sums to do road work between Hanalei and Hā'ena. In 1911 the commission instructed Moragne to prepare plans for straightening the road.<sup>30</sup> By early 1912 "considerable" repair work had been accomplished with "telling results," including the correction of two "disagreeable" curves.<sup>31</sup> With Moragne's \$1,000 budget for road work spent, the LFC added another \$2,000 to continue work between Hanalei and Hā'ena.<sup>32</sup> Completion of the Kaua'i Belt Road entered its final phase in early 1915 when Supervisor Menefoglio proposed a \$100,000 bond to complete the road from Mānā (Barking Sands) to Hā'ena. He estimated that by immediately funding the road work through bonds, Kaua'i could finish the belt road in two years. He noted that if the LFC continued to rely on funding from the territorial legislature, finishing the belt road would take another eight years. He emphasized that Kaua'i would immediately benefit from a good road, as it would increase property values and provide a "great advertisement" for the island. Moragne also favored building the road immediately, agreeing that a two-year project would save money in the long run.<sup>33</sup> <sup>28</sup> "County Work is progressing," Garden Island, November 19, 1912. <sup>29</sup> "Hanalei's Bridges," Garden Island, January 7, 1913. <sup>30</sup> "Minutes of a Special Meeting of the Members of the Kaua'i Loan Fund Commission Held at Līhu'e, Kaua'i, August 17, 1911," Garden Island, August 22, 1911. <sup>31</sup> "County Roads Are Getting Into Shape," *Garden Island*, February 6, 1912. <sup>32</sup> "Loan Fund Commissioners in Meet," *Garden Island,* May 14, 1912. <sup>33</sup> "Chamber of Commerce," Garden Island, February 9, 1915. 17

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section \_7 Page \_10\_ Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i Narrative Description (continued) Instead of completing work on the belt road with bonds, Moragne apparently "plugged away" at the reconstruction and macadamizing of the belt road using money from his regular budget. By August 1916, the final section of the Hanalei portion of the belt road, a stretch of road popularly known as the "Hanalei Road," was ready to be paved from Moloa'a to Hā'ena. Moragne was quite pleased with the county's excellent progress. A year later, work was proceeding rapidly and the belt road that connected Wahiawa in west Kaua'i to Wainiha on the North Shore was nearly completed. The Garden Island noted that Kaua'i was the first island in Hawai'i to complete its belt road, even though the road only went about halfway around the island.<sup>34</sup> Continuing Progress and Completing the Road to Hā'ena After the concentrated efforts to complete the Kaua'i Belt Road, Moragne and his successor, R. L. Garlinghouse, continued the program of bridge construction and maintenance. Bridges were built at Wainiha and Hā'ena, the Waipā Bridge was extended, and the Lumaha'i Bridge was reinforced. In addition, the belt road was improved and extended to Hā'ena. By 1921, three bridges were required to carry the road over the Wainiha River. At least one bridge crossed the Wainiha River between 1904 and 1918, a two-span timber truss structure located on the site of what is today known as Wainiha Bridge #3.35 In 1918, county financial records indicated that \$4,188 was disbursed for the Wainiha Bridge from the "permanent improvement fund."36 That year, J. H. Moragne prepared plans for a two-span Wainiha Bridge, which indicated that the circa 1904 bridge was completely replaced. Moragne's plans provided for new concrete abutments and included a detailed list of lumber, iron, and nails required for construction. The 1918 plans specified a taller truss and larger members than the earlier bridge, 34 "Final Stretch of the Hanalei Road," Garden Island, August 15, 1916; "A Happy Day In Sight," Garden Island, July 10, 1917. <sup>35</sup> Photograph Album 43, "Public Works Projects, 1904-1905," 26. There is also a 1907 Wainiha Bridge plan by J. H. Moragne, County Road Supervisor that postdates construction and may have been drawn to facilitate bridge maintenance and/or repairs. <sup>36</sup> "Receipts and Disbursements, 1918, County of Kaua'i," Garden Island, January 21, 1919.

18

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County
United States Department of the Interior National Park Service
NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET
Section <u>7</u> Page <u>11</u>
Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u>
Narrative Description (continued)
which provided a greater load capacity. <sup>37</sup> The 1918 plans indicated two 75'-6" spans, which were quite close to the current bridge's length of 146'.
In January 1921 the Wainiha River cut a new channel during a storm, which necessitated another bridge, as flooding had carved a "long slim island out of the agricultural land of the valley." The <i>Garden Island</i> reported that the new bridge would "make three bridges in the valley, in within [sic] a distance of about 500 yards." <sup>38</sup> This third structure at Wainiha became known as Wainiha Bridge #2. Plans for a new single-span bridge of 75' were drawn in 1922. The design was a timber-truss structure that complemented the adjacent timber-truss bridge (Wainiha #3). <sup>39</sup> Even though the plans were drawn in February 1922, a construction date was not determined. The Territorial Highway Department records state that the bridge was constructed in 1931. <sup>40</sup> No information was located to indicate when the original Wainiha Bridge #2 was built, although it may have been built as early as the first decade of the twentieth century.
In 1925, the Kaua'i Board of Supervisors decided to extend the Belt Road from the end of its pavement at Wainiha to the Dry Cave at Hā'ena. The Superintendent of Public Works expected to obtain additional funding to extend the road to the Wet Caves. Since a road already ran to Hā'ena and there was an existing trail from Hā'ena to Kā'ē Beach, <sup>41</sup> the "Hā'ena Road Extension" project probably improved the existing road to Hā'ena and built a new road from Hā'ena to Kā'ē Beach. The road was macadamized in 1926. <sup>42</sup> Almost \$3,000 in additional funding was
<ul> <li><sup>37</sup> J. H. Moragne, "Wainiha Bridge, Two Spans, County of Kaua'i" plans, January 21, 1918; J. H. Moragne, "Wainiha Bridge" plans, 1907.</li> <li><sup>38</sup> "Destruction at Wainiha," <i>Garden Island</i>, January 25, 1921.</li> <li><sup>39</sup> County of Kaua'i, District of Hanalei. "75 Ft. Bridge for Wainiha" plans, February 1922.</li> <li><sup>40</sup> Territory of Hawai'i, Territorial Highway Department, Hawai'i Highway Planning Survey, <i>Bridge Inventory for the Island of Kaua'i</i>. In cooperation with the U.S. Department of Commerce, Bureau of Public Roads. 1950. Bridge Data Sheets for Wainiha Bridge #1, #2, and #3.</li> <li><sup>41</sup> United States Geological Survey. Topographic Map of the Island of Kaua'i, Kaua'i County, Hawai'i. (Washington, D.C.: USGS, 1912.)</li> <li><sup>42</sup> Kaua'i County Clerk, Index File: Kaua'i Board of Supervisors, Resolution No. 2, Approved January 6, 1926.</li> </ul>

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section 7 Page 12 Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i Narrative Description (continued) appropriated for the extension in 1927,43 and land was taken in mid 1928.44 This additional appropriation and land may have provided for the road to be extended to the Wet Caves/Ke'e Beach. The road improvements near Hā'ena included two small concrete-frame bridges with solid concrete parapets constructed in 1926. County appropriations funded the structures, one of which was near the Hā'ena School and the other near the Dry Cave. The Hā'ena bridges were designed by County Engineer R. L. Garlinghouse<sup>45</sup> and built by contractor George W. Mahikoa.<sup>46</sup> The structures may have been the first concrete-frame bridges built on Kaua'i.47 The Hā'ena bridges reflected the trend towards wider roads and were built approximately 18' wide, significantly wider than most of the other bridges on the North Shore. When Kaua'i began its road-building program in the early 1900s, the average road width was 12', and nearly all the North Shore bridges were less than 14' wide. To meet the needs of increasing traffic, Kaua'i began widening its major roads and bridges to approximately 20' in 1926. According to Territorial Highway Department reports, the Waipā Bridge was modified and assumed its unusual design of two different bridges in 1925.48 The original design plans for the Waipā Bridge indicated there was an existing "old" timber bridge over the river in 1912.49 In <sup>43</sup> "Supervisors Hold Regular Meeting," Garden Island, January 18, 1927. 44 "Supervisors Hold Regular Meeting," Garden Island, May 15, 1928. <sup>45</sup> R. L. Garlinghouse, plans for "County of Kaua'i, Hā'ena Road Bridge No. 1," March 1926; plans for "County of Kaua'i, Hā'ena Road Bridge No. 2," March 1926. 46 Kaua'i County Clerk, Index File: Hā'ena Road Bridges No. 1 & No. 2, Contract for Construction, Geo. W. Mahikoa, n.d. <sup>47</sup> R. L. Garlinghouse, plans for Ka'awaloa Bridge, October 1926; Kapāhili Gulch Bridge, May 1927; and Kalāheo Bridges Nos. 1 and 2, March 1928. <sup>48</sup> Territorial Highway Department, Bridge Inventory for the Island of Kaua'i, 1950. Bridge Data Sheet for Waipā Bridge. No construction plans or other information was located to confirm the 1925 construction date. <sup>49</sup> J. H. Moragne, plans for "Waipā Culvert, District of Hanalei," 1912. 20

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

	NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County	
	United States Department of the Interior National Park Service	
	NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET	
	Section Page	
	Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u>	
	Narrative Description (continued)	
	addition, a photograph shows that the 1912 concrete bridge served as an extension of the timber bridge and was probably built to span a widened river channel. The photograph shows that one of the timber bridge spans had collapsed, so the second concrete bridge at Waipā apparently became a replacement for the timber bridge. <sup>50</sup> The Waipā Bridge collapsed in 1919 and a temporary trestle of "light construction" was built to span the washout. <sup>51</sup> No plans were found for the new concrete bridge extension, although County Engineer R. L. Garlinghouse drew a similar concrete-slab bridge design for another structure in 1925. <sup>52</sup> The Waipā extension bridge had five spans for a total length of 90 <sup>.53</sup> It was an unusual structure as it did not match the original bridge's width, wall design, or wall height.	
	Disasters Strike the North Shore Bridges	
	Various disasters struck some of the North Shore bridges between 1946 and 1968, necessitating repairs and replacements of the structures. In 1946 and 1957 tidal waves destroyed or damaged bridges at Wainiha and Waikoko. In 1966 and 1968 old age affected bridges at Wainiha and Lumaha'i, causing them to collapse.	
	Hawai'i's well-known April Fool's Day tidal wave of 1946 inflicted Kaua'i's most severe damage in the Hanalei region. At Wainiha, the tidal wave inundated shoreline areas up to the 27' elevation and destroyed both spans of the highway bridge. <sup>54</sup> Waikoko Bridge was also damaged when the tidal wave undermined its eastern abutment, which caused the bridge to sink on one	
×	<ul> <li><sup>50</sup> McKay, Helen, Photograph Album #47b, ca. 1912-1930.</li> <li><sup>51</sup> "Meeting of Supervisors," <i>Garden Island</i>, April 8, 1919.</li> <li><sup>52</sup> R. L. Garlinghouse, plans for "Ma'ulili Bridge Reinforced Concrete Slab, District of Koloa," February 1925.</li> <li><sup>53</sup> Territorial Highway Department, <i>Bridge Inventory for the Island of Kaua'i</i>, 1950. Bridge Data Sheet for Waipā Bridge.</li> <li><sup>54</sup> Department of the Army, Corps of Engineers, Pacific Ocean Division. <i>Flood Hazard</i> <i>Information, Island of Kaua'i, Report R49</i>. (Honolulu: U.S. Army Corps of Engineers, 1973), 12.</li> </ul>	
	21	

NPS Form 10-900-aOMB No. 1024-0018
Hawai i - Kaua I Belt Road, Kaua I County
United States Department of the Interior National Park Service
NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET
Section <u>7</u> Page <u>14</u>
Name of property Kaua'i Belt Road
County and State Kaua'i County. Hawai'i
Narrative Description (Describe the historic and current condition of the property on one or more continuation sheets.)
side 55 The bridge settled to rest at an angle of nearly 20 degrees. Several days after the tidel
wave the County Board of Supervisors instructed the county engineer to make plans to rebuild
the Wainiha and Waikoko bridges <sup>56</sup> The Board of Supervisors minutes noted that repairs on the
damaged "main" Wainiha Bridge (#3) had begun by mid April. <sup>57</sup> Plans drawn in April 1946
illustrated the Wainiha Bridge #1 replacement. The new timber bridge was 38'-6" long and built
on two concrete pile bents and new concrete abutments. The bridge was built of 4" x 14" timber
stringers and featured wood railings constructed of 6" x 6" posts and 4" x 6" rails braced to the
 flooring with 3" x 4" lumber.58 Waikoko Bridge was repaired by filling the collapsed end of the
bridge to a level grade and laying a new roadbed on the bridge. The original bridge still rests on
an angle, resulting in a quite unusual looking structure. Rocks were used to rebuild the sunken
eastern half of the parapet walls at some point after 1950. <sup>59</sup>
and an a second second second second second second
Natural disasters struck the Wainiha bridges on two occasions in 1957. On March 9, three tidal
waves struck Wainiha Valley, destroying the west span and small approach span of Wainiha
Bridge #3 as well as Wainiha Bridges #1 and #2. The only span that remained after the tidal
Wave was the east (Hanalei side) span or Walning #3. In December, flooding from Hurricane
ivina damaged wainina bridge #5 again, making it impassable to traffic until it was repaired.
55 Towitorial Highway Department Bridge Investory for the Island of Kousti 1050 Bridge Date
Sheet for Waikoko Bridge
<sup>56</sup> Kaua'i County Clerk Index File: Wainiba Bridge (and Waikoko Bridge) April 3, 1946
<sup>57</sup> Kaua'i County Clerk, Index File: Waining Bridge, April 17, 1946
<sup>58</sup> County of Kaua'i, Department of Public Works, plans for "Construction of Wainiba Bridge.
Wainiha Stream Crossing, Wainiha, District of Hanalei, April 1946."
<sup>59</sup> Territorial Highway Department, Bridge Inventory for the Island of Kaua'i, 1950. Bridge Data
Sheet for Waikoko Bridge.
<sup>60</sup> Corps of Engineers, <i>Flood Hazard Information</i> , 12.
<sup>61</sup> "Wainiha Bridge May Take Six Weeks for Repair Job, Cost Figured at \$20,000," Garden Island,
December 4, 1957.
22

NPS Form 10-900-aOMB No. 1024-0018 Hawal'i - Kaua'i Belt Road, Kaua'i County

United States Department of the Interior National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section \_7 Page \_15

Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u>

Narrative Description (continued)

Kaua'i Department of Public Works plans provided details regarding the replacement bridges erected after the March 1957 tsunami. The new bridges were constructed on existing concrete abutments and piers. The concrete pile bents from the 1946 Wainiha Bridge #1, however, were removed during the 1957 reconstruction. The standard design for each new structure used steel I-beams and 4" x 4" x 1/4" iron-L bracing forming an inverted truss. The bridges had 4" x 12" timber floor joists and 4" x 12" and/or 2" x 12" wood flooring. Each bridge featured 2" x 4" wood railings and "wheel guards" or curbs constructed of 4"-wide lumber. Bridges #2 and #3 were 8'-10" wide, and Bridge #1 was 8'-3" wide. Wainiha Bridge #2 was built on a skew. The Wainiha Bridge #3 plans revealed that the structure, while always referred to as having two spans, was a three-span bridge constructed on two concrete piers. The west pier was only 22' from the west abutment and supported the bridge approach from the Hā'ena side. This short span was also rebuilt in 1957. Several plans noted that the bridges built in 1957 were "temporary."<sup>62</sup>

#### **CULVERTS**

Numerous reinforced-concrete pipe culverts are located between Mile Marker 8.9 near Hā'ena Beach County Park and the end of the road at Mile Marker 10. Although unable to date the structures' construction, the culverts appear to be of historic significance. The structures are simple in construction and feature a small concrete headwall on both sides of the road (see photograph #20). In addition, several pipe culverts (near Mile Marker 1.3 and 1.4) along the Hanalei River feature headwalls constructed of rubble masonry (photograph #21).

<sup>62</sup> County of Kaua'i, Department of Public Works, "Location Map Showing Wainiha Stream Crossing, Wainiha, Hanalei, Kaua'i"; the following plans also illustrated the work completed at Wainiha: "Temporary Bridge No. 3B for Wainiha;" "Temporary Bridge No. 2 for Wainiha;" "Wainiha [#3], Hanalei Side;" "Wainiha Bridge No. 3C Hā'ena Side Approach;" "Dimension Diagram Bridge No. 1A & Bridge #2."

 NPS Form 10-000-20MB No. 1024-0018
Hawai'i - Kaua'i Belt Road, Kaua'i County
United States Department of the Interior National Park Service
NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET
Section <u>7</u> Page <u>16</u>
Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u>
Narrative Description (continued)
VISTAS and VIEWS
The Kaua'i Belt Road between Princeville and Hā'ena rewards motorists with a variety of scenic views throughout its course, including beaches, ocean, mountains, waterfalls, vernacular architecture, native and exotic vegetation, and traditional landscapes. Many of these views are unchanged since the 1920s when the road was completed.
Viewpoints and pullouts are scattered throughout the Kaua'i Belt Road corridor. Motorists can also stop at beaches to enjoy the views. Many of the pullouts are recent additions to the roadway, for example, the pullout on the hairpin curve descending from Princeville to the Hanalei Bridge that provides a view of Hanalei Bay and the North Shore. The most impressive view from the Kaua'i Belt Road between Princeville and Hā'ena is that from the Hanalei Valley Scenic Overlook, which is considered a contributing resource and located near Mile Marker 0. The overlook provides a stunning view of the Hanalei Valley approximately 160' below. Travelers have enjoyed this view throughout twentieth century. In 1912, Alonzo Gartley photographed the expansive Hanalei Valley from this point. Ray Jerome Baker photographed the valley in 1915.
The Kaua'i Belt Road along the island's north shore provides one of Hawai'i's finest opportunities to view traditional cultural landscapes. <i>Kalo lo'i</i> (taro patches) are visible in Hanalei Valley, Wainiha Valley, and near Hā'ena State Park. Each of the North Shore's river valleys has numerous <i>kalo lo'i</i> . Hanalei Valley, now a National Wildlife Refuge, is considered to be Hawai'i's major producer of <i>kalo</i> .
Native vegetation along the Kaua'i Belt Road includes hala, coconut, and naupaka. For the most part, the roadside vegetation is dominated by exotics, including the abundant ironwood trees.
24

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County
United States Department of the Interior National Park Service
NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET
Section _7 Page17
Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u>
Narrative Description (continued)
Alterations
In September 1966, the east span of Wainiha Bridge #3 collapsed. The 1918 truss bridge that survived two tidal waves and flooding had outlived its expected twenty to thirty year operational life. A new span was built using the same plan as the 1957 Wainiha bridges.
In 1967, the 1905 Lumaha'i Bridge fell into the river. The Hawaiian Dredging and Construction Company was already working on a new reinforced-concrete bridge a short distance upstream of the old bridge. The work had been underway for three months and was expected to take another seven months to complete. <sup>63</sup> The new eight-span Lumaha'i Bridge was super-elevated and built on a 60 degree skew. The two-lane structure was 535' long and 28' wide. Construction included a realignment of the bridge approaches, relocating the bridge and road away from the beach and on a wide curve. The new alignment replaced a sharp 45-degree turn on the west approach of the old bridge. <sup>64</sup> The massive new bridge was a sharp contrast to the small-scale early twentieth century bridges built on Kaua'i's North Shore. The road realignment appears to be the only change to the historic alignment since the Hanalei Grade replaced the switchbacks in 1913. A large abutment from the old Lumaha'i Bridge is on the beach east of the river.
In order to strengthen the aging Hanalei Bridge, a new steel Warren truss was added to the existing Pratt truss in 1967. Transverse floor beams were also added below the existing floor beams. Additional plates and welds were installed on the Hanalei Bridge in 1973. <sup>65</sup> In 1988 the Hanalei Bridge was restored, which included strengthening the Warren trusses and adjusting the Pratt trusses; cleaning and painting the structural steel; replacing the timber deck and stringers; installing reinforcing plates and angles; and adjusting the tensioning rods under the floor beams. <sup>66</sup>
<ul> <li><sup>64</sup> "Old bridge collapses at Hanalei," <i>Honolulu Star-Bulletin</i>, October 20, 1967.</li> <li><sup>64</sup> State of Hawai'i, Department of Transportation, plans for "Lumaha'i Bridge," 1967.</li> <li><sup>65</sup> State Department of Transportation, "Kaua'i Belt Road Kalihiwai to Hā'ena: Preliminary Case Report, Hanalei, Wai'oli &amp; Waipā Bridges," 2-3.</li> <li><sup>66</sup> State of Hawai'i, Department of Transportation, "As-Built" Plans for Kūhiō Highway Rehabilitation of the Hanalei Bridge, Project No. 56D-01-87M, 1988.</li> </ul>
25

NPS Form 10-900-aOMB No. 1024-0018
Hawai'i - Kaua'i Belt Road, Kaua'i County
United States Department of the Interior National Park Service
NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET
Section7 Page18
Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u>
Narrative Description (continued)
In the early 1980s, Hā'ena Bridge #2 was substantially modified when the existing concrete parapets were removed and w-beam guardrails and rub rails were installed to serve as bridge walls. The abutments were rebuilt and at some point a new concrete flat slab was added. The bridge retains no historic integrity and is considered a non-contributing structure. Other minor alterations on the Kaua'i Belt Road over the years include the addition of left-turn lanes and curbs in Hanalei. Near Princeville, the road is wider and has shoulders. Reflectors have been added in many areas along the road.
With the exception of the 1968 Lumaha'i Bridge and the rebuilt Hā'ena Bridge #2, the Kaua'i Belt Road from Princeville to Hā'ena maintains a great measure of historic integrity. The remaining bridges are unaltered. Although most historic bridges in Hawai'i have been altered with the addition of w-beam guardrail approaches, the bridges on Kaua'i's North Shore have not been marred by guardrails. The road's construction materials have changed over the decades, with the original roadbed being dirt. Sections of the road near Hanalei were first paved with macadam circa 1916. In recent decades the road was repaved with asphalt. Although the road itself no longer features original construction materials, other aspects of the route, especially the original alignment, location, rural coastal setting, and narrow width are important features that contribute to the road's integrity as a historic site. For most of the length of the road, there are no guardrails. A few concrete-post and timber-beam guardrails remain, most notably at the Hanalei Valley Scenic Overlook and near Mile Marker 5.6. The road also retains many historic lava-rock walls built to protect motorists along the road's precipitous drop-offs. Many of these rock walls have been undermined by collapsing soil or through the additional layers of asphalt that reduce the wall height. In early 2002, the state DOT installed w-beam guardrails in a few areas. In several locations, several grated drop inlets and concrete gutters have also been installed
26

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County
United States Department of the Interior National Park Service
NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET
Section <u>7</u> Page <u>19</u>
Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u>
Narrative Description (continued)
Inventory of Contributing and Non-contributing Overlooks, Bridges, and Significant Culverts Listed in geographical order west from Mile Marker 0 at Princeville:
<i>Kaua'i Belt Road, Princeville to Hā'ena, Mile Marker 0 - 10.</i> A contributing site, the road maintains historic integrity in its original location and alignment, rural coastal setting and feeling. The road is still narrow in many locations and has no shoulder (except near Princeville.)
<i>Hanalei Valley Scenic Overlook:</i> A contributing site, the Hanalei Valley Scenic Overlook has been an established viewpoint since at least the early twentieth century. In 1912, Alonzo Gartley photographed Hanalei Valley from this point. Ray Jerome Baker photographed from this site in 1915. The site features timber guardrails.
Hanalei Bridge. built 1912, steel through truss (Pratt truss); timber deck and stringers; reinforced concrete abutments; one span; 106'; total bridge length 113'; bridge width 17'; minimum overhead clearance 15'. Designer: Pratt truss by Hamilton and Chambers, New York. Altered: Warren truss added to original Pratt truss in 1967. Restored 1989. Determined eligible for the National Register in 1978.
<i>Culvert #1</i> : concrete-frame with solid concrete parapet; one span 10'; total length 15'; culvert width 28'. (Located near Mile Marker 2.0.)
<i>Culvert #2</i> : flat-slab concrete on CRM abutments, solid concrete parapet with square concrete rail cap; one span 15'; total length 17'; culvert width 23'. (Located near Mile Marker 2.4.)
<i>Culvert #3.</i> concrete-frame with solid concrete parapet; one span, 12'; total length 17'; culvert width 30'. (Located near Mile Marker 2.6.)
<i>Wai'oli Bridge</i> : built 1912; concrete flat slab; solid concrete parapet with square concrete rail cap; three spans, 28'; total length 90'; bridge width 13'. Designer: J. H. Moragne, County Engineer. Builder: George W. Mahikoa. Determined eligible for the National Register in 1978.
27

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section7 Page20 Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i Narrative Description (continued) Waipā Bridge: built 1912; concrete flat slab; three spans, 16'; total length 45'; bridge width 13'. Designer: J. H. Moragne, County Engineer. Builder: George R. Ewart, Jr. Extension bridge: built circa 1925; concrete flat slab; five spans, 16'; total extension length 90'; bridge width 16'.
NP5 Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section7 Page20 Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i Narrative Description (continued) Waipā Bridge: built 1912; concrete flat slab; three spans, 16'; total length 45'; bridge width 13'. Designer: J. H. Moragne, County Engineer. Builder: George R. Ewart, Jr. Extension bridge: built circa 1925; concrete flat slab; five spans, 16'; total length 90'; bridge width 16'. Reth bridge methods and the spans, 16'; total length 90'; bridge width 16'.
United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section7 Page20 Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u> Narrative Description (continued) <i>Waipā Bridge</i> : built 1912; concrete flat slab; three spans, 16'; total length 45'; bridge width 13'. Designer: J. H. Moragne, County Engineer. Builder: George R. Ewart, Jr. Extension bridge: built circa 1925; concrete flat slab; five spans, 16'; total extension length 90'; bridge width 16'.
NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section7 Page20 Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u> Narrative Description (continued) <i>Waipā Bridge</i> : built 1912; concrete flat slab; three spans, 16'; total length 45'; bridge width 13'. Designer: J. H. Moragne, County Engineer. Builder: George R. Ewart, Jr. Extension bridge: built circa 1925; concrete flat slab; five spans, 16'; total extension length 90'; bridge width 16'. Beth bridge county Engineer. Builder: George R. Ewart, Jr. Extension bridge: built circa 1925; concrete flat slab; five spans, 16'; total extension length 90'; bridge width 16'.
Section <u>7</u> Page <u>20</u> Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u> Narrative Description (continued) <i>Waipā Bridge</i> : built 1912; concrete flat slab; three spans, 16'; total length 45'; bridge width 13'. Designer: J. H. Moragne, County Engineer. Builder: George R. Ewart, Jr. Extension bridge: built circa 1925; concrete flat slab; five spans, 16'; total extension length 90'; bridge width 16'.
Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u> Narrative Description (continued) <i>Waipā Bridge</i> : built 1912; concrete flat slab; three spans, 16'; total length 45'; bridge width 13'. Designer: J. H. Moragne, County Engineer. Builder: George R. Ewart, Jr. Extension bridge: built circa 1925; concrete flat slab; five spans, 16'; total extension length 90'; bridge width 16'.
Narrative Description (continued) <i>Waipā Bridge</i> . built 1912; concrete flat slab; three spans, 16'; total length 45'; bridge width 13'. Designer: J. H. Moragne, County Engineer. Builder: George R. Ewart, Jr. Extension bridge: built circa 1925; concrete flat slab; five spans, 16'; total extension length 90'; bridge width 16'.
both bridge parapets are solid concrete with rail caps. Bridges are different widths and parapets are different heights. Determined eligible for the National Register in 1978.
<i>Waikoko Bridge</i> . built 1912; concrete flat slab; solid concrete parapet with rail cap; one span, 43'; total length 45'; bridge width 13'. Designer: J. H. Moragne, County Engineer. Builder: George W. Mahikoa. East abutment undermined in 1946 tidal wave; parapets rebuilt with lava rock.
Lumaha i Bridge: built 1967, two lanes, eight spans.
<i>Wainiha Bridge #1:</i> built 1957 on existing reinforced concrete abutments (1946); steel truss with timber deck; timber railings; one span, 39'; total length 42'; bridge width approximately 11'.
<i>Wainiha Bridge #2</i> : built 1957 on existing reinforced concrete abutments (circa 1922-1930); steel truss with timber deck; timber railings; one span, 74'; total length 78'; bridge width approx. 10'.
<i>Wainiha Bridge #3</i> : west span built 1957, east span built 1966; reinforced concrete abutments built 1918; steel truss with timber deck; timber railings; two spans, 73'; total length 146'; bridge width approximately 11'.
<i>Hāʿena Bridge #1</i> : built 1926; concrete frame; concrete parapet with rail cap; one span, 11'; total length 22'; bridge width 18'. Designer: R. L. Garlinghouse, County Engineer. Contractor: George W. Mahikoa. Bridge has settled to one side and rests at a slight angle.
<i>Hāʿena Bridge #2</i> : built 1926. Lost historic integrity in early 1980s when concrete parapets were removed and w-beam guardrails and rubrails were installed as bridge walls.
<i>Mānoa Ford</i> : construction probably dates to circa 1928 when "Hā'ena Extension" road was built. Ford width approximately 18'.
<i>Limahuli Culvert</i> : construction probably dates to circa 1928 when "Hā'ena Extension" road was built. Flat slab on CRM pier and abutments. Culvert width is 16'-8". No parapets.
28

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section 8 Page 1 Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i Narrative Statement of Significance (Explain the significance of the property on one or more continuation sheets.) The Kaua'i Belt Road achieves state and local significance in the areas of engineering, transportation, and social history under criteria A and C. The construction of bridges and a road from 1900 to 1957 was a major transportation achievement, as the County of Kaua'i and private contractors improved an old trail/road system and built bridges to span the North Shore's wide rivers. Thirteen bridges and culverts built between 1912 and 1957 remain along the route as an example of bridge engineering and construction in Hawai'i during the early twentieth century. The completion of an automobile route to Hā ena circa 1928 provided modern, convenient transportation to the North Shore and its scenic and natural features. The road connected north shore residents with the rest of Kaua'i and provided an overland transportation for agricultural enterprises. The Kaua'i Belt Road is the only remaining intact example of the old belt road system on the island of Kaua'i. The Kaua'i Belt Road from Princeville to Hā'ena retains historic integrity in its original road alignment, narrow lanes, bridges, and spectacular setting along Kaua'i's north coast. Engineering Several segments of the north shore section of the Kaua'i Belt Road were impressive engineering feats for early twentieth-century Hawai'i. Although there was an existing trail over the ridges that separated the river valleys, improved roads across those ridges had to be blasted out of the mountainsides. One of the most notable construction projects was the "Hanalei Grade" or "Hanalei Hill," built in 1912 and 1913. The Hanalei Grade was one of the Kaua'i Loan Fund Commission's earliest projects, reflecting the commission's efforts to eliminate sharp curves and steep grades on the island's belt road. The "Hanalei Grade" replaced the steep switchbacks that descended the Hanalei Hill from Princeville to the Hanalei Bridge. This type of road improvement transformed old carriageways into roads that could be easily negotiated by the automobiles that were introduced to the islands in the early 1900s. Although maps to confirm the 1913 realignment of the road descending Hanalei Hill have not been located, there is no physical evidence of other nearby road alignments, indicating that the road alignment descending to the Hanalei Bridge from Princeville dates to 1913. (The old switchback road is still evident.) Building this section of road from 1911 to 1913 was not an easy task. Only one

29

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section 8 Page 2 Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i Narrative Statement of Significance (continued) contractor, George Mahikoa, bid on the project. The work was dangerous, and one worker almost died when he was buried in an excavated section that had collapsed.<sup>67</sup> The majority of bridges on Kaua'i's North Shore were built using construction methods and materials typical in Hawai'i during the early twentieth century. The steel bridges at Lumaha'i and Hanalei reflected a popular technology at the end of the nineteenth century and early twentieth century. Numerous steel bridges were built throughout the Hawaiian Islands, as builders favored the material's strength over long spans. Today, only a handful of steel bridges remain in the Hawaiian Islands, including the Hanalei Bridge, which is one of two remaining Pratt-truss structures in the state. The Hanalei Bridge is a quite unusual structure because of the addition of a Warren truss in 1967. One bridge engineer deemed the added truss as an "ingenious solution" for strengthening the bridge.68 By the 1910s, reinforced concrete became the favored construction material for bridges in Hawai'i due to the corrosive nature of the Pacific Ocean's salt air and the presence of wood-boring insects that made the use of steel and timber bridges less practical in Hawai'i than in the mainland United States. Engineers and the Loan Fund Commissions observed that although concrete was more expensive to build, the increased cost was justified due to concrete's durability as well as lower maintenance and repair costs. Three north shore bridges built in 1912, Wai'oli, Waipā, and Waikoko, were flat-slab reinforced concrete construction. Designed by the County Engineer J. H. Moragne and built by local contractors, these bridges were simple in appearance, but functional. The bridges are a fine representation of engineering technology and design in the early twentieth century. The use of reinforced concrete indicated that the Territory of Hawai'i and the County of Kaua'i were committed to building permanent public works improvements. The Wainiha Bridges (#1, #2, and #3) are unique in Hawai'i. Designed to be built quickly and inexpensively, the bridges were an expedient response to the destructive 1957 tidal wave that

stranded residents on the west side of the Wainiha River. The county Department of Public

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

<sup>&</sup>lt;sup>67</sup> "Hanalei Road-Hand Buried Under Cave-In," *Garden Island*, September 5, 1911.

<sup>&</sup>lt;sup>68</sup> Jan TenBruggencate, "This Bridge Breathes," Garden Island, April 22, 1986.

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section <u>8</u> Page <u>3</u> Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i Narrative Statement of Significance (continued) Works wasted no time designing new bridges to reconnect the north shore communities, and plans were ready within weeks. The designers used materials that were readily available and had been traditionally used on Kaua'i: steel I- beams, 12" lumber for decks, and 2" x 4"s for railings. Almost fifty years later, the bridges are an important feature of the North Shore's rural landscape and an integral part of its historic belt road.

Talented local engineers were responsible for the design and construction of the belt road and its bridges. The *Garden Island* newspaper credited County Engineer J. H. Moragne with designing and building the Kaua'i Belt Road. Moragne was a road supervisor in 1911 when the Kaua'i Loan Fund Commission appointed him to the position of County Engineer. He had a civil engineering degree from Auburn Technical Institute and came to Hawai'i in 1898. Although his major accomplishment as a public employee was the completion of the Kaua'i Belt Road, Moragne was also associated with numerous other engineering projects on Kaua'i. He had considerable experience as a plantation engineer, designing and building irrigation systems, tunnels, bridges, and reservoirs. He also designed and installed the water-collection system for the Wainiha Power Plant.<sup>69</sup> Little is known about Moragne's successor, R. L. Garlinghouse. His name appears on numerous 1920s bridge plans for the island of Kaua'i, including the concrete-frame Ha'ena Bridges #1 and #2, built in 1926.

#### Transportation, Commerce, and Social History

Belt road projects were a significant element in the transportation history of the Hawaiian Islands. The roads served to connect isolated communities to their island's economic, political, and social centers. Kaua'i congratulated itself on being the first island to achieve the completion of its belt road system. Although its belt road only stretched between Wahiawa and Wainiha by 1917, not Mānā to Hā'ena as expected, Kaua'i boasted that no other island had achieved such an accomplishment. By the late 1920s, the road was extended and improved to Hā'ena. Jealousy from other islands was apparent, with one Maui legislator complaining that Maui was "the only

<sup>69</sup> Carol Wilcox, Sugar Water: Hawai'i's Plantation Ditches. (Honolulu: University of Hawai'i Press, 1996), 70.

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County United States Department of the Interior National Park Service NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET Section 8 Page 4 Name of property Kaua'i Belt Road County and State Kaua'i County, Hawai'i Narrative Statement of Significance (continued) island on which you cannot traverse by road around it."70 Although Maui's belt road to Hana was opened in 1926, the entire belt road around east Maui was not completed until the 1950s. Like Kaua'i, the island of Hawai'i, due to its rugged topography, never achieved a belt road that completely encircled the island. The completion of the belt road along Kaua'i's North Shore was a significant achievement for area residents. One Hanalei citizen reported that the road between Wainiha and Kalihiwai was in good condition, which was valuable because the weekly steamer no longer served the area. The belt road was essential for local merchants who had to haul their goods to Hanalei.<sup>71</sup> The Kaua'i Belt Road was a testament to civic pride on Kaua'i during the early twentieth century. Although the road did not cover as much territory as Supervisor Menefoglio had envisioned, civic pride in Kaua'i's belt road achievement was abundant. The Garden Island bragged that Kaua'i would "have the finest road system on the Islands" and "a blessing that no other island enjoys." The writer expected the other islands would try to belittle Kaua'i's accomplishment by pointing out that the island was small and the belt road went only halfway around it. He was not discouraged, however, pointing out, "We've got our road and are enjoying it . . . we would advise you to put your energy in your own roads."<sup>72</sup> Kaua'i was making tremendous progress even if its belt road did not completely encircle the island. The island began macadamizing its roads in 1906, and by 1917 planned to have all the main roads paved.<sup>73</sup> It also adopted a policy of oiling all macadamized roads "in the interest of travel comfort" and to improve the life of the roads. Parapet rock walls were built to protect drivers along more dangerous areas.<sup>74</sup> <sup>70</sup> "Roads First Need View of Fassoth," *The Maui News*, February 11, 1921. <sup>71</sup> "Hanalei Notes," *Garden Island,* May 20, 1919.

<sup>72</sup> "A Happy Day In Sight," *Garden Island,* July 10, 1917.

32

<sup>74</sup> "Road Progress," Garden Island, July 24, 1917.

<sup>&</sup>lt;sup>73</sup> "Road Maintenance on Kaua'i," *Garden Island*, September 25, 1917. In contrast to Kaua'i's early paving achievements, Maui's Belt Road to Hāna was completed in 1926 but not completely paved until the 1960s.

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County

United States Department of the Interior National Park Service

NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET

Section 8 Page 5

 Name of property Kaua'i Belt Road

 County and State
 Kaua'i County, Hawai'i

Narrative Statement of Significance (continued)

Kaua'i residents enthusiastically noted that their roads were the best in the Territory of Hawai'i. Most of the road between Lthu'e and Waimea was supposedly as "smooth as a parlor floor." A *Garden Island* writer noted that elsewhere in Hawai'i, particularly on the Big Island, the roads were so rough and rocky that automobile tires were worn out every few hundred miles. He mentioned a car that recently drove around the Big Island and consumed eight new tires in the process. The writer observed, "It pays to construct the best and most durable roads that can be made... Kaua'i is prety [sic] well up to date."<sup>75</sup> Some considered good roads a community's most valuable asset, especially on Kaua'i where a variety of scenic roads appealed to tourists.<sup>76</sup> With the belt road completed, a 1918 Hawai'i Tourist Bureau guide to Kaua'i was already promoting activities in the Hanalei area, including "splendid sea bathing," driving and riding trips to the surf at Lumaha'i Beach, the interesting caves at Ha'ena, and even the Wainiha Power House. During the summer, a trip by outrigger canoe was "guaranteed to thrill even the most unimaginative."<sup>77</sup>

Today, a trip along the north shore section of the Kaua'i Belt Road provides an opportunity for motorists to view much of what excursionists would have seen in the late 1920s. The road provides spectacular scenery, with views of Kaua'i's natural beauty: beaches, ocean, and verdant mountains. It provides access to the same activities that attracted tourists in 1918, including beaches, kayaking/canoeing, and the caves at Hā'ena. The rural thoroughfare also affords an important glimpse into Hawai'i's past. Motorists passing through Hanalei may visit the Wai'oli Mission Historic District, which dates to the mid-nineteenth century missionary era. Driving the Kaua'i Belt Road corridor provides a look into Hawai'i's ancient past, as motorists view the *kalo lo'i* and traditional cultural landscapes. The Kaua'i Belt Road along the north shore, with its curvilinear alignment that gently follows the topography, continues to provide motorists a pleasing, scenic journey much as it did in the early twentieth century.

33

AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

<sup>75 &</sup>quot;Kaua'i's Good Roads, Garden Island, January 15, 1918.

<sup>&</sup>lt;sup>76</sup> "Kaua'i Has the Best Roads in the Territory," *Garden Island*, June 18, 1918.

<sup>&</sup>lt;sup>77</sup> H. E. Newton. Kaua'i, Hawaiian Islands. ([Honolulu]: Hawai'i Tourist Bureau, 1919).

	NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County
	United States Department of the Interior National Park Service
	NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET
	Section _9 Page1
	Name of property <u>Kaua'i Belt Road</u> County and State <u>Kaua'i County, Hawai'i</u>
	Major Bibliographical References
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AISR for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: [4] 5 (por.), 6 (por.), 7 (por.), and 8 (por.)

NPS Form 10-900-aOMB No. 1024-0018 Hawai'i - Kaua'i Belt Road, Kaua'i County
United States Department of the Interior National Park Service
NATIONAL REGISTER OF HISTORIC PLACES CONTINUATION SHEET
Section _9 Page2
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35

	<ol> <li>Kaua'i Belt Road (North Shore section)</li> <li>Kaua'i County, Hawai'i</li> <li>Dawn E. Duensing</li> <li>February 9, 2002</li> </ol>
	<ol> <li>Dawn E. Duehsing</li> <li>Hanalei Bridge, view looking east</li> <li>Photograph #1</li> <li>March 27, 2002</li> <li>Culvert #1, view looking mauka (towards the mountains)</li> </ol>
	<ol> <li>Photograph #2</li> <li>March 27, 2002</li> <li>Culvert #2, view looking mauka</li> <li>Photograph #3</li> </ol>
i A	<ol> <li>March 27, 2002</li> <li>Culvert #3, view looking makai (towards the ocean)</li> <li>Photograph #4</li> </ol>
1	<ol> <li>February 9, 2002</li> <li>Wai'oli Bridge, view looking makai (toward the ocean)</li> <li>Photograph #5</li> </ol>
	<ol> <li>February 9, 2002</li> <li>Waipā Bridge, view looking west</li> <li>Photograph #6</li> </ol>
	<ol> <li>February 9, 2002</li> <li>Waikoko Bridge, view looking mauka (toward the mountains)</li> <li>Photograph #7</li> </ol>

NPS I	Form 10-900-aOMB No. 1024-0018	
Hawa	aiʻi - Kauaʻi Belt Road, Kauaʻi County	
Unite	ed States Department of the Interior	
Natio	onal Park Service	
NAT CON	TIONAL REGISTER OF HISTORIC PLACES	
Secti	ion Additional Documentation: Photographs Page _2	
Name	e of property Kaua'i Belt Road	
Cour	nty and State Kaua'i County, Hawai'i	
Α	October 15, 2001	
<del>4</del> . 6.	Wainiha Bridge #1, view looking west	
7.	Photograph #8	
4.	October 15, 2001 Wainiba Brideo #2, view looking east/makai	
7.	Photograph #9	
	0 1	
4.	October 15, 2001	
6.	Wainiha Bridge #3, view looking makai	
γ.	Photograph #10	
4.	October 15, 2001	
6.	Hā'ena Bridge #2, view looking mauka	
7.	Photograph #11	
4	February 9, 2002	
6.	Mānoa Ford, view looking east	
7.	Photograph #12	
4.	March 27, 2002	
6. 7	Limanuli Cuivert, view looking mauka Photograph #13	
/.	110/05/05/1 #10	
4.	February 9, 2002	
6.	road along Hanalei Bay, view looking west at Waikoko Bridge	
7.	Photograph #14	
4.	March 27, 2002	
6.	Hanalei Valley scenic overlook with historic timber guardrails, view looking mauka	
7.	Photograph #15	i.
	×	
	27	
	37	
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Section	Additional Documentation: Photographs Page 3
Name o	f property Kaua'i Belt Road
County	and State <u>Kaua'i County, Hawai'i</u>
4.	October 15, 2001
6.	serpentine road with lava rock parapets, vicinity Mile Marker 6, view looking east
7.	Photograph #16
4.	October 15, 2001
6.	pullout, historic timber guardrails, vicinity Mile Marker 5.2, looking west
7.	Photograph #17
4.	October 15, 2001
6.	serpentine road descending to beach, vicinity Mile Marker 4.5, native hala trees alongside
	road: looking east towards Waikoko Beach
7.	Photograph #18
4	February 9, 2002
6	rod ascending mountain ridge west of Waikoko Bridge view looking west
0. 7	Photomark #10
1.	i notograpit #12
4	Ortober 15, 2001
<b>1</b> .	COUNCE 10, 2001
0.	typical concrete culvert and headwall located in Halena area, this culvert near Mile
_	Marker 9.
7.	Photograph #20
4.	March 27, 2002
6.	CRM headwall, one of two located along Hanalei River near Mile Marker 1.3.
7.	Photograph #21
	20
	30

# **Appendix E Historic Bridge District, Kaua'i Belt Road Map** (North Shore Section) (Fung Associates 2103:3-13)



Figure 106. Historic Bridge District, Kaua'i Belt Road Map (North Shore Section) (Fung Associates 2013:3-13)

Appendix F Final Cultural Impact Assessment for the Wainiha Bridges Project

## FINAL

# Cultural Impact Assessment for the Wainiha Bridge Route 560 Kūhiō Highway Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a, Halele'a District, Kaua'i TMKs: Multiple

**Prepared for** 

### **CH2M HILL**

And on behalf of the

Federal Highway Administration (FHWA) Central Federal Lands Highway Division (CFLHD)

> Prepared by S. Māhealani Liborio, B.A., Nicole Ishihara, B.A., Victoria S. Creed, Ph.D., and Hallett H. Hammatt, Ph.D.

Cultural Surveys Hawai'i, Inc. Kailua, Hawai'i (Job Code: WAINIHA 10)

### March 2016

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# **Management Summary**

Reference	Cultural Impact Assessment for the Wainiha Bridge Route 560 Kūhiō Highway Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a, Halele'a District, Kaua'i, TMKs: Multiple (Liborio et al. 2016)	
Date	March 2016	
Job Code	Cultural Surveys Hawai'i, Inc. (CSH) Job Code: WAINIHA 10	
Agencies	Federal Highway Administration/Central Federal Lands Highway Division (FHWA/CFLHD), State Historic Preservation Division (SHPD)	
Land Jurisdiction	State Department of Transportation (HDOT); Private; and Public	
Project Proponent	FHWA/CFLHD, HDOT	
Project Funding	FHWA/CFLHD	
Project Location	The project areas encompasses the three Wainiha Bridges (Bridges 1, 2, and 3) and the surrounding areas of the bridges, which includes portions of Kūhiō Highway, public lands, and private lands. Also included as part of the proposed project are three one-lane bridges along Kūhiō Highway that access the project site (Wainiha Bridges) located at Wai'oli, Waipā, and Waikoko streams in the event temporary structures may be needed to accommodate loads during construction and two potential staging areas in Lumaha'i Ahupua'a. The project areas exist within the following TMKs: Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.; Waikoko Bridge: [4] 5-6-003:002, [4] 5-6-004:023, 999 por.; Wainiha Bridge 1: [4] 5-8-002:002 por., [4] 5-8-006:021, 022, 031, 032, 033, 034, 035, 037, 045, 046, 060, and 999 por.; Wainiha Bridges 2 and 3: [4] 5-8-006:009, 011, 017, 018, 019, 025, 030, 999 por., [4] 5-8-007:023, 024, 031, 032, 999 por.; Wai'oli Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por., [4] 5-5-006:014, 888 por., [4] 5-6-002:002, 003, 004, 999 por.; Waipā Bridge: [4] 5-6-004:014, 022, 023, 999 por.	
Project Description	The FHWA and the HDOT propose the replacement of three temporary pre-fabricated (ACROW) bridges on Kūhiō Highway (Route 560) on the north side of the island of Kaua'i. The bridges are located between mile posts 6.4 and 6.7 near the mouth of Wainiha Stream before it feeds into Wainiha Bay. The original bridges at these three locations were replaced with temporary ACROW bridges after Bridge 2 suffered permanent damage and Bridges 1 (the southernmost bridge) and 3 (the northernmost bridge) were determined to be structurally deficient. The ACROW bridges were installed as a temporary measure to keep the roadway open to residents and public traffic until environmental clearance and funding for the permanent structures could be secured.	

	The three bridges are owned and maintained by HDOT. FHWA and HDOT propose the replacement of the temporary ACROW bridges with new one-lane bridges that closely match the existing alignment. Also included as part of the proposed project is the placement of temporary one-lane bridges adjacent to or crossing over three historic one-lane bridges along Kūhiō Highway that access the project site (Wainiha Bridges), located at Wai'oli, Waipā, and Waikoko streams. These historic bridges have low load capacities and temporary bridges would allow construction loads to access the Wainiha project site without affecting the historic integrity of these bridges. The existing temporary ACROW bridges at the Wainiha project site would be shifted <i>makai</i> (toward the ocean) to accommodate traffic during construction of the new bridges. All temporary bridges would be removed upon completion of the project. Two potential staging areas in Lumaha'i Ahupua'a are also included in the area of potential effects (APE). Staging also may occur at each bridge location.
Project Acreage	Project acreage includes Potential Staging Area 1: 0.12 hectares (0.296 acres), Potential Staging Area 2: 0.09 hectares (0.221 acres), Wainiha Stream Bridge 1: 0.64 hectares (1.603 acres), Wainiha Stream Bridges 2 and 3: 1.40 hectares (3.466 acres), Wai'oli Stream Bridge: 0.51 hectares (1.256 acres), and Waipā Stream Bridge: 0.59 hectares (1.449 acres) for a total of 3.36 hectares (8.30 acres).
Document Purpose	This cultural impact assessment (CIA) was prepared to comply with the State of Hawai'i's environmental review process under Hawai'i Revised Statutes (HRS) §343, which requires consideration of the proposed project's potential effect on cultural beliefs, practices, and resources. Through document research and cultural consultation efforts, this report provides information compiled to date pertinent to the assessment of the proposed project's potential impacts to cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control's <i>Guidelines for Assessing Cultural Impacts</i> ) which may include traditional cultural properties (TCPs). These TCPs may be significant historic properties under State of Hawai'i significance criterion "e," pursuant to Hawai'i Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance criterion "e" refers to historic properties that "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 being important to the group's history and cultural identity" (HAR §13-275-6 and §13-284-6). The document will likely also support the project's historic preservation and environmental review under HRS §6E-8 and HAR §13-275 and §13-284.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Results of	Background for this project yielded the following results (presented in	
Background	approximate chronological order):	
Research	<ol> <li>Ka 'ao (fictional story) and mo 'olelo (narrative about a historical figure) throughout Halele'a Moku correlate and validate cultural practices of the area. In the tale of <i>Hi</i> 'iakaikapolipole and Malaeha 'akoa, Hi'iaka comes across the fisherman, Malaeha 'akoa. The moku (district) of Halele'a is known for its aquacultural resources such as fishing. The story validates the abundance of resources in the area then and now. It was Malaeha 'akoa who also notified Hi'iaka of her sister's (Pele, the fire goddess) lover's (Lobiau from Hā'ena Abunua'a) death</li> </ol>	
	<ol> <li>The ahupua 'a (land division spanning from the mountain to the sea) of Lumaha'i and Wainiha were known for their tales of the menehune, a legendary race of small people who were responsible for the construction of building fishponds, roads, and heiau (pre-Christian place of worship) in the evenings. Some say the menehune and the mū (legendary people of Lā'au-haela-mai, Kaua'i) were the original inhabitants of Kaua'i until they were driven to the mauka (upland) sections of the island by the arrival of Hawaiians.</li> </ol>	
	<ol> <li>A census in Wainiha Ahupua'a during the time of Kaumuali'i listed 65 men of Lā'au as <i>menehune</i>. The census also listed the following villages to be inhabited by <i>menehune</i>: Naue, Pā'ie'ie, Maunaloa, Pali'ele'ele, Maunahina, Pōhakuloa, Opaikea, Hōmaikalani, and Lā'au.</li> </ol>	
	<ul> <li>4. According to Land Comission Award (LCA) documentation, the <i>moku</i> was heavily farmed in taro <i>lo 'i</i> (irrigated terrace). Wai'oli Ahupua'a yielded 154 <i>lo 'i</i> along the Wai'oli Stream. <i>Kula</i> (plain) lands were planted in sweet potatoes, yams, bananas, and sugarcane. Several claims included fishponds. Data taken concludes that the area was very productive agriculturally.</li> <li>5. A number of burials have been found throughout the Halele'a Moku coastline. State Inventory of Historic Properties (SIHP) # 50-30-03-1982 yielded three burials (McMahon 1995a, b); SIHP # -1988, consisted of three burials and five isolated human remains (Masterson et al. 1997); SIHP # -355 yielded two burials and isolated skeletal remains (Sullivan and Dega 2003); SIHP # 361, did not yield human remains, but a cultural layer which contained pre- and post-Contact artifacts (Chafee and Dega 2005). However, cultural layers have been known to also yield human remains. In 1992, SIHP # -1878 yielded 31 pre-Contact burials along with cultural deposits with fire pits, postholes, and an <i>imu</i> (underground oven) (Spear 1992). In</li> </ul>	

	<ul> <li>along with a cultural layer containing ash, fire-cracked rock, charcoal, stone and coral tools, and partial remains of a pig (SIHP # 1837) (Monahan 2003).</li> <li>6. Rice farming began in the mid-1860s and ended in the 1920s when California rice began to take over the market. Hanalei Valley led the Hawaiian rice market in most acreage planted in rice.</li> </ul>
Results of Community Consultation	<ul> <li>CSH attempted to contact Native Hawaiian Organizations (NHOs), agencies, and community members. Consutlation was received from the following community members:</li> <li>1. Mike Ching, Hanalei business owner and <i>kama 'āina</i> (nativeborn)</li> <li>2. Alan Fayé, Princeville Community Association</li> <li>3. David Helder, resident of Wainiha</li> <li>4. Julian Helder, resident of Wainiha</li> <li>5. Samson Mahuiki, President of the Waipā Foundation</li> <li>6. Barbara Robeson, long-time resident of Wainiha</li> <li>7. Jonathan Wichman, <i>kama 'āina</i> of Halele'a Moku</li> </ul>
Impacts and Recommendations	<ul> <li>Based on information gathered from the cultural and historic background, the proposed project may potentially impact Native Hawaiian burials and subsurface cultural layers. CSH identifies these potential impacts and makes the following recommendations: <ol> <li>There is a very high possibility of <i>iwi kūpuna</i>, or ancestral bones, that may be present based on previous cultural, historical, and archaeological research that was conducted as well as via community consultations. The community has voiced knowledge of burials being found on the beaches and dune lands. Some of the currently proposed project areas are situated on soils classified as Beaches, a preferred sediment for the interment of the dead. Land disturbing activities during construction may uncovered presently undetected burials and/or other cultural finds.</li> </ol> </li> <li>Personnel involved in the construction activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. Should burials (or other cultural finds) be identified during ground disturbance, the construction contractor should immediately cease all work and the appropriate agencies be notified pursuant to applicable law, HRS 86E</li> </ul>

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

# **Table of Contents**

Management Summary	i
Section 1 Introduction	
1.1 Project Background	
1.2 Document Purpose	
1.3 Scope of Work	
1.4 Environmental Setting	
1.4.1 Vegetation	
1.4.2 Soils	
1.4.1 <i>Makani</i> (Prevailing Winds)	
1.4.2 Ua (Precipitation)	
1.4.5 Sull 1.4.4 Built Environment	
Section 2 Methods	
2.1. Archivel Descent	20
2.1 Archival Research	
2.2 Community Consultation	
2.2.1 Scoping for Participants	
2.2.2 Tark Story Sessions	
Section 3 Ka'ao (Legends) and Mo'olelo (Stories)	
3 1 Ka'ao	30
3.1.1 Legend of Paka'a – Halele'a	30
3.1.2 Legend of the Kamapua'a Family	
3.1.3 Hi iakaikapoliopele and Malaeha akoa	
3.1.4 Pele, Hi'iakaikapoliopele, and Malaeha'akoa	
3.2 Moʻolelo	
3.2.1 Ka-nē-loa Seeks a Bride and the Kapa of Wai'oli	
3.2.2 Lonoikamakahiki	
3.2.3 Damming of the Waters of Waipā	
3.2.4 °Olohe	
3.2.5 <i>Mo olelo</i> about the <i>Menehune</i>	
3.2.0 <i>M0 0</i> Accounts	
3.3.1 The Bird Man	40
3 3 2 Kalauhe'e	40
3.3.3 Ka'umaka (Kaūmaka)	
3.4 Other Cultural References	
3.4.1 Rain Names of Wai'oli	
3.4.2 Wind Names of Wai'oli	
3.4.3 Winds of Lumaha'i	
3.4.4 Terms of the Mauka Regions	
3.5 'Ōlelo No 'eau	
3.5.1 <i>'Olelo No 'eau</i> of Wai'oli Ahupua'a	
3.5.2 <i>Olelo No 'eau</i> of Waipā Ahupua'a	
3.5.3 'Olelo No'eau of Lumaha'i Ahupua'a	

3.5.4 ' <i>Ōlelo No 'eau</i> of Hanalei Ahupua'a	
3.6 Mele Oli	
3.6.1 <i>He Oli</i>	
3.6.2 Waipā	
3.7 Mele	
3.7.1 Lumahaʻi	
3.7.2 Nāmolokama	
Section 4 Historical Accounts	50
4.1 The Māhele and the Kuleana Act	50
4 1 1 The Māhele and the Kuleana Act of Wai'oli	52
4 1 2 The Māhele and the Kuleana Act of Wainā and Waikoko	54
4 1 3 The Māhele and the Kuleana Act of Wainiha	57
4 1 4 The Māhele and the Kuleana Act of Lumaha'i	60
4 2 The Boundary Commission Reports for Kaua'i (1873)	60
4.3 Late 1800s to Modern Land Use	
4 3 1 Late 1800s to Modern Land Use in Wai'oli	61
4 3 2 Late 1800s to Modern Land Use in Waina and Waikoko	61
4 3 3 Late 1800s to Modern Land Use in Lumaha'i	70
4.3.5 Late 1800s to Modern Land Use in Wainiha	
Section 5 Previous Archaeological Research	
5.1 Previous Archaeological Research in Wai'oli	
5.1.1 Thomas G. Thrum (1906)	79
5.1.2 Wendell Bennett (1931)	79
5.1.3 Timothy K. Earle (1978)	79
5.1.4 Hammatt (1979); Hammatt and Folk (1979) and William K. Kikuchi (1987)	
5.1.5 Pantaleo and Williams (1991)	
5.1.6 Spear (1992)	
5.1.7 William Kikuchi and Susan Remoaldo (1992)	
5.1.8 Hammatt and Folk (1994a and b)	
5.1.9 Jourdane 1995, McMahon (1995a, b), and Masterson et al. (1997)	
5.1.10 McGerty and Spear (1999)	
5.1.11 Yorck and Hammatt (2004)	
5.1.12 Fong et al. (2006)	
5.2 Previous Archaeological Research in Waipā and Waikoko	
5.2.1 Thrum (1906)	
5.2.2 Bennett (1931)	
5.2.3 Earle (1978)	
5.2.4 Hoffman (1980)	
5.2.5 Panteleo and Williams (1991)	
5.2.6 Sullivan and Dega (2003); Dye 1994a and Chafee and Dega (2005)	
5.2.6.1 Dye (2004a)	
5.2.6.2 Dye (2004b)	94
5.2.7 Fong et al. (2006)	
5.2.8 Kamai and Hammatt (2013) and Wheeler et al. (2013b)	
5.3 Previous Archaeological Research in Lumaha'i	
5.3.1 Bennett (1931)	
5.3.2 Earle (1978)	97

5.3.3 Hoffman (1980)	
5.3.4 Pantaleo and Williams (1991)	
5.3.5 Fong et al. (2006)	
5.3.6 McIntosh et al. 2011	
5.3.7 Wheeler et al. (2013a)	
5.4 Previous Archaeological Studies in Wainiha	
5.4.1 Bennett (1931)	
5.4.2 Earle (1978)	
5.4.3 Pantaleo and Williams (1991)	
5.4.4 Ida et al. (1993)	
5.4.5 Hammatt and Ida (1995)	
5.4.6 McGerty and Spear (1998)	
5.4.7 Rechtman and Dougherty (2001)	
5.4.8 Christropher Monahan (2003)	
5.4.9 Fong et al. (2006)	
5.4.10 Groza et al. (2010)	
Section 6 Community Consultation	
6.1 Introduction	105
6.2 Community Contact Letter	
6.3 Community Contact Table	
6.4 Kamaʿāina Interviews	
6.4.1 Alan Faye, Julian Helder, and David Helder	
6.4.2 Barbara Robeson and Jonathan Wichman	
6.5 Summary of Kama'āina Interviews	
Section 7 Traditional Cultural Practices	
7.1 Gathering of Plant Resources	
7.2 Fishing Practices	
7.3 Burials	
7.4 Cultural Sites	
7.5 <i>Kaʻao</i> and <i>Moʻolelo</i>	
Section 8 Summary and Recommendations	
8.1 Results of Background Research	132
8.2 Results of Community Consultation	132
8.3 Impacts and Recommendations	132
Section 9 References Cited	
Appendix A Place Names of Wai'oli, Waikoko, Waipā, Lumah	a'i and Wainiha 143
Appendix B Boundary Commission Reports	

# **List of Figures**

Figure 1. 1991 Haena and 1996 Hanalei USGS topographic quadrangles with all Wainiha	
Bridges project areas	11
Figure 2. 2013 Google Earth Aerial Imagery with Potential Staging Area 1 and Potential Stagi	ing
Area 2 project areas	12
Figure 3. 2013 Google Earth Aerial Imagery with Waikoko Stream Bridge project area	13
Figure 4. 2013 Google Earth Aerial Imagery with Wainiha Stream Bridge 1 project area	14
Figure 5. 2013 Google Earth Aerial Imagery with Wainiha Stream Bridges 2 and 3 project	
areas	15
Figure 6. 2013 Google Earth Aerial Imagery with Wai'oli Stream Bridge project area	16
Figure 7. 2013 Google Earth Aerial Imagery with Waipā Stream Bridge project area	17
Figure 8. Tax Map Key (TMK) [4] 5-7-03 with Potential Staging Area 1 and Potential Staging	ž
Area 2 project area (Hawai'i TMK Service)	18
Figure 9. TMK [4] 5-6-03 with Waikoko Stream Bridge, Waipā Stream Bridge, and Wai'oli	
Stream Bridge project areas (Hawai'i TMK Service).	19
Figure 10. TMK [4] 5-8-06 with Wainiha Stream Bridges 1, 2, and 3 project areas (Hawai'i	
TMK Service)	20
Figure 11, 2013 Google Earth Aerial Imagery with soil survey overlay for the Waikoko Stream	m
Bridge, Waipā Stream Bridge, and Wai'oli Stream Bridge project areas	24
Figure 12. 2013 Google Earth Aerial Imagery with soil survey overlay for the Wainiha Stream	n
Bridges 1 through 3 and Potential Staging Areas 1 and 2 project areas	25
Figure 13. Photo of Wainiha River and Valley, n.d. (Hawai'i State Archives).	
Figure 14. Map showing population estimate for Kaua'i in 1853 (Coulter 1931:16)	51
Figure 15, 2013 Google Earth Aerial Imagery with LCA overlay spanning Wai'oli, Waipā, an	d
Waikoko Ahupua'a	56
Figure 16, 2013 Google Earth Aerial Imagery with LCAs found in Wainiha Ahupua'a	59
Figure 17. Photo of Haraguchi Rice Mill, n.d. (Library of Congress 2016)	62
Figure 18. Photo of Hanalei Valley with <i>lo 'i</i> , n.d. (Library of Congress 2016)	63
Figure 19. Portion of the 1906 Donn Hawaii Territory Survey Map of Kaua'i with land use	64
Figure 20. Portion of the 1910 Hanalei and Kilauea USGS topographic quadrangles	65
Figure 21. Portion of the 1963 Hanalei and 1965 Haena USGS topographic quadrangles	66
Figure 22. Portion of a 1950 Hanalei Bay Coast aerial photograph of the Wai'ole, Waipā, and	
Waikoko Stream Bridge project areas (UH SOEST)	67
Figure 23. Portion of a 1950 Hanalei Bay Coast aerial photograph of the Potential Staging Are	eas
1 and 2 (UH SOEST)	68
Figure 24. Portion of a 1950 Hanalei Bay Coast aerial photograph of the Wainiha Stream Brid	lges
1–3 project areas (UH SOEST)	69
Figure 25. Photo of Wainiha Stream Bridge, n.d. (CSH)	76
Figure 26. Portions of the 1991 Haena and 1996 Hanalei USGS topographic quadrangles	
depicting all project areas for the Wainiha Bridge project, illustrating all previous	
archaeological studies and Bennett sites found within a 0.5-mile radius from the project	ct
areas	80
Figure 27. Aerial photograph (Google Earth 2013) showing locations of previously identified	
historic properties in portions of Hanalei, Wai'oli, Waipā, and Waikoko Ahupua'a	85
	-

Figure 28. Lo'i systems of Waipā as documented by Timothy Earle (1978:196a)	92
Figure 29. Aerial photograph (Google Earth 2013) showing locations of previous identified	
cultural resources in Lumaha'i and Wainiha Ahupua'a; note Bennett's (1931) sites 152	2
and 153 are beyond the scope of this map, further south within Wainiha Valley	100
Figure 30. Community consultation letter, page one	107
Figure 31. Community consultation letter, page two	108

# List of Tables

Table 1. Summary of LCAs in the Halele'a District	
Table 2. LCAs along Kūhiō Highway in Wai'oli, from East to West	53
Table 3. LCAs Along Kūhiō Highway in Waipā and Waikoko, from East to West	54
Table 4. LCAs along Kūhiō Highway in Wainiha, from East to West	57
Table 5. LCAs along Kūhiō Highway in Lumaha'i, from East to West	60
Table 6. Previous Archaeological Studies in Wai'oli Ahupua'a	81
Table 7. State Inventory of Historic Places Sites in Wai'oli Ahupua'a	83
Table 8. Previous Archaeological Studies in Waipā and Waikoko Ahupua'a	89
Table 9. State Inventory of Historic Places Sites in Waipā and Waikoko Ahupua'a	91
Table 10. Waipā Irrigation System as Documented by Earle (1978:125)	93
Table 11. Previous Archaeological Studies in Lumaha'i Ahupua'a	99
Table 12. State Inventory of Historic Places Sites in Lumaha'i Ahupua'a	99
Table 13. Previous Archaeological Studies in Wainiha Ahupua'a	101
Table 14. State Inventory of Historic Places Sites in Wainiha Ahupua'a	102
Table 15. Results of Community Consultation	109

## Section 1 Introduction

## **1.1 Project Background**

At the request of the Federal Highway Administration, Central Federal Lands Highway Division (FHWA), and the State of Hawai'i Department of Transportation (HDOT), Cultural Surveys Hawai'i Inc. (CSH) has conducted a cultural impact assessment (CIA) for the Wainiha Bridges project, Wai'oli, Waikoko, Waipā, Lumaha'i, and Wainiha Ahupua'a, Halele'a District, Kaua'i. Tax Map Keys (TMK) and corresponding acreage are listed below:

- Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.; 0.517 acres
- Waikoko Bridge: [4] 5-6-003:002, 999 por.; 0.715 acres
- Wainiha Bridge 1: [4] 5-8-002:002 por.; [4] 5-8-006:030, 031, 032, 033, 046, 060, and 999 por.; 0.669 acres
- Wainiha Bridge 2-3: [4] 5-8-006:009, 011, 017, 018, 019, 030, 999 por.; [4] 5-8-007:023, 024, 031, 032, 999 por.; 2.272 acres
- Waioli Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por.; [4] 5-5-006:014, 888 por.; [4] 5-6-002:002, 004, 999 por.; 0.913 acres
- Waipā Bridge: [4] 5-6-004:014, 022, 023, 999 por.; 0.916 acres

The FHWA and the HDOT propose the replacement of three temporary pre-fabricated (ACROW) bridges on Kūhiō Highway (Route 560) on the north side of the island of Kaua'i. The bridges are located between mile posts 6.4 and 6.7 near the mouth of Wainiha Stream before it feeds into Wainiha Bay. The original bridges at these three locations were replaced with temporary ACROW bridges after Bridge 2 suffered permanent damage and Bridges 1 (the southernmost bridge) and 3 (the northernmost bridge) were determined to be structurally deficient. The ACROW bridges were installed as a temporary measure to keep the roadway open to residents and public traffic until environmental clearance and funding for the permanent structures could be secured. The three bridges are owned and maintained by HDOT. FHWA and HDOT propose the replacement of the temporary ACROW bridges with new one-lane bridges that closely match the existing alignment. Also included as part of the proposed project is the placement of temporary one-lane bridges adjacent to or crossing over three historic one-lane bridges along Kūhiō Highway that access the project site (Wainiha Bridges), located at Wai'oli, Waipā, and Waikoko streams. These historic bridges have low load capacities and temporary bridges would allow construction loads to access the Wainiha project site without affecting the historic integrity of these bridges. The existing temporary ACROW bridges at the Wainiha project site would be shifted makai (toward the ocean) to accommodate traffic during construction of the new bridges. All temporary bridges would be removed upon completion of the project. Two potential staging areas in Lumaha'i Ahupua'a are also included in the area of potential effects (APE). Staging also may occur at each bridge location. Figure 1 is a composite of all project areas on a U.S. Geoglogical Survey (USGS) map. Figure 2 through Figure 7 are aerial photographs of the project areas. Figure 8 through Figure 10 depict the project areas on corresponding Tax Map Keys (TMK).

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 1. 1991 Haena and 1996 Hanalei USGS topographic quadrangles with all Wainiha Bridges project areas

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 2. 2013 Google Earth Aerial Imagery with Potential Staging Area 1 and Potential Staging Area 2 project areas

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 3. 2013 Google Earth Aerial Imagery with Waikoko Stream Bridge project area

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Figure 4. 2013 Google Earth Aerial Imagery with Wainiha Stream Bridge 1 project area

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 5. 2013 Google Earth Aerial Imagery with Wainiha Stream Bridges 2 and 3 project areas

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i





Figure 6. 2013 Google Earth Aerial Imagery with Wai'oli Stream Bridge project area

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 7. 2013 Google Earth Aerial Imagery with Waipā Stream Bridge project area

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 8. Tax Map Key (TMK) [4] 5-7-03 with Potential Staging Area 1 and Potential Staging Area 2 project area (Hawai'i TMK Service)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 9. TMK [4] 5-6-03 with Waikoko Stream Bridge, Waipā Stream Bridge, and Wai'oli Stream Bridge project areas (Hawai'i TMK Service)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 10. TMK [4] 5-8-06 with Wainiha Stream Bridges 1, 2, and 3 project areas (Hawai'i TMK Service)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

### **1.2 Document Purpose**

The purpose of this CIA is to comply with the State of Hawai'i's environmental review process under Hawai'i Revised Statutes (HRS) §343, which requires consideration of the project's potential effect on cultural beliefs, practices, and resources. Through document research and cultural consultation efforts, this report provides information compiled to date pertinent to the assessment of the proposed project's potential impacts on cultural beliefs, practices, and resources (pursuant to the Office of Environmental Quality Control's *Guidelines for Assessing Cultural Impacts*), which may include traditional cultural properties (TCPs). These TCPs may be significant historic properties under State of Hawai'i significance criterion "e," pursuant to Hawai'i Administrative Rules (HAR) §13-275-6 and §13-284-6. Significance criterion "e" refers to historic properties that "have an important value to the native Hawaiian people or to another ethnic group of the state due to associations with traditional beliefs, events or oral accounts—these associations being important to the group's history and cultural identity" (HAR §13-275-6 and §13-284-6). The document will likely also support the project's historic preservation and environmental review under HRS §6E-8, HAR §13-275, and §13-284.

Due to federal funding, this project is a federal undertaking, requiring compliance with Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, and Section 4(f) of the Department of Transportation Act.

### **1.3 Scope of Work**

The scope of work for this CIA includes the following:

- 1. Examination of cultural and historical resources, including Land Commission documents, historic maps, and previous research reports with the specific purpose of identifying traditional Hawaiian activities including gathering of plant, animal, and other resources or agricultural pursuits as may be indicated in the historic record.
- 2. Review of previous archaeological work at and near the subject parcel that may be relevant to reconstructions of traditional land use activities; and to the identification and description of cultural resources, practices, and beliefs associated with the parcel.
- 3. Consultation and interviews with knowledgeable parties regarding cultural and natural resources and practices at or near the parcel; present and past uses of the parcel; and/or other practices, uses, or traditions associated with the parcel and environs.
- 4. Preparation of a report that summarizes the results of these research activities and provides recommendations based on findings.

## **1.4 Environmental Setting**

#### 1.4.1 Vegetation

The project sites, the study areas, and the potential staging areas are located in five *ahupua'a* (land division usually extending from the uplands to the sea) on the north side of Kaua'i: Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha. Kūhiō Highway traverses many types of terrain including the large stream of Wai'oli, stretches of coastal sands along precipitous cliffs on the boundaries of Waikoko, Lumaha'i, Wainiha, and Hā'ena. Modern vegetation is extremely diverse, including *pū hala* trees (pandanus; *Pandanus odoratissimus*), *naupaka* (*Scaevola taccada*), *koa* 

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

(Acacia koa), melastoma (Melastoma malabathricum), bamboo (Bambuseae), yellow foxtail (Setaria geniculata), hau (Hibiscus tiliaceus), lantana (Lantana camara), false staghorn fern (Gleichenia linearis), lace fern (Sphenomeris chusana), spathoglottis (Spathoglottis sp.), paspalum (Paspalum sp.), rhodomyrtus (Rhodomyrtus tomentosa), silver oak (Greviliea robusta), guava (Psidium guajava), Java plum (Syzygium cumini), mangrove (Bruuiera gymnorhiaa), and scrubby 'ōhi'a lehua (Metrosideros collina). The nearest temperature tracking station, located in Kīlauea (317 feet [ft] elevation) records an average (mean) minimum of 66 degrees Fahrenheit to an average maximum of 84 degrees Fahrenheit (Armstrong 1983). Given the project sites' and study areas' proximity to the coast, the average temperature ranges may be a few degrees higher. Rainfall averages around 80 inches per year (Juvik and Juvik 1998:56). Earle (1978) describes the Halele'a District surrounding the project area in terms of the natural topography and stream catchments as they relate to ahupua'a:

Halelea is divided into nine *ahupua* 'a, the boundaries of which were determined by topographic features. The four largest ahupua 'a-Wainiha, Lumahai, Hanalei, and Kalihiwai—are each based on the catchment basin of a single large stream. The catchment areas of these streams are separated from each other by the dramatic ridges which form the political boundaries between ahupua'a . . . these boundaries deviate from the dominant, natural divisions so as to divide sections of critical resources between ahupua'a. The five smaller ahupua'a—Ha'ena, Waikoko, Waipā, Wai'oli, and Kalihikai—are based on the catchment areas of one or more smaller, permanent streams. [Earle 1978:25]

#### 1.4.2 Soils

Although there is some rock outcrop (rRO) where Waipā meets Wai'oli Ahupua'a, the majority of the soil within this portion of the project area consists of Hihimanu silty clay loam with occasional slopes of 40 to 70% (HMMF) (Foote et al. 1972). Soils underlying the highway are as diverse as the landscapes it traverses. Beginning in Wai'oli, the soils are identified as Mokuleia series and distinct variants stretch through Wai'oli and along the entire plain of Waipā into Waikoko, interrupted only once by the volcanic ridge of Makaihuwa'a that borders the highway just west of Wai'oli Stream. The soils of this area are typical of the Hihimanu series. This soil underlies the highway until just after the Lumaha'i Lookout where it again descends into the coastal flats and the associated Mokuleia sands. Beyond the Lumaha'i Bridge, the highway ascends into soils identified as Rough Broken Lands (rRR) that extend to just west of Wainiha. According to the U.S. Department of Agriculture (USDA) Soil Survey Geographic (SSURGO) database (2001) and soil survey data gathered by Foote et al. (1972), Mokuleia soils are described as follows:

... well-drained soils along the coastal plains on the islands of Oahu and Kauai. These soils formed in recent alluvium deposited over coral sand. They are shallow and nearly level. Elevations range from nearly sea level to 100 feet. The annual rainfall amounts to 15 to 40 inches on Oahu and 50 to 100 inches on Kauai. The mean annual soil temperature is 74° F. Mokuleia soils are geographically associated with Hanalei, Jaucas, and Keaau soils. The soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of kiawe, klu, koa haole, and Bermuda

grass in the drier areas and napier grass, guava, and *joee* in the wetter areas. [Foote et al. 1972:95]

Hihimanu soils are described as follows:

... well-drained soils on uplands on the island of Kauai. These soils developed in material weathered from basic igneous rock and colluvium at the base of slopes. They are very steep. Elevations range from 100 to 2,000 feet. The annual rainfall amounts to 70 to 120 inches. The mean annual soil temperature is  $69^{\circ}$  F. Hihimanu soils are geographically associated with Hanalei and Hanamaulu soils. These soils are used for water supply, pasture, wildlife habitat, and woodland. The natural vegetation consists of *koa*, melastoma, yellow foxtail, lantana, false staghornfern, paspalum, *hala*, guava, *ohia*, and associated shrubs and grasses. [Foote et al. 1972:40]

Rough Broken Lands (rRR) are described as follows:

... consists of very steep land broken by numerous intermittent drainage channels. In most places it is not stony. It occurs in gulches and on mountainsides on all the Islands except Oahu. The slope is 40 to 70 percent. Elevations range from nearly sea level to about 8,000 feet. The local relief is generally between 25 and 500 feet. Runoff is rapid, and geologic erosion is active. The annual rainfall amounts to 25 to more than 200 inches. These soils are variable. They are 20 to more than 60 inches deep over weathered rock. In most places some weathered rock fragments are mixed with the soil material. Small areas of rock outcrop, stones, and soil slips are common . . . This land type is used primarily for watershed and wildlife habitat. In places it is used also for pasture and woodland. The dominant natural vegetation in the drier areas consists of guava, lantana, Natal redtop, bermuda grass, *koa haole*, and molasses grass. *Ohia, kukui, koa*, and ferns are dominant in the wetter areas. Puakeawe, *aalii*, and sweet vernal grass are common at the higher elevations. [Foote et al. 1972:119]

Soil types in the project areas are shown in Figure 11 and Figure 12.

#### 1.4.1 *Makani* (Prevailing Winds)

Northeasterly trade winds prevail throughout the year, although their frequency varies from 80 to 95% of the time during the summer months, when high-pressure systems tend to be located north and east of the Hawaiian Islands. During the winter months, the high pressure systems are located farther to the south, decreasing the occurrence of the trade winds to about 50 to 80% of the time (WRCC 2010). For more on winds specific to *ahupua* '*a*, see Section 3.4.



Figure 11. 2013 Google Earth Aerial Imagery with soil survey overlay for the Waikoko Stream Bridge, Waipā Stream Bridge, and Wai'oli Stream Bridge project areas

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 12. 2013 Google Earth Aerial Imagery with soil survey overlay for the Wainiha Stream Bridges 1 through 3 and Potential Staging Areas 1 and 2 project areas

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

#### 1.4.2 Ua (Precipitation)

Precipitation is a major component of the water cycle, and is responsible for depositing *wai* (fresh water) on local flora. Pre-Contact *kānaka maoli* (Native Hawaiians) recognized two distinct annual seasons. The first, known as *kau* (period of time, especially summer) lasts typically from May to October and is a season marked by a high-sun period corresponding to warmer temperatures and steady trade winds. The second season, *ho 'oilo* (winter, rainy season) continues through the end of the year from November to April and is a much cooler period when trade winds are less frequent, and widespread storms and rainfall become more common (Giambelluca et al. 1986:17). Typically the maximum rainfall occurs in January and the minimum in June (Giambelluca et al. 1986:17). These North Shore areas get an average of 50 inches of rain per year.

#### 1.4.3 Surf

Reef structure and a related sand bar at the mouth of the Wai'oli Stream creates a small estuary, naturally backing water *mauka* (inland, toward the mountains) of the Wai'oli Stream Bridge. The surf break off the sand spit at the mouth of the Wai'oli Stream is known as "Grandpa's." Manolau is the name of the inhabited first terrace *mauka* of Grandpa's and the steep ridgeline of Makaihuwa'a Ridge marks the boundary of Wai'ole and Waikoko. Headed westerly along Kūhiō Highway toward the Waipā and Waikoko stream bridges, one enters Waipā Ahupua'a, just seaward of Makaihuwa'a Ridge, and passes over the western portion of the Hanalei Plain at elevations of 6 m (20 ft) or less above sea level, to the border with Waikoko Ahupua'a. Timothy K. Earle (1978) provides the following summation of Waipā Ahupua'a:

The *ahupua* 'a of Waipā is relatively small (6.8 square kilometers) but it includes several good areas for irrigated agriculture. Waipā has a coastal strip on Hanalei Bay, but no coral reefs. The boundaries extend inland to include the catchment area of the Waipā stream. This stream travels through a narrow valley until, 0.8 kilometers (km) from the sea, it enters a flat alluvial plain about 1.2 km across. The westerly 0.2 km of this plain is divided off as part of the *ahupua* 'a of Waikoko. In addition to the dominant stream called Kīwa'a which empties into the same alluvial flat. Discharge from this second stream has made the central and eastern parts of the flatland quite marshy . . . [Earle 1978:33]

The Waikoko Stream Bridge crossing exists immediately *mauka* of the Pohakuopio reefs, also known as the surf break "Waikokos" at the foot of Pohakuopio Ridge. The portions of the project area identified as Staging Areas 1 and 2 exist as switchback pull-out areas along Kūhiō Highway on Pohakuopio Ridge, a *makai* (seaward) extension of Pu'u Ka Manu, "the bird hill," or Pu'u Hinihini at an elevation of 210 m (690 ft) above sea level. The broad expanse of Lumaha'i Beach exists downslope *makai* and to the west of these staging areas, punctuated by Kolokolo Point, where the mouth of the Lumaha'i River creates an estuary similar to that of Wai'oli. Timothy K. Earle (1978) provides the following overview for Lumaha'i Ahupua'a:

Lumaha'i is a large *ahupua* 'a (36.9 square kilometers) including the catchment area of the major stream, Lumaha'i. Like Wainiha, the Lumaha'i Stream starts in a deep valley thrusted into the central mountains of Kaua'i. The upper part of the stream is joined by numerous tributaries, which rush down the steep valley slopes. About 1.5 kilometers (km) from the sea, the stream enters a compact alluvial plain

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple

bounded on either side by the valley ridges and on the sea by low sand dunes. The coast is 1.2 km long with no significant reefs. [Earle 1978:32]

Continuing westward on Kūhiō Highway, crossing Kolokolo Point to Wainiha Valley and the portion of the project area at Wainiha Stream Bridge 1 and Wainiha Stream Bridges 2 and 3. These portions of the project area cross the mouth of the Wainiha River at the Wainiha Beach Park, where a substantial sand bar extends across the river mouth to create a small estuary similar to those found at Wai'oli and Lumaha'i.

#### 1.4.4 Built Environment

The overall project area including project site, potential staging areas, and environmental study areas consists of a portion of the Kūhiō Highway known as Route 560, a stretch of highway just east of Hanalei known as Wai'oli and traverses to the north of Wainiha Bridge 3.

Kuhio Highway is the only link to the main urban facilities of Kauai for residents westward beyond the project area on the north shore. Residents, the community and businesses depend entirely on the highway for access for the transportation of goods, visitors, travel to and from schools, stores, the airport, hospitals and places of work. [Hawai'i Department of Transportation 2011:3]

Kūhiō Highway enters Waipā Ahupua'a on the east just seaward of Makaihuwa'a Ridge (just west of Wai'oli Stream) and passes over the western portion of the Hanalei Plain at an elevation below 20 ft to the border with Waikoko Ahupua'a (to the west). On the eastern banks of the Waipā Stream crossing, *mauka* of Kūhiō Highway, the Waipā Foundation has built its facilities for a non-profit organization working to restore Waipā as a Native Hawaiian learning and community center. At the Wainiha River crossing is the Wainiha Beach Park and a small community of single family residences, vacation rentals, and the Wainiha General Store, a small family-owned grocery store. Generally speaking, the entire project area exists in a relatively undeveloped and serene portion of the north shore of Kaua'i, between the extensive preserves of Kamehameha School, Honoonāpali Natural Reserve, the Alaka'i Wilderness Preserve and the Halelea Forest Reserve.

After crossing Waipā Bridge, the road follows the beach along the west shore of Hanalei Bay. The road then winds up and around the mountain ridge as it proceeds to Lumaha'i Valley. As it winds over the ridge, the road reaches an elevation of nearly 16' above sea level. Descending into Lumaha'i Valley, the road again follows the beach before crossing Lumaha'i Bridge and leaving the valley. Another mountain ridge is traversed before entering Wainiha Valley, where the road crosses the three Wainiha Bridges and passes through the small village of Wainiha. [Fung Associates 2013:10]

## Section 2 Methods

## **2.1 Archival Research**

Research centers on Hawaiian activities including *ka'ao* (legends), traditional *mo'olelo* (stories), *wahi pana* (storied places), *'ōlelo no'eau* (proverbs), *oli* (chants), *mele* (songs), traditional subsistence and gathering methods, ritual and ceremonial practices, and more. Background research focuses on land transformation, development, and population changes beginning with the early post-Contact era to the present day.

Cultural documents, primary and secondary cultural and historical sources, previous archaeological reports, historic maps, and photographs were reviewed for information pertaining to the study area. Research was primarily conducted at the CSH Library. Other archives and libraries including the Hawai'i State Archives, the Bishop Museum Archives, the University of Hawai'i at Mānoa's Hamilton Library, Ulukau, The Hawaiian Electronic Library (Ulukau.org 2014), the State Historic Preservation Division (SHPD) Library, the State of Hawai'i Land Survey Division, the Hawaiian Historical Society, and the Hawaiian Mission Houses Historic Site and Archives are also repositories where CSH cultural researchers gather information. Information on Land Commission Awards (LCAs) were accessed via Waihona 'Aina Corporation's Māhele database (Waihona 'Aina 2000), the Office of Hawaiian Affairs (OHA) Papakilo Database (OHA 2014), and the Ava Konohiki Ancestral Visions of 'Āina website (Ava Konohiki 2015).

### **2.2** Community Consultation

#### 2.2.1 Scoping for Participants

We begin our consultation efforts with utilizing our previous contact list to facilitate the interview process. We then review an in-house database of *kūpuna* (elders), *kama 'āina* (native born), cultural practitioners, lineal and cultural descendants, Native Hawaiian Organizations (NHOs; includes Hawaiian Civic Clubs and those listed on the Department of Interior's NHO list), and community groups. We also contact agencies such as SHPD, OHA, and the appropriate Island Burial Council where the proposed project is located for their response to the project and to identify lineal and cultural descendants, individuals and/or NHO with cultural expertise and/or knowledge of the study area. CSH is also open to referrals and new contacts.

#### 2.2.2 "Talk Story" Sessions

Prior to the interview, CSH cultural researchers explain the role of a CIA, how the consent process works, the project purpose, the intent of the study, and how their '*ike* (knowledge) and *mana*'o (thought, opinion) will be used in the report. The interviewee is given an Authorization and Release Form to read and sign.

"Talk Story" sessions range from the formal (e.g., sit down and  $k\bar{u}k\bar{a}$  [consultation, discussion] in participant's choice of place over set interview questions) to the informal (e.g., hiking to cultural sites near the study area and asking questions based on findings during the field outing). In some cases, interviews are recorded and transcribed later.

CSH also conducts group interviews which range in size. Group interviews usually begin with set, formal questions. As the group interview progresses, questions are based on interviewee's

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

answers. Group interviews are always transcribed and notes are taken. Recorded interviews assist the cultural researcher in 1) conveying accurate information for interview summaries, 2) reducing misinterpretation, and 3) providing missing details to *mo* '*olelo*.

CSH seeks  $k\bar{o}kua$  (assistance) and guidance in identifying past and current traditional cultural practices of the study area. Those aspects include general history of the *ahupua* '*a*; past and present land use of the study area; knowledge of cultural sites (for example, *wahi pana*, archaeological sites, and burials); knowledge of traditional gathering practices (past and present) within the study area; cultural associations (*ka* '*ao* and *mo* '*olelo*); referrals; and any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the study area.

#### **2.2.3** Completion of Interview

After an interview, CSH cultural researchers transcribe and create an interview summary based on information provided by the interviewee. Cultural researchers give a copy of the transcription and interview summary to the interviewee for review and ask them to make any necessary edits. Once the interviewee has made those edits, we incorporate their *'ike* and *mana'o* into the report. When the draft report is submitted to the client, cultural researchers then prepare a finalized packet of the participant's transcription, interview summary, and any photos that were taken during the interview. We also include a thank you card and honoraria. This is for the interviewee's records.

It is important to CSH cultural researchers to cultivate and maintain community relationships. The CIA report may be completed, but CSH researchers continuously keep in touch with the community and interviewees throughout the year—such as checking in to say hello via email or by phone, volunteering with past interviewees on community service projects, and sending holiday cards to them and their 'ohana (family). CSH researchers feel this is an important component to building relationships and being part of an 'ohana and community.

"I ulu no ka lālā i ke kumu—the branches grow because of the trunk," an ' $\bar{o}lelo$  no 'eau (#1261) shared by Mary Kawena Pukui with the simple explanation: "Without our ancestors we would not be here" (Pukui 1983:137). As cultural researchers, we often lose our  $k\bar{u}puna$  but we do not lose their wisdom and words. We routinely check obituaries and gather information from other informants if we have lost our  $k\bar{u}puna$ . CSH makes it a point to reach out to the 'ohana of our fallen  $k\bar{u}puna$  and pay our respects including sending all past transcriptions, interview summaries, and photos for families to have on file for genealogical and historical reference.

## Section 3 Ka'ao (Legends) and Mo'olelo (Stories)

Storytelling is better heard than read for much becomes lost in the transfer from the spoken word to the written word. Hawaiian storytellers of old were greatly honored. Their stories were a major source of entertainment and contained teachings while interweaving elements of Hawaiian life-styles, genealogy, history relationships, arts, and the natural environment. *Ka'ao* are often full of hidden and double meanings (Pukui 1995:ix).

Beckwith notes that Hawaiians use the term *ka* 'ao "for a fictional story or one in which fancy plays an important part"; *mo* 'olelo is "a narrative about a historical figure, one which is supposed to follow historical events. Stories of the gods are *mo* 'olelo." In reality, the distinction between *ka* 'ao as fiction and *mo* 'olelo as fact cannot be "pressed too closely. It is rather in the intention than in the fact" (Beckwith 1970:1). Thus a so-called *mo* 'olelo, which may be enlivened by fantastic adventures of *kupua* (supernatural beings), "nevertheless corresponds with the Hawaiian view of the relation between nature and man" (Beckwith 1970: 1). A *ka* 'ao, on the other hand, is "so consciously composed to tickle the fancy rather than to inform the mind as to supposed events" (Beckwith 1970:1).

The following section presents traditional accounts of ancient Hawaiians living in the vicinity of the project area. These originate before the time of the first Hawaiian to an age of mythical characters whose epic adventures inadvertently led to the Hawaiian race of *ali'i* (chief) and *maka'āinana* (commoner) alike. The *ka'ao* in and around the project area shared below are some of the oldest Hawaiian stories that have survived and still speak to the characteristics and environment of the area and its people. The *mo'o* (lizard, water spirit) tales are usually cautionary tales, especially in regard to caring for the land. The *wahi pana* are storied places, but particularly places which Hawaiians feel are embued with special *mana* or spiritual power. The *'ōlelo no 'eau* are a collection of sayings collected and translated by Mary Pukui Kawena (1983). *Mele* are songs, athems, or chants of any kind tha are poetic. However, *oli* or chant, was not danced to. Chants were prolonged phrases in one breath, often with a trill at the end of each phrase. Both *mele* and *oli* possess themes and hidden meanings (Pukui 1986:245, 284).

## 3.1 Ka'ao

#### 3.1.1 Legend of Paka'a – Halele'a

Given by his mother "a finely polished calabash containing the bones of his grandmother Loa, who in her life had controlled the winds of every district from Hawaii on the east of Kaula on the west of the group . . . [and taught] how to open the calabash and call the name of whatever wind he desires" (Beckwith 1970:86). Paka'a passed this lore on to his son, Kuapaka'a, who had occasion to use it when the chief Keawenuiaumi came to Moloka'i in search of Paka'a (Dye 2004a:6). In order to bring about a storm that will drive Keawenuiaumi's canoes ashore, Paka'a tells Kuapaka'a to call for the winds of Kaua'i and Ni'ihau:

.... He luha ko Hanalei He waiamau ko Waioli He puunahele ko Waipa He haukolo ko Lumahai He lupua ko Wainiha ....

[Translated] ... The luha is of Hanalei The waiamau is of Waioli The puunahele is of Waipa The haukolo is of Lumahai The lupua is of Wainiha ... [Fornander 1918:96–97]

Wichman (1998) relates traditions of fabulous birds (both particularly associated with the *Legend of Aukele*) related to two places at Waipā, Halulu and Kīwa'a:

Halulu was the bird that the great god Kāne sent to the four directions of chaos to announce that he was about to create the world. *Halulu* was also the man-eating bird that could take on human form when he wished...Kīwa'a was Halulu's sister...The  $K\bar{i}wa'a$  is also the pilot bird that leads a navigator through the surf to the canoe shed at the landing place. [Wichman 1998:114]

#### 3.1.2 Legend of the Kamapua'a Family

The adventures of the hog-man, Kamapua'a, born to Hina include a section about his struggles on Kaua'i, first with chief Makali'i then his own father, Kahiki-ula, who is ruling under Makali'i and then a rival chief on behalf of his father-in-law: "He was occasionally worshiped as a god, if the report is correct that at Wainiha, Kauai, was a small paved heiau [pre-Christian place of worship] which had Kamapua'a for its deity" (Beckwith 1940:203).

#### 3.1.3 Hi'iakaikapoliopele and Malaeha'akoa

Emerson narrates the journey of Hi'iakaikapoliopele as she comes across the fisherman, Malaeha'a-koa, lame, guileless, innocent of all transgressions, meanwhile, sat and fished. Wainiha is briefly mentioned as the place where Malaeha'akoa, the lame fisherman and seer, was raised. When Hi'iaka arrived on Kaua'i during her mission to bring Pele's lover Lohi'au back to the island of Hawai'i, it was Malaeha'akoa who met her at Hā'ena and eventually told her of Lohi'au's death (Emerson 1978:109–131). Hi'iaka:

He had cast the comminuted [broken up] fragments of the shrimps whose bodies baited his hooks and, as he waited for a bite he chanted a song (to the god of good luck) that reached Hiiaka's ear:

Pa mai ka makani o ka lele wa'a, e: Makani kai ehu lalo o ka pali o Ki-pu. I malenalena i Wai-niha i ka'u makau: He i'a, he i'a na ka lawaia, na Malae-ha'a-koa, e!

TRANSLATION

A wind-squall drives the canoes in flight, Dashing the spray 'gainst the cliff of Kipu. Peace, waves, for my hook at Wai-niha: Come, fish, to the hook of the fisher. The hook of Malae-ha'a-koa.

Hiiaka's answer to this was a song:

Malae-ha'a-koa, lawaia o ka pali, Keiki lawaia oe a Wai-niha, Mo'opuna oe a Ka-nea-lani, Lawaia ku pali o Haena; Au umauma o ke ala haki; He i'a na ka lawaia, Na Malae-ha'a-koa, e.

<u>Translation</u> I hail thee, Malae-ha'a-koa, Thou fisherman of the cliffs. As a youth you fished at Wai-niha; Grandson thou to Ka-noa-lani, Fishing now 'neath the bluffs of Haena, Sometime breasting the steep mountain ladder. Send fish, O Heaven, to this fisherman; Send fish to Malae-ha'a-koa.

As if obedient to the charm of Hiiaka's incantation, the breeze sank to a whisper and the ruffled surface of the ocean took on a calm that brought fish to the fisherman's hooks. [Emerson 1915:110–111]

#### 3.1.4 Pele, Hi'iakaikapoliopele, and Malaeha'akoa

Wichman offers a similar story to Emerson, but details the two sisters:

... met Malaeha'akoa at Naue as he was fishing. He was crippled and unable to walk. He recognized Hi'iaka and prepared a feast for her. The fisherman and his wife led the dancing and chanting of a long song recounting Pele's story, much to Hi'iaka's delight, and in return she restored his ability to walk. [Wichman 1998:124]

## 3.2 Moʻolelo

#### 3.2.1 Ka-nē-loa Seeks a Bride and the Kapa of Wai'oli

A romantic narrative of unknown origin called *Wai'oli* is retold by Frederick B. Wichman in *Kauai Tales* (1985:44–60). This legend tells of the god Ka-nē-loa coming to Kaua'i and landing at Manolau/Monolau, a place where Wai'oli Stream enters the ocean, where canoes would be moored to seek a bride. This visit brings the rainbow to Kaua'i. The legend describes the making of different colored tapa and associates the sources of the dyes with specific place names in Wai'oli. Specific reference is made to a number of materials used for tapa making including *noni* (Indian mulberry; *Morinda citrifolia*), 'alani wai (Pelea wailealae), 'ōlena (turmeric; *Curcuma domestica*), māmaki (Pipturus spp.), 'uki'uki (Dianella sandwicensis) berries, sea urchins, *hala, kalili* (native violet; *Viola kauaensis*), burned sugarcane, coconut milk, and *maile* (Alyxia

*olivaeformis*). Wai'oli was a center of tapa arts. Charles Wilkes, Commander of the United States exploring expedition who attended Rev. William Alexander's church in Wai'oli in 1840 remarked,

They were all much struck with the dress of the native women, its unusual neatness and becoming appearance. It seemed remarkable that so many of them should be clothed in foreign manufacture, and that apparently of an expensive kind; but on closer examination, the dressed proved to be *tapas*, printed in imitation of merino shalls, ribands. [Riznik 1987:10]

Manolau/Monolau where Wai'oli Stream enters the ocean was inhabited and is a place where tapa was traditionally produced.

#### 3.2.2 Lonoikamakahiki

Kamakau and Fornander tell of Lono-i-ka-makahiki, a son of Keawe-nui-a-'Umi who goes crazy and wanders for a long time on Kaua'i. When he regains sanity, his faithful attendant sings a song reminding him of the places they wandered, especially on Kaua'i, and one of the lines recalls, "Ka ua ho'opala 'ohi'a o Wai'oli—The rain that ripened the mountain apples of Wai'oli" (Kamakau 1961:52; Fornander 1919:4(2):358–359).

Fornander's account of Keawe-nui-a-'Umi, who lived sometime in the sixteenth century, in the *Story of Lonoikamakahiki* gives the same interpretation (Fornander 1917-1918:4(2):358–359).

Ka-iki-lani-kohe-panai'o wanders through the wilderness of Kaua'i with his companion, Kapa-'ihi-a-hilina, out of his mind with grief for having killed his wife (Dye 2004a:7). Ka-iki-lani-kohepanai'o composed a chant of affection for the chief, recounting their wanderings in the wilderness of Kaua'i mostly on the North Shore:

He kaʻupu e Lono e,	A friend [was I] O Lono,
He kanaka au no ka ua iki,	A server was I in the light rain,
Ina hoʻi ha he hoa au no ka ua iki	I was your companion in the light
la paʻia,	rain of the forest,
He hoa i ka nahele lauhala loloa,	A companion in the long-leafed pandanus groves,
Mai Kilauea a Kahili la,	[That extend] from Kilauea to Kalihi,
O ka hala i 'aina kepa 'ia e ka	The pandanus [whose fruit] is
тапи	pecked by the birds,
O Poʻoku i Hanalei la.	[The pandanus] of Po'oku in Hanalei.
Hala ia mao a ka ua e ka hoa e,	There we were till the rain ceased falling,
He hoa i ka makani lauwili	O my companion, My companion in the hurrying
Poʻaihele,	whirlwind,
Mauka o Hanalei iki a Hanalei nui,	In the uplands of lesser Hanalei,
	of greater Hanalei,
Mauka mai hoʻi kekahi ua,	[In] the rain that came from the uplands,
Makai mai hoʻi kekahi ua,	Rain that came from the lowlands,
Ma na 'e mai ho 'i kekahi ua,	Rain that came from the east,
Malalo mai hoʻi kekahi ua,	Rain that came from the south,
Maluna iho hoʻi kekahi ua,	Rain that came from the above,
Malalo aʻe hoʻi kekahi ua,	Rain that came from below,
Ma ka lae hala o Pu'upaoa,	Along the cape of Pu'upaoa, over-grown

	with pandanus,
Ilaila ka ua kike hala,	There was the rain that pelted the
	pandanus fruit,
Hoʻowalea ike oneʻai a ke kinaʻu,	Drenching the sand where the sand eels fed,
He kiaʻuʻai hala o Mahamoku,	The eels that ate the pandanus of
	Mahamoku,
Ka ua hoʻopala ʻohiʻa o Waiʻoli	The rain that ripened the mountain
	apples of Wai'oli [Kamakau 1992:48–51]

#### 3.2.3 Damming of the Waters of Waipā

Wichman (1998) refers to a tradition behind the periodic damming of the waters of Waipā by a sand bar at the coast:

This, according to legend, was caused by a chief named Lauhaka. His mother left her husband, Kalākānehina, the ruling chief of Waimea, during the time of the kona kingdom because of his cruelty. Lauhaka was raised in the mountains by his uncle, a bird catcher. Learning that two bird catchers were catching the forbidden 'ua'u, the dark-rumped petrel, Kalākānehina sent some warriors to kill them. Lauhaka stationed himself on the steep path where only one man at a time could come toward him. As Lauhaka killed the soldiers the bodies fell into the stream and dammed up the river. [Wichman 1998:114]

Wichman (1998) also connects the naming of Waikoko to this story:

When Lauhaka was damming up the neighboring stream, the blood from the soldiers flowed into this stream and colored it red. In Ancient times, however, an aquatic plant grew in this stream that dyed the water red, but these plants disappeared when rice began to be grown here. [Wichman 1998:115]

#### 3.2.4 'Ōlohe

Wichman (1998) retells a tale of brigands associated with Makahoa Point and an adjacent beach Kahalahala:

Ka-pu'a'a-pilau and two friends lived here, robbers well trained in the art of *lua* (bone-breaking). They were ' $\bar{o}lohe$  (robbers who removed all the hair from their head and body and kept their skin well-oiled and slippery). An ' $\bar{o}lohe$  inherited a fearsome reputation, usually well deserved. One of his friends watched from the ridge. If several travelers came together, the lookout called out, 'High tide!' and they were not attacked. However, if a single traveler, well-laden with goods came along, the look-out called, 'Low tide!' and the traveler was attacked, killed, and his body placed in a hole in the tongue of lava at the foot of Makahoa Ridge. In time, the body was taken out to sea by the waves and brought ashore onto the sands. The *konohiki* [headman of an *ahupua* 'a land division under the chief] of Wainiha was disturbed that so many bodies were coming ashore and sent a man to spy on the situation. This man saw and heard what was happening and reported back to his chief. The chief and his warriors successfully killed the three robbers, and their bodies were thrown into the pit where they had disposed of their own victims. [Wichman 1998:115–116]

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#### 3.2.5 Mo'olelo about the Menehune

The *mo* 'olelo we have collected for Lumaha'i and Wainiha relate to the *menehune* (legendary race of small people who worked at night, building fishponds, roads, and temples) and therefore appear below.

Perhaps the most popular mention of Wainiha in the folklore of Hawai'i is as the home of the legendary *menehune* and  $m\bar{u}$  (legendary people of Lā'au-haele-mai, Kaua'i) people. Described as shy and small in stature, some say they were the original inhabitants of Kaua'i, driven to the interior of the island by the arrival and flourishing of the Hawaiians. A census of Wainiha taken by the *konohiki* (overseer) of the *ahupua'a* during the time of Kaumuali'i lists 65 men of Lā'au as *menehune* (Lydgate 1913:126). J.H. Kaiwi, Thrum's informant for the "Story of the Race of Menehunes," says his grandparents became familiar with the *menehune* while spending time collecting sandalwood in an area called Waineki in the Alaka'i Swamp, overlooking Wainiha (Thrum 1923:219).

The upper reaches of the valley were also where the bird-catchers or *po'e hahai manu* practiced their skill at collecting the colorful feathers of forest birds which adorned capes, helmets, *lei* (garland), and other objects usually associated with the *ali'i* (chiefly) class. In "A maiden from the Mu," Pukui (1951:67–75) relates the tribulations of Kiamanu, a bird-catcher of Wainiha, who marries a  $m\bar{u}$  girl. Wainiha bird-catchers also figure in the tales of "Kanaloa-huluhulu" and "Lauhaka" by Wichman (1985:114–124). Many of these stories mention a well-traveled trail from Waimea on the southwest coast of the island, up through Kōke'e and across the Alaka'i Swamp, finally dropping down into Wainiha. In historic times, politician and outdoorsman Eric Knudsen (1946:202) traversed the island along this ancient trail on an annual basis. Knudsen describes an 1895 passage from Hanalei to Hā'ena as following little more than a trail (Fung 2013:12).

#### 3.2.5.1 The Bird Catcher's Daughter

High in the uplands along the Wainiha River a bird catcher was caught in the rain and couldn't return home because the river was rushing so hard (Figure 13). He found refuge in the forest village of the  $m\bar{u}$  people, "a tribe of the *menehune* perhaps" (Pukui and Curtis 1951:67). Kia, the bird catcher, found himself staying in the village far after the weather had improved. Eventually, he fell in love with a maiden of  $m\bar{u}$  and they had a daughter. Eventually Kia began to miss his childhood environment and the smells of the beach and he found himself along the shore. While he was there a young chief spoke with him and after hearing of the beauty of his daughter, the young chief proclaimed that he wished to marry her. Kia told the young chief his daughter would not marry him, and that she was scared of strangers and he warned "no man can being a forest bird to dwell beside the ocean" (Pukui and Curtis 1951:72). Regardless of the warning, the young chief came to the village of the  $m\bar{u}$  people and waited for the frightened  $m\bar{u}$  people to return, specifically the daughter of Kia. Eventually the daughter felt safe enough to come back into the home, and as she entered, the young chief sprang from his hiding place and blocked the door so that she could not run out. "She married the young chief and lived with him content. The forest bird was happy by the ocean, tamed by love" (Pukui and Curtis 1951:75).



Figure 13. Photo of Wainiha River and Valley, n.d. (Hawai'i State Archives)

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TMKs: Multiple
#### 3.2.5.2 Menehune Lighthouse at Makaihuwa'a - Wai'oli

Makaihuwa'a Ridge, the steep prominence overlooking the Waipā and Waikoko Stream Bridges includes three excavated pits on its ridgeline, a nearby village where tapa was traditionally produced, a taro *lo'i* (irrigated terrace), and *heiau* at its base. The Menehune Lighthouse at Makaihuwa'a is a reference to excavated pits in the steep ridgeline face on the western margin of Wai'oli, just *mauka* of Kūhiō Highway (Wheeler et al. 2013b).

Once, at the northwest base of Makaihuwa'a Ridge, Kupakoili Heiau stood; It no doubt was used by the people of Manolalu village. It also had a canoe mooring in the estuary which was created by the sand bar at the mouth of the Waipā Stream. It is at Manolau/Monolau that canoes were moored and, in the Wai'oli story, tapa was beaten. Manolau was probably a preferred landing and staging area and, at least at times, fires would burn on Makaihuwa'a Ridge to guide canoes into this estuary.

Makaihuwa'a is translated, *maka-ihu-wa'a*, "eye (prominence or mark) nose canoe"; perhaps it is a reference either to the signal fires in Wichman's tale of Makaihuwaa, or perhaps the phosphorescent glowing water at night. It is possible that from the ridgeline one could view phosphorescent algae glow seen in the water at night. Or, it may be that the name references the vision one may have had when they were paddling near shore looking at the nose of their canoe and saw these reflections of glowing signal fires or of the phosphorescent algae in the water. That is, the lights in the water were seen at the nose of the canoe because the canoe was breaking the water and agitating the algae, causing them to glow. Regarding Makaihuwa'a Ridge, Wichman relates the following:

Makaihuwa'a, 'eyes for the canoe prow,' is a ridge rising from the Wai'oli River. Menehune fishermen complained that on dark nights they could not find their way back to land when fishing on the deep ocean. Their chief devised a plan. He ordered his men to dig out a platform halfway up the ridge and place large torches there. On a dark night the light from these torches could easily be seen from outside the bay. In this way the first lighthouse in Hawai'i was built. [Wichman 1998:113]

The original source for this account is cited as "Akina, Joseph A., The Story of the Menehune People," an unpublished holographic manuscript in Hawaiian, translated by Frances Frazier (1904). A longer account is provided by Wichman (1985:35–42) in *Kauai Tales*. This account provides information about the fishermen, scattered from Hā'ena to Kīlauea, operating out of Hanalei Bay. An undercurrent of the story is that *menehune* proverbially had to complete their work at night which would require *menehune* fishermen getting back to shore in the pre-dawn in order to "feed all the *menehune* at their daily feast that finished just before daybreak" (Wichman 1985:36). In the Wichman (1985) account it is the concern of a *menehune* chief for the welfare of his people that leads him to ponder a solution to the Menehune fishermens' problem. As he moves about at night his attendants carry torches and *lamakū* (*kukui* nuts strung on a midrib; signal fires). He gets the idea to use such *kukui* nut torches as an aid to navigation and in the pre-dawn set "a line of *lamakū* burning and sputtering along the beach." The experiment helped a little but the light could not be seen from far off shore. The leader of the fishermen (described as owl-like) relates, "The idea is good. The lights are good. But they need to be higher" (Wichman 1985:40). Thus:

The chief . . . climbed up the ridge. When he could look out over the treetops and the clouds swirled just above his head, the chief . . . [said] 'Here we must dig out a

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platform from the edge of the ridge, large enough to place all the *lamak* $\bar{u}$  we need to light our fishermen home again.' The Menehune went about the chore with their usual good sense, sound engineering, and the knowledge that many hands working together make any chore easier and quicker. A small platform dug out of the side of a hill was a simple chore compared to many others they had done in years past. ... One group dug away the dirt and formed the platform. Another group formed a line reaching to the river beds of Waipa'a and Waikoko and passed smooth stones hand to hand to the work site. Before half the night was gone the platform was finished and paved with stones. All that time the torchbearers were busy trying to keep their torches lit . . . the rain sometimes fell so hard that the flames sputtered and danced away so far they became lost and went out. The chief sat farther up the ridge where he could see the work, and his voice shouting instructions could be heard. 'Build a roof over the platform' he yelled into the stormy night. 'It must be higher in front than in back. It must protect the torches from the rain. It must also be high enough so the roof won't catch on fire.' No sooner said than the work started. One group cut logs for uprights and the roof frame. Another group went for banana leaves which, laid down carefully, made a waterproof cover. Soon a flat roof with no walls had been built over the platform. The  $lamak\bar{u}$  were set in place and lit. For the rest of the night the flames sputtered and danced and poured a beacon of light into the dark and stormy night. [Wichman 1985:41–42]

3.2.5.3 Ka'alele of the Red Rocks – Lumaha'i

Rice (1923) gives the following account:

One day as the Menehunes were bathing at Lumaha'i, one of them caught a large *ulua*. The fish tried to escape, but the little man struggled bravely, and finally killed it. The man was so badly wounded, however, that his blood flowed over the spot and turned the earth and stones red. This place is still called Ka-'a-le-le, from the name of the wounded man. [Rice 1923:44–45]

Wichman (1998:117) indicates the "Rocks called *Ka'alele*, 'messenger', near the river mouth are noted for their redness."

3.2.5.4 Ka-'ī-li-o-pā-'ia Heiau – Lumaha'i

Rice (1923) gives the following account:

On the plain above the Lumahai River the Menehunes made their homes for a time. There one of the small men began to build a *heiau* which he called Ka-'ī-li-o-pā-'ia. As he was working, the big owl of Kāne came and sat on the stones. This bird was large enough to carry off a man, and, naturally, it frightened away the little workman. He returned next day, only to see the huge bird flying over the spot croaking. He also saw the great monster dog Kū-'ilio-loa, My-Long-Dog, running about the *heiau*. These evil omens caused the Menehune to believe that the *heiau* was polluted, so he gave up his work. [Rice 1923:44–45]

Regarding the construction of this *heiau*, Wichman (1998) tells of an omen interpreted as a fear that the people of the *ahupua* 'a might be punished by a chief for some real or imaginary offense by imposing a tax so heavy as to be almost impossible to pay:

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The *heiau* that a Menehune named Mā'ihi-lau-koa began soon after the Menehune arrived at Lumaha'i. First he marked the edges of the *heiau* with stakes of *hau* wood. Then he began to construct rock walls around a platform of coral. Before the work could be finished, a huge owl named Pueo-nui-o-Kāne, also known as Ka-'ā-'aia-nu'u-nui-a-Kāne, flew overhead. This was a fearful omen and gave rise to a saying: *Papapau kākou he 'ā'aia kō ka hale* The Legendary bird strikes at everyone. [Wichman 1998:120]

3.2.5.5 Kealahula Point - Lumaha'i

Rice (1923) gives the following account:

At the point of Kealahula, at Lumaha'i, these wonderful men made a small hill on the seashore, by cutting off part of the point. You can still see the bare place on the ridge, where the earth was sliced off. At the base of this small hill the Menehunes placed a large stone, which they used as a jumping-off place. The hill is called Ma-ka-ihu-wa'a, the Landing Place of the Canoes. [Rice 1923:44–45]

#### 3.2.6 Mo'o Accounts

#### 3.2.6.1 Hoʻohila

Wichman (1998) tells a traditional tale of Ka-hula'ana, "a cliff point at the seashore where one must swim around to the beach on the other side of the cliff," which is probably related to the following Hi'iaka account below:

When Hi'iaka and Wahine-'ōma'o came, Ho'ohila, the *mo'o* who guarded Kahula'ana, caused the waves to smash high against the cliff. She came out of her cave to see what Hi'iaka would do. Wahine-'ōma'o scooped up a handful of sand and flung it into the *mo'o*'s eyes. Ho'ohila retreated into her cave, her spell forgotten. The waves died down and Hi'iaka and her friend continued on their way. [Wichman 1998:115–116]

This path washed out anytime there was a storm, which meant travelers had to return home to wait until the path had been repaired or swim around it in dangerous waters.

#### 3.2.6.2 Kōleaka

The hill Ka-mo'o-kōlea-ka was once a dangerous *mo* 'o who lured the unwary to their deaths with a show of friendliness (Wichman 1985:49).

A chief from Wainiha was the object of the affections of this *mo* 'o. In olden times, Wai-a-ka-Pala'e Cave ("water of the lace fern") in Hā'ena was said to be the hair of a beautiful *mo* 'o maiden who would comb her hair near the entrance to the cave. She fell in love with a chief from Wainiha and they both disappeared for some time. When she reappeared she said the chief had died (Pacific Worlds 2004).

## 3.3 Wahi Pana

Hawaiian historian Mary Kawena Pukui defines each *ahupua 'a* name. Waipā literally translates to "touched water" (Pukui et al. 1974:227). Waikoko translates to "blood water" (Pukui et al. 1974:223). Wainiha is defined as "unfriendly water" (Pukui et al. 1974:226). While Wai'oli

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translates to "joyful water" and is also the name of a portion of a valley located in Hanalei. Wai'oli is also the name of a river (Emerson 1965:155). Lumaha'i is defined as "a certain twist of the fingers in string fingers" and is also a medicine (Pukui 1983).

The district of Halele'a ("joyful house") encompasses all of these *ahupua 'a* listed above (Pukui 1983:37). In addition, the mountain range that spans the district is known as Nāmolokama ("the interweaving bound fast") (Pukui 1983:162).

A special category of names is associated with the *menehune*. The *menehune* are said to have lived in these villages as recent as 1820. The names of the *menehune* villages include Naue, Pā'ie'ie, Maunaloa, Pali'ele'ele, Maunahina, Pōhakuloa, Opaikea, Hōmaikalani, and Lā'au were villages mentioned in Lydgate's 1913 report of the *konohiki* census during Kaumuali'i's time (1794-1825). A compilation of *wahi pana* with descriptions of sites and any other information pertaining to the site can be found in Appendix A.

#### 3.3.1 The Bird Man

A stone was placed "near the mountain of Maunahina in a little brook, above Wainiha, where to this day, natives leave offerings of *lehua* branches to the *kupua*, or demi-god, of the locality. On this stone, Lahi and his son lived, after Lahi had been defeated in Waimea" (Rice 1923:36).

Lahi, or Lauhaka, as he is sometimes called, lived in Wainiha valley. From childhood he had refused to eat any food but the meat of birds . . . Lahi and his uncle had moved to the head of a very narrow valley through which flowed a small stream. If anyone stepped into this stream at any place in its course, the water at the source would ripple. In this way a warning of the coming of friend or foe was always given . . . One day, as they were roasting birds, the boy saw the water rippling and called out his warning . . . they saw the king and his four hundred men advancing . . . [Rice 1923:36]

The pass was so narrow that only one man could ascend at a time. And so the boy killed the soldiers, one by one, as they attempted to come up, until the four hundred were thrown over the cliff. The last one to come up was the king. He recognized the boy as his own son and begged, "Give me life in the name of your mother!"

Lahi therefore spared his life (Rice 1923: 47–48). However, the king still planned to kill Lahi, but Lahi found out and killed his father and his faithless subjects. Lahi then became king.

#### 3.3.2 Kalauhe'e

Wichman (1998) retells an account associated with the place known as Ka'aluhe'e ("sagging one"; known also as Kalauhe'e, "slippery leaf"), a tributary stream on the east side of the Wainiha River:

On its banks, a lonely young woman beat her *kapa*. She was disfigured with birthmarks and people teased her by saying she was really a *loli* (seaslug). One day, as she beat her *kapa*, a *he* '*e mākoko* (deep ocean octopus) swam up the stream and settled on a rock near her. She was so lonely that she began to talk to the octopus. After many days the *he* '*e* revealed that he was a demi-god who could assume the form of a man. He assumed his human form and his face too, was marked as hers. Loli fell in love. She left her *tapa* soaking too long in the stream while they dallied.

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Her scandalized parents tried to separate the lovers, but Loli jumped off the nearby cliff. She was changed into a *he'e mākoko* to be united forever with her lover. [Wichman 1998:123]

#### 3.3.3 Ka'umaka (Kaūmaka)

Another storied place at Wainiha is Ka'umaka (also known as Kaūmaka). Wichman (1998) describes two accounts both involving a pair of fishermen and a shark's eye(s):

Ka'umaka-a-Mano's grandfather had united the island into one kingdom and his father Mano-kalani-pō, had been able to enlarge the cultivated lands. Hunting for the man-eating shark along Nāpali was popular. Ka'umakaamano went shark fishing, and that episode became the basis of the tales told of this point that bears his name.

Two brothers, Wa'awa'a-iki-na'auao and Wa'awa'a-iki-na'aupō, were fishing. The older, who didn't want to clean fish, said that all fish with two eyes belonged to the younger brother, while he, the older, owned all the fish with only one eye. A shark with only one eye (the other was blind and bulged out like a nipple, hence Kaūmaka, 'nipple,' a variation on the name) was caught by the younger brother, who immediately turned the line over to his older brother. The shark towed Wa'awa'aikina'auao out to sea where, with great difficulty, he escaped from the shark and returned to land.

Another story of this point concerns two male *kupua* named Ka'u-maka, 'my eye,' and Ka'u-weke 'my weke fish.' They were fishing at this cape, but all the small fish had disappeared. They saw a shark and Ka'umaka jumped into the water and fought with it. Ka'umaka was very strong and killed the shark. Ka'uweke was able to catch *weke* (goatfish) from the headland once the shark was gone. The two feasted that evening. Ka'uweke on his favorite fish and Ka'umaka enjoying dining on the shark's eyes. [Wichman 1998:123]

Literary sources give an incomplete picture of the aboriginal settlement of Wainiha, but a degree of insight may be gained from their examination. Lydgate (1913), as mentioned before, reported on a census taken by the *konohiki* of Wainiha during Kaumuali'i's time. Kaumuali'i was the reigning chief of Kaua'i from 1794-1825 (Kamakau 1961:169, 265). At this time "upward of 2,000 souls" resided in the valley in the villages of (listed *makai* to *mauka*) Naue, Pā'ie'ie, Maunaloa, Pali'ele'ele, Maunahina, Pōhakuloa, Opaikea, Hōmaikalani, and Lā'au. Lydgate (1913) goes on:

... Laau, the hamlet farthest *mauka* in the depths of the mountains, where the valley contracts to a narrow gorge, with a brawling stream running white in the bottom . . . All along up the river, wherever the encroaching *palis* on either side leave the least available space, the land has been terraced and walled up to make '*lo*'is.' And so the whole valley is a slowly ascending stairway of steps, broad in tread and low in the rise, all the way to Laau, where the last available space was won, if not by dwarfs, at least by someone who understood this kind of agricultural engineering. These artificial lands have long since reverted to the wilderness from which they came, and it is only by chance that the traveler stumbles upon them, beating his

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

way through the jungle. But they bear witness to a large population . . . [Lydgate 1913:126]

Bennett (1931:136), during his survey of Kaua'i in 1928-1929, observed the remains of many terraced house sites and irrigated fields at Maunahina Ridge (Site 153), about 4½ miles from the sea. Interestingly, Maunahina is said to be the location of the ancient trail (Wichman 1985:114) that leads out of Wainiha, up to Kilohana at the north edge of the Alaka'i Swamp, through Kōke'e and down to Waimea on the southwest side of the island. Undoubtedly, the trail was used to take advantage of the resources of Alaka'i and as a shorter (however, more difficult) overland alternative route to Waimea. The use of this trail tempers the perception of Wainiha as simply a high-walled valley, open only at the shoreline, and perhaps was at least part of the incentive for habitation and development in the valley's upper reaches.

## **3.4 Other Cultural References**

#### 3.4.1 Rain Names of Wai'oli

The rain that ripened the mountain apples of Wai'oli (*Ka ua ho'opala 'ohi'a o Wai'oli*) is referred to in the Lonoikamakahiki traditions (Kamakau 1961:52; Fornander 1919:4(2):358–359).

Wichman's (1985:49) account of *Wai'oli* associates Lani-huli with the yellow rain called Ualena. Wichman (1998:113) relates that the rain associated with the massive mountain range of Nāmolokama is "Ua-lani-pili" ("rain of the near heavens").

#### 3.4.2 Wind Names of Wai'oli

Accounts of the *Legend of Kuapaka'a* name the wind of Wai'oli as "Waiamau" (*He waiamau ko Wai'oli*) (Fornander 1917-1918:5(1):96-97). *The Epic Tale of Hi'iakaikapoliopele* lists several winds of the area. Pele tells Lohi'au "this is an area here on Kaua'i with myriad winds. The land here on Kaua'i with the most winds, however, is Wainiha. . . . Wainiha has thirty-two . . . " (Ho'oulumāhiehie 2008:18).

The wind of Nāmalokama is an Ualanipili

The wind of Wai'oli is a Huiwaiamau

The man-smiting moss of Manu'akepa is slick

and slippery

A wind of the sandy stretches of Manolau

The wind of Kūpākoili is a Makaihuwa'a

The wind that takes hala blossoms, food of

the kīna'u eel, is a Kalena

60. Urging on the people of the land

Here is Māpuana, taking all

And swimming off in the sea, sparing that land

The fish is a kīna 'u eel

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple The wind of Waipa is an 'Oma'okaulehua 65. The wind of Waikoko is a Māpuholo The wind of Kiimaku'u is a Moapali The wind of Kalualanoho is a Kaupaku'ole The wind of Kahalahala is a Polipumehana The wind of Kealahula is a Kaiko'o 70. The wind of Pu'uhinahina is a Kuhia The wind of Kēwā is a Mahinakēhau The wind of Lumaha'i is a Haukoloa The wind of Kuamaui is a Palekēwai Floating on the windblown watercourses of Wainiha's highlands 75. The water surges forth, rushing along with the wind The winds of La'a go amid the wild hē'ī banana in the gulches Over the streams rushing to the sea The woman is of the shore, the woman is of the uplands The winds of Lumahaa are doubly-blustering at the bays 80. High is the flight of the clouds in the heavens Raised up by the winds of the land Beloved land of Lumahaa, there beyond. And finally the myriad winds of Wai'niha Here below are the winds as they were named by Pele, and it truly is a small land to be so buffeted by winds, as will be seen. The wind of Wainiha is a Ho'opulukēwai The wind of Wainiha is a Waianu The wind of Wainiha is a Kuamauna The wind of Wainiha is a Ka'awakiki 5. The wind of Wainiha is a Pāpala'ā The wind of Wainiha is an Akeakea The wind of Wainiha is a Paio The wind of Wainiha is a Mālualani The wind of Wainiha is a Nihipali

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple

10. The wind of Wainiha is a Pāweo The wind of Wainiha is a Lulu'upali The wind of Wainiha is a Lehualā'au The wind of Wainiha is a Hanakaipo The wind of Wainiha is a Pe'a 15. The wind of Wainiha is a Maunahina The wind of Wainiha is a Puna The wind of Wainiha is a Kalalea The wind of Wainiha is a Hukia The wind of Wainiha is a Malama 20. The wind of Wainiha is a Pueo The wind of Wainiha is an 'Alihiwai The wind of Wainiha is a flying Lele wind The wind of Wainiha is a Kapaia The wind of Wainiha is an Amoa  $25 \cdot$  The wind of Wainiha is a Hīhīmanu The wind of Wainiha is a Likenōalike The wind of Wainiha is a Limunui. [Ho'oulumāhiehie 2008:20–22]

#### 3.4.3 Winds of Lumaha'i

Accounts of the "Legend of Kuapaka'a" name the wind of Lumaha'i as "Haukolo" (Fornander 1917-1918:5(1): 96–97). Wichman (1998) reports that at Lumaha'i:

A special wind was *Kalena ka makani lawe pua hala'ai a ke kīna'u*, '*Kalena* is the wind that strews the pandanus fruit eaten by  $k\bar{i}na'u$  eels.' The  $k\bar{i}na'u$ , a small white eel, ate the *hala* fruit and in turn were eaten themselves. [Wichman 1998:117]

#### 3.4.4 Terms of the Mauka Regions

There are many terms for rains in the *mauka* regions of the area. The cold weather, fog, and mist are also accompanied with rain patterns. Terms include *ki'owao, ko'iawe, 'awa, kēhau, kilihune, lelehune, noekolo, and uakoko*, which would apply to the terms of Wainiha Mauka (Pukui and Elbert 1986). These terms also apply to wet areas around the Hawaiian archipelago as well.

## 3.5 'Ōlelo No'eau

Mary Kawena Pukui is known as one of the greatest contributors to the preservation of the Hawaiian language, a scholar, and ethnographer. Hawaiian knowledge was shared by way of oral history and many often competed in poetic battles of wit to see who could ascribe the most *kaona* to the simplest phrase. The following section draws from Pukui's knowledge of Hawaiian folk

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

tales, proverbs, and sayings to describe the '*āina* (land) in the project area. The '*ōlelo no*'eau is first described, followed by the Hawaiian phrase and English translation.

#### 3.5.1 'Ōlelo No'eau of Wai'oli Ahupua'a

#### 3.5.1.1 Proverb #2860

When Kamehameha dreamed of his conquest of Kaua'i, he mentioned the southernmost boundary of Wai'oli, Namolokama, as one of the places he wished to enjoy:

E holo a inu i ka wai o Wailua, a hume i ka wai o Nāmolokama, a'ai i ka 'anae 'au of Kawaimakua i Hā'ena, a lei ho'i i ka pahapaha o Polihale, a laila, ho'i mai a O'ahu, 'oia ka 'āina e noho ai

Let [us] go and drink the water of Wailua, wear a loincloth in the water of Nāmolokama, eat the mullet that swim in Kawaimakua at Hā'ena, wreathe [ourselves] with the seaweed of Polihale, then return to O'ahu, the land to dwell upon. [Pukui and Elbert 1986:271]

Another saying is: "'U'ina ka wai o Nāmolokama," [The water of Nāmolokama falls with a rumble] because because Nāmolokama Falls, Kaua'i is famous in chants and songs (Pukui 1983:313).

#### 3.5.2 'Ōlelo No'eau of Waipā Ahupua'a

#### 3.5.2.1 Proverb #1107

The following proverb describes the wind of the area:

Hoopāpā i Waipā ka Lūpua.

#### The Lūpua wind touches at Waipā.

Said of one who cannot refrain from touching or pawing. Waipā is the name of a wind and location on Kaua'i. [Pukui 1983:118]

#### 3.5.3 'Ōlelo No'eau of Lumaha'i Ahupua'a

#### 3.5.3.1 Proverb #1778

The following proverb describes shells native to Kaua'i island used for the craft of hat bands:

Ke one lei pūpū o Waimea.

#### The sand of Waimea, where shells for lei are found.

Waimea, O'ahu, and Lumaha'i, Kaua'i, were the two places where the shells that were made into hat bands were found. Those on O'ahu were predominantly white and those on Kaua'i, brown. Not now seen. [Pukui 1983:191]

#### 3.5.4 'Ōlelo No'eau of Hanalei Ahupua'a

#### 3.5.4.1 Proverb #404

The following 'olelo noeau discusses a mo'olelo concerning the ali'i of Hanalei and his land:

Haehae ka manu, ke 'ale nei ka wai.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple

#### Tear up the birds, the water is surging.

Let us hurry, as there is no time for niceties. Kane'aloha and his son lived near the lake of Halulu at Wai'ale'ale, Kaua'i. They were catchers of '*uwa'u* birds. Someone falsely accused them of poaching on land belonging to the chief of Hanalei, who sent a large company of warriors to destroy them. The son noticed agitation in the water of Halulu and cried out a warning to his father, who tore the birds to hasten cooking. [Pukui 1983:50]

3.5.4.2 Proverb #1442

This '*ōlelo no* 'eau discusses the *limu* of Hanalei:

Ka limu kā kanaka o Manu 'akepa.

#### The man-throwing algae of Manu'akepa.

Hanalei, Kaua'i, was known for its pouring rain. A slippery algae grows among the grasses on the beach, and when carelessly stepped on, it can cause one to slip and fall. This algae is famed in songs and chants of that locality. [Pukui 1983:156]

3.5.4.3 Proverb #1584

The following describes the rain of the *ahupua* 'a:

Ka ua loku o Hanalei.

#### The pouring rain of Hanalei. [Pukui 1983:170]

3.5.4.4 Proverb #1787

This proverb describes the deameanor of a person as well as a *wahi* (place) in Hanalei Valley:

Ki'ekie'e Kaupoku-o-Hanalei.

#### High up is Kaupoko-o-Hanalei.

Said of the haughty, conceited, or willful. Kaupoku-o-Hanalei is a ridge behind Hanalei Valley, Kaua'i. [Pukui 1983:192]

#### 3.5.4.5 Proverb #2034

The proverb below describes an expression related to the rain of Hanalei:

Lu'ulu'u Hanalei i kaua nui; kaumaha i ka noe o Alaka'i.

# Heavily weighted is Hanalei in the pouring rain; laden down by the mist of Alaka'i.

And expression used in dirges and chants of woe to express the burden of sadness, the heaviness of grief, and tears pouring freely like rain. Rains and fogs of other localities may also be used. [Pukui 1983:219]

#### 3.5.4.6 Proverb #2151

The following 'olelo no 'eau is an expression related to Hanalei Ahupua'a:

Me'e u'i o Hanalei.

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#### The handsome hero of Hanalei.

Said of one who is attractive. [Pukui 1983:234]

## 3.6 Mele Oli

#### 3.6.1 He Oli

The following *mele oli* describes a part of a rainy valley within Hanalei Ahupua'a, which neighbors Wai'oli Ahupua'a to the east:

He Oli

Halau Hanalei i ka nini a ka ua; Kumano ke poʻo-wai a ka liko; Naha ka opi-wai a Wai-aloha; O ke kahi koe a hiki i Wai-oli. Ua ike ʻa.

Translation A Song

Hanalei is a hall for the dance in the pouring rain; The stream-head is turned from its bed of fresh green; Broken the dam that pent the water of love— Naught now to hinder its rush to the vale of delight. You've seen it. [Emerson 1965:155]

#### 3.6.2 Waipā

Waipā is the *ahupua* 'a that extends from the *mauka* areas of the Halele'a Forest Reserve in the Hanalei district to the *makai* access to the sea (Pukui et al. 1974:226). The following is a poetic verse describing the fragrant *hala* which grows along the banks of the stream in Waipā.

Hoohiki oe a hihi I lei kohu no neia kino. Ahea oe hiki mai? Akau ka La i na pali; Ka huli a ka makani Wai-a-mao, Makemake e iki ia ka Hala-mapu-ana, Ka wai halana I Wai-pā.

<u>Translation</u> Entwine them into garland, Fit emblem and crown of our love. And what the hour of your coming? When stands the Sun o'er the pali, When turns the breeze of the land, To breathe the perfume of hala, While the currents swirl at Wai-pā.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

[Emerson 1965:133-134]

## 3.7 Mele

There are several *mele* that concern or mention the various *ahupua* 'a in Halele' a Moku, presented below.

#### 3.7.1 Lumaha'i

The following *mele* by Alfred Alohikea, transports the reader to the beaches of Kaua'i and describes the areas via proverbs and poetical phrases. The third verse is about Lohi'au, the prince of Kaua'i who resides in Hā'ena Ahupua'a and was the lover of the fire goddess, Pele. Pele's youngest sister, Hi'iaka, was sent to Kaua'i to escort Lohi'au back to her sister on Hawai'i Island. The seaspray represents the hardships encountered on the voyage as well as Lohi'au's changing attitude between the two sisters.

Hanohano Hanalei i ka ua nui He pakika i ka limu o Manu'akepa

'Au'au i ka wai 'o Lumaha'i Ka lehua maka noe o Lulu'upali

E'ena Hā'ena i ka 'ehu kai A he aha la o ka hana Lohiau ipo

Haʻina ʻia mai ana ka puana He pakika i ka limu o Manuʻakepa

#### **Translation**

Famous is Hanalei for much rain Slippery the seaweed of Manu'akepa

Bathed in the water of Lumaha'i Is the misty-faced lehua of Lulu'upali

Ha'ena is fearful, because of the seaspray And what is Lohiau ipo's work

The story is told Slippery the seaweed of Manu'akepa [Huapala 2015]

#### 3.7.2 Nāmolokama

The *mele* in manuscript below by Alfred Alohikea was found in Hilo. Nāmolokama is the name of a waterfall in the Nāmolokama Mountains located within Hanalei Valley.

TMKs: Multiple

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Kani 'u 'ina lā Ka wai a 'o Nāmolokama Nākolo e oeoe nei i Ke alo o nō pali Ho 'ohāku 'i ana i ka pae 'ōpua Ho 'ohihi wale aku nō wau i laila

Hui: 'U'ina 'u'ina 'u'ina Ka wai a'o Nāmolokama

'U'ina 'u'ina 'u'ina Nākolo e, nākolo lā Nākolo e, nākolo lā

<u>Translation</u> Rumbles The waterfall of Nāmolokama It roars before The face of the cliffs The sound reaches the cloud banks How I long to be there again

Chorus: Rumbles, rumbles, rumbles the waterfall of Nāmolokama rumbles Rumbles, rumbles, rumbles Roars, roars, Roars, roars [Huapala 2015]

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple

## Section 4 Historical Accounts

## 4.1 The Māhele and the Kuleana Act

In the mid-1800s (1845 and 1846), through the Organic Act, Kamehameha III decreed a division of lands called the Māhele which introduced private property into Hawaiian society (Chinen 1958). In 1848, lands were divided into three portions: crown lands, government lands, and lands set aside for the chiefs. Individual plots, called *kuleana* (Native Hawaiian land rights) awards, were granted within these divided lands to native inhabitants who lived on and farmed these plots and came forward to claim them. The population during this time period is unknown. A population distribution map by Coulter (1931) (Figure 14) indicates estimates for the population of Kaua'i ca. 1853, "concentrated chiefly on the lower flood plains and delta plains of rivers where wet land taro was raised on the rich alluvial soil" (Coulter 1931:14). Table 1 summarizes the Land Commission Awards (LCA) in the Halele'a District.

Maly and Maly (2003) provide information regarding Māhele 'Āina of Waipā Ahupua'a:

- James Kanehoe the son of John Young, foreign advisor to Kamehameha I, Kanehoa accompanied Liholiho to England and was his translator. He was *konohiki* [land overseer] of Waipā at about 1839.
- Koukou *konohiki* under Kanehoa in the 1840s; and
- Kamokuhina *konohiki* at the time of LCAs.

DISPOSITION OF LANDS: THE MAHELE 'AINA AND DEVELOPMENT OF FEE-SIMPLE PROPERTY AND FISHERY RIGHTS (CA. 1846-1855) By the middle 1840s, the Hawaiian system of land tenure was undergoing radical alteration, and the Hawaiian system of land and fishery rights being defined and codified. The laws set the foundation for implementing the Māhele 'Āina of 1848, which granted fee-simple ownership rights to the hoa 'āina (common people of the land, native tenants). The records of the Māhele are of great importance, as they identify families associated with lands; describe practices on the land; and some, also identify fishery resources. During the Mahele at least 251 claims were registered for *kuleana* (by native tenants) and *ahupua 'a* (by *ali 'i* or *konohiki*) in the Halele'a District; of those claims, 194 were awarded. Thus, 57 applicants either withdrew their claims (many died in the process), or had their claims rejected as not being justified (Hawaii State Archives (HAS) Interior Department digitized records of claims in the collection of Kumu Pono Associates LLC and Hawaii Board of Commissioners Indices of Awards 1929). Only two claims were located for land in the Nāpali District. One being made by Hawele, for a parcel at Wailaulau (not awarded), the *ahupua* 'a name not being given; and the other, being one-half of the ahupua'a of Hanakoa, awarded to Mokuohai (Buke Mahele 1848:76); who was also a resident landlord in the Kē'ē vicinity. [Maly and Maly 2003:6, 8, 18, 20, and 27–28]

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple



Figure 14. Map showing population estimate for Kaua'i in 1853 (Coulter 1931:16)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Of the lands in the Halele'a District, the following list identifies the *ahupua* 'a, number of claims made, and number of awards issued in each *ahupua* 'a:

Ahupua'a	Number of Claims	Number of Awards	<i>Aliʻi</i> Claimant
Ha'ena	34	25	A. Paki
Hanalei	75	57	Kamehameha III/ Government
Kalihikai	15	14	A. Kealiiahonui
Lumaha'i	2	1	L. Konia
Waikoko	2	1	M. Kekauonohi
Wainiha	43	33	M. Kekauonohi
Waiʻoli	66	51	Kamehameha III/ Government
Waipā	14	12	R. Ke'elikolani and J.Y. Kanehoa

Table 1. Summary of LCAs in the Halele'a District

Researching the claims and testimonies given in the mid-1800s can sometimes assist in forming a settlement pattern for the region at that time and possibly earlier. Thus, it is through records for LCAs generated during the Māhele that specific documentation of traditional life in Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a comes to light. Fisheries, as well as land uses, are described in the *Māhele 'Āina*. M. Kekuanaoa; to Keoni Ana:

I, M. Kekuanaoa, make known the prohibited fish of the lands of V. Kamamalu, and Ruta Keelikolani, on the island of Kauai . . . R. Keelikolani Apana 5: Waipa Hee. [Hawai'i State Archives Interior Department – Lands Document]

#### 4.1.1 The Māhele and the Kuleana Act of Wai'oli

From the LCA testimony, it seems that by 1850 the people in the district have a tradition of shared resources and functioned as part of the larger district entity rather than maintaining a separate *ahupua* 'a status. Even though neighboring *ahupua* 'a would have had their own resources, LCAs show some persons had agricultural land in Wai'oli but lived elsewhere, and some people living in Wai'oli had agricultural land elsewhere. During early historic times Wai'oli served as a nucleus of not only the new western culture and religion, but also as a resource garden for imported cultigens in the vicinity of the Wai'oli Mission.

The Land Commission Awards describe at least 154 taro *lo* '*i* along the Wai'oli Stream, the '*auwai* (irrigated ditch) systems, and Waikonono Stream, another small stream leading eventually down to the floodplain on the Nāpali side of Wai'oli Stream. There are 26 claims for house lots in Wai'oli with 12 persons claiming they live in Hanalei (LCAs 4109, 9139, 9261, 9274, 9275, 9276, 9278, 9280, 10593, 10594, 10915, and 11059) but have their *lo* '*i* in Wai'oli. Another claimant has a house lot in Wai'oli but the rest of his land is in Hā'ena (LCA 7949). Various other claimants mention they live in Wai'oli but do not claim a house lot. There are claims for 27 *kula* (pasture) in Wai'oli. There are no specified crops listed for any of the *kula*, but based on traditional *kula* lands, there would be sweet potatoes, yams, bananas, and sugarcane. One claimant mentions a *muliwai* (or brackish water pond behind the sand dunes used for fishing; LCA 3781), and two mention a fishpond (LCAs 4109, 10309). The Land Commission Awards also include one for the Wai'oli

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Mission, where claim is for a framed schoolhouse, pasture land and cultivated grounds, a 4-acre taro patch, a Native Church on 1/2 acre, and pasture land on the narrow strip on the western side of the Wai'oli River.

Wai'oli, with 3,350 acres, has 154 claims for lo'i, which works out to .046 lo'i per acre for the entire ahupua'a or probably 1.5 per acre on the 100 acres of floodplain. Lo'i represent 74% of possessions claimed, kula 13%, house lots 12.6%, and other less than 1%. A scant 14% of the awardees claimed to have held the land prior to 1824. A guarter of the claimants received their land during the time of avida Papohaku, konohiki of Wai'oli from 1834-1837. Davida Papohaku or David Stonewall was one of the five members who came with Rev. Whitney to help organize the Wai'oli Mission and it was his duty to correct and help Mr. Alexander translate his sermons into Hawaiian. He came with 75 of his own retainers and they formed the little village of thatched huts known as Kalema or Bethlehem (Damon 1931:325). Perhaps these claimants' families came with Papohaku to the Hanalei area and were part of his train. Another fifth of the claimants received their land from Daniela Oleloa, a konohiki in the 1840s. Oleloa did not have a very high genealogy but he held four lands prior to the Māhele (Kamē'eleihiwa 1992:280). There are 88 names mentioned in the LCAs as neighboring land cultivators or house lot holders and some of these persons received grants to the land, such as Emelia but have no LCA listed for them. Others like Lewi and Kalili are shown in the LCA index as having received land, but no maps show them as having title to the land (at least by 1912). We might assume they died, perhaps intestate, or perhaps they have passed the land to someone else. In any case someone else is shown occupying the land they claimed. Table 2 summarizes the LCAs along the highway in and around the environmental study area of Wai'oli for the current proposed project.

LCA # TMK or maps	Awardee	<i>Ahupua'a</i> and <i>'Ili</i>	Land Use	Landscape Features	Amount
387 Lydgate 1912 map	ABCFM (American Board of Commissioners for Foreign Missions)	Waiʻoli	Wai'oli Mission residence, church schoolhouse, pasture land, and cultivated land	On the narrow strip of land on the western side of Wai'oli River	9.79 acres
10305	Nahau, D.	Waiʻoli	House lot	Government road, jail house	2 acres, 3 roods 2 rods
3781 5-5 Lydgate 1912	Opio	Waiʻoli Manuakepa	House lot	Road	2 acres, 15 rods

			-	
Table 2 I CAs along	Kuhiō Highway i	n Wai'ali	from East to	Woot
1 auto 2. LCAS along	Kumo mgmway i	II wai uii.	I I UIII Last to	VV USL

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

LCA # TMK or maps	Awardee	<i>Ahupua'a</i> and <i>'Ili</i>	Land Use	Landscape Features	Amount
9833B 5-5 Lydgate 1912	Ререе	Waiʻoli, Kapanoa, Kuloko, Nanipoa, Nanihoa	House lot	Government road, <i>muliwai</i>	2 acres, 17 rods
4075 5-5 Lydgate 1912 map	Koi and Kapela	Waoili Kapuoa	House lot	Government road, <i>muliwai</i>	1 rood 1 rod
10663:2 5-6-004	Puaiki	Waiʻoli	Five <i>loʻi</i> in Waiʻoli	Five <i>loʻi</i>	Unknown

#### 4.1.2 The Māhele and the Kuleana Act of Waipā and Waikoko

Waipā Ahupua'a was awarded to Ruta Ke'elikōlani, great-granddaughter of Kamehameha I, during the Māhele: LCA 7716:1, TMK: 5-6-04, which became part of the Bishop Estate. It was one of 12 lands she retained, the majority of which were located on Hawai'i Island and Maui (Dye 2004:8). Eleven individuals were awarded lands in Waipā Ahupua'a. Table 3 summarizes the LCAs along the highway in and around the study area of Waipā for the current project. There were two names mentioned in Waikoko Ahupua'a but only one was awarded. LCA 11216 was given to M. Kekauonohi, great-granddaughter of Kekaulike, King of Maui, and granddaughter of Kamehameha the Great. No land use or landscape features were given. Figure 15 illustrates LCAs awarded in Wai'oli, Waipā, and Waikoko Ahupua'a.

LCA # TMK or maps	Awardee	<i>Ahupua'a</i> and <i>'Ili</i>	Land Use	Landscape Features	Amount
3781:3 5-6-004	Оріо	Waipā	Fishpond and <i>loʻi</i>	Public road and <i>pali</i>	Two <i>'āpana</i> (parcel); 2 acres 15 rods
10171 5-6-004	Mana (not Waiʻoli Mission and not 1071)	Waipā Haʻaheo	House lot (TMK gives 0.25 acres)	Public road and Makanui	One <i>'āpana</i> ; 1 rood
10076:2 5-6-004	Makanui	Waipā Kiwaa, Haʻaheo	Four <i>lo 'i, kula,</i> and house lot (TMK gives 0.25 acres)	Government road, <i>muliwai,</i> hau	One <i>'āpana</i> ; 3 roods 14 rods

Table 3. LCAs Along Kūhiō Highway in Waipā and Waikoko, from East to West

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

LCA # TMK or maps	Awardee	<i>Ahupua'a</i> and <i>'Ili</i>	Land Use	Landscape Features	Amount
9118:2 5-6-004	Koukou	Waipā	House lot (TMK gives 0.25 acres)	<i>Makai</i> by beach, government road	Two <i>'āpana</i> ; 1 rood 33 rods
9832:3	Kupukupu	Waipā Haako	House lot	<i>Mauka</i> foot path; <i>makai</i> beach	No amount given
7918:2 5-6-004	Kanohokou	Waipā Kapuhae, Kuhihiilu, Kawaihine	House lot in Kapuhae	<i>Mauka</i> public road; <i>makai</i> sea beach	One <i>'āpana</i> ; 1 rood 8 rods
235N:2 5-6-004	Nuuanu	Halaloa, Puaanui	<i>Kula</i> and two <i>loʻi</i>		One <i>'āpana</i> ; 6 acres 1 rood 31 rods
10663:2 5-6-004	Puaiki	Waipā Wai'oli	House lot in Waipā		No amount given
7716:1 5-6-003	R. Keelikolani	Waipā Ahupua'a			No amount given
11216:4 5-6-003	M. Kekauonohi	Waikoko Ahupua'a			476 acres

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple



Figure 15. 2013 Google Earth Aerial Imagery with LCA overlay spanning Wai'oli, Waipā, and Waikoko Ahupua'a

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

#### 4.1.3 The Māhele and the Kuleana Act of Wainiha

Wainiha is part of a larger LCA (11216.5) of M. Kekau'ōnohi, great-granddaughter of Kekaulike, King of Maui and granddaughter of Kamehameha the Great. A study of all the claims and their supporting testimony for Wainiha shows a well-developed land system in place. The overall settlement pattern, dating to the mid-1800s, exhibited habitation near the coast and agricultural undertakings in the well-watered interior areas. During his island-wide survey of Kaua'i in 1928-1929, Bennett (1931:136) observed the remains of many terraced house sites and irrigated fields at Maunahina Ridge (Site 153), about 7.2 km (4.5 miles) from the sea. Maunahina is said to be the location of the ancient trail (Wichman 1985:114) that leads out of Wainiha, up to Kilohana at the north edge of the Alaka'i Swamp, through Kōke'e and down to Waimea on the southwest side of the island, used to take advantage of the resources of the Alaka'i and as an overland alternative route to Waimea. Earle's (1978:58–67, 126) analysis of the Land Commission Awards of 1850 shows that by that time, far inland sites were already abandoned and active use of the valley extended only about 2.4 km inland from the sea. At Wainiha, Earle's field survey identified six separate irrigation systems. Table 4 summarizes the LCAs along the highway in and around the proposed project area of Wainiha, also illustrated in Figure 16.

LCA # TMK	Awardee	<i>Ahupua'a</i> and <i>'Ili</i>	Land Use	Landscape Features	Amount
9169:2 5-8-011	Kealai	Wainiha Kaili, Naue	House lot, <i>loʻi,</i> and <i>kula</i>	2) Napali by water course; Koʻolau by rook Laukalo	No amount given
11216:5 5-8-011 and 012	M. Kekauonohi	Wainiha Ahupuaʻa			No amount given
9171:1 5-8-007	Keaka	Wainiha Kapaloa, Puhalanui, Kapaele, Ulukea	<ol> <li>house lot and farming pasture (TMK is</li> <li>575 acres)</li> <li><i>kula</i></li> <li>three <i>lo 'i</i></li> <li>one <i>lo 'i</i></li> <li>one <i>lo 'i</i></li> </ol>	Bounded <i>makai</i> and Koʻolau by Wainiha River	Five <i>'āpana</i>
9184:2 5-8-006	Kamoolehua	Wainiha Kapohaku	1) house lot 2) two <i>lo 'i</i> (TMK is 0.217 acres)	2) Napali by ditch, Koʻolau by Wainiha River	Two <i>'āpana,</i> 1 acre 34 rods
9267:2 5-8-006	Pumaia	Wainiha Kaeleele, Paulihu	<ol> <li>house lot in</li> <li>Paulihu</li> <li>three <i>lo</i> 'i and <i>kula</i> in Kaeleole</li> </ol>	No. 2 bounded by <i>lo</i> ' <i>i</i> , watercourse, and <i>konohiki kula</i>	No amount given

Table 4. LCAs along Kūhiō Highway in Wainiha, from East to West

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

LCA # TMK	Awardee	<i>Ahupua'a</i> and ' <i>Ili</i>	Land Use	Landscape Features	Amount
9271:1 and :2 5-8-006	Kapuumaka	Wainiha Kaeluku, Umi	1) house lot in Kaaluhee 2) four <i>loʻi</i> in Umi		Two <i>ʿāpana</i> in Umi 2.25 acres
9270:1 5-8-006	Kiwaa	Wainiha Kaeleele, Kaluhea	House lot in Kaelieli, two <i>loʻi</i>	<i>Mauka</i> church yard and road; Napali, church <i>makai</i> Wainiha river; Koʻolau Kaahoku brook	One <i>'āpana</i> , 1 rood 28 rods



Figure 16. 2013 Google Earth Aerial Imagery with LCAs found in Wainiha Ahupua'a

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

#### 4.1.4 The Māhele and the Kuleana Act of Lumaha'i

Basic *kuleana* documentation specifies that the entire *ahupua'a* was awarded to L. Konia Wahine. No individual *kuleana* are indicated by the Māhele data to date. In addition to the irrigated fields of *kalo*, it can be assumed that all the common Hawaiian agricultural crops were raised in Wainiha. Handy and Handy (1972) state the following:

There were, of course, house sites all through the valley on ground not suitable for irrigation. On such land sweet potatoes were planted. Bananas flourished: in 1931 *mai 'a Poloapola* (Borabora banana, *musa pehi*) was found in gulches. This Tahitian banana, which bears its fruit on an upright stalk, is said by local Hawaiians to be indigenous to Wainiha. *'Awa* of several varieties was growing there also, and undoubtedly the economic staples *wauke* and *olona* were planted. Specimens of yams were collected in 1931. [Handy and Handy 1972:420]

The *Foreign Testimony* (1850) presented before the Land Commission indicates Hawaiians were also raising more recently introduced crops such as oranges and coffee. The cultivation of rice came to Wainiha like to many other *kalo*-growing areas in Hawai'i, during the late 1800s. Immigrant Chinese rice growers took over former *lo'i* devoted to *kalo* and founded a major cash crop industry catering to Hawai'i's growing Asian population (Coulter and Chun 1937:21).

LCA # TMK or maps	Awardee	<i>Ahupua'a</i> and ' <i>Ili</i>	Land Use	Landscape Features	Amount
5224:7 5-7-001	L. Konia Wahine	Lumahaʻi Ahupuaʻa			No amount given

Table 5. LCAs along Kūhiō Highway in Lumaha'i, from East to West

## 4.2 The Boundary Commission Reports for Kaua'i (1873)

Following the Māhele, there arose a need to define the boundaries and rights of *ahupua'a* awarded or sold to large private owners, mostly *ali'i* (Waihona 'Aina 2000). As a result, a Commission of Boundaries was formed, and testimonies from elder native residents was taken. A thorough review of all records of the Boundary Commission was made as a part of this study. Narratives describing boundaries of the lands of Lumaha'i, Wai'oli, Waipā (Waipaa) (all 1873) appear in Appendix B. These narratives include testimonies describing land features, *wahi pana* (storied places), and the original survey notes for the named lands. In the previous period, or as a part of the proceedings, maps were also produced in conformance with the testimonies and Certificate of Boundaries.

Duncan McBryde was the Commissioner of Boundaries for the Island of Kaua'i in 1873. Edwin O. Hall requested the boundaries of Wai'oli but the report did not state whether he was the owner. The boundaries for the *ahupua'a* of Waipā were requested on behalf of Her Excellency, R. Keelikolani, who was the owner of the land; Lumaha'i was owned at this time by Charles R. Bishop.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

## 4.3 Late 1800s to Modern Land Use

#### 4.3.1 Late 1800s to Modern Land Use in Wai'oli

Karol Haraguchi (1987) brackets the rice-growing period from the mid-1860s—at the end of the whaling industry-until the 1920s, when California rice began to take over the Hawaiian rice market. The Hanalei Valley of Kaua'i led all other single geographic units in the amount of acreage planted in rice (Figure 17 and Figure 18). The development and maintenance of the Kūhiō Highway facilitated the export of surplus crops grown in Halele'a (Figure 19). The valley was one of the first areas converted to this use and continued to produce well into the 1960s. Haraguchi notes that Chinese immigrants, who first arrived as contract laborers in 1852, worked most of the rice fields. It was not until after 1882 that Japanese workers supplanted the Chinese labor force in Hawai'i. Haraguchi documents the revival of the Hawai'i rice industry in 1906, 1933, and 1934, which was especially fruitful in the remote Hanalei Valley where at the time there were no competing demands for the land. Aerial photographs of the project areas in the 1950s show the predominance of agricultural-oriented land use in and in the vicinity of the project areas. By 1985 there is no trace left of the rice fields (Haraguchi 1987:xiii-xv). The production fell off rapidly by 1927 when the stem borer appeared (Territory of Hawaii 1939:95). Figure 20 and Figure 21 illustrate the changes from 1910 to the mid-1960s, especially in the Hanalei area where there is more development. Figure 22 through Figure 24 focus on the project areas.

#### 4.3.2 Late 1800s to Modern Land Use in Waipā and Waikoko

As with Lumaha'i, the historical records for Waipā were briefly examined and no modern history details had been written for this *ahupua'a*. However, Waipā Ahupua'a most likely took part in the broad changes that swept Halele'a after 1850. Early missionary census records for Waipā Ahupua'a indicate the population was declining in the decades before the Māhele. The 1835 census records show 85 people (73 adults and 12 children) living in Waipā Valley. By 1847, the population of Waipā had declined to 66 people. Between 1853 and 1896, population statistics collected by the Hawaiian Kingdom indicated a population in Hanalei and Ko'olau that fluctuated between a low of 1,558 people in 1872 and a high of 2,775 people in 1896 (Dye 2004a:14). In the first half of the twentieth century, the United States census indicated a relatively stable population with a high of 2,630 people in 1900 and a low of 2,065 people in 1940 with a rapid population decline in 1960 falling to 1,312 people (Dye 2004a:14).

#### 4.3.2.1 Historic Taro Production in Waipā

Handy and Handy (1972:420) briefly discuss taro production in Waipā: "Below Hanalei and a little to the west of it on the bay is a compact area of terraces watered by Waipā stream." However, they reprint a reminiscence of an early resident (Lydgate 1913) concerning the terraces of Wainiha Ahupua'a, in the same district.

All along the river, wherever the encroaching *palis* on either side leave the least available space, the land has been terraced and walled up to make '*lois*.' And so the whole valley is a slowly ascending stairway of steps, broad in the tread and low in the rise, all the way to Laau. [Lydgate 1913:125–127]

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple



Figure 17. Photo of Haraguchi Rice Mill, n.d. (Library of Congress 2016)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 18. Photo of Hanalei Valley with *lo'i*, n.d. (Library of Congress 2016)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 19. Portion of the 1906 Donn Hawaii Territory Survey Map of Kaua'i with land use

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple



Figure 20. Portion of the 1910 Hanalei and Kilauea USGS topographic quadrangles

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i



Figure 21. Portion of the 1963 Hanalei and 1965 Haena USGS topographic quadrangles

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i



Figure 22. Portion of a 1950 Hanalei Bay Coast aerial photograph of the Wai'oli, Waipā, and Waikoko Stream Bridge project areas (UH SOEST)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i



Figure 23. Portion of a 1950 Hanalei Bay Coast aerial photograph of the Potential Staging Areas 1 and 2 (UH SOEST)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i



Figure 24. Portion of a 1950 Hanalei Bay Coast aerial photograph of the Wainiha Stream Bridges 1–3 project areas (UH SOEST)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i

Like Lumaha'i, Waipā was a taro-growing area, and using LCAs records, Earle (1973 and 1978) has been able to pinpoint four irrigation systems along Waipā Stream in 1850 which were used for taro cultivation (Hoffman 1980:15). Waipā Valley followed similar patterns to that of Lumaha'i, shifting from taro to rice:

By the 1860s Chinese and later Japanese laborers imported en masse for plantation bottom lands, large areas of old taro pond fields were converted to rice. From 1880 to 1930 rice became an extremely important export industry for Halelea, and taro was virtually abandoned except in Haena, the most isolated *ahupua'a*. Technologically, water buffalos with associated harrowing and leveling implements were introduced to prepare planting surfaces. The increased effectiveness of the individual farmer coupled with a growing market in the western United States resulted in a rapid expansion of the area in production. This was possible only with extensive use of flumes, wood and cement dams, and perhaps more intricate drainage channels. The cleaning of these expanded ditch systems was in turn greatly facilitated by the use of sickles, pitchforks, and shovels. It is highly likely, therefore, that irrigation systems in operation after 1880 were both altered and expanded for rice production. [Earle 1973:183–184 in Dye 2004a:14]

The 1938 Territory tax records indicate several dwellings and other buildings in the vicinity of the rice mill in Waipā held by Hiramoto (Dye 2004a:15). These Territory tax records list the family names of Takabayashi, Hiramoto, Okazaki, Koga, Morimoto, and Azeka. Hoffman (1980:15) reported that the lands in the survey area were Bishop Estate lands entirely used for cow pasture, although the more marshy sections were not well suited for this use. According to Kinichi Shikawa, a Waikoko farmer, the land had been overgrown for a long period of time and some years previously Bishop Estate demanded the lessee, the Robinson family, to make improvements that resulted in massive clearing operations; large areas were chained and bulldozing eliminated sections of irrigation systems east of Waipā Stream (Hoffman 1980:15). In 1986, Bishop Estate leased the land to the Hawaiian Farmers of Hanalei, Inc., a community-based, for-profit corporation that manages the *ahupua* 'a of Waipā (Dye 2004a:15).

Waipā Ahupua'a is currently managed by the Waipā Foundation, a communitybased 501c3 nonprofit that evolved from an original community initiative in the 1980s. The Waipā Foundation serves as a Native Hawaiian learning center and community center where all who visit can renew ties to the 'aina (land and resources), and learn about traditional values and lifestyle through *laulima* (many hands working together). As stewards of the *ahupua'a*, we are intently focused on our *kuleana* (responsibility) to establish and perpetuate a thriving *ahupua'a* as an example of healthy interdependent relationships between people and earth's natural resources. We strive to be a leader in demonstrating a Hawaiian approach to watershed-scale natural resource management. [Waipā Foundation 2012]

#### 4.3.3 Late 1800s to Modern Land Use in Lumaha'i

Earle (1978) provides the following overview regarding Lumaha'i:

Very little is known about the land use of this *ahupua* 'a. Around the turn of this century, there were extensive rice plantations in the alluvial area near the sea. For

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i TMKs: Multiple

the earlier historic period (1850), only limited information is available because no land awards were granted to commoners in Lumaha'i *ahupua'a*. The reason for this absence is unclear but it was not for want of a community population (see Schmitt 1966, 1973 for nineteenth century census data). Perhaps the *ahupua'a* chief and/or *konohiki* (headman of an *ahupua'a* land division under the chief) were instrumental in discouraging awards. Extensive bulldozing for pasturage has destroyed all archaeological evidence of pond-fields in the lower section of the valley, but numerous small terrace sites are to be found in the interior. One such site was identified 2.5 km from the sea, during a rapid reconnaissance survey, and others have been described by local hunters. [Earle 1978:33]

#### 4.3.3.1 Historic Taro and Rice Farming in Lumaha'i

By the 1860s, taro production was being replaced by rice cultivation in all the valleys of the district except Hā'ena, frequently reworking the irrigation systems previously used for taro pond fields (Hoffman 1980:4). This shift from taro to rice production included the importation of Asian laborers for the plantation as well as the introduction of Asian technology developed for irrigation and cultivation of rice. Rice production flourished from 1890 to 1930 in the Halele'a District, at which point prices dropped due to increased rice production in California and most Hawaiian rice fields were abandoned (Earle 1973:183). The growth of rice cultivation is documented by a population shift suggested by tax records and by a lease between the Bishop Estate and Chulan and Company in 1882 which rented parts of Lumaha'i Valley's alluvial plain for rice production (Hoffman 1980:4). The 1865 tax records documented 25 Hawaiians and one Chinese paying taxes. By the time Chulan and Company had been growing rice for three years, the 1890 tax records documented only one Hawaiian and 34 Chinese. The Sing Tai Wai Company also rented lands for rice growing in the Lumaha'i Valley (Kelly et al. 1978).

George Bowser, editor of *The Hawaiian Kingdom Statistical and Commercial Directory and Tourists Guide* (1880) wrote about various statistics and places of interest around the Hawaiian Islands (Maly and Maly 2003). In the following excerpts from "An Itinerary of the Hawaiian Islands . . ." Bowser's narratives offer descriptions of the communities and various attractions of the Halele'a region:

The next place, about two miles further on, is Lumahai. The valley here is about twenty miles long, and is on the average about a mile and a half wide. It is nearly all under cultivation. Messrs. Chulan & Co. have about 100 acres of it under cultivation for a rice crop. The supply of water is abundant at all seasons of the year. The scenery here is extremely grand, the mountain tops being cut into every imaginable shape of crag and peak, and their sides clothed with evergreen trees. In the gulches and ravines the wild banana grows to perfection, and the *awa* is found in profusion. This part of the island will grow any description of vegetable. When there I tasted at the table of my host, Mr. Robinson, some most delicious green peas, the seeds of which had only been sown six weeks before. The weather was delightful when I was there, and, although the rains are sometimes very heavy, the climate as a whole is exceedingly fine and enjoyable. Whilst here I climbed to the top of the dividing range between the Wainiha and Lumahai valleys. The views thus obtained are exceedingly grand. The massive mountain peaks running up to

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i TMKs: Multiple

3,000 feet high, are covered almost to their summits with forests, with occasional intervals of splendid grass. In the distance was the sea with scarcely a ripple on its surface, and the fine beach of brown sand. In the valleys the winding streams pursuing their course to the sea, hidden sometimes by the overhanging trees, with the rice fields in various stages of growth, some covered with water, others beautifully green and laid out in the most perfect order. Add to this a lovely Italian sky and a pleasant temperature of about 70°, a gentle breeze to make riding no exertion, and you have the scene as I saw it, as charming as any I have seen in the islands . . . [Maly and Maly 2003:36]

The exact date these companies discontinued rice cultivation in Lumaha'i is unknown but oral reports indicate they were gone by 1925 when six Japanese families moved into Lumaha'i Valley to grow rice (Hoffman 1980). One family "lived on the eastern side of the stream, about a mile *mauka* [inland] of the highway; the other families lived on the western (Wainiha) side, and their houses still stand today" (Kelly et al. 1978). Four families left the valley as rice prices dropped, while two others converted to taro cultivation (Hoffman 1980). The lease was taken over by Lester Robinson for cattle grazing in Lumaha'i Valley. Robinson offered the two remaining Japanese families land in neighboring Wainiha Valley and all cultivation in the valley ceased (Hoffman 1980). Handy and Handy (1972) state the following:

Lumahai must have had many *lo'i* areas in old Hawaiian days, but in 1935 most of it was used for ranch lands, which obliterates the evidences of Hawaiian farming. It could not have supported a population as large as Wainiha or Hanalei. [Handy and Handy 1972:420]

#### 4.3.5 Late 1800s to Modern Land Use in Wainiha

#### 4.3.5.1 Agriculture and fishing in Wainiha

Agriculture and fishing endeavors continued as the mainstay for Wainiha Ahupua'a. By the early 1900s, Wainiha had its own Chinese community which included not only the rice farmers, but also merchants and other business people (Coulter and Chun 1937). The rice industry eventually went into decline due to disease, pests, and competition from outside Hawai'i, and rice lands reverted to *kalo* (taro). Rice cultivation probably served the unintended purpose of keeping the ancient irrigation systems and *lo'i* operational throughout this period. In the 1930s Handy (1940:73) reported both crops being cultivated simultaneously in Wainiha with actually more land seemingly devoted to *kalo* than rice. The valley even had its own commercial *poi* factory at the time. The cultivation of *kalo* is ongoing today and is the most active agricultural undertaking in the still rural Wainiha Valley.

#### 4.3.5.2 The Wainiha Hui

No history of Wainiha is complete without at least a mention of the Wainiha Hui. A detailed and sometimes colorful account of the *hui*'s (group or club) origins and dealings is given by Lydgate (1913) and continued by Thrum (1924). The story provides an understanding of the changing socio-economic aspects of land ownership in Wainiha following the Māhele and entering into the twentieth century. A greatly abbreviated version follows. Sometime after the Māhele, Kekau'ōnohi, a chief, held the *konohiki* lands of Wainiha, those being all of the remaining lands in the valley not awarded to the tenant farmers as *kuleana*.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i
Seeking a quick profit on a sandalwood deal, Kekau'ōnohi convinced Aldrich & Company of Honolulu to back the venture to the amount of \$10,000. Kekau'onohi purchased a schooner, the Manuokawai, hired a captain and crew, filled the ship with sandalwood and sent it off to the Far East. Whether the ship was wrecked at sea or as Lydgate implies, was stolen by the captain who had less than a pristine reputation, she was never seen in Hawai'i again. Able to raise \$1,000, Kekau'onohi still needed \$9,000 to pay off Aldrich & Company. The plan was to sell the land to the Wainiha kuleana owners. The residents agreed to the plan although most of them were still basically subsistence farmers and did not have the cash to close the deal. Kekau'onohi gave them one year to raise the capital. By the time the year ended, 71 Wainiha residents had convinced Princeville Plantation of Hanalei to underwrite their venture at \$100 each with the residents signing notes for the future delivery of agricultural goods, services, and labor to the plantation. This only amounted to \$7,100 but Kekau'onohi persuaded his creditor to let the residents assume the rest of the debt with interest (Lydgate 1913). Thus, in 1877 the Hui Kū'ai 'Āina O Wainiha, the "group to purchase the land of Wainiha" was officially formed. The Wainiha Hui, as it was commonly called, now owned approximately 15,000 acres of the valley (Garden Island 1947). A plan was instituted to give each shareholder 10 acres of arable land-5 acres mauka and 5 acres makai. The land was never formally surveyed nor legally partitioned and disputes were settled by an executive committee. In the coming years the hui members, in debt and paying property taxes, found that being large landowners was not at all like what Kekau'onohi had promised, as shares in the hui had essentially become a liability (Lydgate 1913).

Around the turn of the century, McBryde Sugar Company was looking for a source of electrical power to run its irrigation pumps and mill operations at 'Ele'ele on the southwest side of the island. They proposed to build a hydro-electric power plant at Wainiha and to pay the *hui* \$1,500 a year for the water rights (Thrum 1924:95–112). The Kauai Electric Company was formed to construct and operate the power plant, which was completed in 1908. They built a landing and warehouse on Wainiha Bay with a light rail system to carry materials up the valley, along with roads, trails, and laborers' camps, as well as the plant itself and the transmission line that traversed the island (Gartley 1908:141–146). While there were other similar groups formed on Kaua'i, most notably at Hā'ena and Moloa'a, the Hui Kū'ai 'Āina O Wainiha remained a singular success story. The lands of Wainiha were finally partitioned and the *hui* dissolved in 1947 after legal action was initiated by McBryde Sugar Company. Each of the original 71 shares was then worth about \$5,000. Through the years McBryde had bought up most of the shares and owned 48. The Robinson brothers, Aylmer and Sinclair, held 10 and  $6\frac{1}{3}$  shares respectively. Only the remaining few shares were still in the hands of the heirs of the original *hui* members (Circuit Court of the Fifth Judicial Circuit 1947).

# 4.3.5.3 The Kūhiō Highway, Tsunamis, and Historic Flooding in Wainiha

The Kūhiō Highway, completed in 1917 and listed as site 03001048 on the National Register of Historic Places in Hawai'i, exists throughout the project area. As mentioned previously, in 1895, traveler Eric Knudsen described the route from Hanalei to Hā'ena as a trail, the wagon road ending at Hanalei. "West of Waikoko Stream, Knudsen related that the trail climbed over the bluff and then descended straight down to the ocean before turning back and running along the beach again" (Fung 2013:12).

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i

According to historian Ralph Kuykendall, nineteenth century Hawai'i roads, 'or what were called roads,' came into existence by a familiar historical process, 'the trail became a road.' Many roads, especially in the rural districts like Kaua'i's North Shore, were little more than cleared rights-of-way. [Fung 2013:12]

By the end of the nineteenth century, each of the major Hawaiian Islands dreamed of building a "belt" road system. The idea for belt roads dated to the early Hawaiians, who built and maintained networks of traditional trails on all the islands. Belt roads that circumnavigated the islands played an important role in Hawa'i's transportation history, connecting isolated communities to their island's economic, political, and social centers.

In 1911, the territorial legislature established a 'loan fund,' which provided the bonding needed for each island to build its belt roads and bridges. A Loan Fund Commission (LFC) was appointed for each island . . . By 1917, Kaua'i considered its belt road complete, a feat that was accomplished earlier than any other island. [Fung 2013:14–15]

Kūhiō Highway, Route 560, was completed in 1917:

Route 560 is a 10-mile rural road that was part of the first completed belt road in the Hawaiian Islands (constructed in early 1900s), and has retained a significant portion of its original characteristics and features. In recognition of Route 560's historic stature, a Rural-Historic Road Corridor Plan was drafted to provide design guidelines for the DOT-HWY that reflect a community consensus for future work on the highway. [Hawai'i Department of Transportation 2011:12–13]

The highway westward of Wai'oli Bridge in Hanalei is identified as a scenic roadway and historic district corridor:

The historic district begins at Mile Marker 0 on Route 560 and continues to its termination at Mile Marker 10 at Ha'ena State Park . . . The Kaua'i Belt Road between Princeville and Ha'ena traverses ten miles along the island's north shore and is coterminous with its historic right-of-way. This portion of Kaua'i's 'belt road' was part of Kaua'i's original belt-road system, which extended from Ha'ena on the north shore to Mana on Kaua'i's west shore. Although belt-road systems in the Hawaiian Islands were intended to circumvent [sic] each island, Kaua'i's road, like the Hawai'i Belt Road, never completely encircled the island due to the rugged topography of Na Pali Coast. The north shore section of the Kaua'i Belt Road begins at State Route 560's Mile Marker 0 at Princeville and passes through the communities of Hanalei, Wainiha and Ha'ena, ending at Mile Marker 10 at Ha'ena State Park. The . . . historic district includes the road, the Hanalei Valley Scenic Overlook, and thirteen historic bridges and culverts. The period of significance for the north shore section of the Kaua'i Belt Road is from 1900 when the Territory of Hawai'i Superintendent of Public Works began roadway improvements until 1957 when the Wainiha Bridges were rebuilt after a tidal wave. The Kaua'i Belt Road between Princeville and Ha'ena retains historic significance and character in its location, alignment, design, setting, and association. The Kaua'i Belt Road between Princeville and Wainiha was built during the 1910s, and from Wainiha to Ha'ena circa 1928. Most of the roadway alignment is unaltered and predates the road's

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i TMKs: Multiple

construction. The road passes through rural areas along Kaua'i's North Shore, connecting communities much as it did in the early twentieth century when it was built. In many areas, the road was built over a trail used by Hawaiians and nineteenth-century travelers. There is no shoulder along most of the roadway, except near Princeville. The road has been widened since its construction, but is still narrow in many locations. The roadbed varies between 18' and 20' wide, being narrower as it hugs the sea cliffs and wider as it passes through valleys and residential communities. Near Princeville and Hanalei, the road is 22' wide. For most of the road's length, there are no guardrails, which contributes to the road's historic feeling. Lava-rock guardwalls, some dating to the 1920s, remain along the road in many locations, although many have been undermined by soil erosion. In a few locations, timber guardrails remain along the road. Only a few steel w-beam guardrails have been installed along the road in recent years. [Fung 2013:6]

Maintaining the aesthetics of this scenic and historic highway, the stream bridges along the Kūhiō Highway, Route 560, of Kauai'i's north shore are all one-lane bridges listed on the National Register of Historic Places as a Historic Bridge District on the Kaua'i Belt Road (North Shore Section) (Fung 2013). The one-lane bridges require a local courtesy of taking turns, five to seven cars crossing at a time (Figure 25).

Most of the bridges and culverts on the Kaua'i Belt Road are one-lane wide and date to the early 1900s. The bridges represent two popular types of construction in early twentieth century Hawai'i: steel truss and reinforced-concrete flat slab. The reinforced concrete bridges feature solid concrete parapets. In addition, there are also several pipe culverts with masonry rock headwalls that were probably constructed in the first half of the twentieth century. [Fung 2013:10]

Improvements to Kūhiō Highway and specifically to Kauai'i's north shore bridges became a high priority in the early twentieth century:

Kaua'i's bridge-building program was extensive in 1912. During a special meeting in May, the LFC decided to build 'a number of bridges' near Hanalei, including Waikoko, Waipa, and Wai'oli. The LFC instructed Moragne to prepare plans and specifications for concrete structures, and he designed three flat-slab bridges with solid concrete parapets. Within months of Moragne's assignment, contracts were authorized for George Mahikoa to build the Wai'oli and Waikoko bridges; and George Ewart to build Waipa Bridge. Work on the new bridges began almost immediately and was none too soon. In August 1912, three of the timber bridges that were to be replaced collapsed under the strain of wagons delivering crushed rock for the new concrete bridges. [Fung 2013:16]

Wainiha is vulnerable to inundation by tsunamis originating in the North Pacific Ocean. The tsunami of 1946 greatly impacted the northern shore of Kaua'i. Shepard et al. (1950:415) detail the following disturbing account of the damage at the coast in the vicinity of the current project area:

Half a mile east of Haena Bay the water swept inland 1,600 feet, knocking over trees, and a little further east it smashed through a dense grove of pandanus, laying

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i TMKs: Multiple



Figure 25. Photo of Wainiha Stream Bridge, n.d. (CSH)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i

the trees over in parallel rows . . . Fishes were carried inland, as at many other places; and 11 days after the wave, small fish were found still alive in a pool 1,000 feet inland . . . At the head of Wainiha Bay the water rose 24 to 27 feet above normal sea level. . . several houses were wrecked and some loss of life occurred. [Shepard et al. 1950:415]

This destruction included stripping the sediment from the beach areas, which was washed varying distances inland and deposited. Coral blocks, up to 12 ft in diameter, were picked up and carried as much as 500 ft inland (Shepard et. al. 1950:414–415). Another account reports, "The 1946 tsunami hit with two powerful waves, with a maximum run-up of forty-five feet in elevation. All the bridges at Wainiha were washed out, and the tiny village of Wainiha itself was flattened" (Pacific Worlds 2001).

The 1957 tsunami caused a 38-ft rise in sea level at Wainiha and low-lying areas as far as 4,000 ft inland were inundated (DLNR 1975). Flooding due to heavy rainfall is also a frequent occurrence in Wainiha and results from stream-channel overflow. The valley has recorded rainfall as high as 24 inches in 24 hours. Since 1956 there have been at least eight damaging floods in Wainiha, one of which caused loss of life (DLNR 1975). As previously mentioned, the flooding of Wainiha is referred to in folklore (Pukui 1951:67). Perhaps it is this natural characteristic of the valley which explains the origin of the name "unfriendly water."

Thus, navigating the streams of Kaua'i's north shore, the bridges within the project areas have historically had to contend with periodic flash floods and tsunami storms. Indicating the severe natural elements that the bridges are exposed to, the stream crossings within the project areas periodically require seasonal reworking or replacement:

In January 1921 the Wainiha River cut a new channel during a storm, which necessitated another bridge, as flooding had carved a 'long slim island out of the agricultural land of the valley.' The Garden Island reported that the new bridge would 'make three bridges in the valley, in within [*sic*] a distance of about 500 yards.' 38 This third structure at Wainiha became known as Wainiha Bridge #2. Plans for a new single-span bridge of 75' were drawn in 1922. The design was a timber-truss structure that complemented the adjacent timber-truss bridge (Wainiha #3).39 Even though the plans were drawn in February 1922, a construction date was not determined. The Territorial Highway Department records state that the bridge was constructed in 1931.No information was located to indicate when the original Wainiha Bridge #2 was built, although it may have been built as early as the first decade of the twentieth century. [Fung 2013:40–41]

Wainiha Bridges 1 and 3 were originally constructed in 1904 with wooden trusses and by 1921 an additional bridge was built to cross a new stream channel that formed during flooding. This middle Wainiha Bridge, referred to as Wainiha Bridge 2, was completed in 1931, however successive storms in 1946, 1957, and 1966 destroyed or damaged all three original wooden Wainiha Bridges which were replaced.

Natural disasters struck the Wainiha bridges on two occasions in 1957. On March 9, three tidal waves struck Wainiha Valley, destroying the west span and small approach span of Wainiha Bridge #3 as well as Wainiha Bridges #1 and #2. The only span that remained after the tidal wave was the east (Hanalei side) span of

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i TMKs: Multiple

Wainiha #3. In December, flooding from Hurricane Nina damaged Wainiha Bridge #3 again, making it impassable to traffic until it was repaired. [Fung 2013:22]

Storms in 2004 and 2007 further damaged the replacement bridges, which were then demolished and replaced with the modular steel truss bridges currently in existence.

Raw materials used in the construction of the stream crossings along the Kūhiō Highway, Route 560, of Kaua'i's north shore have included timber, steel, concrete, and basalt. The bridges were likely originally constructed from locally milled timber and were ultimately replaced with steel and concrete bridges. As discussed further in Section 4, the 1946 repair of the Waikoko Stream Bridge involved utilizing the fallen concrete structure in place with basalt boulders and concrete used to stabilize and level the feature.

The earliest bridges on Kaua'i were constructed of wood and steel. Wood was a prevailing construction material throughout the Hawaiian Islands during the nineteenth century; it was widely available, relatively inexpensive, and fairly durable. By the end of the nineteenth century, steel represented the latest in industrial technology and was a preferred construction material for its strength. Although steel bridges had to be imported from the United States or Great Britain, the strength of steel provided a feasible solution for spanning Kaua'i's wide rivers. Steel was also used throughout the islands to erect the substantial bridges required to carry railroads over Hawaii's rivers and rugged gulches . . . By 1904 timber bridges spanned the rivers at Wainiha, Waikoko, and Waipā, and plans were made for a steel bridge over the Lumaha'i River. [Fung 2013:13]

# Section 5 Previous Archaeological Research

Some 30 or more previous archaeological studies have been conducted near the current proposed project areas in the Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a (Figure 26). Previous archaeological studies are described below for each *ahupua'a*.

# 5.1 Previous Archaeological Research in Wai'oli

Table 6 displays all previous archaeological studies conducted within Wai'oli Ahupua'a, while Table 7 identifies all historic properties found during those studies. These tables are followed by discussion of the research and cultural resources. Figure 27 is a composite of historic properties (including Bennett sites, burials, architectural historic properties, and historic or archaeological districts) found within a 0.5-mile radius of the current project area.

# 5.1.1 Thomas G. Thrum (1906)

The earliest archaeology of Wai'oli is described by Thomas G. Thrum (1906) in his article *Heiaus* and *Heiau Sites Throughout the Hawaiian Islands* where he lists two *heiau* in Wai'oli:

Nakikoniawaiaau Wai'oli uka - An open paved space, not large, dedicated to Laka, to which offerings at the annual festivities were brought.

Mamalahoa Wai'oli - A small *heiau* 24x60 feet in size, paved with walls 3 to 5 feet high. Of husbandry class. Kanehekili its deity; Kapihi its priest. [Thrum 1906:43]

Thrum lists Kupakoili Heiau (SIHP # 50-30-03-144), "Reported as a small *heiau*; probably simply a place of offering" as in Waipā but it appears to be in Wai'oli (Thrum 1906:43).

# 5.1.2 Wendell Bennett (1931)

Wendell Bennett, in *The Archaeology of Kaua'i* (1931:135), lists Nakikoniawalaau Heiau (SIHP # 50-30-03-145) but furnishes only Thrum's description for it and does not give a specific location for it. TMK: [4] 5-6 shows the site of Nakikoniawalaau Heiau on the east side of Wai'oli Stream far inland of Kūhiō Highway. Bennett locates Kupakoili Heiau "on the west side of the *pali* west of Wai'oli Stream, not far from the sea" (Bennett 1931:135). TMK: [4] 5-6 depicts the site of Kupaloili Unu just *mauka* of Kūhiō Highway on the west side of Wai'oli Stream, seemingly in Wai'oli Ahupua'a. Bennett does not mention Mamalahoa Heiau and its location is unknown.

# 5.1.3 Timothy K. Earle (1978)

Timothy K. Earle (1978) did the first in-depth study of the Halele'a District, *Economic and Social Organization of a Complex Chiefdom: The Halele 'a District, Kaua 'i.* This work is a seminal piece of research within the vicinity of the project area and is a classic archaeological study of traditional irrigations systems. Earle (1978) showed that the taro *lo 'i* in Wai'oli had been replaced by the cultivation of coffee and rice before the turn of the century. Earle's Systems 22, 23, and 24 describe the Wai'oli valley systems. However, within Wai'oli Ahupua'a all of these documented taro systems lie 200 m or more *mauka* of Kūhiō Highway.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i and Wainiha Ahupua'a, Halele'a, Kaua'i TMKs: Multiple



Figure 26. Portions of the 1991 Haena and 1996 Hanalei USGS topographic quadrangles depicting all project areas for the Wainiha Bridge project, illustrating all previous archaeological studies and Bennett sites found within a 0.5-mile radius from the project areas

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Source	Location	Nature of Study	Results (SIHP # 50-30-03****)
Earle 1978	Halele'a District: Wai'oli	Economic and social organization study	Describes Wai'oli Valley irrigation systems 22 and 23
Hammatt 1979	Waiʻoli Mission Hall	Archaeological surface examination and subsurface testing	Documents SIHP # -00601, pre- Contact and early historic cultural layer
Hammatt and Folk 1979	Waiʻoli Mission Hall	Archaeological excavations	Discusses findings and conclusion for SIHP # -00601, pre-Contact and early historic cultural layer
Pantaleo and Williams 1991	Transmission line corridor	Archaeological reconnaissance	No cultural resources identified in Wai'oli
Spear 1992	St. Williams Church, TMK: [4] 5-5-002:037	Archaeological inventory survey	SIHP # -06028, pre-Contact and early historic cultural layer
Kikuchi and Remoaldo 1992	Burials located at more than 50 cemeteries on Kaua'i	Island-wide inventory of cemeteries	Maps and descriptions of burials in Kaua'i cemeteries (not shown on Fig. 26)
Hammatt and Folk 1994a	30 acres (TMK: [4] 5-5- 006:009)	Burial treatment plan	SIHP # -01877, single burial
Hammatt and Folk 1994b	30 acres (TMK: [4] 5-5- 006:009)	Archaeological inventory survey	Identified SIHP #s -06031, a marsh deposit; -06032, buried cultural deposit; and -06028, a human burial
Jourdane 1995	5-5496C Kūhiō Hwy, TMK: [4] 5-5-006:012	Inadvertent burial report	SIHP # -03014, inadvertent skeletal remains
McMahon 1995a, b	Malolo Rd, Hanalei, TMK: [4] 5-5-003:035	Inadvertent burial report	SIHP # -01982, three burials described
Masterson et al. 1997	Hanalei School lot, <i>mauka</i> of Kūhiō Hwy, TMKs: [4] 5-5-006: por. 009, 018	Archaeological monitoring	SIHP # -01988, three burials and five isolated human remains
McGerty and Spear 1999	Waiʻoli Town Park, <i>mauka</i> of Kūhiō Hwy, TMK: [4] 5- 6-002:005	Archaeological inventory survey	No cultural resources identified

Table 6.	Previous	Archaeol	logical	Studies in	n Wai'o	li Ahupua'a	
			<u> </u>				

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Source	Location	Nature of Study	Results (SIHP # 50-30-03****)
Yorck and Hammatt 2004	Coastal residence, TMKs: [4] 5-5-004:009 and 010	Archaeological monitoring	Three discrete features identified; historic to modern layer, three historic bottles, and two cow teeth, no SIHP # given
Fong et al. 2006	Approx. 10-mile stretch of Kūhiō Hwy, Princeville to Hā'ena	Archaeological monitoring	No cultural resources identified

SIHP # 50-30-03-	Site Type/Name	Location	Reference
B004	Wai'oli Hui'ia Church Cemetery Architectural recordation recommended to mitigate project's potential effects on SIHP # 50-30-03-2296 evaluated as eligible to the National and Hawai'i Registers	South of Kūhiō Hwy, between Wai'oli Park and Hanalei School, TMK: [4] 5-5-006:019	Kikuchi and Remoaldo 1992:13–14
00601	Pre-Contact and early historic cultural layer	Waiʻoli Mission Hall	Hammatt 1979; Hammatt and Folk 1979
01877	Pre- and post-Contact deposits	Waiʻoli	Spear 1992
01982	Burial	Malolo Rd, Hanalei	McMahon 1995a
01988	Burials	Hanalei School	Masterson et al. 1997
03014	Burial	Kobayashi Subdivision, Waiʻoli	Jourdane 1995
06028	Burial	Kobayashi Subdivision, Waiʻoli	Hammatt and Folk 1994; Hammatt 1994
06031	Marsh deposit	Kobayashi Subdivision, Waiʻoli	Hammatt and Folk 1994
06032	Cultural deposit	Kobayashi Subdivision, Waiʻoli	Hammatt and Folk 1994
09300	Waioli Mission District	Waiʻoli	SHPD files
09374	Mahamoku (Wilcox Hanalei Beach House)	5344 Weke Rd, Hanalei, Kauaʻi, TMK: [4] 5-5- 003:010	Historic Hawai'i Foundation
09386	Douglas Baldwin Beach House	5242 Weke Rd, Hanalei, Kauaʻi, TMK:[4] 5-5- 002:107	Historic Hawai'i Foundation
09388	Say Dock House	Hanalei	Historic Hawai'i Foundation

Table 7	State Inventory	of Historic	Places S	Sites in	Wai'oli	Ahunua'a
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CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

TMKs: Multiple

SIHP # 50-30-03-	Site Type/Name	Location	Reference
None	Excavated pits	75 m southwest of Site 144	Wheeler 2013b
None	Irrigation system 22	East of Wai'oli Stream	Earle 1978:67–68
None	Irrigation system 23	West of Wai'oli Stream	Earle 1978:69–70

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 27. Aerial photograph (Google Earth 2013) showing locations of previously identified historic properties in portions of Hanalei, Wai'oli, Waipā, and Waikoko Ahupua'a

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

# 5.1.4 Hammatt (1979); Hammatt and Folk (1979) and William K. Kikuchi (1987)

In 1979, full-scale excavations of the missionary church at Wai'oli helped document the entire history from 1832 to the twentieth century (Hammatt 1979; Hammatt and Folk 1979).

William K. Kikuchi (1987:11–12) in an article called "Kaua'i Fishponds," describes six *loko-i-a-kalo* ponds that grew both taro and fresh water crustacean, fish, shellfish, and certain aquatic plants (Kikuchi 1987:11) in Wai'oli:

- B1a Name Ahau, of unknown acreage,
- B1b Name unknown, of unknown acreage,
- B1c Name unknown, of unknown acreage,
- B6A Named Kaiulu, of unknown acreage,
- B25a Name unknown, of 10.3 acres, and
- B25b Name unknown of .12 acres. [Kikuchi 1987:8]

Kikuchi suggests these five fishponds were near the shore in Wai'oli. He also lists five other "unknown type" fishpond sites at Wai'oli:

- B6b Name Kaaikahala, of 1.34 acres,
- B10b Name Kuloko, of 1.06 acres,
- B16a Name Maikai, of unknown acreage,
- B16b Name Momona, of unknown acreage, and
- B18a Name Opahale of 0.25 acres. [Kikuchi 1987:8]

These unknown types of ponds are mentioned in the LCAs as being in the upland above the big bend in the river. These fishponds were in use in 1848 but already by 1852 some of them had disappeared (cf. Native Register 1847-1853 and Foreign Testimony 1848-1850).

# 5.1.5 Pantaleo and Williams (1991)

In 1991, an archaeological reconnaissance survey was conducted in selected portions of the Port Allen to Wainiha transmission line corridor. The purpose of the study was to determine the presence and/or absence of any inclusive cultural resources. Portions of this survey were conducted on the north side of Kaua'i including Wai'oli, Waipā, Waikoko, Lumaha'i, and stops in Wainiha Valley at the Wainiha Valley Hydro-electric Plant. No new cultural resources were identified in the Wai'oli Ahupua'a.

# 5.1.6 Spear (1992)

In 1992, Robert Spear conducted an archaeological inventory survey of St. Williams Church. Results of this archaeological inquiry included documentation of SIHP # -06028, a pre-Contact and early historic cultural layer.

# 5.1.7 William Kikuchi and Susan Remoaldo (1992)

In 1992, William Kikuchi and Susan Remoaldo printed their first volume of the inventory on Kaua'i cemeteries. There is only one site inventoried in detail, the Wai'oli Hui'ia Church Cemetery

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

(SIHP # -B004). They catalogue 48 gravesites with markers giving the range of known dates from 1842 through 1980. The family names were Aaron, Deverill, Doiron, Doso, Haumea, Johnson, Kapu, Kaukaha, Kawika, Kekauoha, Lota, Mahinai, Maka, Pauole, Peters, Rindt, Waiuli, Werner, and Willis (Kikuchi and Remoaldo 1992:13–17). A historical study (Wai'oli Mission House, Hanalei, Kaua'i, Grove Farm Homestead, and Wai'oli Mission House, Kaua'i) has also been done on the Wa'oli Mission by Barnes Riznik (1987). The Hawai'i Register of Historic Places (DLNR 1974) lists the Mission House as SIHP # -9300. Riznik documents the families who lived there and the process of restoring the Mission House. Designare Architects (1992) report a recent assessment of damage done by Hurricane 'Iniki to the Wai'oli Hui'ia Church and Meeting Hall.

#### 5.1.8 Hammatt and Folk (1994a and b)

Within the central area of the Wai'oli Ahupua'a just *mauka* of the highway, CSH conducted a couple of archeological studies. Three cultural resources were identified during an archaeological inventory survey of a 30-acre proposed subdivision. SIHP #s -6031, a marsh deposit; -6032, a buried A horizon with few scattered flakes and sparse charcoal; and -6028, a flexed human burial were identified (Hammatt and Folk 1994a). Another AIS including subsurface testing was conducted in Hanalei School. Pond field sediments were observed in test trenches. Based on radiocarbon date of the sediments, the pond fields date to the 1960s (Hammatt and Folk 1994b).

# 5.1.9 Jourdane 1995, McMahon (1995a, b), and Masterson et al. (1997)

In 1995, SHPD investigated inadvertent burial finds near the project area (Jourdane 1995; McMahon 1995a and b). Burials were also identified while monitoring in Hanalei School in 1997 by a CSH archaeologist. SIHP # -01988, three burials and five isolated human remains, were identified (Masterson et al. 1997).

# 5.1.10 McGerty and Spear (1999)

In 1999, Scientific Consultant Services (SCS) conducted an AIS with limited subsurface testing to observe stratigraphy beneath the surface. A total of seven test units were excavated. No cultural resources were identified.

# 5.1.11 Yorck and Hammatt (2004)

In 2004, CSH put together an archaeological monitoring package for renovation and relocation of a house site along the Wai'oli coastal area. The monitoring package consisted of a monitoring plan (Hammatt and Shideler 2003) and monitoring report (Yorck and Hammatt 2004). Three historic to modern discrete features were observed during the monitoring. The findings include a layer containing modern to historic refuse, three historic bottles, and two cow teeth (Yorck and Hammatt 2004:21).

# 5.1.12 Fong et al. (2006)

In 2006, CSH monitored an approximately 10-mile stretch from Princeville to Hā'ena for the Kūhiō Highway, Route 560 Shoulder Improvements project (Fong et al. 2006). On the basis of historic research and previous archaeology, monitoring was recommended and an archaeological monitoring plan was written (Shideler et al. 2004). During monitoring of subsurface activities, sediments appeared as disturbed by previous road construction. No cultural resources were observed (Fong et al. 2006).

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

# 5.2 Previous Archaeological Research in Waipā and Waikoko

Table 8 outlines previous archaeological studies conducted in Waipā and Waikoko Ahupua'a, while Table 9 depicts historic properties identified, followed by discussion of the research and cultural resources. The locations of identified cultural resources within Waipā and Waikoko Ahupua'a are shown in Figure 27.

# 5.2.1 Thrum (1906)

As previously mentioned, Thrum (1906:43) lists the *heiau* of Kupakoili, in the *ahupua'a* of Waipā, and says it is "reported as a small *heiau*; probably simply a place of offering." While Hoffman (1980) places the *heiau* just *mauka* of Kūhiō Highway in Waipā, Thrum also lists Halaloa Heiau in the *ahupua'a* of Waipā. He relates it as located "at Waipā Stream. A square *heiau* of about 80 feet in size, with low walls, Kāne its deity," noting it was destroyed years ago for a mill site (Thrum 1906:43).

# 5.2.2 Bennett (1931)

Bennett (1931) describes no sites in Waikoko and Halaloa Heiau at Waipā. Hoffman places the location of this historic property more than 500 m inland of the highway (Bishop Museum site KA-D8-1; SIHP # -146) more than 500 m inland of the highway.

Site 146: Halaloa *heiau*, at the end of a little road running up on the east side of Waipā stream, at the site of an old rice mill. Thrum describes it as 'A square *heiau* of about 80 feet in size, with low walls. Kāne its deity. Destroyed years ago for mill site.' Nothing remains now but a few stones scattered about. [Bennett 1931:135]

# 5.2.3 Earle (1978)

Earle (1978) describes four wetland taro irrigation systems at Waipā as System Number(s) 18, 19, 20, and 21 with one of these systems extending into Waikoko (Figure 28, Table 10). None of these agricultural systems extends as far seaward. Wetland taro irrigation "System 18" is the only one of the four *lo'i kalo* (irrigated taro terrace) systems of Waipā that Earle describes in detail under the heading of "Halelea's Modern Taro Irrigation" (perhaps because it was the only one in active use at the time of the 1971-1972 fieldwork). Earl (1978) indicates that:

In 1850, System 18 irrigated a major section of the ahupua'a of Waipa but now it is used only to irrigate one taro farm in the neighboring ahupua'a of Waikoko. The primary ditch of System 18 taps the Waipa stream in the narrow valley just before the stream enters the broad alluvial plain. The intake is placed at a natural bend in the stream so that the main ditch line continues the direction of stream flow above the dam. The head dam, itself, is a standard stone mound percolation dam using in situ boulders. River cobbles (15-30 cm) are heaped between the boulders to create a mound wall 8 m long, 1 m wide, and 0.6 m high. The primary ditch, then, channels the water around a small hill and through the alluvial plain. This ditch is a simple earth channel about 1.1 m wide by 0.5 m deep at natural ground level. Along much of the ditch's length, roots of the hau, which grows exuberantly, clog the ditch and present a major maintenance problem. Excess water is hand-led simply by a spillway to the Waikoko stream. The primary ditch is now about 1.32 km long. The

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple

Source	Location	Nature of Study	Results (SIHP # 50-30-03)
Thrum 1906	Island-wide	Island-wide survey	Nakikoniawaiaau, Mamalahoa, and Kupakoili Heiau (SIHP # -144)
Bennett 1931	Waipā and Waikoko	Island-wide survey	SIHP #s -144, Kupakoili Heiau; -146, Halaloa Heiau; and -147, Kailiopaia Heiau
Earle 1978	Waipā	Anthropological study	SIHP #s -484, -436, -434, and -433, four <i>lo'i</i> systems
Hoffman 1980	Alluvium plains of Waipā Valley	Archaeological survey, limited test excavations	Confirmed Earle's irrigation systems
Pantaleo and Williams 1991	Transmission line corridor	Archaeological reconnaissance survey	No cultural resources identified in Waipā and Waikoko
Sullivan and Dega 2003	0.25-acre property in Waipā, TMK: [4] 5-6- 004:015	Burial treatment plan	SIHP # -00355, two burials and isolated skeletal remains
Dye 2004a	KSBE lands, leased to Hawaiian farmers of Hanalei, TMKs: [4] 5-6- 004:022, 023, and 025	Archaeological inventory survey	Two previously identified cultural resources: SIHP #s -00146, rice mill at the site of Halaloa Heiau and -00484, irrigation system described by Tim Earle as System 18 and three newly identified cultural resources in project area: SIHP #s-01040, a cave shelter; -01041, 'auwai, and -01042, an 'auwai system
Dye 2004b	Loʻi System in Waipā, Kauaʻi	Inventory survey and mapping of <i>lo 'i</i> system	Four traditional taro pond-field systems SIHP #s -1047, -1048, -1049, and -1050
Chafee and Dega 2005	0.25-acre property in Waipā, TMK: [4] 5-6- 004:015	Archaeological monitoring	Two cultural resources identified: SIHP #s -00355, two burials and isolated skeletal remains, and -00361, a cultural layer containing pre- and post-Contact artifacts
Fong et al. 2006	Approx. 10-mile stretch of Kūhiō Hwy, Princeville to Hā'ena	Archaeological monitoring	No cultural resources identified in Waipā and Waikoko

Table 8. Previous Archaeological Studies in Waipā and Waikoko Ahupua'a

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Source	Location	Nature of Study	Results (SIHP # 50-30-03)
Kamai and Hammatt 2013	KSBE land; TMK: [4] 5- 6-004:023	Burial site component of an archaeological preservation plan	SIHP # -2196, an inadvertent burial discovery
Wheeler et al. 2013b	KSBE land, TMK: [4] 5- 6-003:001 por.	Archaeological reconnaissance survey and literature review	One cultural resource identified: three excavated pits on Makaihuwa'a Ridge

SIHP # 50-30-03-	Site Type/Name (if any)	Location	Reference
144	Kupakoili Heiau	West of Wai'oli Stream	Thrum 1906:43; Bennett 1931:135; Hoffman 1980
146	Halaloa Heiau	East side of Waipā	Bennett 1931:135
147	Kailiopaia Heiau	Western portion of Makahoa Point	Bennett 1931:135
00355	Burials and isolated skeletal remains	0.25-acre property in Waipā, TMK: [4] 5-6-004:015	Chafee and Dega 2005
00361	Cultural deposit containing pre- and post-Contact artifacts	0.25-acre property in Waipā, TMK: [4] 5-6-004:015	Chafee and Dega 2005
00433	Irrigation system 21	Eastern edge of Waipā Ahupua'a	Earle 1978:234; Hoffman 1980:25; Dye 2004
00434	Irrigation system 20	Eastern boundary of Waipā Ahupua'a, at the base of the hills	Earle 1978:234; Hoffman 1980:25; Dye 2004
00436	Irrigation system 19	Southwest of Waipā Stream	Earle 1978:223; Hoffman 1980:25; Dye 2004
00484	Irrigation system 18	Northwest of Waipā Stream	Earle 1978:33, 67; Hoffman 1980:24; Dye 2004
01040	Cave shelter	Mauka end of a natural depression	Dye 2004:21–24
01041	'Auwai section	East side of Waipā Stream	Dye 2004:25
01042	'Auwai system	East side of Waipā Ahupua'a	Dye 2004:26–27
01047	Traditional lo'i system	Upper portion of Waipā ahupua'a	Dye 2004:2
None	Excavated pits	Makaihuwa'a Ridge	Wheeler et al. 2013b:47–56

Table 9.	State	Inventory	of Historic	Places	Sites in	Waipā and	Waikoko	Ahupua	'a
		2							

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 28. Lo'i systems of Waipā as documented by Timothy Earle (1978:196a)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple

System # (SIHP # 50- 30-03)	Туре	Source	Length in Meters of Irrigation Ditch		Area in Hectares of Irrigation System		Number of Farmers on Irrigation System	
			Total	Initial Segment	Net	Gross	Net	Gross
18 (SIHP # -484)	Alluvial Coastal Plain	Main stream	1,095	400	2.56	5.18	6	8
19 (SIHP # -436)	Alluvial Coastal Plain	Main stream	875	745	1.80	1.80	5	9-10
20 (SIHP # -434)	Alluvial Bottom	Small independent stream	0	0	0.33	0.33	2	2
21 (SIHP # -433)	_	Ground water	0	0	0.36	0.36	1	1

Table 10. Waipā Irrigation System as Documented by Earle (1978:125)

ditch follows the line of an old ditch for the first 0.84 km and then it turns at right angles to the west where it is flumed across the Waikoko stream to water a farm with twelve pond fields. This westerly extension of the system is apparently recent, dating after the introduction of rice. The system is presently operated by a single oriental farmer. [Earl 1978:67]

The Waipā systems are clearly small for Halele'a District as a whole. Earl (1978:127) notes the mean net area for these Halele'a District systems was calculated to be 1.93 ha (range 0.1-16.38). This may be compared to the mean net area for the Waipā systems of 1.26 (range 0.33-2.56). On the basis of "receiving grants," Earle (1978:127) concludes, "The mean number of farmers within an irrigation system [of Halele'a] was 4.7 (range 1 - 43)." The corresponding mean for the farmers of Waipā appears to be 3.5 (range 1-6). It appears Earl's estimate of the total number of farmers likely to have been working on the Waipā *lo*'i systems was approximately 20 to 21.

# 5.2.4 Hoffman (1980)

The Hoffman study notes previous massive clearing operations in the coastal flats of Waipā. No new sites were identified but seven previously located sites are briefly summarized. The only two sites Hoffman discusses are Kupakoili Heiau previously discussed and Earle's agricultural system 21, BPBM # KA-D8-7, SIHP # -433, located "along Kūhiō Highway." Hoffman notes this later site included a fishpond as indicated in 1850 land records. Neither of these sites was investigated in the Hoffman study.

# 5.2.5 Panteleo and Williams (1991)

In 1991, an archaeological reconnaissance survey was conducted in selected portions of the Port Allen to Wainiha transmission line corridor. The purpose for the study was to determine the

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

presence and/or absence of any inclusive cultural resources. Portions of this survey were conducted on the north side of Kaua'i including Wai'oli, Waipā, Waikoko, Lumaha'i, and stops in Wainiha Valley at the Wainiha Valley Hydro-electric Plant. No new cultural resources were identified in the Waipā and Waikoko Ahupua'a.

# 5.2.6 Sullivan and Dega (2003); Dye 1994a and Chafee and Dega (2005)

In 2003, SCS wrote a burial treatment plan for two inadvertently disturbed human remains discovered during excavation of a structure foundation and a leach field of a single family residence (Sullivan and Dega 2003). Tom Dye conducted an archaeological inventory survey with subsurface testing for Waipā Foundation in 2004. Further information regarding two previously identified cultural resources and three newly identified cultural resources were documented. Previously identified cultural resources consist of SIHP # -146, a rice mill at the site of Halaloa Heiau, and SIHP # -484, an 'auwai system first identified by Tim Earle who labeled it as "System 18." Dye describes the current condition of the mill, and notes some of the waterworn cobbles used in the concrete mill construction might have been taken from the *heiau*. The newly identified cultural materials include SIHP # -01040, a cave shelter, and SIHP # -01041, "likely associated with the *heiau* ceremonial complex in pre-Contact times" (Wheeler 2013b:39-40). Additionally, Dye (2004) documents a section of 'auwai along the east bank of Waipā Stream and SIHP #s -1042 and -484, an 'auwai system on the east side of the Waipā Ahupua'a (Dye 2004). Archaeological monitoring was conducted after the discovery of inadvertent burials. The burials and isolated finds were given SIHP # -00355; SIHP # -00361 was identified as a cultural layer (Chaffee and Dega 2005).

# 5.2.6.1 Dye (2004a)

An archaeological inventory survey was conducted in Waipā Ahupua'a of lands leased by Kamehameha Schools lands in anticipation of the renewed use of the lower valley for traditional Hawaiian farming and educational purposes. Three parcels were surveyed encompassing 119.417 acres. No features of high significant were noted (Dye 2004:57).

# 5.2.6.2 Dye (2004b)

A National Park Service grant to the Waipā Foundation permitted the group to survey and map the remains of four traditional Hawaiian taro pond-field systems. "The *lo 'i* system contains about 68 patches over an area 200 m long and up to 60 m wide, with an elevational drop over the length of the system of more than 14 m." (Dye 2004:2).

# 5.2.7 Fong et al. (2006)

In 2006, CSH monitored an approximate 10-mile stretch from Princeville to Hā'ena for the Kūhiō Highway, Route 560 Shoulder Improvements project (Fong et al. 2006). On the basis of historic research and previous archaeology, monitoring was recommended and an archaeological monitoring plan was written (Shideler et al. 2004). During monitoring of subsurface activities, the soil all appeared to be previously disturbed by road construction. No cultural resources were identified (Fong et al. 2006).

# 5.2.8 Kamai and Hammatt (2013) and Wheeler et al. (2013b)

In 2013, CSH wrote a burial site component of an archaeological preservation plan for the Waipā Foundation Community Cultural Center project. An inadvertent discovery of human

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

remains was identified during the excavation of an electrical trench. The burial was given SIHP # -2196 (Kamai and Hammatt 2013).

Also in 2013, CSH conducted a reconnaissance survey and literature review for a portion of Waipā for Kamehameha Schools. One cultural resource was identified, a *lo'i* (SIHP # -00434), and three excavated pit features were documented on the Makaihuwa'a Ridge. The pit features may relate to a traditional account of an aid to navigation on the ridge (Wheeler et al. 2013b).

The central of the three pit features is by far the largest. This central pit is roughly circular, measuring between 2.5 and 3.0 m in diameter and having a maximum depth of 1.7 m below the brow of the ridge on the south side. The walls of this pit are nearly vertical on the southeast, south, and southwest sides. The north side is somewhat sloping, seemingly due to collapse. The floor is roughly level and of the nature of a shallow bowl, perhaps the result of deliberate excavation into the relatively soft saprolitic, decomposing basalt of the ridge summit. This pit was observed to be located in an area with a particularly good view of the sweep of Hanalei Bay to the northwest, north, and northeast; Waipā Valley extending back to the southwest; and Wai'oli Valley extending back to the southeast (Wheeler et al. 2013b:47–56).

Wheeler et al. (2013b) note the following preliminary points in comparing the Wichman (1985) account to the archaeological reality observed:

- The aid to navigation is deliberately placed 'higher . . . over the treetops and [below where] the clouds swirled just above . . . the chief . . .' on Makaihuwa'a Ridge (Wichman 1985:40–41). This fits the location of the observed historic property very well. The tradition and the archaeology both command the ideal location.
- The chief said 'Here we must dig out a platform from the edge of the ridge . . . A small platform dug out of the side of a hill' (Wichman 1985:41). This is what was observed: a larger excavation with seemingly two smaller excavations with relatively level bottoms.
- 'Another group formed a line reaching to the river beds of Waipa'a and Waikoko and passed smooth stones hand to hand to the work site' (Wichman 1985:41). This was a proverbial way of thinking about how *menehune* worked. No water-rounded cobbles and boulders were observed. There would have been no clear need for the transport of such stones for the story to be basically true.
- The chief sat father up the ridge where he could see the work, and his voice shouting instructions could be heard. A minor mystery was the evidence of two smaller constructions spaced above and below the main pit feature. The upper one, which is certainly close enough for a chief to shout instructions, could have been a supervisory position.
- The account relates a roof over the platform, higher in front than in back in order to protect the torches from the rain and also high enough so the roof wouldn't catch on fire. No archaeological remnant of a roof would be expected with the passage of time in such an exposed, open, wet (approximately 100 inches of rain a year) location. The 1.7-m deep hole was a surprise in that it initially was not obvious why anyone would dig such a deep hole for a signal fire. The concept that the

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

construction/excavation was a response to the extraordinary rain and wind does, however, make perfect sense. While remnants of a roof support system were not observed, more careful analysis might develop details of what this would have looked like.

• The nature of the fire is consistently indicated to be '*lamakū*.' The concept is presented as if the lights were akin to chiefly torches understood as *kukui* nut kernels strung on a midrib, woven into cylinders and bundled with dried banana leaves. *Lamaku* does, however, also mean 'signal fires' which more prosaically might be of dried wood. No charcoal was observed in the archaeological properties. After the passage of two centuries it would seem likely that even a meter-thick charcoal deposit might entirely disappear from such an exposed, open, wet location. It may be that the preferred fuel would leave less trace than a bonfire. [Wheeler et al. 2013b:55–56]

Accounts of pre-Contact Hawaiian aids to navigation are few. Love Dean's *The Lighthouses of Hawai'i* is somewhat dismissive, asserting that:

Before Western contact, Hawaiians did not need permanent navigational aids. Those who set out in boats to fish or to travel to neighboring villages or islands knew the coastlines and all the landmarks well. An open fire to guide them safely to shore was used only at night or during storms. [Dean 1991:1]

We do, however, have an account of a trade agreement made between the planters at Kukuiolono ("Light of Lono"; Kalāheo, Kaua'i) and the fisherman of the Kona District that required that a huge torch be kept burning at night atop Kukuiolono cinder cone. It is said that fisherman relied on this light for navigation as it could be seen along the whole south coast of Kaua'i, from Kōloa to Ni'ihau (Sandison 1956). Clark (1977:41) relates another popular derivation from "*lei*" and "*"ahi*" or "wreath of fire" which may have been related to the tradition of signal beacon fires lit on the crater rim—either for special occasions and/or as a beacon for canoes. Clark also notes the probability that the prominent Leahi cape (*lae*) was used as a reference point in locating the deep sea fishing grounds or *ko'a* (shrine, often consisting of circular piles of coral or stone, build along shore or by ponds or streams, used in ceremonies as to make fish multiply) for *'ahi* (Hawaiian tuna fishes, especially the yellow-fin tuna; *Thunnus albacares*) fish.

# 5.3 Previous Archaeological Research in Lumaha'i

Table 11 provides a list of archaeological research conducted within Lumaha'i, including columns for source, location, nature of study, and findings. Table 12 is a list of known cultural resources within the *ahupua'a* and includes columns for state site numbers, site type, location and reference. The locations of identified cultural resources within Lumaha'i Ahupua'a are shown in Figure 29.

# 5.3.1 Bennett (1931)

Pu'uohewa and Pu'uomama were not found during Bennett's survey. Bennett (1931) lists one archaeological site at Lumaha'i: "Site 147. Kailiopaia *heiau*, shoreward of the government road, to the east of Lumaha'i stream on a raised coral point" (Bennett 1931:135).

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

# 5.3.2 Earle (1978)

Earle (1978) discusses Lumaha'i in a general way but develops no detailed information regarding the agricultural systems of Lumaha'i. He notes the following:

Extensive bulldozing for pasturage has destroyed all archaeological evidence of pond fields in the lower section of the valley, but numerous small terrace sites are to be found in the interior. One such site was identified 2.5 km from the sea, during a rapid reconnaissance survey, and others have been described by local hunters. [Earle 1978:33]

This identified terrace site was given Bishop Museum site number Ka-D7-3 and SIHP # -450.

# 5.3.3 Hoffman (1980)

Hoffman (1980) performed a survey of approximately 300 acres along the floor of Lumaha'i Valley overlapping the Cordy (1978) and Kelly and Hee (1978) study areas but extending farther to the west. The Hoffman study confirmed three previously reported sites and identified five previously unrecorded sites, Bishop Museum sites KA-D7-9 through -13; SIHP #s -440 through -444. All of these sites are 1.3 km inland or more. She notes the "massive earth-moving operations of historic times" and confirms earlier work: as Earle (1973:233) suggests, "no sites remain in the coastal plain; all located sites are above the 6-meter contour line" (Hoffman 1980:6). Hoffman (1980) does plot the location of Kaliopaia Heiau, just east of the mouth of Lumaha'i River but notes the site was "not located by survey team."

# 5.3.4 Pantaleo and Williams (1991)

In 1991, an archaeological reconnaissance survey was conducted on selected portions of the Port Allen-Wainiha Transmission Line Corridor (Pantaleo and Williams 1991). The corridor spanned through the Līhu'e District passing through Hanamā'ulu, North Olohena, Waipouli, and Wailua Ahupua'a. It then continued north and west through Halele'a District in Kalihiwai, Kalihikai, Hanalei, Wai'oli, Waipā, Waikoko, and Lumaha'i Ahupua'a. No new archaeological sites were discovered during the reconnaissance. However, the transmission line did pass through SIHP # -1006, a pond field remnant in Hanalei Valley.

# 5.3.5 Fong et al. (2006)

In 2006, CSH conducted archaeological monitoring for the approximately 10-mile stretch of Kūhiō Highway spanning from Princeville to Hā'ena (Fong et al. 2006). During monitoring no archaeological or cultural finds were encountered. Soils found consisted of road fill, disturbed soils, and layers of sand.

# 5.3.6 McIntosh et al. 2011

In 2011, Pacific Legacy, Inc. conducted an archaeological inventory survey in the vicinity of Lumaha'i along the highway for a proposed bypass road and emergency repair work. No cultural resources were identified (McIntosh et al. 2011).

# 5.3.7 Wheeler et al. (2013a)

In 2013, CSH conducted an archaeological field inspection and literature review for an approximately 99-acre portion of Lumaha'i Ahupua'a for Kamehameha Schools. The purpose of the study was to provide the landowner (or their representative) with an overview of existing

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

archaeological conditions, to facilitate planning, and to inform our client on appropriate archaeological considerations on land use for planning (Wheeler et al. 2013a:1).

Source	Location	Nature of Study	Results (SIHP # 50-30-03)
Bennett 1931	Lumahaʻi	Island-wide survey	Site -147, Kailiopaia Heiau
Earle 1978	Halele'a District: Lumaha'i	Study of economic and social organization	No cultural resources identified in Lumaha'i
Kelly et al. 1978	Lumahaʻi Valley	Historical survey	Traditional and historical literature review; identified one cultural resource, SIHP # -00445, Chinese Camp
Hoffman 1980	Alluvium plains of Lumahaʻi Valley	Archaeological survey	Confirmed three previously identified cultural resources and identified five new cultural resources: SIHP #s -00440 through -00444
Pantaleo and Williams 1991	Transmission line corridor	Archaeological reconnaissance survey	No cultural resources identified in Lumaha'i
Fong et al. 2006	Approx. 10-mile stretch of Kūhiō Hwy, Princeville to Hā'ena	Archaeological monitoring	No cultural resources identified
McIntosh et al. 2011	Proposed Bypass road (TMK (4) 5-7-03). Vicinity of Makahoa Point.	Archaeological Inventory Survey	No traditional sites or featires were located.
Wheeler et al. 2013a	99-acre portion of Lumaha'i Ahupua'a, TMK: [4] 5-7-002:001 por.	Field inspection and literature review	No cultural resources identified. No nearby trails will be impacted.

Table 11. Previous Archaeological Studies in Lumaha'i Ahupua'a

Table 12. State Inventory of Historic Places Sites in Lumaha'i Ahupua'a

SIHP # 50-30-03-	Site Type/Name (if any)	Location	Reference
00445	Chinese Camp	Lumahaʻi Valley	Kelly et al. 1978:35

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i



Figure 29. Aerial photograph (Google Earth 2013) showing locations of previous identified cultural resources in Lumaha'i and Wainiha Ahupua'a; note Bennett's (1931) sites 152 and 153 are beyond the scope of this map, further south within Wainiha Valley

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

# 5.4 Previous Archaeological Studies in Wainiha

Table 13 provides a list of archaeological research conducted within Wainiha, including columns for source, location, nature of study, and findings. Table 14 is a list of historic properties within the *ahupua* 'a and includes columns for state site numbers, site type, location, and reference. The locations of identified cultural resources within Wainiha Ahupua'a are shown in Figure 29.

# 5.4.1 Bennett (1931)

Bennett (1931) in his systematic, but not exhaustive, survey of archaeological sites on Kaua'i, describes six sites in Wainiha, all of which appear to be on or near Wainiha River. Two of Bennett's sites (148, 149) are on or close to the coast, and the four remaining sites are all upstream and include two *heiau* (Site 150 - Laumaki Heiau, Site 151 - Apaukalea Heiau), taro terraces (Site 152), and house sites on Mauna Hina Ridge (Site 153). Bennett describes the sites as follows:

Site 148. *Heiau* on Popoki knoll. Popoki knoll is located next to the road (inland side) in front of Site 149 near the Wainiha river. It is said to have been a *heiau* site, but nothing remains to mark it. [Bennett 1931:135]

Site 149. Kaunupepeiao Heiau, back of the first house on the first *pali* east of the mouth of the Wainiha River. A flat place about 30 feet wide and 20 feet deep with stones along the front edge meet the description given by Thrum: 'A 12-foot open-paved *heiau* of husbandry class; probably simply a place of offering.' [Bennett 1931:135]

Site 150. Laumaki *heiau*, on a knoll west of the 'Power House' road—about one mile from the government road, in Wainiha valley. Thrum describes this *heiau* as 'A small, open platform, paved heiau, 2 feet high, of husbandry class.' The platform measures 20 feet wide and 10 feet deep and faces the sea. It is paved with river stone. [Bennett 1931:135]

Source	Location	Nature of Study	Results
Bennett 1931	Island-wide	Archaeological survey	Lists three <i>heiau</i> in Wainiha: Laumiki, Apaukalea, and Kaunupepeiao
Earle 1978	Halelea'a District: Wainiha	Archaeology and socio-economics	Identifies extensive <i>lo'i</i> systems along Wainiha Stream
Pantaleo and Williams 1991	Transmission line corridor	Archaeological survey	No cultural resources identified in Lumaha'i

Table 1	13	Previous	Archaeo	logical	Studies i	in Waini	ha Ahunua'a
	13.	rievious	Alchaeo	logical	Studies	III vv aiiii	na Anupua a

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Source	Location	Nature of Study	Results
Spear 1992	Lot in Wainiha Ahupua'a, TMK: [4] 5-8-009:045	Inventory survey and data recovery	SIHP # -1878, cultural deposit with fire pits, postholes, <i>imu</i> , and a burial, data recovery located 30 pre-Contact burials
Ida et al. 1993	West side Wainiha Valley back from river mouth, TMK: [4] 5-8-002:003	Archaeological survey	No cultural resources identified
Hammatt and Ida 1995	West side of Wainiha valley back from mouth, TMK: [4] 5-8-002: por. 003	Archaeological investigation	No cultural resources identified
McGerty and Spear 1999	Lot 44, Wainiha, TMK: [4] 5-8-009:044	Archaeological inventory survey	Burial on adjoining lot part of SIHP # -1878, cultural deposit
Fong et al. 2006	Approx. 10-mile stretch of Kūhiō Hwy, Princeville to Hā'ena	Archaeological monitoring	No cultural resources identified
Groza et al. 2010	Proposed Wainiha Well, TMK: [4] 5-8-002:003	Archaeological assessment	No cultural resources identified

Table 14. State Inventory	of Historic	Places Sites in	Wainiha Ahupua'a
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SIHP # 50-30-03-	Site Type/Name (if any)	Location	Reference
148	Heiau	On Popoki knoll	Bennett 1931:135
149	Kaunupepeiao Heiau	First <i>pali</i> east of mouth of Wainiha River	Bennett 1931:135
None	System 14	West side of Wainiha Stream	Earle 1978:58-63
None	System 15	On an island between two major channels of Wainiha Stream	Earle 1978:59, 63– 66
None	System 16	On the east side of Wainiha Stream	Earle 1978:59
None	System 17	On flat alluvial soils west of Wainiha Stream	Earle 1978:66–67

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Site 151. Apaukalea *heiau*, adjoins the "Power House" road on the east side, inland from Site 150 in Wainiha valley:

The remains of recent occupation together with modern stone platforms, walks, graves with tombstones and other such work, make the distinction of this heiau difficult. The *heiau* consists of a small, square, paved area about 35 feet on a side. The east wall is 15 feet wide, and badly tumbled on the outside, though 3 feet high on the inside. The north wall is irregular, about 15 feet wide, and 2 feet high. A projection inwards forms a platform 10 by 15 feet. The west wall is just a trace of stone, but seems to have been 15 feet wide. The south wall is of varying width and runs from the road to the bluff, a distance of 130 feet. It is about 3 feet high. To the west of this enclosure is a flat space with two lines of stone traversing it, while on the east are two paved house sites about 10 feet square. [Bennett 1931:135]

Two of Bennett's (1931) sites, Sites 152 and 153, described as taro terraces and house site respectively, are within the Wainiha Valley:

This interesting taro section is high on the side of the valley utilizing a little stream and a small flat area. The hill is on one side and the stream and a bluff on the other, leaving a fairly steep section in between. At one place above the terraces stones are built across the stream as an intake, which could, with the addition of a few more stones, shunt the water into a ditch which runs between large rocks and dirt walls. All along the edge of the stream is a wall built to keep the water from running back. The terraces are from 6 inches to 3 feet high . . . Site 153. House sites, on Mauna Hina ridge in Wainiha Valley. Remains of many old house sites and much irrigated land. The house sites are mostly of the terraced type and 10 to 15 feet wide. [Bennett 1931:135, 136]

# 5.4.2 Earle (1978)

Earle's documentation of irrigated taro systems in Wainiha is shown on a USGS map of the valley (Earle 1978:59). Earle's System 14 extends along Wainiha River to just southeast of Powerhouse Road. Earle observed that the lower portion of Wainiha Valley was extensively used for taro cultivation through the 1850s (Earle 1978:32).

#### 5.4.3 Pantaleo and Williams (1991)

See description in Section 5.2.5.

# 5.4.4 Ida et al. (1993)

In 1993, CSH conducted an archaeological inventory survey for a 50-ft by 50-ft parcel for a GTE Hawaiian Tel telecommunications hut (Ida et al. 1993) adjacent to an existing water pump. The old Wainiha Powerhouse Road and water pump access road cut through the eastern portion of the parcel, providing a maximum stratigraphic profile of 90 cmbs (cm below surface). No cultural material was found during the pedestrian survey or during a review of the exposed stratigraphy within the road cuts. No further work was recommended and the project area was observed to be too steeply sloped for agricultural cultivation or habitation.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

#### 5.4.5 Hammatt and Ida (1995)

In 1995, CSH conducted an archaeological investigation (Hammatt and Ida 1995) in the same general area as the Ida et al. (1993) project described above. The field survey included an area designated as Lot 1 that consisted of a 6,000-sq-ft area with a water tank, and a 15,769-sq-ft utility easement that extended from a pump station on Powerhouse Road to the Lot 1 water tank. No cultural material was observed during the field survey or during a review of the exposed stratigraphic profile within the road cuts. The same stratigraphic profile observed during the Ida et al. (1993) project was also present within the current project area.

#### 5.4.6 McGerty and Spear (1998)

In 1998, SCS completed an archaeological inventory survey for Lot 44, Wainiha, TMK: [4] 5-8-009:044 and found a burial on the adjoining lot, which is part of SIHP # -1878, a cultural deposit. Archaeological monitoring was advised.

#### 5.4.7 Rechtman and Dougherty (2001)

In 2001, Rechtman Cronsulting conducted an archaeological inventory survey for two noncontiguous parcels (TMKs: [4] 5-8-012:005, 011) within Wainiha Ahupua'a (Rechtman and Dougherty 2001), one of which is approximately 500 m north and the other 500 m northeast of the current project area. Subsurface testing included a total of three trenches within Parcel 5 and four trenches within Parcel 11. No further work was recommended based on the lack of findings during the pedestrian survey and subsurface testing.

#### 5.4.8 Christropher Monahan (2003)

In 2003, monitoring was conducted during excavation of the foundation for the Smith Property (TMK: [4] 5-8-009:025). Eleven individual burials, a cultural layer containing ash, fire-cracked rock, charcoal, stone and coral tools, and partial remains of a pig. These plus earlier collected materials have been designated SIHP # -1837. While there is no evidence of permanent settlement, the place was a traditional burial ground for *maka 'āinana* (Monahan 2003).

# 5.4.9 Fong et al. (2006)

See description in Section 5.2.7.

# 5.4.10 Groza et al. (2010)

In 2010, CSH conducted an archaeological inventory survey with shovel testing for a proposed Wainiha well (Groza et al. 2010). No cultural resources were identified.

# Section 6 Community Consultation

# 6.1 Introduction

Throughout the course of this assessment, an effort was made to contact and consult with Native Hawaiian organizations (NHO), agencies, and community members including descendants of the area in order to identify individuals with cultural expertise and/or knowledge of the *ahupua* 'a of Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha. CSH initiated its outreach effort in October 2015 through letters, email, telephone calls, and in-person contact. Consultation efforts in finalizing transcriptions and summaries are still ongoing.

# 6.2 Community Contact Letter

In the majority of cases, letters (Figure 30 and Figure 31) along with a map and an aerial photograph of the project were mailed with the following text:

At the request of The Federal Highway Administration, Central Federal Lands Highway Division (FHWA) and the State of Hawai'i Department of Transportation (HDOT), Cultural Surveys Hawai'i Inc. (CSH) is conducting a Cultural Impact Assessment (CIA) for the Wainiha Bridges Project, Wai'oli, Waikoko, Waipā, Lumaha'i, and Wainiha Ahupua'a, Halele'a District, Kaua'i Island. Tax Map Keys (TMK) and corresponding acreage are listed below:

- Potential Staging Areas 1 and 2: [4] 5-7-003:003, 999 por.; 0.517 acres
- Waikoko Bridge: [4] 5-6-003:002, 999 por.; 0.715 acres
- Wainiha Bridge 1: [4] 5-8-002:002 por.; [4] 5-8-006:030, 031, 032, 033, 046, 060, and 999 por.; 0.669 acres
- Wainiha Bridge 2-3: [4] 5-8-006:009, 011, 017, 018, 019, 030, 999 por.; [4] 5-8-007:023, 024, 031, 032, 999 por.; 2.272 acres
- Waioli Bridge: [4] 5-5-005:005, 007, 021, 028, 999 por.; [4] 5-5-006:014, 888 por.; [4] 5-6-002:002, 004, 999 por.; 0.913 acres
- Waipā Bridge: [4] 5-6-004:014, 022, 023, 999 por.; 0.916 acres

The FHWA and the HDOT propose the replacement of three temporary prefabricated (ACROW) bridges on Kūhiō Highway (Route 560) on the north side of the island of Kaua'i. The bridges are located between mile post 6.4 and 6.7 near the mouth of Wainiha Stream before it feeds into Wainiha Bay. The original bridges at these three locations were replaced with temporary ACROW bridges after Bridge #2 suffered permanent damage and Bridges #1 (the southern-most bridge) and #3 (the northern-most bridge) were determined to be structurally deficient). The ACROW bridges were installed as a temporary measure to keep the roadway open to residents and public traffic until environmental clearance and funding for the permanent structures could be secured. The three bridges are owned and maintained by HDOT. FHWA and HDOT propose the replacement of the temporary ACROW bridges with new one-lane bridges that closely match the existing alignment. Also

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

included as part of the proposed project is the placement of temporary one-lane bridges adjacent to or crossing over three historic one-lane bridges along Kūhiō Highway that access the project site (Wainiha Bridges), located at Wai'oli, Waipā, and Waikoko Streams. These historic bridges have low load capacities and temporary bridges would allow construction loads to access the Wainiha project site without affecting the historic integrity of these bridges. The existing temporary ACROW bridges at the Wainiha project site would be shifted *makai* (towards the ocean) to accommodate traffic during construction of the new bridges. All temporary bridges would be removed upon completion of the project. Two potential staging areas in Lumaha'i Ahupua'a are also included in the Area of Potential Effects. Staging also may occur at each bridge location.

The purpose of the CIA is to gather information about the project area and its surroundings through research and interviews with individuals that are knowledgeable about this area. The research and interviews assists us when assessing potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project.

We are seeking your  $k\bar{o}kua$  (assistance) and guidance regarding the following aspects of our study:

- General history and present and past land use of the project area.
- Knowledge of cultural sites- for example, historic sites, archaeological sites, and burials.
- Knowledge of traditional gathering practices in the project area, both past and ongoing.
- Cultural associations of the project area, such as legends and traditional uses.
- Referrals of *kūpuna* or elders and *kama'āina* who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua'a* lands.
- Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the project area.

Cultural Archaeologi Hallett H. H	Surveys Ha cal and Cultural ammatt, Ph.D., J	wai'i, Inc. Impact Studies President		
P.O. Box 111	4 Kail	ua, Hawai'i 96734	Ph: (808) 262-9972	Fax: (808) 262-4950
Job code: WA	INIHA 10	amitche	ll@culturalsurveys.com	www.culturalsurveys.com
				October 201
Aloha mai	e kāua,			
At the (FHWA) at (CSH) is c Waikoko, (TMK) and	request of The nd the State of conducting a C Waipā, Lumah corresponding	e Federal Highwa Hawai'i Departma Cultural Impact As a'i, and Wainiha g acreage are listed	y Administration, Cent ent of Transportation (F ssessment (CIA) for th Ahupua <sup>*</sup> a, Halele <sup>*</sup> a Di below:	ral Federal Lands Highway Divisio IDOT), Cultural Surveys Hawai'i Ind ne Wainiha Bridges Project, Wai'ol istrict, Kaua'i Island. Tax Map Key
• Pote	ential Staging A	Areas 1 and 2: [4] 5	5-7-003:003, 999 por.; 0	0.517 acres
• Wa	ikoko Bridge:	4] 5-6-003:002, 99	99 por.; 0.715 acres	
• Wa 0.66	iniha Bridge 1: 59 acres	[4] 5-8-002:002 1	por.; [4] 5-8-006:030, 0	31, 032, 033, 046, 060, and 999 por
• Wa 031	iniha Bridge 2 , 032, 999 por.	-3: [4] 5-8-006:00 ; 2.272 acres	9, 011, 017, 018, 019,	030, 999 por.; [4] 5-8-007:023, 024
• Wa 002	ioli Bridge: [4 :002, 004, 999	] 5-5-005:005, 00 por.; 0.913 acres	07, 021, 028, 999 por.;	[4] 5-5-006:014, 888 por.; [4] 5-6
• Wa	ipā Bridge: [4]	5-6-004:014, 022,	023, 999 por.; 0.916 ac	res
The FH bridges on between m original bri suffered pe were detern to keep the permanent and HDOT closely ma temporary Highway th These histo access the temporary accommod upon comp	IWA and the Kūhiō Highwa ile post 6.4 and dges at these t rmanent damag nined to be stru- roadway open structures coul propose the r tch the existing one-lane bridg nat access the p bric bridges hav Wainiha proje ACROW bridg ate traffic duri letion of the p	HDOT propose the y (Route 560) on the d 6.7 near the mouth ree locations were ge and Bridges #1 acturally deficient) to residents and puild be secured. The eplacement of the g alignment. Also ges adjacent to or project site (Wainith re low load capacities the without aff and construction of roject. Two potent	e replacement of three the north side of the isla th of Wainiha Stream I re replaced with tempor (the southern-most brid . The ACROW bridges ublic traffic until enviro three bridges are own temporary ACROW be included as part of the crossing over three h ha Bridges), located at W ties and temporary brid fecting the historic int a project site would be the new bridges. All	temporary pre-fabricated (ACROW and of Kaua'i. The bridges are locate before it feeds into Wainiha Bay. Th rary ACROW bridges after Bridge # lge) and #3 (the northern-most bridge were installed as a temporary measur mmental clearance and funding for th ed and maintained by HDOT. FHWA ridges with new one-lane bridges that proposed project is the placement of istoric one-lane bridges along Kūhi Vai'oli, Waipā, and Waikoko Streams ges would allow construction loads t egrity of these bridges. The existin shifted <i>makai</i> (towards the ocean) t temporary bridges would be remove maha'i Ahupua'a are also included i location.

Figure 30. Community consultation letter, page one

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

WAINIHA 10

CIA for the Wainiha Bridges Project

Page 2

The purpose of the CIA is to gather information about the project area and its surroundings through research and interviews with individuals that are knowledgeable about this area. The research and interviews assists us when assessing potential impacts to the cultural resources, cultural practices, and beliefs identified as a result of the planned project.

We are seeking your kokua (assistance) and guidance regarding the following aspects of our study:

- · General history and present and past land use of the project area.
- Knowledge of cultural sites- for example, historic sites, archaeological sites, and burials.
- Knowledge of traditional gathering practices in the project area, both past and ongoing.
- Cultural associations of the project area, such as legends and traditional uses.
- Referrals of *kūpuna* or elders and *kama'āina* who might be willing to share their cultural knowledge of the project area and the surrounding *ahupua'a* lands.
- Any other cultural concerns the community might have related to Hawaiian cultural practices within or in the vicinity of the project area.

In advance, we appreciate your assistance in our research effort. If you are interested in participating in this study, please contact Auli'i Mitchell (<u>amitchell@culturalsurveys.com</u>) by email or phone at (808) 262-9972 no later than November 13, 2015.

Mc ka ha'aha'a,

Auli'i Mitchell CSH Cultural Advisor

Figure 31. Community consultation letter, page two

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i
# 6.3 Community Contact Table

Table 15 contains the names, affiliations, dates of contact, and comments from NHOs, individuals, organizations, and agencies contacted for this project. Results are presented below in alphabetical order.

Name	Affiliation	Comments
Aipolani, C. Kunane	Chair, Kauaʻi-Niʻihau Island Burial Council	Letter and maps sent via email 16 October 2015
Akana, Kaipo	Former archaeologist, Kauaʻi resident	Letter and maps sent via U.S. Postal Service (USPS) 9 October 2015 Mr. Akana emailed CSH on 16 October 2015 with the following: <i>Mahalo for letter and maps. Yes I am</i> <i>interested. However, the locations are a bit</i> <i>distant to travel as an octogenarian. I have</i> <i>read and reviewed the maps and do not</i> <i>believe that there are a significant</i> <i>archaeological impact to these areas.</i> <i>Thank again for the postings.</i>
Alapai, Keliʻi	Kilauea community, fisherman	Letter and maps sent via USPS 19 October 2015 CSH followed up with a phone call to Mr. Alapai on 27 October 2015, left message
Albao, Liberta	Kākau 'Ōlelo, Queen Deborah Kapule Hawaiian Civic Club	Letter and maps sent via USPS 9 October 2015
Andrade, Carlos	Professor of Hawaiian Studies, University of Hawai'i at Mānoa Resident of Hā'ena Ahupua'a	Letter and maps sent via email 16 October 2015
Berg, Carl	Biologist Chair, Surfrider Foundation (Kauaʻi Chapter)	Letter and maps sent via USPS 9 October 2015
Butler, Bob	Fisherman, business owner	Letter and maps sent via USPS 9 October 2015 CSH followed up with a phone call to Mr. Butler on 27 October 2015, left message

Table 15. Results of Community Consultation

Name	Affiliation	Comments
Cabebe, Andrew	Activist	Letter and maps sent via USPS 9 October 2015 CSH followed up with a phone call to Mr. Cabebe on 27 October 2015, left message
Carswell, Curly and Gayle	Princeville community resident	Letter and maps sent via USPS 9 October 2015
Chandler, Jeff and Linda	Historic Sites Specialist, Hui Hoʻomalu I Ka ʻĀina Cultural consultant <i>Kamaʻāina</i>	Letter and maps sent via USPS 9 October 2015
Ching, Mike	Hanalei business owner <i>Kamaʻāina</i>	Letter and maps sent via USPS 9 October 2015 Mr. Ching responded via phone on 27 October 2015 with the following: <i>They should make it all two lanes except</i> <i>for the tiny bridges. That is all.</i>
Crabbe, Kamana'opono	<i>Ka Pouhana</i> (Chief Executive Officer), Office of Hawaiian Affairs	Letter and maps sent via USPS 19 October 2015
Dohrman, Mal and Pam	Kama 'āina	Letter and maps sent via USPS 16 October 2015 CSH to meet with Mrs. Dohrman on 16 November 2015
Downer, Alan	Administrator, State Historic Preservation Division – Department of Land and Natural Resources	Letter and maps sent via email 16 October 2015
Enright, Rory	Princeville Community Association	Letter and maps sent via USPS 9 October 2015
Fayé, Alan and Suzi	Princeville Community Association	Letter and maps sent via USPS 9 October 2015
		Interviewed 16 November 2015
		CSH emailed 1 December 2015 draft transcription of interview
		Mr. Fayé responded via email 1 December 2015 stating he will begin reviewing document

Name	Affiliation	Comments
		Mr. Fayé completed his edits and sent via email 2 December 2015 CSH emailed Mr. Fayé on 3 December with some edits and clarifications; Mr. Fayé responded via email the same day with edits Mr. Fayé's interview can be found in
		Section 6.4.1
Fitzgerald, Michael	Hanalei Business Community Owner, Hanalei Poi Company, LLC	Letter and maps sent via USPS 9 October 2015
Fronda, Kalani	Land Assets Manager, Kamehameha Schools' Land Assets Division	Letter and maps sent via email 16 October 2015
Furfaro, Jay	Councilman Gomes family historian	Letter and maps sent via USPS 19 October 2015
Goo, Wendell	<i>Kupuna</i> and fisherman	CSH called Mr. Goo on 27 October 2015, left message CSH called and spoke to Mrs. Goo on 29 October 2015 Letter and maps sent via USPS on 30 October 2015
Guy, Joel	Hanalei Community Board President Hanalei to Hā'ena Community Assocation	Letter and maps sent via USPS 9 October 2015
Helder, David	Resident of Wainiha	Interviewed 16 November 2015
		CSH emailed 1 December 2015 draft transcription of interview
		Mr. Helder responded via email on 2 December 2015 that he would review later as he was currently traveling
		CSH responded to Mr. Helder via email on 3 December 2015

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Name	Affiliation	Comments
		Mr. Helder responded via email 29 December 2015 with edits
		Mr. Helder's interview can be found in Section 6.4.1
Helder, Julian	Resident of Wainiha	Interviewed 16 November 2015
		CSH emailed 1 December 2015 draft transcription of interview
		Mr. Helder's interview can be found in Section 6.4.1
Ham Young, Kalehua	<i>Kupuna</i> of Hanalei Waipā Foundation	Letter and maps sent via USPS 9 October 2015
Hanalei Poi Company		Letter and maps sent via USPS 9 October 2015
Harada, Yoshi	Course Superintendent, Princeville Golf Club	Letter and maps sent via USPS 9 October 2015
Haraguchi, Rodney	Taro farmer (Hanalei)	Letter and maps sent via USPS 9 October 2015 CSH followed up with a phone call to Mr. Haraguchi on 27 October 2015, left message
Hashimoto, Annie	Friends of Aloha Endowment	Letter and maps sent via USPS 9 October 2015
Hashimoto, Tommy	Historian	Letter and maps sent via USPS 9 October 2015
Hermosua, Ann	Resident of Kīlauea	Letter and maps sent via USPS 9 October 2015
Hilo, Regina	Burial Sites Specialist, State Historic Preservation Division – Department of Land and Natural Resources	Letter and maps sent via email 16 October 2015
Imparato, Carl	Hanalei Community	Letter and maps sent via USPS 9 October 2015
Ishikawa, Kennichi	Historian	Letter and figures sent via USPS 9 October 2015
Jeremiah, Jason	Senior Manager, Land Assets Division – Kamehameha Schools	Letter and maps sent via email 16 October 2015

Name	Affiliation	Comments
Jones, Donny	President, Hanalei Canoe Club	Letter and maps sent via USPS 9 October 2015
Ka'aumoana, Maka'ala	Executive Director, Hanalei Watershed Hui	Letter and maps sent via USPS 19 October 2015
Kaluahine, Stanley	Former employee at Princeville	Letter and maps sent via USPS 9 October 2015
Kaneali'i, Julie	Kākau 'Ōlelo, 'Ahahui Kīwila Hawai'i O Mo'ikeha	Letter and maps sent via USPS 9 October 2015 Second letter and maps sent via email 16 October 2015
Kauka, Sabra	Кити	Letter and maps sent via USPS 9 October 2015
Kimura, Jan	Hunter, Princeville employee	Letter and maps sent via USPS 9 October 2015, letter returned
Kobayashi, Chris	Kama'āina	Letter and maps sent via email 16 October 2015
Like, Kaipo	Caretaker, Waipā	Letter and maps sent via email 16 October 2015 CSH followed up with a phone call to Mr. Like on 27 October 2015, left message
Mahuiki, Samson	President, Waipā Foundation	Letter and maps sent via USPS 9 October 2015; CSH followed up with a phone call to Mr. Mahuiki later that evening and he stated the following: <i>Lived Hā</i> 'ena we never did go anykind place until we got older then we went [and] KS [Kamehameha Schools] had that place up for lease, when young Robinson had that lease until they developed that place cause I used to work fire department. Then KS had public auction, had a group was supposed to get them. Was all five acre parcels, when they left they had information on the fire station porch. All his life he wanted the land for raise animals. Hawaiians tried to organize a group to get the lease, it was hard for us to get anything at that time. Just show up as Hawaiians. We never did frequent those areas until we get the lease. Never go Wainiha only fish in Hā 'ena. Heavy nets [were used] to fish down by Hā 'ena Cave.

Name	Affiliation	Comments
		Just summer months for akule, we had commercial license for fish; akule come in big schools; limu kohu that was the easiest safe place to pick up. Hā 'ena Beach Park, look to the left point, always get limu kohu [where the] breakers hit and low tide is the best time to pick up. If you want to eat fish, you go anytime of year get loaded with fish. Now we go have the kids cook for us. Reef 'enenue all that kind they cracka jack now, they gotta do all the physical stuff. The net is the one when you offer them they give, you eat with desire and mahalo. You make your poi bowl clean, you going eat with friends, for give time for each other with that kind of pleasant that kind of stories. You make time for them who visit you.
McCrory, Lynn	Resident of Hanalei- Princeville	Letter and maps sent via USPS 9 October 2015; letter returned
Mijares, Scott	Save Kauaʻi	Letter and maps sent via email 16 October 2015
Miller, Pi'ikea	<i>Kamaʻāina, kuleana</i> land	Letter and maps sent via email 16 October 2015
Pacheco, Gary	Lions Club, Rotary	Letter and maps sent via USPS 9 October 2015
Robeson, Barbara	Long-time resident of Wainiha	Interviewed 17 November 2015 CSH followed up with Mrs. Robeson via email on 20 November 2015 Mrs. Robeson emailed CSH on 20 November 2015 stating she has documents to send CSH emailed Mrs. Robeson a draft interview summary via email 27 January 2016; Mrs. Robeson replied the same day that she would review later Mrs. Robeson's interview can be found in Section 6.4.2

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple

Name	Affiliation	Comments
Rogers, Nani	Hoʻokipa Network	Letter and maps sent via email 16 October 2015; letter returned
Say, Barbara	Member, Kauaʻi-Niʻiahu Island Burial Council	Letter and maps sent via USPS 19 October 2015 CSH followed up with a phone call to Mrs. Say on 27 October 2015, left message
Schuller, Julie	Princeville Community	Letter and maps sent via USPS 9 October 2015
Sheehan, Annie and Keola	Hanalei business community	Letter and maps sent via USPS 9 October 2015
Sheehan, Patsy	Hanalei community Kauaʻi Historical Society	Letter and maps sent via USPS 9 October 2015
Sloggett, Dick	<i>Kama ʿāina</i> and fisherman	Letter and maps sent via USPS 9 October 2015
Smith, Dick	Nā Molokama Canoe Club	Letter and maps sent via USPS 9 October 2015
Sproat, Stacy	Waipā Foundation	Letter and maps sent via USPS 9 October 2015
Surface, Jan	Watershed Coordinator, Hanalei Heritage River	Letter and maps sent via USPS 19 October 2015
Ueunten, Gary	Clean Water Branch, Department of Health – Environmental Services, State of Hawai'i	Letter and maps sent via USPS 9 October 2015
Wichman, Jonathan	<i>Kamaʻāina</i> of Haleleʻa Moku	Interviewed 17 November 2015 CSH followed up with Mr. Wichman via email on 21 November 2015
		CSH emailed Mr. Wichman a draft interview summary via email 27 January 2016
		Mr. Wichamn replied via email on 28 January 2016 stating he would review later
		Mr. Wichman emailed edits to CSH on 1 February 2016
		Mr. Wichman's interview can be found in Section 6.4.2

Name	Affiliation	Comments
Winter, Kawika	Director, Lima Huli Garden	Letter and maps sent via USPS 9 October 2015
Yent, Martha	Archeologist, Hawaiʻi State Parks	Letter and maps sent via email 16 October 2015
Yokotake, Naomi	President, Hanalei Hawaiian Civic Club <i>Kumu hula</i> , Hula Hālau 'o Hanalei	Letter and maps sent via USPS 9 October 2015
Yokotake, Sherri	Hanalei Hawaiian Civic Club	Letter and maps sent via USPS 9 October 2015

### 6.4 Kama'āina Interviews

The authors and researchers of this report extend our deep appreciation to everyone who took time to speak and share their *mana* 'o with CSH whether in interviews or brief consultation, including contacts who opted not to contribute to the current cultural impact assessment, but nevertheless spent time explaining their position on the proposed project. We request that if these interviews are used in future documents, the words of contributors are reproduced accurately and in no way altered, and that if large excerpts from interviews are used, report preparers obtain the express written consent of the interviewee/s.

#### 6.4.1 Alan Faye, Julian Helder, and David Helder

On 16 November 2015, Auli'i Mitchell of CSH conducted a group "talk story" session with Mr. Alan Fayé, Mr. David Helder, and Mr. Julian Helder to discuss the CIA for the Wainiha Bridge Route 560 Kūhiō Highway Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha Ahupua'a, in the district of Hanalei, on the beautiful island of Kaua'i. We were most fortunate to be hosted in the home of Mrs. Susie Fayé. The following is a summary of the interview.

Before our session began, CSH provided five separate USGS maps of the project areas on the bridges in each *ahupua'a*. These maps were displayed before us as to refer to them during our "talk story" session. The session began by introducing each other for recording purposes and this began with the introduction of Mr. Alan Fayé.

Mr. Alan Fayé was born in 1932 at the Waimea Sugar Plantation Dispensary to Alan Eric Fayé, Sr. and Mrs. Janet Fayé. Alan Eric Fayé was born in 1905, he and his wife, Janet raised their children in the lands of Waimea. Mr. Faye spoke sprightly about his childhood:

I grew up in Waimea; then I went away to prep school on the east coast. All of us barefooted *haole* [white person] boys and sometimes some local Hawai'i boys too went back to that Prep School in Connecticut. I was at that school for three years. Choate School; a prep school for Yale. My father was one of five Fayé brothers who also went to Choate. One of the five actually did go to Yale; the rest went out to Stanford and University of California, Berkeley. So when I graduated, we were all juniors with same names as our fathers. We went from Hawaii and we learned how to wear neckties and say, "Sir," to the Masters; learned how to be proper, and how to find out what we wanted to do in life. It was spiritual school; it was Christian. Then from Choate, I was going to go to Stanford but then at the last minute I decided I wanted to go to the University of Washington in Seattle, and that is where I met Susie.

Alan's grandfather, Hans Peter Fayé (H.P. Fayé) started the Kekaha Sugar Company, one of the first big plantations on the west side. His grandfather was joined by G.N. Wilcox and others. Later his grandfather purchased Waimea Sugar from some missionaries which became the families "Waimea Sugar Mill Co., Ltd." together with the Waimea Dairy.

Mr. Faye shared an interesting fact that his grandfather, H. P. Fayé came from Norway and spoke very little English, so the first thing he learned was the Hawaiian language. On special occasions Alan's grandfather was invited to the island of Ni'ihau by the Robinson Family for social gatherings. He continues by sharing how his grandparents met:

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

For a "special occasion," he was invited by the Robinson Family, to Ni'ihau Island for a social weekend. At the same time the Robinson Family also invited my grandmother's family, which was the Lindsay Family from Moloa'a; they were also invited to Ni'ihau for the same weekend for the same social party. The Robinsons don't do that socializing on Ni'ihau anymore, but they sure did then. The Robinson Family was all like godfathers and godmothers to us in the Waimea Foreign Church. So, my grandfather from Waimea and my grandmother, Margret Elizabeth Lindsay from Moloa'a met there on Ni'ihau, and became pretty well connected. After that, grandpa would get on his horse, (he lived in Kekaha-Mānā), and would ride all the way to Moloa'a to court my grandmother. So finally they got married in 1894. From then on, their life went wild with sugar and dairy. They had a dairy, the Lindsay's in Moloa'a, we had a dairy in Waimea, so they moved the Moloa'a Dairy to Waimea. The Waimea Dairy and Sugar Plantation combination was of great value, in that we could use sugar cane tops for cattle feed, along with the molasses. Raw sugar and molasses were benefits at home from the cane operation. The dairy provided the milk and byproducts.

Growing up in Waimea next door to a Filipino Camp, Alan's childhood was filled with all kinds of local friends, some of which worked at the family dairy. His grandfather passed away in 1928 so his father took on the role of managing WSMCo, Ltd, including the dairy, which he managed until his death in 1968. Mr. Fayé later went to work with Boeing in 1955, later he went to work for NASA. Alan added:

I went to work with Boeing after I graduated from UW in 1955. I later went to work for NASA. Before NASA, it was called "NACA," National Advisory Committee for Aeronautics, and the NACA Committee Chairman was Jimmy Doolittle. As NACA, we were called "Ames Aeronautical Laboratory," located in Mountain View, California. So that is where I really started.

So, from starting at Boeing for one year, then on to NACA in 1956, and then in 1958, we, NACA, suddenly became NASA; named NASA Ames Research Center. We were the first research center for NASA. Mostly you heard later, of Houston and Florida. We were the ones to start with the first astronauts. We trained the first seven astronauts that did Mercury, Gemini and finally the Apollo space flights, so I knew all the guys. We trained them and built flight simulators for them and I got to know Neil Armstrong very well before he became an astronaut, when he was still flying the NACA X-15s hypersonic rocket aircraft, at Edwards. Every time I look up at the moon I think of Neil. We built a research jet-lift test bed with automated controls, to simulate the lunar module controls, to train for Neil's "manual control" on landing on the moon, if needed. He came back to thank us for the manual control landing training. The auto-land would have crashed the "LEM" into a big rock formation. He flew on. Missed the rocks and landed safely!

After 25 years there, I retired and came back home to help out our plantation development, which got moved along by Hurricane Iwa. Iwa thrashed our whole sugar plantation camp so we moved the camp houses around and started the

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Waimea Plantation Cottages, which is a very successful "Plantation Cottage Resort" to this day.

Mr. Fayé and his wife Susie has lived in Princeville for 34 years. Their connection to the *ahupua* 'a of study goes back to when Alan's father built a house on the beach in Hanalei, a vacation house in 1914 in which he spend his childhood year. At that time he remembers that there were only five to ten *haole* families in Hanalei everyone else was of Hawaiian and Chinese ancestry. This was a time when the Hawaiian *hukilau* (seine) were real and the Hawaiian culture became ingrained in all who lived there.

Our "talk story" session continued with the introduction of Mr. David Helder. Mr. Helder was born in 1947 and has lived in Wainiha for eighteen years. David is a retired artist and a caring member of the Hanalei Community. Attending the "talk story" session was his son, Julian Helder, a recent Master's graduate at the University of Hawai'i at Mānoa's Department of Urban and Regional Planning. His research thesis, *Historic Preservation as a Planning Tool for the Protection of a Culturally Diverse Island*, focuses on the district of Hanalei and sheds light on the bridges within the district. His specialty is community planning and historic preservation. Julian expressed his thoughts on the past history of Hanalei in the following words:

It used to be incredibly rural basically all of the north shore past Hanalei was multiculturalism based--Filipino, Chinese, Samoan, and Pacific Islanders. They all kind of lived this subsistence based life out there and they were connected with taro farming and agriculture that went around and that was the case almost still when we moved there in 1998 even though they still did subsistence fishing and hunting all that kind of stuff, but since we moved in it has been slowly shifting over time, now half of the houses out there are vacation rentals, it has definitely changed.

It was conveyed by David Helder that Wainiha used to be considered a kind of hot bed of Hawaiianism, there and Anahola were the two places Hawaiians moved to from everywhere else. Mr. Helder also mentioned there is actually a space where there used to be a town of Hā'ena which was taken out with the title wave. It was located where the church was. There is still of cluster of Hawaiians living there that would be good to interview. These families include the Chandler Family and the Mahuiki Family. When the Helder family moved to Wainiha they noticed the many fishermen out on the reefs, throwing net, and people used nets to fish the river. There were areas where certain people fished and other people were not allowed to fish. Unspoken rules that one would adapt in order to assimilate while going out there so not to disturb the fishing activities. The Helder Family enjoyed and respected this one of the reasons they chose to live in Wainiha. David added:

One of the things that they have just done is make a subsistence area for fishing, right off the state beach in Hā'ena. It has been because of this subsistence fishing that has gone out there. This thing was just like three weeks ago, where if you come in there and you are Hawaiian from someplace else and you want to fish you have to fish the way they fish. They now really have approval of control over it which says a lot of the area because they are wanting to do all this stuff. They are still that active that they want to protect that and preserve it. Wainiha, if you read about it, the valley used to support 2,000 Hawaiians. There was settlements all the way up the valley, I assume Lumaha'i had something similar. There was a town that

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple

Lumaha'i that got wiped out. So it has been an area out there that has been very successful and supported of Hawaiian living, Hawaiian lifestyle up until probably until post-Contact. They just took out so many people.

According to David Helder, when his family moved to Hanalei, they held many memories of what cultural events they witnessed in their time. One major event was the practice of *hukilau*. The Hawaiians were still using subsistence fishing methods, usually one a month. David remembers that Wainiha Beach used to be filled with pick-up trucks and the Hawaiians were out fishing all the time. Mr. Helder recalled the practice of fishing was very evident where Hawaiian families lived and fished all night long. Surfing was another practice amongst the Hawaiians at that time were they could often be seen on the right hand side of Lumaha'i Bay where they dive for lobster. According to Mr. Helder these activities have substantially died off, where the children have grown up and Wainiha has gotten so expensive that they are either living at home or they have moved away to find work.

Mr. Fayé chimed in the discussion sharing his thoughts that Wainiha was the last of the old day style of Hawaiian fishing practices. Coming to Hanalei as a child, there were just a few non-Hawaiian families. Alan and his family used to sit down in front of the families beach house, they witnessed boats ready to go out filled with nets from Hanalei to Waipā. Back in the 1930s he observed a man that would sit up high in a tree watching for the fish to swim in. The man would then signal to all and everyone would take their boats out to sea. Mr. Fayé got to experience the laying of the nets. All the nets were laid way out in front of the beach way out as far as the eyes can see, then another boat came from the river side and one from the Waikoko side, then out at the end the nets were sewed together by the Hawaiians. The nets used at that time would be 16 to 18 feet deep. The Hawaiians would stay under the water for two or three minutes, holding their breath while they sewed the nets and then the *hukilau* started. The entire community new about the *hukilau*. Alan described how the *hukilau* worked:

So the way it worked is this, they had these wooden winches, like the barrel was maybe 2 feet in diameter it was wooden. It had a huge plus kind of a bottom, so here is this thing on the top there was a huge wood piece that came through here, is this round thing on the ground so what it's got it is pretty well fixed on the ground what it is a winch, because the first 100 feet, 50 feet of the net was just rope, so the guys would turn the crank until the nets got close enough so people in the water could start *huki* [pull], both sides these big wooden winches, wooden winches crank 'em, crank 'em. Then when it comes to a certain then everyone is down there on both sides of the nets, huki, huki, huki, huki, huki, by that time bunch of guys would come down with baskets. The fish would be all like this, bamboo woven baskets about 3 feet in diameter, they would start putting the small fish in the basket, they go first, then they take them back and put them inside of the pick-up trucks, model A truck is what it was. It was huge thing in the back with a screen and they would through the fish inside there, they keep throwing the fish in the back and then they finally come to the big fish and a different bigger trucks would come and they fill those up and finally you get to the big ones, sometime like the ono [large mackerel type fish; Acanthocybium solandri] would go take off and go right through the puka [hole] in the nets and you couldn't grab an ono, but you kept maybe a few mahimahi [dolphin; Coryphaena hippurus], you always got plenty of papio

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

[juvenile crevalle] and some *ulua* [certain species of crevalle, jack, or pompano], so and everybody would take the fish in their t-shirts or kind of shirts and fill them up whatever you can put in side that is what you take that is the fish you take. All the other fish take to the market certain this chakalaka would go over to Kapa'a maybe take the fish to the whole east side. I think they went as far as Kapa'a and Anahola and they would go real fast before the fish got bad. Then people at that end would know about because had hand crank phone in those days. So then, they had this Hanalei Pier used to have nothing on top it was open they had a railroad track that went all the way back, they had this shed a big long shed inside it was hundreds and hundreds and piles of hukilau nets they stored them in there, so when was hukilau time the nets weren't down by the boats. They dragged 'em down to the boat you know depends on how deep the hukilau. Whoever went up to see the fish, the fish potter, he had a Hawaiian name. He would tell how many fish, how far out and they judge how deep the net had to be because it had to go all the way to the bottom. In the waning days of the *hukilau*, the man who sat up in the tree, had one iron wood tree, iron wood tree must of been about 40 feet high, and he climb up to the top and sit up there for hours and wait for the fish, it was none other than John Hanohano Pa.

Mr. Fayé spoke very highly of Mr. John Hanohano Pa. According to Alan, John Hanohano Pa was a very famous person who lived in Wainiha, he was born in Kalalau and used to swim back and forth from Kalalau to Hā'ena. At the age of three years old, Mr. Pa taught Mr. Fayé how to swim, he was like a Hawaiian father to him. In his youth, Alan's father received a *wa'a ali'i* from Kona. It was special for the *ali'i* once had racing canoes, this canoe was very slender and it was kept in Waimea until each summer it was brought to Hanalei along with a 16 foot sailboat. It was then that John Hanohano, referred to as "Hanohano" by the family, would right up the sailboat and take everyone out around the point pass Pu'upoa Point. Mr. Hanohano would teach how to spear fish and get lobster. Today he is survived by his granddaughter, Honey Girl.

The observing of fish was an ancient practice known as *kilo i* '*a*, where a man would climb high in the tree and tell to the people below about the fish in the water. During this discussion Mr. David Helder shared that the man who used to watch for the fish over at Kalihiwai was Uncle George. He was the *konohiki* at that time. The following story is told by Mr. David Helder:

There was a story...... the guy who used to watch for the fish over at Kalihiwai was Uncle George, he got old and really couldn't see all that well. This one Christmas he was really was looking to spot some fish and go get 'em himself. He was the *konohiki* and he had come down there and he had a new and he was up there, the way he spotted the fish the oil that would come up on the surface when the fish ball was being attacked, the oil would come up on the surface of the water and so he was out there and walked out and looked and here was this big oil boil in Kalihiwai Bay. He got in his pick-up truck got in his canoe and drug his net all the way and was bringing it in, and the guy, there was a guy down there watching him...the man was from the water company and he had gotten drunk and drove his truck off in the water and it was leaking oil and that was leaking the oil. He told Uncle, "Listen I can't swim, so if you take this cable out we can pull my truck in and if you don't tell 'em I put my truck in, I won't tell them you netted my truck."

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i TMKs: Multiple

That was a while back, those kind of events happened all the time here. One time we were down at Hanalei Bay not too far from the peer they were having a *hukilau* and everyone on that beach got in the water to help.

Mr. Helder stated that the *hukilau* he witnessed in Hanalei Bay was about 20 years ago and at that time everybody on the beach got in the water. Two pick-up trucks with 55 gallon drums in the back filled with fish.

Our "talk story" session now focused on the topic of cultural sites, archaeological site and historic sites in the project area. Mr. David Helder was quick to note that there are burials everywhere on the beach. It was told to them many times where the state archaeologist have dug in the past and *iwi* (bones), just around the corner from his home and down at the Brescia's property where many burials were found.

Mr. Helder states there were over 30 burials were discovered last year. The burials on the beach were a common practice of the past where the waves would wash the back into the sea. In Wainiha, the bridges are right on the ocean. The sea wall was built and this wall is presently being broken down. His son Julian expressed that whenever a new housing project occurs it is almost certain burials will be found, in which the Brescia case was highlighted for in the past.

The conversation led to the Waikoko Bridge that was knocked out in a past tidal wave, where basically the end was washed out and the bridge fell and dropped down. At that time the Hawaiians simply built the bridge out of stone directly on top of the old one, therefore this group voiced their shock of the replacement of the bridge for the Waikoko Bridge is really indicative of the history of the place and the industriousness of the people who quickly repaired it. Mr. Helder wished they do not improve it at all. Mr. Alan Fayé was concerned with the erosion on the sea wall. He states that one of the most important things about the bridge is that it is really is a one lane bridge with a weight limitation more so than any other bridges in Hanalei. This is what keeps the big concrete trucks from coming out into the Hā'ena and Wainiha areas.

As we spoke the topic of the twin bridges of Wainiha surfaced in which the group referred to as Acro Bridges. These bridges were said to be the weakest of the bridges due to rust. All five bridges are on the historic register. The group felt no reason to restore the bridges of Waioli, Waipā and Waikoko. David Helder witnessed:

It used to be that the bridges were narrow they had a low side, the kids in the neighborhoods would all go out and jump off them which you can't do now and they were kind of the heart and soul of Wainiha Village. They were photographed many times and they were just absolutely gorgeous. The DOT [Department of Transportation] had just no idea. They don't know why they don't seem to have a historic preservation officer working with DOT at all. They will do what they want to until they are stopped. In this case I really do believe in the activism because if you want to protect something it's going have to an internal vigilance when come to the DOT. That is why people like Karen Diamond and Barbara Robeson are so important in preserving what we have out there now because if they went doing someone else have to otherwise it would be gone.

Julian Helder readily explained the meaning of "bottom planning" in that basically what happens is, if the planning department is geared for development they want "top down planning,"

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

therefore a powerful planning commission in wanted, this way things stay the same or slower development, more historic in mind of preserving a place the way the residence like it, so it must be done from the bottom up, thus the need for social activism. Mr. Helder refers to the Transient Vacation Rental (TVR) issue, where half of the building are vacation rentals bringing the sense of community to slip away.

Getting back to the bridges Mr. Fayé raised questions relating to the Wainiha Bridge No. 1 on what is wrong with the present bridge. And what has to be done? Mr. David Helder mentioned that it was torn down along with all the Wainiha Bridges, he shared that in its place are now Acro Bridges.

Mr. Helder stated that in the past the Department of Transportation promised that they were going to replace the bridges, but they were torn down and the two were perfectly good viable historic bridges.

The group's discussion led to any possible cultural sites within the project area in which Mr. Fayé felt that the two Wainiha Bridges were part of the cultural community and they should be restored to what they were culturally and historically correct. David Helder pointed to the map near the Waipā Bridge is a fishpond which belongs to Bishop Estates and the Waipā Foundation, under the direction of Stacy Sproat. Mr. Helder shared that six years ago, the foundation restored the fishpond and now runs a camp for the children. He stated that the fishpond is absolutely lovely.

Julian Helder that Mr. Carlos Andrade wrote a book on Hā'ena and he is the leading authority on the history of Hā'ena, and he is teaches at UH (University of Hawai'i) Hawaiian Studies, he would be a good one to talk with relating to Hā'ena history.

Mr. Faye tells of a *moi* (threadfish; *Polydactylus sexfilis*) cave located underneath Lumaha'i. The cave is a curved tubed cave and the Hawaiian people go in and spear fish. The people come down from the Lumaha'i side or they come down another side where there is path that goes down.

Mr. David Helder shared his experience on witnessing traditional cultural practices in Wainiha Bay. The following is his description of *hukilau*:

In Wainiha Bay where these two bridges are, this beach here is Wainiha Beach Park [pointing to map] this is the one I am talking about with all the people doing the *hukilau*. Kids surf this side of the bay all the time that is a continuous process and it is the Hawaiians kids not the *haole* kids that are here, they fish her all the time, they night fish off of this point they fish all the time, just straight fishing [pointing to map] off this beach and they do some fishing here but there is a reef out here that kind of blocks it; this is interesting is that the reef doesn't come in front of it is about 40 feet deep right here and the reef curls out like that so we whales right in here.

Mr. Fayé spoke about a place known as Black Pot Beach, today known as Hanalei Beach Park. The name is associated with a descendant of the area, Mr. Ham Young who used a black pot to cook fish. Alan tells that all the fisherman would bring in their fish and they would throw the fish into a pot. This pot was tended by Mr. Ham Young, Tai Hook Ham Young. Mr. Ham Young would cook dinner at the beach in a big black pot of fish stew and everyone would come and eat there. The park actually took its name from the practice of cooking in a black pot.

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The topic of cultural sites continued. Mr. Helder pointed to the map where he knew to be a *heiau* located near the property of Mr. Michael Olanolan. This huge *heiau* is located across a place known today as Tunnels. David shared that the kids in the community were paid to park cars there before. He mentioned that the *heiau* is on top of the ridge and no one is allowed to go up there, on Power House Road. In Mr. Helder's lifetime he has witnessed many people that took beloved's remains in the form of ashes of the beach in Wainiha, then paddling out to conducting ritual and ceremony.

Concerns were voiced by Mr. Helder in that the practice of fishing is still practiced today all along the coast. He believes that this project may impact that practice once the construction of the bridges are under way for it will take up to a couple years to complete a project this big. Mr. Fayé was quick to mention that this project cannot go ahead if the shearwater birds are here. Mr. Helder continued to share that the north shore, considered to be local is this stretch of Lumaha'i Beach where the Lumaha'i River, a place where everybody from this neighborhood brings their children to play and swim in the waters. He mentioned that sometimes on Kolokolo Point one can witness some hula girl practicing her chanting. Night fishing is also a cultural practice along these shores.

Mr. Fayé spoke of a time around 1949 while he and his cousin were driving the road and crossed Lumaha'i Bridge and right up on the road level was a big white dog running down the road, in which he associates the dog as Pele, the fire goddess. The group referred CSH to contact the Chandler Family as the story tellers of these lands.

On the topic of trails in the area, Mr. Helder pointed to the map to a trail where in early years a man died and his body was taken up the trail to be buried, up between the two Wainiha Bridges. David mentioned that it was an old practice to take their people up and bury them on the ridges in the mountain. Mr. Helder clarified that the first Wainiha Bridge is on the stream, the second and third go over the road that runs up behind the Wainiha General Store. The trail he spoke of earlier starts behind a blue house behind the general store and goes *mauka* and the man's house sits on the start of the trail. The trail comes down from the point of the ridge (*alapi 'i* marked on the map).

It is at this time the group voiced their various concerns about the proposed projects for the five Hanalei Bridges to be replaced. Mr. Fayé felt it is very important to keep the bridges the way they were originally, in the same way they are on the national register and the reason for that is what curbs development out there. Mr. David Helder anticipates the inclusion of width and weights. He voices the principle reason is because it cost \$600 dollars for a cubic yard of concrete. They would have to bring a truck and then bring all the induvial materials, a mixer, mix it on site, with three men, and a pumper, thus it ends up being \$600 a yard and that keeps development down no matter what the instant you make it possible for any size of concrete truck with pre-mix it is going to Pop! Development! David states that all houses has to be 27 feet in the air like his home. They have to pour these huge concrete columns that makes the cost for just a straight foundation for a house about \$55,000 to \$60,000, adding it really is about preservation. He believes it doesn't have to be. The bridges do not need to be any more stressed than the Hanalei Bridge which is 4,000 lbs. Mr. Favé states that this is the one that restricts, Mr. Helder agrees, it is a physical restriction, for the weight limit on the Hanalei Bridge is stress for more than 8 tons. He continues by noting that these are not stressed bridges and that no engineer has ever put a limit what can be driven over or what cannot be driven over, because the way the bridge was fixed by the people who live out here when it was broken. Mr. Helder believes:

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

The problem is that all the time out here the locals drive over limit trucks. That is what broke this bridge is that they had a way over loaded truck and it busted the bridge off. So if you take an 8,000 pound bridge and you put it 12,000 lbs., sure as 18,000 is going to go over it, so we prefer that they stay like this. If you want to have this road. It is just like looking at Hana Road, if you want to keep Hana Road, Hana Road, don't put a freeway or monorail you leave it as it is, because it is the only other road that is on the historic register.

Our "talk-story" session concluded with all agreeing that improvements need to be made and at the same time it is important to keep the historic nature and physical appearances of these bridges proposed for replacement.

#### 6.4.2 Barbara Robeson and Jonathan Wichman

CSH conducted a "talk story" session with Mrs. Barbara Robeson and Mr. Jonathan 'Johnny' Wichman on 17 November 2015 for the cultural impact assessment for the Wainiha Bridges Project, Wai'oli, Waikoko, Waipā, Lumaha'i, and Wainiha Ahupua'a, Halele'a District, Kaua'i Island. This "talk story" session was graciously hosted at the home of Mrs. Robeson in Wainiha. The following is a summary of a recorded "talk story" session with Mrs. Robeson and Mr. Wichman.

Mrs. Barbara Robeson was born and raised in San Diego, California. Mrs. Robeson married her husband, Mr. Scott Robeson in 1972. That same year they purchased property in Wainiha and built their lovely home moving permanently to Wainiha in 1975. Mrs. Robeson has been involved with many projects including the present project concerning the rehabilitation of the historic Wainiha Bridges and preservation of the Hanalei Bridge to Kē'ē, Kūhiō Highway now on the National Register of Historic Preservation.

Our "talk story" session included a delightful man, *kama 'āina* to Hawai'i *nei*, born in Honolulu and raised in Hā'ena, Mr. Jonathan Goodale Wichman. Mr. Wichman has a rich family history connected to the island of Kaua'i. He was born in 1963 to Mr. Charles Wichman and Jeanne Rose Wichman. His paternal grandparents are of well-known Kaua'i Families, Mr. Holbrook Goodale and his wife, Juliette Rice Wichman. Grandma 'Jule', as she was affectionately known to her 'ohana, was a living treasure of Kaua'i and a co-founder of the Kaua'i Museum. Today Mr. Wichman, who works for LBH Hawai'i is raising his family in Hā'ena.

Our discussion began by talking of the general history of the project area and any knowledge of the past and present land use related to the bridges in Wainiha. Mrs. Robeson began with the following information in relationship with the Wainiha Hui Partition located around Bridge Number 3:

The Wainiha Hui Partition and the various impacts at that particular time and the continuing impacts for those parcels that were part of the Partition and that they now have multiple owners, and taxes. For example, some of them own only a twentieth of a parcel and you see that when you look at a TMK, so a lot of times the parcel gets sold to somebody else, or it goes into some kind of "who pays the property taxes" issue. It leaves the community, basically which is a concern and then also some of the Wainiha folks from way back. They would have a portion of several parcels and you know they wouldn't pay or be able to pay taxes on one even

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though they were paying for those people that owned it. It has been very controversial, controversial is the wrong word, but concerned that they haven't been able to maintain the parcels that belonged to them from way back. Other histories n the partition within the past 30-plus years include litigation: The Mahuiki, North Shore 'Ohana, et. al. vs. the Planning Commission and Alex Ferreira (related to the Wainiha Subdivision), and three other lawsuits in the Wainiha Subdivision (Lots 2, 6 & 12) won by our community at the State Supreme Court). Plus I could get into the impacts from the zoning of those vacation rentals which has taken over a lot of parcels in the particular area. Not so well in the Wainiha Bridge area but mainly in the Wainiha Hui Partition which is around bridge number 3. The impacts of those Transient Vacation Rentals (TVR) will impact the circulation of the bridges, especially in a *tsunami* [tidal wave] evacuation zone in which we are located.

Because of the abundance of water, Mrs. Robeson mentioned Wainiha's past land use included *kalo* farming and a rice mill in the 1920s. It is at this time Barbara marks on the USGS Map provided by CSH the location of her home in Wainiha. Mr. Jonathan Wichman's knowledge of Wainiha recounts a fishing village and although Mr. Wichman does not give a specific location to a rice mill, the history of one was told to him. He notes that for the bridges and road ways it is important to record the roadway as the community's life line and how important the road way is and always has been. CSH learned when the bridges went out in the 1946 and 1957 *tsunamis*, everyone, especially the residents of Hā'ena were cut off. Jonathan also feels it is important to realize today the community members are committed to single lane bridges, keeping then slow and safe, and to keeping Route 560's historic nature intact. Mr. Wichman shared the following words:

In the 1970's, The State of Hawai'i had plans to replace the Hanalei Bridge with a huge, sweeping, modern style concrete bridge. The community rose up and prevented that. The community fought for the Hanalei Bridge which Barbara was heavily involved in to keep it single lane. Since then the community is being committed to keeping the rest of these bridges downstream of the Hanalei bridge one single lane.

Our conversation shifted to talking about any memories or knowledge that existed in these areas relating to cultural events. Mr. Wichman recalled the *hukilau* as being a cultural practice witnessed often. The *hukilau* he recalls hearing of were conducted on the beachs at Hanalei, Hā'ena, Maniniholo, and Hā'ena Beach Park. He was around five years old at that time, but recalls that everybody would go down to the beach. His uncle Thomas Hashimoto, one of the lead fisherman in Hā'ena, would lead the *hukilau*. Mr. Wichman remembers everyone helping to pull in the *hukilau* nets and the sharing of fish, but the *hukilau* has not happened for a long while. Barbara Robeson recollected in the past 20 to 30 years there were many more community gatherings, like baby's first birthday  $l\bar{u}$  'au (Hawaiian feast) and those kind of family practices.

Mrs. Robeson and Mr. Wichman relates the lack of traditional cultural practices within Wainiha, Hanalei and H $\bar{a}$ 'ena could be contributed to the fracture of the local communities. Mrs. Robeson discussed the facts that the residential population has decreased. They share the following information:

I don't know if you are aware of the census data. Census designated place for Hanalei and another for Wainiha and another one for  $H\bar{a}$ 'ena. The residential

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

population has decreased. In the 2000 CDP [census-designated place] verses the 2010 CDP and my interpretation of that is people can't afford to live here anymore and a lot of those structures were taken over and became a vacation rental. For example in the CDP for Hanalei, the population of the residents in the year 2000 was 478 and in 2010 it was 450 it went down. The number of occupied of residential housing units went down also between that 10 years and you would think that population would grow for residential populations but it has gone exactly the opposite way. In this area the residential population for 2010 was 2.5 a persons per unit in 2010 in the US census data. TVRs [transient vacation rental] based on if you go to various websites and see how many people they sleep between 2 and 14 or between 2-16 people so the occupancy rates for TVRs is an average of about six or seven.

Mr. Wichman added:

The community has been fractured. The community in Hā'ena is barely a community anymore because there are so many vacation rentals. Everyone has been driven out, locals have been driven out. There are probably 10 or 20 kids in Hā'ena where there used to be a hundred. So that is what is happening and that is what has happened not so much in Wainiha but in Hanalei. Hanalei is like a big hotel now. All the houses are in the front are vacation rentals all the ones across Weke are vacation rentals so it is hard. These numbers are conservative because there is a lot of illegal vacation rental that are saying they're residential but they are not.....but then along with that the road way and bridges is getting heavier use. Because the number of visitors goes up so the cars are growing the number is at an all-time low, this summer was the all-time high.

Both agree that the cars on the bridges and road has increased which will impact the *tsunami* evacuation zone, as the cars increase the community becomes more committed to single lane bridges. Single land bridges slow traffic down for the *malihini* (stranger, foreigner) who often times are late for the sunset or late for a *hula* (dance) show or  $l\bar{u}$  'au.

At this time CSH re-directs the discussion to the cultural connection of Mr. Jonathan Wichman with the island of Kaua'i. Any researcher of Kaua'i Island legends is familiar with the Wichman 'Ohana. Mr. Wichman is the descendant of two long time Kaua'i Families. The Rice Family were descendants from the early missionaries to Kaua'i arriving in the 1850s. Other family became cattle ranchers at Kipu. He is a descendant of the Goodale Family on his grandfather's side who were school teachers on Kaua'i. His great-great grandfather, William Hyde Rice recorded many legends famous of Kaua'i and spoke Hawaiian fluently, translating many legends of the Garden Isle.

Our "talk story" returned to subject of past and present land use in relationship with agriculture. CSH learned the community of Hā ena with the aid of the State helped in the restoration of *kalo lo i* at Hā ena by forming a stewardship program, so that ancient practice is on-going today. Other agriculture is still going on, by diverting the water from Wainiha River into *kalo* farming areas.

The topic of *hula hālau* (school where ancient Hawaiian dance is taught) practicing today in the general areas of the bridges led to the knowledge of most of the *hula hālau* take their practices

TMKs: Multiple

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

to  $K\bar{e}^{\dagger}\bar{e}$  at the *Ke Ahu a Laka*. This led to the sharing knowledge about any burials that may be impacted by the proposed work on the bridges. Mrs. Robeson related:

The only large number of burials I know about in the Wainiha Hui Partition were on the Brescia property, Lot 6 of the Wainiha Subdivision. This was one of the lawsuits I previously mentioned. Not related to burials, across the way from here is the sand bar that was of the Partition, now it is the County Beach Park.

On the subject of history, Mrs. Robeson spoke about another site located distant from the project area which include a charcoal kiln for making charcoal which was identified when she revealed it to an archaeologist who was working up at Powerhouse Road. At the site, there were also, remnants of train tracks used for taking equipment up to the construction of the Powerhouse Plant in about 1906.

As we came to the end of our "talk story" session, Mrs. Robeson led us to some artifacts she collected from the Wainiha Landing. Our session ended with much gratitude for each other in the knowledge that was shared and the exchanging of addresses to keep in touch. CSH is so grateful to Mrs. Barbara Robeson and Mr. Jonathan Wichman for their willingness to share their knowledge about the lands they call home and their great concerns for their community.

### 6.5 Summary of Kama'āina Interviews

A common theme for all interviews was subsistence practices throughout Halele'a Moku. All parties that were interviewed discussed the practice of *hukilau*. Mr. Alan Fayé recalls sitting with his 'ohana on the beach and watching boats being filled with nets. Boats would travel from Hanalei to Waipā. Nets would be stretched far and have a depth of 16 to 18 feet. Fish caught during hukilau included ono, mahimahi, papio, and ulua. The community would gather their share and the remaining fish would be taken to the market in Kapa'a and Anahola. Mr. Jonathan Wichman recalls hukilau being practiced at Hanalei, Hā'ena, Maniniholo, and Hā'ena Beach Park. Mr. Wichman recalls Uncle Tommy Hashimoto leading the hukilau at Hā'ena with the community. Mrs. Robeson adds that these community gatherings were more common 20 to 30 years ago for a baby's first birthday celebration and other family practices. Mr. David Helder remembers kilo i'a, Uncle George, who sat in a tree in Kalihiwai and would observe the fish below in the water. Uncle George was the konohiki of the area. Although Uncle George couldn't see very well, he had a method to spot the fish by observing the oil the fish secreted when they were being attacked. Hanalei Beach Park, commonly known amongst the community as Black Pot Beach, was named after Tai Hook Ham Young who brought a large black pot to cook fish in. Fishermen would bring their catch to Mr. Ham Young, who would create a pot of fish stew and share it with the community.

Mr. Wichman and Mrs. Robeson add that these community fishing practices have been fractured over time most likely due to the change in the residential population, which has decreased. An increase of vacation rentals have appeared in the Halele'a district.

In addition to aquaculture resources, Halele'a Moku is abundant with agricultural resources. Mrs. Robeson points out that Wainiha Ahupua'a is abundant with water and past land use of the area included *kalo* and rice farming. Hā'ena Ahupua'a continues the cultural practice of restoration of *lo'i kalo* with the help of the State of Hawai'i to create a stewardship program. Water from the Wainiha River is also being diverted to assist with *kalo* farming areas.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Another topic that was mentioned was burials. Mr. David Helder points out that many *iwi*  $k\bar{u}puna$  (ancestral bones) can be found on the beaches of the area. He recalls when archaeologists have dug in the vicinity of his home and at the Brescia property and many bones were found. Just last year 30 burials were found. He adds that burials on the beach were a common practice for Native Hawaiians. His son, Julian Helder, adds that the Wainiha Bridges are built on the ocean. The sea wall is currently being broken down. As new housing projects begin, Mr. Julian Helder is almost certain that burials will be discovered, as was the case for the Brescia case. Mrs. Robeson also knows of the burials that were found at the Brescia property.

In relation to other cultural practices significant to the area, Mrs. Robeson also knows of *hula*  $h\bar{a}lau$  who practice to Kē'ē at the *Ke Ahu a Laka*. Mr. David Helder recalls surfing was another common practice on the right sie of Lumaha'i Bay, also a place where people would dive for lobster. According to Mr. Helder, these two practices—surfing and diving for lobster—have died due to the next generation moving away and finding work elsewhere due to the high cost of living in Wainiha. Across from Mr. Michael Olanolan's home is a *heiau*. The *heiau* is located across a place called Tunnels on Power House Road. Mr. David Helder recalls people taking human remains in the form of ashes to the beaches of Wainiha and scattering them out in the ocean.

Mr. Fayé also spoke of Mr. John Hanohano Pa, a very famous person who lived in Wainiha Ahupua'a. Mr. Pa was born in Kalalau located on the North Shore of Kaua'i, accessible by hike from Hā'ena Ahupua'a. Mr. Pa would regularly swim from Kalalau to Hā'ena. When Mr. Fayé was the age of three years old, Mr. Pa taught him how to swim. Mr. Fayé compares Mr. Pa to a Hawaiian father figure.

In regards to the proposed Waikoko Bridge replacement project, Mr. Fayé, Mr. David Helder, and Mr. Julian Helder voiced they are in shock that the bridge is being repaired. Mr. Fayé is concerned with erosion of the sea wall. Mr. David Helder wished they did not need to improve the bridge at all as it would take away from the historical integrity. The group pointed out that all five bridges are on the Historic Register and felt that there is no reason to restore the bridges. Mr. David Helder pointed out that a fishpond that belongs to Bishop Estate and the Waipā Foundation is located near the Waipā Bridge. Another concern of Mr. Helder's are fishing practices and how the project will impact cultural practitioners who participate in aquaculture subsistence. Mr. Fayé adds that if shearwater birds are in the vicinity of these bridges, the project cannot go through.

Mr. Julian Helder refers University of Hawai'i at Mānoa Hawaiian Studies professor, Carlos Andrade, who has written a book on Hā'ena Ahupua'a.

# Section 7 Traditional Cultural Practices

# 7.1 Gathering of Plant Resources

According to LCA documentation, all *ahupua* 'a appeared to have been heavily farmed in *lo* 'i *kalo*, especially Wai'oli Ahupua'a with a record of 154 *lo* 'i along the Wai'oli Stream. *Kula* lands were planted in sweet potatoes, yams, bananas, and sugarcane. Several claims in Wai'oli, Waipā, and Waikoko claimed fishponds. Data taken during this time concludes that the area was very productive agriculturally.

Today, still abundant in water, Halele'a Moku continues to be famous for *kalo* and rice farming. During the early 1900s, a Chinese community in Wainiha began rice farming, which also included merchants and other business people (Coulter and Chun 1937). The rice industry declined over time due to disease, invasive species, and competition from outside of Hawai'i. Rice paddies were reverted back to *lo'i kalo*. Hā'ena Ahupua'a continues the practice of *lo'i kalo* farming today. With the help of the State of Hawai'i, a cultural stewardship program was developed to continue the restoration of taro farming. Water from the Wainiha River is also being diverted to assist with *kalo* farming areas.

# 7.2 Fishing Practices

A common topic for interviewees was aquaculture throughout the district of Halele'a. All parties interviewed discussed the practice of *hukilau*. Boats would travel from Hanalei to Waipā and would be stretched at their maximum capacity with a depth of 16 to 18 feet. The community would assist in the practice. Fish caught during hukilau included ono, mahimahi, papio, and ulua. The community would gather their share of fish. Any remaining fish would be taken to the market in Kapa'a and Anahola Ahupua'a and sold. Mr. Jonathan Wichman recalls hukilau being practiced at Hanalei, Hā'ena, Maniniholo, and Hā'ena Beach Park. Mr. Wichman recalls Uncle Tommy Hashimoto leading the *hukilau* at Hā'ena with the community. Mrs. Robeson adds that these community gatherings were more common 20 to 30 years ago for a baby's first birthday celebration and other family practices. Mr. David Helder remembers kilo i'a, Uncle George, who sat in a tree in Kalihiwai and would observe the fish below in the water. Uncle George was the konohiki of the area. Although Uncle George couldn't see very well, he had a method to spot the fish by observing the oil the fish secreted when they were being attacked. Hanalei Beach Park, commonly known amongst the community as Black Pot Beach, was named after Tai Hook Ham Young who brought a large black pot to cook fish in. Fishermen would bring their catch to Mr. Ham Young, who would create a pot of fish stew and share it with the community. Mr. Samson Mahuiki, states that akule came in large schools during the summer. Commerical fishing licenses were obtained to fish. Limu kohu was picked at Hā'ena Bech Park.

# 7.3 Burials

A number of burials have been found throughout the Halele'a Moku coastline. SIHPs # 50-30-03-1982 yielded three burials (McMahon 1995a, b); SIHP # -1988, consisted of three burials and five isolated human remains (Masterson et al. 1997); SIHP # -355 yielded two burials and isolated skeletal remains (Sullivan and Dega 2003); SIHP # 361, did not yield human remains, but a cultural layer which contained pre- and post-Contact artifacts (Chafee and Dega 2005). However, cultural

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

layers have been known to also yield human remains. In 1992, SIHP # -1878 yielded 31 pre-Contact burials along with cultural deposits with fire pits, postholes, and an *imu* (underground oven) (Spear 1992). In 2003, monitoring was conducted and 11 burials were found along with a cultural layer containing ash, fire-cracked rock, charcoal, stone and coral tools, and partial remains of a pig (SIHP # 1837) (Monahan 2003).

Interviewees all mentioned the Brescia case where 30 burials were unearthed. Mr. David Helder points out that a common practice amongst Native Hawaiians during pre-Contact and post-Contact era was to bury *iwi kūpuna* on the beach. He adds that many *iwi* can be found along the beaches of Halele'a Moku and can regularly be found. His son, Julian Helder, adds that the proposed Wainiha Bridge project is along the ocean. As sea walls continue to break down and new housing projects begin, Mr. Julian Helder is almost ceretain that burials will be unearthed, as was the case for the Brescia property.

### 7.4 Cultural Sites

Some of the earliest archaeological studies were conducted by Thomas G. Thrum (1906) and Wendell Bennett (1931). Thrum and Bennett both cataloged Nakikoniawaiaau Heiau and Mamalahoa Heiau in Wai'oli Ahupua'a. Kupakololi was reported in the *ahupua'a* of Waipā by both Thrum and Bennett. Thrum also listed Halaloa Heiau in Waipā Ahupua'a. Pu'uohewa and Pu'uomama Heiau were found in Thrum's survey of Lumaha'I, however, Bennett did not located them in his 1931 survey. Bennett instead lists Kailiopaia Heiau, *makai* of the government road and to the east of Lumaha'i Stream. In Wainiha Ahupua'a, Bennett describes six sites: *Heiau* on Popoki knoll; Kaunupepeiao Heiau; Laumaki Heiau; Apaukalea Heiau; and two taro terraces and a house site.

Mr. David Helder also pointed out Mr. Michael Olanolan's property, which is near a *heiau*. The *heiau* is located across an area known as Tunnels. The *heiau* sits at the top of a ridge on Power House Road.

# 7.5 Ka'ao and Mo'olelo

In the tale of *Hi'iakaikapoliopele and Malaeha'akoa*, Hi'iaka comes across the fisherman, Malaeha'akoa, who sat and fished. Malaeha'akoa was also a seer. The correlation of Malaeha'akoa of being a fisherman validates the abundance of aquacultural resources in the area. Malaeha'akoa was also the messenger who told Hi'iaka about Lohiau's (Pele's lover from Hā'ena) death when she arrived on the shore of Hā'ena.

Lumaha'i and Wainiha Ahupua'a have many tales about the *menehune*, a legendary race of small people who were responsible for the construction of building fishponds, roads, and *heiau* in the evenings. Some say the *menehune* and the *mū* were the original inhabitants of Kaua'i, driven to the *mauka* sections of the island by the arrival of the Hawaiians. A census of Wainiha Ahupua'a during the time of Kaumuali'i's ruling, lists 65 men of Lā'au, Kaua'i as *menehune*. The census also listed the following places as *menehune* villages: Naue, Pā'ie'ie, Maunaloa, Pali'ele'ele, Maunahina, Pōhakuloa, Opaikea, Hōmaikalani, and Lā'au. Makaihuwa'a Ridge, a steep prominence that overlooks Waipā and Waikoko Stream Bridges, consists of three excavated pits on the ridgeline as well as a *lo'i* and *heiau* at its base. This is the site of the Menehune Lighthouse. Translated, Makaihuawa'a means "eye nose canoe," a possible reference to the signal fires that emitted from the pits or phosphorescent algae in the water.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

# Section 8 Summary and Recommendations

CSH undertook this CIA at the request of CH2M HILL and on behalf of the FHWA/CFLHD. The research broadly covered the entire *ahupua* 'a of Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha.

# 8.1 Results of Background Research

Background research for this study yielded the following results:

- 1. *Ka'ao* and *mo'olelo* throughout Halele'a Moku correlate and validate cultural practices of the area. In the tale of *Hi'iakaikapolipole and Malaeha'akoa*, Hi'iaka comes across the fisherman, Malaeha'akoa. The *moku* of Halele'a is known for its aquacultural resources such as fishing. The story validates the abundance of resources in the area then and now. It was Malaeha'akoa who also notified Hi'iaka of her sister's (Pele, the fire goddess) lover's (Lohiau from Hā'ena Ahupua'a) death.
- 2. The *ahupua'a* Lumaha'i and Wainiha were known for their tales of the *menehune*, a legendary race of small people who were responsible for the construction of building fishponds, roads, and *heiau* in the evenings. Some say the *menehune* and the  $m\bar{u}$  were the original inhabitants of Kaua'i until they were driven to the *mauka* (upland) sections of the island by the arrival of Hawaiians.
- A census in Wainiha Ahupua'a during the time of Kaumuali'i listed 65 men of Lā'au as menehune. The census also listed the following villages to be inhabited by menehune: Naue, Pā'ie'ie, Maunaloa, Pali'ele'ele, Maunahina, Pōhakuloa, Opaikea, Hōmaikalani, and Lā'au.
- 4. According to Land Comission Award (LCA) documentation, the *moku* was heavily farmed in taro *lo'i*. Wai'oli Ahupua'a yielded 154 *lo'i* along the Wai'oli Stream. *Kula* lands were planted in sweet potatoes, yams, bananas, and sugarcane. Several claims included fishponds. Data taken concludes that the area was very productive agriculturally.
- 5. A number of burials have been found throughout the Halele'a Moku coastline. SIHPs # 50-30-03-1982 yielded three burials (McMahon 1995a, b); SIHP # -1988, consisted of three burials and five isolated human remains (Masterson et al. 1997); SIHP # -355 yielded two burials and isolated skeletal remains (Sullivan and Dega 2003); SIHP # 361, did not yield human remains, but a cultural layer which contained pre- and post-Contact artifacts (Chafee and Dega 2005). However, cultural layers have been known to also yield human remains. In 1992, SIHP # -1878 yielded 31 pre-Contact burials along with cultural deposits with fire pits, postholes, and an *imu* (Spear 1992). In 2003, monitoring was conducted and 11 burials were found along with a cultural layer containing ash, fire-cracked rock, charcoal, stone and coral tools, and partial remains of a pig (SIHP # 1837) (Monahan 2003).
- 6. Rice farming began in the mid-1860s and ended in the 1920s when California rice began to take over the market. Hanalei Valley led the Hawaiian rice market in most acreage planted in rice.

# 8.2 Results of Community Consultation

CSH attempted to contact NHOs, agencies, and community members. Below is a list of individuals who shared their *mana* 'o and '*ike* about the project area and the *ahupua* 'a of Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

- 1. Mike Ching, Hanalei business owner and *kama 'āina* (native-born)
- 2. Alan Fayé, Princeville Community Association
- 3. David Helder, resident of Wainiha
- 4. Julian Helder, resident of Wainiha
- 5. Samson Mahuiki, President of the Waipā Foundation
- 6. Barbara Robeson, long-time resident of Wainiha
- 7. Jonathan Wichman, *kama 'āina* of Halele'a Moku

### 8.3 Impacts and Recommendations

Based on information gathered from the cultural and historic background, the proposed project may potentially impact Native Hawaiian burials and subsurface cultural layers. CSH identifies these potential impacts and makes the following recommendations:

- 1. There is a very high possibility of *iwi kūpuna*, or ancestral bones, that may be present based on previous cultural, historical, and archaeological research that was conducted as well as via community consultations. The community has voiced knowledge of burials being found on the beaches and dune lands. Some of the currently proposed project areas are situated on soils classified as Beaches, a preferred sediment for the interment of the dead. Land disturbing activities during construction may uncovered presently undetected burials and/or other cultural finds.
- 2. Personnel involved in the construction activities of the project should be informed of the possibility of inadvertent cultural finds, including human remains. Should burials (or other cultural finds) be identified during ground disturbance, the construction contractor should immediately cease all work and the appropriate agencies be notified pursuant to applicable law, HRS §6E.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

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# Appendix A Place Names of Wai'oli, Waikoko, Waipā, Lumaha'i and Wainiha

Place Names are compiled from Dr. Lloyd Soehren *Inoa 'Aina (Hawaiian Place Names)*, ulukau.org, legends, LCAs, Pukui et al. 1974 and Wichman 1985.

#### Wai'oli Place Names

Haeleele, boundary point, *pu'u*, "little green hill" between Mookoleaka and Pu'u Ki on the Hanalei/Waioli boundary. (Soehren)

Hanalei, town, bisected by the Hanalei/Wai'oli boundary. (Soehren)

**Hanalei Bay,** a large, semicircular bay fronting the *ahupua'a* of Hanalei, Wai'oli, Waipā and Waikoko. USGS map, coastal frontage of Waipā and eastern Waikoko. Literally, "crescent bay" (Pukui et al. 1974:40–41). Wichman (1985:108) traces the name to "wreath making" and "*lei* valley" relating "The wreaths are the rainbows that appear in the upper valley from the constant rain showers."

**Kahula'ana,** an oceanside cliff where high waves often prevent one from going around the cliff. Hi'iaka and Wahine-'ōma'o route the *mo'o* Ho'ohila so they can continue on their journey (Wichman 1998).

Kaliko, pu'u, Hanalei Ahupua'a, between Waipā and head of Wai'oli on the Hanalei/Wai'oli boundary, elevation 4200+ ft. (Soehren)

**Kalapa**, boundary point, rock, Wai'oli Ahupua'a, the boundary of [Wai'oli] commences on the east side of the Wai'oli River at a stone in the sea called Kalapa (Soehren)

Kamanui, Wai'oli, *lo'i*, LCA 9278 to Uaua, "Apana 2, Akahi loi maloko o Waioli 'Kamanui ka inoa..." (Soehren)

Kamo'okoleaka, a hill which was once a *mo* 'o (Wichman).

**Kapuoa**, boundary point, place, Wai'oli Ahupua'a, "...a place on the river bank..." between Kalapa and Makaihuoa on the Wai'oli/Waipā boundary. (Soehren)

**Kuhimana**, boundary point, place, "flat kalo land" at foot of Mookoleaka ridge, between Kamookoleaka and Naoneana on the Hanalei/Waioli boundary. (Soehren)

Manalau, Wai'oli Ahupua'a, ancient surf at Wai'oli, Hanalei.

**Mamalahoa**, Wai'oli Ahupua'a, boundary point, *pu'u*, between Kapalikea and Pu'u Manu on the Wai'oli/Waipā/Lumaha'i boundary; the *mauka* corner of Waipā. Elevation 3745 ft. Also known as "Neki or Namalawa" (q.v.). Perhaps a corruption of Namalawa? (Soehren)

Manuakepa, 'ili, LCA 3781, Wai'oli Ahupua'a. (LCAs)

Naoneana, boundary point, place Hanalei Ahupua'a, "place on Government road" between Manolau and Kuhimana on the Hanalei/Wai'oli boundary. (Soehren)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

**Palikea**, Wai'oli Ahupua'a, boundary point, *pu'u*, between Makaihuwaa and Kapalikea on the Wai'oli/Waipā boundary. Elev. 940 ft. Not named in Boundary Commission testimony (Soehren)

**Pu'u Ki**, Hanalei Ahupua'a, boundary point, *pu'u*, between Kamoo Koleaka and Hihimanu on the Hanalei/Wai'oli boundary. Written "Puu Kii" in BCT. (Soehren)

**Pu'u Kokala**, boundary point, *pu'u*, the Hanalei/Wai'oli boundary passes "round head of [Wai'oli] valley to commencement of Eastern boundary at a place on high hill called Pu'u Kokala..." Perhaps the same as or near Kaliko (Soehren)

**Waiokihi**, Wai'oli Ahupua'a, boundary point, *pu'u*, between Makaihuwaa and Kapalikea on the Wai'oli/Waipā boundary. Elevation 940 ft. Not named in Boundary Commission testimony. (Soehren)

Wai'oli, *ahupua 'a* (Soehren)

Wai'oli Beach Park, park in Wai'oli. (Soehren)

Wai'oli Park, park in Wai'oli. (Soehren)

Wai'oli Stream, Wai'oli Ahupua'a, stream (LCA 10564)

Wahiawa, mo'o in Claim no. 9069 by Kulou. (Soehren)

#### Waipā Place Names

Awaa, 'ili of Waipā Ahupua'a (LCA 10663:1).

Haako, 'ili of Waipā Ahupua'a (LCAs 9831, 9832 and 10076:2; 10171).

Haaloa, 'ili of Waipā Ahupua'a (LCA 235N).

Halulu, Wichman (1985:114) cites this as a place in Waipā named after a fabulous bird.

**Kaooa**, Waipā Ahupua'a, boundary point, *pu'u*. Between Kuahua and Kolopu on the Waipā/Lumaha'i boundary. Elevation 760+ ft. The *mauka* corner of Waikoko Ahupua'a (Soehren)

**Kahalahala**, Wichman (1985:115) cites this as a beach near near Makahoa Point named after the "young stage of the *kāhala* (*Seriola dumerilii*) fish".

Kahihiilu, 'ili of Waipā Ahupua'a (LCA 7918:3).

**Kahula'ana**, Wichman (1985:116) cites this as "a cliff-point at the seashore where one must swim around to the beach on the other side of the cliff" near Makahoa Point.

Kaluanono, 'ili of Waipā Ahupua'a (LCA 10171).

Kamani, USGS map, 1,002 ft high peak on west boundary of Waipā with Lumaha'i.'

Kaoo, USGS map, area on east boundary ridge where Waikoko, Waipā and Lumaha'i come together.

**Kapailu**, USGS map, area on west boundary of Waipā with Lumaha'i at approximately 2,000 ft elevation.

Kapalikea, USGS map, approximately 1,000 ft high peak, east boundary of Waipā and Wai'oli.

TMKs: Multiple

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i
Kapuhae, 'ili of Waipā Ahupua's (LCA 7918:2).

Kawahine, 'ili of Waipā Ahupua'a (LCA 7918:1).

**Keahu**, Waipā Ahupua'a, boundary point, place, the Waipā/Waikoko boundary between Pohakuopio and Kuahua runs along the east side of Waikoko stream from the sand beach at Keahu. Coordinates approximate. (Soehren)

Kīwa'a, Wichman (1985:114) cites this as a place in Waipā named after a fabulous bird.

Kolopua, USGS map, 1,270 ft high peak on west boundary of Waipā with Lumaha'i.

**Kuahua**, Waipā Ahupua'a, boundary point, hill, "...a small hill" between Keahu and Kaooa on the Waipā/Waikoko boundary. Elevation 40+ ft. The boundary no longer passes over this hill, but lies to the west.(Soehren); USGS map, flats back from coast shared by Waikoko and Waipā.

Kuhihiilu, 'ili of Waipā Ahupua'a (LCA 7918:3).

Mahina Kēhau, USGS map, approximately 1,600 ft high peak on west boundary with Lumaha'i.

**Makahoa Point**, point, Hanalei Bay; ridge and *heiau* near Kaunalewa Kaua'i; literally, "friendly point" (Pukui et al. 1974:140) Waikoko Ahupua'a. Point named after the "young stage of the *kāhala* (*Seriola dumerilii*) fish".

Makaihuwa'a, USGS map, coastal ridge on east boundary of Waipā with Wai'oli.

**Māmalahoa Peak**, USGS maps, 3,745 ft high peak where Lumaha'i, Waipā, and Wai'oli come together. Peak, Hanalei District, Kaua'i (Pukui et al. 1974:144). Perhaps 1985:113).

Papahoiki, 'ili of Waipā Ahupua's (LCA 10661).

**Pohakuopio**, Waipā Ahupua'a, boundary point, stone, "...a stone on sand beach called Pohakuopio" marks the boundary at the shore between Waipā and Waikoko. The name appears misplaced on USGS. Coordinates are for the boundary at shore. (Soehren)

Pu'a'anui, 'ili of Waipā Ahupua'a (LCA 235-N:2).

**Pu'u Ka Manu**, USGS map, 690 ft high hill on east boundary with Waikoko. Literally, "the bird hill" (Pukui et al. 1974:198).

Waiakaaka, mo'o of Waipā Ahupua'a (LCA 3917:4).

Waiokihi, USGS map, 947 ft high peak on east boundary of Waipā with Wai'oli.

Waioli, 'ili of Waipā Ahupua'a (LCA 10663:2).

**Waipā**, *ahupua 'a*, land division and stream; literally, "touched water" (Pukui et al. 1974:227). Wichman (1998:114) relates the meaning "to request to the gods in prayer."

**Waipa'a**, Given by Wichman (1985:114) as a variant of Waipā, "dammed-up water" referring to the frequent building up of a sand bar at the stream mouth.

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

#### Waikoko Place Names

**Pu'u Hanauakia**, Waikoko Ahupua'a, boundary point, place, between Kahalahala and Pu'u Hanauakia on the Waikoko/Lumaha'i boundary. Elevation 600+ ft. (Soehren)

**Lepahu**, Lumaha'i Ahupua'a, boundary point, place, boundary between Lumaha'i and Waikoko (Lumahai Boundary Commission).

**Pohakupili**, Waikoko Ahupua'a, boundary point, place, between Pu'u Hanauakia and Kaooa on the Waikoko/Lumaha'i boundary. Course 4 "Passing Pohakupili" (BC 11). Coordinates estimated.

**Waikoko**, Waikoko Ahupua'a, *loko*, *pali*, "The pali of Waikoko" bounds the west side and "a dry loko called Waikoko" bounds the *mauka* side of Claim No. 10564:2 by Oleloa. (Soehren)

Waikoko Stream, Waikoko Ahupua'a, stream. (Soehren)

## Wainiha Place Names

Kaili, Wainiha Ahupua'a, *lo'i*, LCA 9169 to Kealai. "Apana 1. Akahi loi Kaili ka inoa maloko o Wainiha..." (Soehren)

**Maunahina Stream**, Wainiha ahupua'a, stream, Rises at about 2760 ft. elevation, enters the Wainiha River at 440+ ft.

**Puwainui Falls**, Wainiha Ahupua'a, *wailele*, on the Wainiha River at the gaging station, elevation about 990 ft. (Soehren)

#### Lumaha'i Place Names

**Aikanaka**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Kealawela and Pu'u Iliahi on the Lumaha'i/Wainiha boundary. Elevation 1080+ ft. Not named in Boundary Commission records but corresponds with point called "Moi" (q.v.). (Soehren)

Hapuupuu, Lumaha'i Ahupua'a

Hilele, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Moi and Pipiwai on the Lumaha'i/Wainiha boundary. (Soehren)

**Kahoolinapaka**, Lumaha'i Ahupua'a, boundary point, place, the boundary at the shore between Lumaha'i and Wainiha. (Soehren)

**Kahililoa**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Pipiwai and Kioula on the Lumaha'i/Wainiha boundary.(Soehren)

**Kaluahee**, Lumaha'i Ahupua'a, boundary point, place, along Kolokolo Ridge, between Kolokolo and Waianu on the Lumaha'i/Wainiha boundary. Elevation 240+ ft. (Soehren)

**Kaluamaikai**, Lumaha'i Ahupua'a, boundary point, place, between Waianu and Kealawele on the Lumaha'i/Wainiha boundary, along Kolokolo Ridge. Elevation 240+ ft. (Soehren)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

**Kaluapohakukee**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Kawaialea and Kawailoa on the Lumaha'i/Wainiha boundary. (Soehren)

**Kamakeanu**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Pu'u Iliahi and Laau Ridge on the Lumaha'i/Wainiha boundary. Elevation 3880+ ft. Not named in Boundary Commission records. (Soehren)

**Kawaialea**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Kioula and Kaluapohakukee on the Lumaha'i/Wainiha boundary. (Soehren)

**Kawailoa**, Lumaha'i Ahupua'a, between Kaluapohakukee and Hapuupuu on the Lumaha'i/Wainiha boundary.(Soehren)

**Kealawele**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Kaluamaikai and Moi on the Lumaha'i/Wainiha boundary. Elev. 1098 ft. Misspelt "Kealawela" on USGS 1965. (Soehren)

**Kioula**, Lumaha'i Ahupua'a, boundary point, gulch, between Kahililoa and Kawaialea on the Lumaha'i/Wainiha boundary. (Soehren)

**Kolokolo Point**, Lumaha'i Ahupua'a, boundary point, point, ridge, the narrow ridge separating Lumaha'i and Wainiha is called Kolokolo in Boundary Commission testimony and in BC 11 (1:54). Also called "Lae o Kolokolo" (Mitchell 1930:154, East trig. station). (Soehren)

**Kulanaililia**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Pu'u Nopili and Pali Eleele on the Wainiha/Hā'ena boundary. Elevation 2003 ft. Not named in Boundary Commission records. (Soehren)

Laau Ridge, Lumaha'i Ahupua'a, boundary point, ridge, between Kamakeanu and Pu'u Kamaha on the Lumaha'i/Wainiha boundary. Not named in Boundary Commission records. (Soehren)

**Mahinakehau Ridge**, Lumaha'i Ahupua'a, boundary point, ridge, between Pu'u Laau and the head of Lumaha'i on the Lumaha'i/Wainiha boundary. Elev. about 3700 ft. Not named in Boundary Commission records. (Soehren)

**Moi,** Lumaha'i Ahupua'a, boundary point, *pu'u*, between Kealawele and Hilele on the Lumaha'i/Wainiha boundary. Elevation 1080+ ft. This point is called "Aikanaka" on USGS 1965. (Soehren)

**Pipiwai**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Hilele and Kahililoa on the Lumaha'i/Wainiha boundary. (Soehren)

**Puu Iliahi**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Aikanaka and Kamakeanu on the Lumaha'i/Wainiha boundary. Elevation 3390 ft. Not named in Boundary Commission records. (Soehren)

**Puu Laau**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Pu'u Kamaha and Mahinakehau Ridge on the Lumaha'i/Wainiha boundary. Elevation 3504 ft. Not named in Boundary Commission records. (Soehren)

**Pulehua**, Lumaha'i Ahupua'a, boundary point, *pu'u*, the corner of Hanalei/Lumaha'i/Wainiha. Elevation about 4560 ft. (Soehren)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

**Pu'u Nopili**, Lumaha'i Ahupua'a, boundary point, pu'u, between the shore and Kulanaililia on the Wainiha/Hā'ena boundary. Elev. 1087 ft. Not named in Boundary Commission records. (Soehren)

**Pu'u Kamaha**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Laau Ridge and Pu'u Laau on the Lumaha'i/Wainiha boundary. Elev. 4016 ft. Not named in Boundary Commission records. (Soehren)

**Pu'u Uahia**, Lumaha'i Ahupua'a, boundary point, *pu'u*, between Kolokolo Point and Kealawela on the Lumaha'i/Wainiha boundary. Elev. 921 ft. Not named in Boundary Commission records. Perhaps this should be written "wāhia" (Soehren)

**Waianu**, Lumaha'i Ahupua'a, boundary point, place, between Kaluahee and Kaluamaikai on the Lumaha'i/Wainiha boundary. Elevation 200+ ft. on Kolokolo Ridge. (Soehren)

# Wainiha Place Names

Alakai, Wainiha Ahupua'a, boundary point, *pu'u*, the corner of Wainiha and Hanakapiai on the Hanalei/Waimea District boundary. Elevation 4120+ ft. (Soehren)

Aliinui, Wainiha Ahupua'a, boundary point, *pu'u*, "...the furthest point of Haena and the jctn of this land with Wainiha." (BCT) Between Kalapahalulu and Haka on the Wainiha/Hanakapiai boundary. Elevation 3330 ft. This point is called "Hono o Na Pali" on USGS 1965. (Soehren)

**Apaukalea**, Wainiha Ahupua'a, *heiau*, Bennett's Site 151. "...adjoining the 'Power House' road on the east side, inland from Site 150 [Laumaki heiau] in Wainiha valley. The remains of recent occupation together with modern stone platforms, walks, graves with tombstones, and other such work, make the distinction of this heiau difficult." (Soehren)

Haka, Wainiha Ahupua'a, boundary point, *pu'u*, between Aliinui and Waiau on the Wainiha/Hanakapiai boundary. (Soehren)

**Hiaupe Stream**, Wainiha Ahupua'a, stream, rises at about 2500 ft. elevation, enters Wainiha River at 300 ft. (Soehren)

Hinalele Falls, Wainiha Ahupua'a, *wailele*, on the Wainiha River, elevation about 2600 ft. (Soehren)

**Hono o Na Pali**. Wainiha Ahupua'a, boundary point, *pu'u*, the *mauka* corner of Hā'ena, called "Aliinui" (q.v.) in BC 21. Between Pali Eleele and Kilohana on the Wainiha/Hā'ena/Hanakapiai boundary. Elevation 3330 ft. (Soehren)

**Io**, Wainiha Ahupua'a, *mo 'o*, stream, Claim No. 9802 by Napea: "In the ili Kilua...a houselot in Io, Wainiha." Bounded on *mauka* side by Io brook. (Soehren)

**Kaloopa**, Wainiha Ahupua'a, *'ili 'āina*, LCA 11053 to Naoi. "2 apana ma ka ili o Kaloopa i Wainiha..." Perhaps Ka-lōpā? (Soehren)

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

**Kapoki**, Waimea Ahupua'a, boundary point, *pu'u*, vent, "...the NE corner of [Waimea] and the SW corner of Wainiha..." and the north corner of Makaweli. A vent in the Koloa Volcanic Series. Elevation 4680+ ft. in Alakai Swamp. (Soehren)

**Kaunupepeiao**, Wainiha Ahupua'a, *heiau*, Bennett's Site 149. "...back of the first house on the first pali east of the mouth of the Wainiha River. A flat place about 30 feet wide and 20 feet deep with stones along the front edge meet the description given by Thrum: 'A 12-foot open-paved heiau of husbandry class; probably simply a place of offering."" (Soehren)

Laumaki, Wainiha Ahupua'a, *heiau*, Bennett's Site 150. "...on a knoll west of the 'Power House' road, about one mile from the government road, in Wainiha valley. Thrum describes this heiau as 'A small, open platform, paved heiau, 2 feet high, of husbandry class." (Soehren)

**Makawea Stream**, Wainiha Ahupua'a, stream, rises at about 2760 ft. elevation, enters Wainiha River at 300+ ft. (Soehren)

**Nalowale**, Wainiha Ahupua'a, *heiau*, Bennett's Site 148. "...on Popoki knoll....located next to the road (inland side) in front of Site 149 near the Wainiha river. It is said to have been a heiau site, but nothing remains to mark it." The name is lost. (Soehren)

**Pali Eleele**, Wainiha Ahupua'a, boundary point, *pali*, between Kulanaililia and Hono o Na Pali on the Wainiha/Hā'ena boundary. Elevation 3225 ft. Not named in Boundary Commission records. (Soehren)

**Waiau**, Wainiha Ahupua'a, boundary point, *pu'u*, between Haka and Alakai on the Wainiha/Hanakapiai boundary. (Soehren)

Wainiha, Wainiha Ahupua'a, town/village (Soehren)

Wainiha Bay, Wainiha Ahupua'a, bay. (Soehren)

Wainiha Pali, Wainiha Ahupua'a, *pali*, Wainiha Pali Comments: Forms the west side of the Wainiha Valley and the east side of Alakai Swamp. (Soehren)

Wainiha River, Wainiha Ahupua'a, river/stream. (Soehren)

# **Appendix B Boundary Commission Reports**

# Wai'oli

# Waioli Ahupua'a, District of Halele'a, Island of Kaua'i, Boundary Commission, Volume 1, pps 56-61

Boundary of the Ahupuaa of Waiole Department of Interior Honolulu September 13th 1873

Honorable D. McBryde, Commissioner of Boundaries Sir In setting the boundaries of Land on your Island please have defined the following which have been suggested by his Honor Judge Widemann in: Waiole 2 of Houkou Hanakapiai Kalalau Pohakuao Q Honopu Waiapuhi Kamalamalo Kaakoanui O Halaula Q Mountain lands adjoining Moloaa whatever named. Some of the above with an O Mr. W. was doubtful whether still unsold or unleased. Yours Very truly, Edwin O Hall [flourish at end of name]

Thereupon appointed the 7th day of October 1873 at Court house house [sic] Waioli for the hearing of the evidence in relation to the Boundary of the Ahupuaa of Waioli, and caused notice to be served on the owners of the adjoining lands to appear at the hour and place above named.

Peepee, sworn, The boundary of this land commences on the East side of the Waiole River at a stone in sea, Kalapa thence to a place on river bank called Kapuoa thence crosses river to stone at corner of hill Makaihuoa thence up ridge to top and called same name Makaihuoa thence up peak called Peapea [page 57] Thence up ridge to Kapalekea Thence up to junction with Lumahae at Neki Thence along ridge to little hill called Kapailu Thence along to another hill Haulauloa [first u perhaps crossed out] and thence on to Molokama

thence to peak Kanaenae the extreme point of Western Boundary of this land, Thence round head of Valley to commencement of Eastern Boundary at a place on high hill called Puukokala thence down the ridge to Puukii thence down the ridge to little green hill, Hooeleele thence down to flat kalo land, Kuhimana near Ohia trees and thence along and on top of and old Kuaauna to a place on Government [road called Nameana thence to a place in sea called Manolau and round to place of commencement

From the above and the evidence of several other natives whose testimony was the same the following decision was given.

# Decision

The Northwest boundary of this land commences at a rock out in the sea called Kalapa from thence to a place on the east Bank of the stream called Kapuoa. Thence across stream to stone at foot of hill called Makahuoa, thence to top of hill called same name Makaihuoa, thence up and along ridge to peak called Peapea. Thence up ridge to peak Kapalekea, thence up ridge to Junction with Lumahae at Neki. Thence along ridge to peak or hill Kapailu, thence to hill or peak Halauloa, thence to Molokama. Thence to Peak Kananae, the most western point on the boundary of this land. Thence following round the head of valley to commencement of Eastern Boundary to a place on high hill called Puukokala. Thence down the ridge to Puukii, thence down ridge to little green hill called Hoaeleele. Thence down and round ridge to Mookoleaka thence following down ridge to flat kalo land Kuhimana near Ohia trees and thence down and along an old bank or Kuaauna to a place on Government[page 58] Road called Naoneana thence to a place in the sea called Manolau, and round to place of commencement. Duncan McBryde

Survey Ordered, Boundary Commissioner, Island of Kauai

Notes of Survey of Waiole Kauai

The North East corner of this land commences on the sea shore of Hanalei harbour at a stone let into the ground and from whence the following objects bear. An Orange tree on the ridge at the head of Waikoko and called Kaooa

South 70° 47' West true (61? 45' West Magnetic). A peak called Leapea on the Western boundary of this land South 39? 55' West true (South 30? 53' Magnetic) a tall stake on point of hill below Peapea South 58° 23' true (49? 21' Magnetic) This Eastern boundary runs thence

South 26° 44' true (35? 46' Magnetic) 1000 links through a grove of Guava bushes and across Government Road and just within Johnsons Paddock, Thence

South 20° 76' 1405 links crossing through Johnsons Paddock to the end of an old Kuauna. Thence

South 23° 44' East 1560 links following along old Kuaauna and hau tree fence to taro patches. Thence

South 9° 21' East 1700 links crossing through taro patch to foot of a spur and thence up said spur

to place called Kuhimana. Thence

South 24° 29' West 531 links. Thence

South 27° 1' East 1360 links. Thence

South 30° 37' East 1604 links. Thence South 60° 1' East 779 links. Thence

South 23° 59' East 576 links. Thence

South 6° 31' 274 links. Thence

South 40° 26' East 280 links. Thence

North 66° 18' East 256 links. Thence

South 84° 25' East 579 links. Thence

North 86° 25' East 316 links to top of a peak at junction of ridge leading toward the flat, and at this place there is a mark cut in the ground and filled with stones and in the centre a broken bottle Y [mark]. Thence the boundary follows along the watershed of Mooleaka Ridge on the following bearings and distances South 23° 15' East 2400 links. Thence

South 44° 30' East 2240 links to the edge of the woods. Thence

South 69? 30' East 1240 links up the ridge through woods to junction of main range leading down from the mountain. Thence

South 6° 30 West 2220 links up watershed of main ridge to Hoaleleele Peak.Thence<del>1100 links</del> [page 59]

South 36° 30' West 1500 links to sharp peak Hihimanu. Thence down 1100 links to sharp peak called Pukii, Thence

South 26° 30' West 3150 links to sharp peak called Puuhokala, Thence following round in a South Westerly direction the water shed of range to a peak called Kanaenae (see plan) which is the south east end of this land.

Returning to place of commencement the north boundary follows along the sea shore North 74° 15' 3412 links to a long stone fit into the ground which is the Northwest corner of this land thence the Westerly boundary runs thence

South 11° 7' East 401 links to a place called Kupuaa on the river bank. Thence

South 40° 59' West 600 links crossing the river and on to the foot of spur called

Makaiheaa. Thence South 19° 35' West 640 links up face of spur to a stone let into the ground. Thence

South 33° 2' 1290 links up this spur the watershed being the boundary. Thence

South 2° 45' West 2080 links to peak called Peapea, Thence

South 63° 8' West 1850 links along ridge to peak. Thence

South 8° 15' West 2400 links to a sharp peak, Thence

South 16° 54' West 2120 following round the head of spur to edge of woods. Thence

South 5° 35' West 4260 links up the face of spur to Kapalekea. Thence

South 20° 15' East 1980 links; Thence

South 2° 0' East 4600 links to top of peak called Neki or Namalawa. Thence

South 27° 10' East 4120 links to a peak called Kapailu. Thence

South 36° 45' East 3250 links to peak called Halaula. Thence

South 40° East 2440 links to sharp peak

South 84° 30' East 3360 links to the top of a mountain called Namoolakama. Thence following round in an easterly direction to water shed of ridge to a peak called Kawainae, which is the

Southeast corner of this land (see plan) and containing an area of Three Thousand, Three Hundred and Fifty acres more or less (3350 acres).

N.B. At all stations where practicable there is a mark put with a stone bottle below, or else a trench Y with bottle broken and set down in the centre. James W. Gay, Surveyor

October 17th 1873 N.B. for fishing right, see plan Duncan McBryde, Commissioner of Boundaries

[No. 13, Waioli Ahupuaa, District of Halelea, Island of Kauai, Boundary Commission, 3350 acres, 1873]

#### Waipā

Waipaā Ahupua'a, District of Halele'a, Island of Kaua'i, Boundary Commission, Kaua'i, Volume 1, pps. 60-61

Boundary of the Ahupuaa of Waipaa

No. 13

Received the following petition

Honorable D. McBryde, Commissioner of Boundaries for the Island of Kauai Wahiawa, August 21st 1873

Sir:

For and on behalf of Her Excellency, R. Keelikolani, I beg to apply to you for the rectification of the boundaries of Ahupuaa of Waipaa, District of Hanalei on said Island.

Waipaa is bounded on the south by the Government land of Waiole, and on the North by the Ahupuaa of Waikoko, now owned by Mr. Albert Wilcox. I have the honor to be Your Most obedient servant H.A. Widemann

Thereupon appointed the 7th day of October A.D. 1873 at the Courthouse Hanalei for the hearing of said petition and caused notice to be served on the owners of the adjoining lands or agents to appear and attend to their interests.

Court opened at 10 a.m.

Mr. James Gay appeared for the petitioner and called the following witness and others.

Peepee, sworn, The Western Eastern boundary commenced at the sea there at a stone called Kalapa; thence to a place on river bank called Kapuoa

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

Thence across river to stone at bottom of ridge, Makaihuaa; Thence to top of ridge same named Makaihuaa; Thence up ridge to peak Peapea; Thence up ridge to peak Kapalikea; Thence to junction with Lumahai at Neki; Thence to hill or peak, Puuhoonauwekia; Thence down to Kolopuu; Thence continuing down ridge to Kaooa; Thence down small ridge along Waikoko boundary to a small hill called Kuahua; [page 61] And thence down the east side of the bank of the stream to sand beach at Keahu and thence to a stone in sand beach called Pohakuopeo, and thence round to place of comencement [sic].

From the above evidence and that of several other natives which was precisely similar, the following decision was rendered.

# Decision:

The Northeastern Boundary of this land comences [sic] in the sea at a stone called Kalapa and from thence runs to a place o the river bank called Kapauoa;thence across stream to a stone at foot of ridge called Makaihuaa; thence to top of ridge at a place called by the same name, Makaihuaa; thence up ridge to a peak callee Peapea. Thence up ridge to a place called Kapalakea; thence up ridge to junction with Lumahae at a pace called Neki and thence to hill or peak, Puuhoonauwikia and thence down to Kolopuu, continuing down ridge to Kaooa, where there is an Orange tree, the Junction of Waipaa and Waikoko; thence following down a branch ridge along the boundary of Waikoko to a place called Kuahua, from thence down the east side of the Waikoko stream to sand beach at Kuahu, thence along the beach to a large stone on the sand called Pohakuopai, and from thence to place of comencement [sic]. Duncan McBryde, Commissioner of Boundaries, Island of Kauai.

No survey received. Decision 9th October 1873

[No. 13, Waipaa Ahupua'a, District of Halelea, Island of Kauai, Boundary Commission, no amount, 1873]

# Lumaha'i

Lumaha'i Ahupua'a, District of Halele'a, Island of Kaua'i, Boundary Commission, Kaua'i, Volume 1, pps. 52-55

1873, Boundary of the Ahupuaa of Lumahai

## No. 11

August 7, Received notice from Charles R. Bishop, owner of the Ahupuaa of Lumahai to have the Boundary of that land settled and defined, also received intimation that Mr. James Gay has

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

been empowered to act for said owner if convenient for him to do so.

Thereupon appointed the 6th day of October A.D. 1873 for the hearing of said petition and caused notices to be served on the several witnesses and the owners of the adjoining lands.

Momooiki, sworn: The northeastern boundary of this land commenced on the sea shore at a place called Kaahoolinapakai; from thence up side of hill to ridge called Kolokolo; thence up ridge to Lauhala, Kaluahee; thence to Waianu; thence to Lauhala, Kaluamaikai; thence across gulch and up ridge to Kealawele; thence up ridge and to peak, Moi; thence up ridge to peak Hilele; thence up ridge to Pipewai[?]; thence up ridge to peak Kaheleloa; thence to gulch; Keoula; thence to gulch Kawaialea; Thence up ridge to Kaluapohakukee; thence up ridge to Kawailoa; thence up ridge to Hapuupuu; thence up ridge to Pulehua;

The junction of this land with Hanalei; thence down the Eastern boundary to Namolokama; [thence down to] Kapailu; Thence to hill Neki; Thence to Kolopu; Thence to Keokiawailua; Thence to orange trees, Kaooa; The junction of Waipa & Waikoko; thence to Pohakupili; thence Puuhanamakia; thence to Lepahu; thence to Kahalahala; thence to sea and round to place of commencement. [page 53]

Kanohoku, sworn, this boundary commences on the sea shore at a place called Kahookinapakai; from thence up the side of hill to ridge called Kolokolo; thence up ridge to Lauhala tree Kaluahee; thence up ridge to Waianu; thence to Lauhala Kaluamaikai; thence across gulch and up ridge to Kealawele; Thence up ridge to peak Moi; thence up ridge to Helele, thence to Pipewai; thence to Kaheleloa; thence to gulch Kioula; thence to Kaluapohakukee; thence to Kawailoa; thence to Hapuupuu; thence to Pulehua; the junction of this land with Hanalei; thence down the Eastern Boundary to Namolokama; thence down to Kapailu[?] thence to high hill Niki; thence to Kolopuu; thence to Pohakupili; thence to orange trees at Kaooa; the junction with Waipa and Waikoko; thence to Pohakupili; thence to Puukananakia; thence to Lepahu; Thence to Kalahala; thence to sea and round to place of commencement.

The following Decision was then rendered

The Northwestern boundary of this land commenced on the sea shore at a place called Kahoolinapakai and from thence up the side of hill to ridge called Kolokolo and thence up and along ridge to a Lauhala tree at Kaluahee; thence along ridge to Waianu; thence to hala tree at Kaluamaikai; thence across gulch and up ridge to a place called Kealawele; thence up ridge to peak Moi; thence up ridge to peak Hilele; thence up ridge to peak Pipiwai; thence up ridge to Kahililoa; thence up to gulch Kioula and Kawaialea; thence up ridge to Kawailoa; thence to Hapuupuu; thence up to Pulehua; the junction of this land with Hanalei. Thence down the Eastern Boundary to Namoolokama; thence down to Kapailu; thence down to high hill Neki; thence down to Kolopu; thence continuing down ridge to keokiawailua; thence down to orange trees at Kaooa; the junction of Waipa and Waikoko; thence down ridge to Pohakupili; thence to

Puukanakaia; thence down to Lepahu; thence down to Kalahala; thence to [page 54] sea and round to place of commencement.

Duncan McBryde, Commissioner of Boundaries, Kauai

Survey Ordered

Notes of Survey of Lumahai, Situated on the Island of Kauai

The Northeast corner of this land commences on the sea shore at a rocky point called Kahalahala, and runs thence

North 1° 21' West 2000 chains and ten links crossing over the top of a conical hill close to the beach and on to top of spur called Lepahu; Thence

South 74° 16' West 760 links along the ridge; thence

South 69° 11' West 1300 links to Puuhanauakea (X iki); Thence

South 10° 58' West 3200 passing Pohakupili, a large prominent stone on the spur; thence

South 25° 50' West 2460 links; thence

South 1° 19' East 5820 links to Keokiawaelua; Thence

South 16° 9′ West 3950 links along the ridge; Thence

South 26° 6' East 1540 links up the ridge to stony peak or knob called Kolopuu; thence

South 30° 36′ East 9460 links to a peak called Puuhoonauwekia (appearing thus) [diagram: line angling down from left with knob in center and then large U or gully below on right]; the ridge to the west of the bearings is the boundary; Thence

South 81° 36' East 3860 links along the ridge to Neki or Namalawa; thence

South 27° 10'East 41 chains 20 links to a peak called Kapailu; thence

South 36° 45' East 3240 links to a peak called Halaula; thence

South 40° East 2440 links to sharp peak; Thence

South 34° 30' East 3360 links to the top of mountain called Namoolokama.

Returning to place of commencement at Kahalahala, the Northern boundary of this land runs N 75° 41′ West 5300 links, along sandy beach and crossing river, and on up to the top of spur called Kolokolo; thence

North 49° 52' West over the face of pali to sea shore distance about two chains; thence from Kolokolo the boundary runs thence

South 40° 10' West 1200 links along the ridge; thence

South 52° 5′ West 379 links along ridge to Makai side of the road, crossing the spur; thence South 29° 20′ West 409 links; thence

South 41° 4' West 870 links along the ridge to place called [page 55] Kaaluahee; thence South 8° 28' West 967 links along ridge to Waianu; thence

South 19° 36' West 1122 links along the ridge and 50 links west of some Lauhala trees; Thence South 11° 1' West 1190 links along ridge; where there is a Lauhala and a large hole called Kaluamaikai; Thence

South 39° 34' West 1360 links crossing a gully and over on to the point of spur; thence South 71° West 620 links up spur; thence

South 31° 55' West 418 links up spur; thence

South 75° 46' West 491 links; Thence

CIA for the Wainiha Bridges Project, Wai'oli, Waipā, Waikoko, Lumaha'i, and Wainiha, Halele'a, Kaua'i

South 39° 0' West 794 links; thence South 87° 16' West 961 links; Thence North 76° 36' West 428 links to the top of spur; Thence South 37° 6' West 978 links up the ridge; Thence South 84° 24' west 169 links to the top of Kealawele; thence South 4° 28' West 3800 links to Moi (the boundary from Kealawele follows along water shed of ridge up and round the head of Lumahai valley and down to the beach at Kahalahala); Thence South 16° 24' West 3500 links to Hilele; thence South 6° 54' west 5760 links to Pipiwai; Thence South 5° 39' West 6440 links to Kahililoa; Thence South 14° 36' East 5000 links to Keoula; thence in a southeast direction along the ridge to gulch called Kawaialea. Thence up the ridge going aground the gulch to a place called Kaluapohakukee. Thence along ridge to Kawailoa; Thence to Hapuupuu; Thence along the ridge to Palehua; the junction with Hanalei, which is the southeast corner of this land. Thence following round range of mountains ain a Northwest direction to Namoolokama, the end of survey, on eastern boundary of this land (see plan), and containing an area of Three thousand one hundred and Fifty acres, more or less, 3150 acres.

N.B. At all practical places on this survey and where desirable marks have been put in the ground either a stone with broken bottle beneath or a trench with a broken bottle in the center [diagram 3 petals in triangle or upside down Y] thus.

I hereby certify, that this is a correct survey of the boundary of this land as decided upon by Judge McBryde, Commissioner of Boundaries for the Island of Kauai. James W. Gay, Surveyor, October 17th 1873 Approved, 30 June 1875 Duncan McBryde, Commissioner of Boundaries, Kauai.

[No.11, Lumahai Ahupua`a, District of Halelea, Island of Kauai, Boundary Commission, 3150 acres, 1873]

Appendix G Summary of Avoidance, Minimization, and/or Mitigation Measures

# Summary of Avoidance, Minimization, and/or Mitigation Measures

This appendix summarizes the avoidance, minimization and mitigation measures discussed in Chapter 3. Additional details regarding these measures are included in the applicable resource sections within Chapter 3.

# Topography, Geology, and Soils

Impacts of the Action Alternative to topography, geology, and soils are less than significant and do not require specific mitigation measures. The project would be designed appropriately for site conditions in accordance with the 2014 AASHTO LRFD Bridge Design Specifications, Seventh Edition (AASHTO 2014).

Avoidance and minimization measures include the implementation of BMPs to minimize the soil erosion potential, and hence minimize potential air quality and water quality impacts. Sections 3.2, Climate and Air Quality and section 3.3, Water Resources provide a summary of these BMPs.

# **Climate and Air Quality**

Construction activities would incorporate fugitive dust emission control measures in compliance with provisions of HAR Chapter 11-60.1, "Air Pollution Control," Section 11-60.1-33 on Fugitive Dust and Kauai County Code, Chapter 22, Article 7. Measures that are expected to be used to control airborne emissions include the following:

- Use water, disturbance area limitations, and re-vegetation to minimize dust emissions.
- Stabilize all disturbed areas with erosion control measures.
- Cover open-bodied trucks and trailers whenever hauling material that can be blown away.
- Revegetate disturbed area as soon as practical after construction.
- Stabilize construction entrances to avoid offsite tracking of sediment.
- Maintain equipment in working order.

## Water Resources

#### Surface Water

All avoidance and minimization efforts will be detailed in full within the 404 and 401 permit application and include, but are not limited to the following:

- Obtain a Section 404 Permit (from the USACE), a Section 401 Water Quality Certification and NPDES General Permit coverage for storm water associated with construction activities, dewatering, and hydrostatic testing if applicable, from the DOH-CWB and a stream channel alteration permit the Hawai'i Commission on Water Resources Management (CWRM), requesting authorization for impacts to jurisdictional waters. CLFHD will ensure all permit terms and conditions are met, including any mandated offsets to permanent impacts.
- The roadway alignment is being designed to follow the existing alignment as much as possible.
- The slopes are steepened to reduce and/or avoid impacts to jurisdictional features.
- The proposed alignment will be shifted in allowable areas to reduce and/or avoid impacts to jurisdictional features.
- Reinforced soil slopes and/or walls may be utilized in practicable areas along the roadway to reduce the slope and avoid impacts to jurisdictional features.

• Equipment shall not be operated, and materials shall not be discharged, within the boundaries of wetlands and waters of the United States without the proper permits. Fording of running streams with construction equipment will not be allowed. Temporary bridges shall be used whenever crossing of the creek is necessary.

In addition, to ensure excavated soil is not disposed of in a manner or location to create indirect effects to other environmental resources (such as, wetlands and other waters), FHWA-CFLHD will require that the excavated soil be used onsite to the extent practicable, or properly disposed of in an approved and permitted location.

#### **Ground Waters and Water Quality**

Impacts related to water resources and water quality would be less than significant. The following measures would be implemented to avoid or minimize the potential for effects.

• Treatment BMPs have varying levels of effectiveness in treating specific pollutants. FHWA-CFLHD will consider this data when developing appropriate water quality treatment solutions for the project in close coordination with our contractor.

Potential water quality impacts to surface waters during construction of the project will be mitigated by adherence to State and County water quality regulations governing grading, excavation and stockpiling.

Best Management Practices (BMPs) and a stormwater and in-water pollution prevention plan (SWPPP/IWPPP) will be implemented during the construction of the projects to mitigate the potential for sedimentation impacts downstream and to near-shore waters and marine ecosystems. Isolation of construction activities from water would prevent construction induced downstream sediment delivery. While a temporary pulse of suspended sediment may occur in the immediate project area during installation and removal of in-water isolation and confinement BMPs, it would be highly localized to the immediate area, small in quantity, and very temporary in duration. The contractor will be required to follow the project specifications, which are consistent with the following:

• Standard project specifications are detailed in the *Standard Specifications For Construction Of Roads And Bridges On Federal Highway Projects FP-14* (FHWA 2014) which are mostly consistent with those identified in the Construction Best Management Practices Field Manual (HDOT 2008); and the Hawaii Standard Specification for Road, Bridge and Public Works Construction. Other project specific measures or more stringent requirements would be detailed in the Special Contract Requirements (SCR) and are summarized below.

A NPDES General Permit for Storm Water Associated with Construction Activity, as administered by the State DOH, will be required to control storm water discharges. Mitigation measures will be instituted in accordance with site-specific assessments, incorporating appropriate structural and/or non-structural BMPs, and minimizing time of exposure between construction and re-vegetation.

As part of the Stormwater Pollution Prevention Plan (SWPPP), the CFLHD will prepare and implement an erosion control and restoration plan to control short- and long-term erosion and sedimentation effects, and to restore vegetation and stabilize soils in areas affected by construction activities. The plan will include necessary requirements regarding erosion control, and will implement BMPs for erosion and sediment control as required. Following construction, restoration would occur to temporary work areas disturbed during construction. Only appropriate non-invasive plant material will be used for erosion control and restoration. BMPs will be placed on all disturbed slopes and material storage sites, as indicated by the FHWA Erosion Control Plan. Treatment BMPs have varying levels of effectiveness in treating specific pollutants. FHWA-CFLHD will consider this data when developing appropriate BMP solutions for the project in close coordination with the contractor. Below is a summary of the different BMPs that may be employed which are described in detail in Chapter 4 of the following manual: *An Integrated Storm Water Management Approach and a Summary of Clear Water Diversion and Isolation Best Management Practices for Use in the* 

#### *State of Hawaii, by the Federal Highway Administration and Hawaii Department of Transportation, Practitioners Guide.* FHWA-CFLHD also will ensure compliance with the FP-14 and the following measures:

#### **General Site Best Management Practices**

- Maintain and require all contractor(s) and the subcontractor(s), that are performing work covered under the applicable permits, to maintain at the construction site or in the nearby field office, a copy of all permits, all notification and compliance reporting requirements, and all records demonstrating that every requirement of the permits have been complied with.
- The area beyond the construction limits will not be disturbed. Trees, shrubs or vegetated areas temporarily damaged by construction operations will be re-vegetated.
- Ensure that all erosion and sediment BMPs around the perimeter of the project are deployed prior to the commencement of any construction work (including grading and grubbing); are properly maintained throughout the entire period of in-water work; and are not removed until work is completed and the water quality in any in-water work area(s) has returned to its pre-construction condition as demonstrated by the monitoring results.
- Hauling trucks exiting the site shall be inspected to ensure they are clean and do not track materials when entering or exiting the project site. Trucks shall be cleaned to prevent the tracking of mud or debris over roads or parking lots. The jobsite shall be kept free of rubbish and construction debris. The project site shall be cleaned regularly and the materials shall be collected in roll-off containers. These materials shall be disposed of on a routine basis in accordance with all applicable regulations.
- The Contractor will be responsible for proper handling and disposal of construction waste, including hazardous waste, and for preparing a waste disposal plan that specifies proper removal and disposal of all debris from the project area. For all project-generated waste, the Contractor will make a determination whether the waste is classified as hazardous waste, universal waste, excluded waste, waste water, or solid waste. Dispose of construction debris, waste products, vegetation and/or dredged material removed from the construction site at upland State and County approved sites. Prior to construction, the Contractor will complete and submit a Solid Waste Disclosure Form for Construction Sites to the Department of Health, Solid Waste Section. The form can be downloaded at: https://health.hawaii.gov/shwb/files/2013/06/swdiscformnov2008.pdf.
- The effectiveness of sediment-control devices will depend on an adequate inspection, maintenance, and cleaning program. Frequent inspections, especially during and after storm events, will be conducted to determine if devices are operating effectively. When a device proves inadequate, it will be immediately redesigned or replaced until it is effective.
- FHWA will allow concrete surfaces to cure for 7 days prior to contact with any flowing or open water and will ensure that no concrete truck wash water is disposed by percolation into the ground. A temporary concrete washout facility shall be used to contain concrete wash-out or waste and shall be constructed with sufficient size / volume to contain all liquid and concrete waste generated by concrete washout operations. The facility shall be lined with plastic lining material of a minimum of 10 mil polyethylene sheeting. The sheeting shall be free of holes, tears or other defects that may compromise the impermeability of the material. The facility may be constructed above-grade or below-grade and shall be maintained daily to prevent migration of concrete contaminated wash water from entering the adjacent waters. The breaking up and removal of hardened solids may damage the plastic lining. If damage occurs, the pit will be repaired and relined with new plastic. Concrete wash-outs will be located 50 feet from storm drain inlets, open drainage areas, and waterbodies, and will be maintained as needed.
- Dust generation shall be minimized by using water to dampen the surfaces to be demolished when feasible. Requirements of Hawaii Administrative Rules, Title 11, Chapter 60.1 (HAR 11-60.1) for Air

Pollution Control shall be followed for preventing the release of dust during construction activities. Measures shall be taken to reduce and eliminate sediment from leaving the jobsite whether it is airborne or in the form of silty water. These additional measures may include (but not be limited to) spraying water to eliminate dust, reducing traffic on the site, dust screen on perimeter fencing, silt curtains, sand bags, drain inlet/scupper protection, silt fence, gutter buddies, bio-socks, sediment filter bags (if appropriate) or any alterative or equivalent means to prevent silts/sediments or pollutants from leaving the jobsite.

- BMPs will visually monitored daily, especially following precipitation events to ensure these structures are functioning property. Inspections will be documented, and records for all inspections and repairs will be maintained on-site. When a device proves inadequate, it will be immediately redesigned or replaced until it is effective.
- Portable toilets for sanitary waste management will be serviced regularly.
- On-site storage of construction materials shall be stored within the limits indicated on the contract drawings. Materials shall be properly stored in a container, on dunnage, or as required by the manufacturer to avoid contact with storm water in order to control spills.
- In Hawaii, the Commission on Water Resource Management (CWRM) issues permits regulating withdrawals of surface and groundwater. If water drafting is necessary, FHWA-CFLHD will ensure this water use is approved in accordance with a streamwater use permit obtained from the CWRM (HRS §174C-48 [1987]).

#### In-Water and Above Water Work

The project would involve demolition, excavation, grading, and construction in the stream and on the streambanks. All avoidance and minimization efforts will be detailed in full within the 404 and 401 permit applications that will be prepared by the contractor for this project and include, but are not limited to obtaining a Section 404 Permit, a Section 401 Water Quality Certification, and a stream channel alteration permit, from the USACE, the Department of Health Clean Water Branch (DOH-CWB) and the Hawaii Commission on Water Resources Management, respectively. Additionally, potential water quality impacts to surface waters during construction of the project will be mitigated by adherence to state and county water quality regulations governing grading, excavation, and stockpiling. FHWA-CLFHD will ensure all permit terms and conditions are met, including any mandated offsets to permanent impacts.

In addition to the implementation of the project SWPPP and the before mentioned BMPs; impacts because of in-water construction would be minimized and mitigated through the following BMPs, including the following:

- Isolate and confine all upland activity to contain/retain pollutants (including, but not be limited to, airborne particulate; dust, concrete slurry, concrete chips, concrete surface preparation washing effluent, construction debris, etc.) upland and not allow it to enter waters, including the designated inwater work area. Do not discharge any effluent associated with the proposed construction activities, such as dewatering effluent, effluent resulting from hydroblasting, saw cutting, concrete surface preparation, rock washing, concrete and rock truck washing effluent or any other similar regulated activity(ies). Effluent shall be properly contained, collected and prevented from entering, either directly or indirectly, State waters, except for those discharges that have received authorization issued by the DOH-CWB under the NPDES Permit as applicable.
- All in-water work areas will be isolated and confined from open water habitats through the use of approved isolation techniques such as filter fabrics, turbidity curtains, K-rails, cofferdams, sheet piles, gravel/rock berms, gravel/sandbag berms, and/or stream diversions (pumped, pipe/flume, or excavated). In-water work will be conducted in compliance with the following manual: *An Integrated Storm Water Management Approach and a Summary of Clear Water Diversion and Isolation Best*

Management Practices for Use in the State of Hawaii, by the Federal Highway Administration and Hawaii Department of Transportation, Practitioners Guide. The contractor shall completely isolate and confine all in-water work areas throughout the entire water column (surface to bottom) such that all potential water pollutants will not leave or enter the work area. The entire volume of water in the in-water work area needs to be isolated and confined. Frequent inspections of these BMPs will be conducted to determine if devices are operating effectively. When a device proves inadequate, work will cease and the device will be immediately redesigned or replaced until it is effective. The diversion or isolation BMPs shall remain in place throughout the entire period of in-water work; and are will not be removed until the water quality in the in-water work area has returned to its pre-construction condition. In-water BMPs shall be removed immediately after work is completed in a manner that would allow flow to resume with the least disturbance to the substrate.

- Allow unimpeded flow around the isolated and confined in-water work area to allow for aquatic animal migration and/or to prevent downstream flooding situations. Adequate water depth and channel width must be maintained at all times for passing design flood discharges.
- Equipment shall not be operated, and materials shall not be discharged, within the boundaries of wetlands and Waters of the U.S.; without the proper permits. Fording of running streams with construction equipment will not be allowed
- Watertight formwork shall be constructed to prevent concrete from entering the water when in-water construction work is being performed. Forms constructed at or close to the water level shall be constructed to achieve a watertight seal. Concrete surfaces will be allowed to cure for seven (7) days prior to contact with any flowing or open water.
- Apply best degree of treatment or control measures to the potential water pollutant discharges associated with the proposed construction activity (ies) that assures the discharges will meet requirements compatible with the basic water quality criteria applicable to all waters, uses and specific water quality criteria and recreational criteria established for the class of the receiving State waters. BMPs shall be properly implemented and maintained during the entire construction period.
- Only utilize BMPs that are inert and not sources of pollution itself. (Examples of inappropriate in-water BMPs include, but are not limited to: compost biosocks since it is a source of nutrients; silt fence since the material is porous; and a soil berm since the soil particles will erode away). Ensure that all material(s) placed or to be placed in State waters are free of waste material, heavy metals, organic materials, debris and any water pollutants at toxic or potentially hazardous concentrations to aquatic life as specified in HAR, §11-54-4(b).
- For dewatering that may be required during excavation or construction of the project, a NPDES General Permit for Construction Activity Dewatering would be required for discharging dewatering effluent into waters of the U.S.. The permit will require appropriate BMPs, an erosion control plan, and a water quality monitoring plan to mitigate any impacts on receiving waters.
- Ensure contractor and subcontractor compliance with all requirements of the Section 401 WQC; Water Quality Standards (WQS) in Hawaii Administrative Rules (HAR), Chapter 11-54; and all information submitted to the DOH-CWB for compliance with the Notification and Reporting Requirements. Ensure that the activity will not result in non-compliance or violations to the applicable State WQS. Ensure that all discharges associated with the proposed construction activities are conducted in a manner that will comply with "Basic Water Quality Criteria Applicable to All Waters" as specified in HAR, §11-54-4.
- If required, conduct or contract with a qualified laboratory/environmental consultant to conduct the
  pre-construction, during construction, and post construction monitoring requirements in the Applicable
  Monitoring and Assessment Plan. Test methods promulgated in 40 CFR Part 136 effective on July 1,
  2011, and when applicable, the chemical methodology for sea water analyses (HAR, § 11-54-1 0) shall be
  used. The detection limits of the test methods used shall be equal to or lower than the applicable WQS

as specified in HAR, Chapter 11-54. For situations where the applicable WQS is below the detection limits of the available test methods, the test method which has the detection limit closest to the applicable WQS shall be used. If a test method has not been promulgated for a particular parameter, the applicant may submit an application through the Director for approval of an alternate test procedure by following 40 CFR 136.4. Comply with any modification to the sampling locations, frequencies, and/or parameters as instructed by the DOH-CWB for corrective/remedial action.

- The contractor shall inspect the BMPs at the start of the day's construction to assess their condition and shall monitor the effectiveness of the BMPs throughout the construction period and immediately cease the portion of the construction work if water quality monitoring or daily inspection or observation result(s) indicates that noncompliance to HAR, §11-54-4(a) or §11-54-4(b), will occur or is occurring. HAR §11-54-4(a) requirements prohibit substances attributable to domestic, industrial, or other controllable sources of pollutants (including materials that will settle to form objectionable sludge or bottom deposits; visible floating debris, oil, grease, scum, or other floating materials; and objectionable color or turbidity plumes. Comply with all new State WQS adopted by the DOH after the effective date of WQC. The construction activity shall not resume until adequate measures are implemented and appropriate corrective actions are taken and water quality monitoring demonstrates that the non-compliance has ceased. Note: These actions shall not preclude the DOH-CWB from taking enforcement action authorized by law. Maintenance of BMPs shall be in accordance with the manufacturer's recommendations.
- Ensure that the proposed construction activities related discharges not covered under the applicable permits will also comply with State water pollution control permitting requirements under NPDES as established in HAR, Chapter 11-55:
- Discontinue work during storm events or during flood condition.
- Modify environmental protection measures, including BMPs and monitoring requirements, when instructed by the DOH-CWB for corrective action/remedial actions.
- Allow the USACE, DOH-CWB, or other regulatory agencies to conduct routine inspections of the construction site in accordance with applicable permits and HRS, §342D-8.
- Not stockpile, store, or place construction material or construction activity-related materials in State waters or in ways that will disturb or adversely impact the aquatic environment.
- During demolition over water, construct structurally adequate debris shields to contain debris and prevent it from entering the water. This shall be accomplished by either locating floats beneath the areas where demolition will take place or by building temporary platforms, where necessary, to capture demolition debris beneath these areas. Do not permit debris to enter waterways, travel lanes open to public traffic, or areas designated not to be disturbed. If debris does fall into a stream during demolition, it will be removed from the stream without dragging the material along the streambed. Debris shall be collected from these areas and disposed of in accordance with all applicable regulations and at approved processing areas.
- Treated Lumber:
  - Treated Lumber will not be utilized for any in water applications.
  - Wood treated with Pentachlorophenol will not be utilized.
  - Cutting, shaping, drilling, and other construction activities associated with treated lumber should not be conducted near the water where sawdust, chips, or other debris might fall into the water.
  - Sawdust, chips, waste wood, and other debris should be collected and disposed of properly.

#### Site Work (Land Based Activities)

- For grading, grubbing and stockpiling activities needed during construction CFLHD will ensure proper permits are obtained and adherence to state and county regulations governing grading, excavation, and stockpiling. Clearing and grubbing will be held to the minimum necessary to complete the work.
- Drainage inlets for the site civil works shall be covered with a non-woven geotextile to prevent the migration of fines into the drain lines as appropriate. Gravel, debris, fines, etc. shall be removed from geotextile filters regularly.
- Off-site hauling shall be undertaken in covered trucks for disposal. If the material is not contaminated and satisfies all federal, state, and city and county requirements, it may be re-used for general fill at other project sites.
- Collect water pollutants (including, but not be limited to, airborne particulate; dust, concrete slurry, concrete chips, concrete surface preparation washing effluent, construction debris, etc.) from localized work areas and not allow these water pollutants to enter or re-enter State waters, including the inwater work area.

#### **Material Storage**

- Construction, building and waste materials and containers shall be stored in designated areas indoors or in covered areas, where practical, that are protected from rainfall and contact with storm water runoff. When it is necessary to store materials and containers outdoors, the containers and materials shall be covered with a tarp, plastic, or other suitable covering, wherever practical.
- Construction waste shall be disposed of in designated areas and storm water shall be kept from flowing onto or off these areas.
- Perimeter controls, containment structures, covers, and liners shall be installed and repaired or replaced as needed to maintain proper function.
- The storage areas shall be checked weekly and after rain events. The materials shall be stored away from drainage pathways to prevent contact with stormwater. The area shall be kept neat, clean, and equipped with spill containment supplies for each material being stored.
- Spills shall be prevented to the extent possible and immediately cleaned up, if occurs.
- All containers shall be closed, securely fastened, stored neatly, and properly labeled or retained in their original containers. Very large items may be stored in the open in the materials storage area, however, such materials shall be elevated on wood blocks or placed on higher ground to minimize contact with stormwater.
- Appropriate measures shall be taken to ensure that incompatible chemicals are not stored next to each other.
- The contractor shall submit a site map showing the storage and stockpile locations of these materials at least 30 calendar days prior to the start of construction activities. Safety Data Sheets (SDS), an inventory of the material, and emergency numbers shall also be kept near the storage area.
- All products shall be used in accordance with the manufacturer's specifications and directions for handling, storage, and disposal.

#### **Spill Prevention**

Precautions shall be taken to prevent spills of oil and other hazardous substances from entering the water. All waste and hazardous materials shall be properly managed, stored and handled, and secondary containment shall be provided as applicable. Fueling, lubricating, and maintenance of equipment, motor vehicles, and vessels shall be conducted in such a manner to prevent spills, and these shall not be conducted over water unless secondary containment is provided. Bulk fuel storage containers shall be provided with a secondary containment system. The following measures will be implemented to mitigate spill risk:

- Contractor must submit a Spill Prevention, Control, and Countermeasure (SPCC) Plan at least 2 days before beginning work.
- Spill kits will be available on-site at locations where hazardous materials are used. Spill kits will be inspected regularly and supplies replaced as needed. Staff will be trained on spill prevention and cleanup.
- Any spill of petroleum products, hazardous materials, or other chemical or biological products released from stationary sources or construction, fleet, or other support vehicles shall be properly cleaned, mitigated, and remedied, if necessary. Any spill of petroleum products or a hazardous material shall be reported to the appropriate federal, state, and local authorities, if the spill is a reportable quantity. Response shall occur in accordance with federal, state, and local regulations.
- In general, when gasoline, diesel fuel, antifreeze, hydraulic fluid or any other chemical contained within the vehicle is released to the pavement or the ground, proper, corrective, clean-up and safety actions specified in the SPCC and SWPPP will be immediately implemented. All vehicles with load rating of 2 tons or greater will carry, at minimum, enough absorbent materials to effectively immobilize the total volume of fluids contained within the vehicle.
- Leaks will be repaired immediately on discovery. Equipment that leaks will not be used. Oil pans and absorbent material will be in place prior to beginning repair work. The contractor will be required to provide the "on-scene" capability of catching and absorbing leaks or spillage of petroleum products including antifreeze from breakdowns or repair actions with approved absorbent materials. A supply of acceptable absorbent materials at the job site in the event of spills, as defined in the SWPPP will be available. Sand and soil are not approved absorbent materials. Soils contaminated with fluids will be removed, placed in appropriate safety containers, and disposed of according to state and/or federal regulations.
- All waste fuels, lubricating fluids, and other chemicals will be collected and disposed of in a manner that ensures that no adverse environmental impact will occur. Construction equipment will be inspected daily to ensure hydraulic, fuel and lubrication systems are in good condition and free of leaks to prevent these materials from entering any stream. All heavy equipment operations will be postponed or halted should a leak be detected, and they will not proceed until the leak is repaired and the equipment is cleaned.
- Vehicle servicing and refueling areas, fuel storage areas, and construction staging and materials storage areas will be sited a minimum of (50 feet) 15 meters from ordinary high water, typically referred to as the Q2 elevation, and wetlands, and contained properly to ensure that spilled fluids or stored materials do not enter any stream or wetland. Fueling of vessels will be done at approved fueling facilities. Fueling areas or fuel storage areas will be contained properly to ensure that spilled fluids or stored materials do not enter any stream or wetland. A plan will be developed to prevent debris and other wastes from entering or remaining in the marine environment during the project.
- In the event of a spill, the following actions shall be taken:
  - 1. STOP FUELING/OILING IMMEDIATELY!
  - 2. Reduce the amount of the spill by shutting down the equipment, shutting off the valve, shutting off the pump or up righting the container, etc. Place a pan or bucket under the leak to catch as much of the spill as possible.

- 3. Confine fuel to containment areas as much as possible. If on a crane barge, then confine the fuel to the deck and out of the water.
- 4. Should an overboard spill occur from a crane barge, use sorbent pads and deploy 200-foot long (minimum) oil containment boom to minimize the limits of the spill.
- 5. Immediately notify the contractor's company Spill Response Safety Officer by radio or telephone. He / She shall take over coordination of operations and further notifications. Whether assistance is required or not, all supervisors and personnel shall follow these notifications steps.
- 6. If the spill is too large to handle with on-site resources, then the Emergency Spill Clean-up Contractor, a subcontractor of the prime contractor, shall be notified and mobilized.
- 7. Notify the FHWA CFLHD Project Engineer and Project Manager immediately.
- 8. The Emergency Spill Clean-up Contractor shall take over containment, clean-up and disposal of the spill and any contaminated material in accordance with their established procedures. The contractor shall provide whatever aid the Emergency Spill Clean-up Contractor requires.

#### **Protection of the Marine Environment**

Specific measures shall be employed to prevent contamination of the marine environment from project-related activities.

- Hazardous materials shall be properly stored and handled on-site.
- Appropriate materials to contain and clean potential oil/fuel spills shall be stored at the work site and be readily available.
- The contractor's superintendent and heavy equipment operators shall perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations shall be postponed or halted should a leak be detected and shall not proceed until the leak is repaired and equipment cleaned.
- Fueling of land-based vehicles and equipment shall take place at least 50 feet away from surface waters over an impervious surface with drip pans.
- No project-related materials (fill, sediment stockpile, rock, etc.) shall be stockpiled within 50 feet of surface waters. Material staging and storage area(s) shall be designated within project's footprint and equipped with sediment control BMPs to prevent loss of material due to erosion or leaks.
- Any materials or equipment to be used to carry out the authorized work must be cleaned of pollutants before use on-site. The contractor is required to use stone that is free of organic matter, clay, silt, dirt, or any deleterious material as stated in the contract specifications.
- No land-based heavy equipment shall be operated directly in waters of the US. In-water work zones must be isolated and confined from open water with water tight forms.
- Turbidity and siltation from project-related work shall be minimized and contained through the appropriate use of erosion control practices and the curtailment of work during severely adverse weather and tidal/flow conditions. Erosion control practices shall include a silt fence around all disturbed areas landward of the existing shoreline. A double layer of sediment control BMPs (i.e. two rows of sediment control such as silt fence) shall be maintained adjacent to surface waters where suitable vegetative buffers are not obtainable.
- The contractor shall conduct daily visual observations to ensure that all BMPs and erosion control measures shown on the BMP plans are in place and functioning properly. If an activity-related turbidity plume is observed outside of the silt curtain during periods of in-water construction, the contractor shall stop that activity and take immediate corrective action by repairing the silt curtain. Activity shall resume only after the problem is corrected.

- Water quality monitoring shall be performed in accordance with the 401 Water Quality Certification issued for the project by the Department of Health.
- All debris removed from the marine/aquatic environment shall be disposed of at an approved upland waste management site.
- Pesticides application in State waters shall comply with HAR, §§11-54-4(a), 11-54-4(b), 11-54-4(c), 11-54-4(f) and/or Chapter 11-55, Appendix M NPDES General Permit Authorizing Point Source Discharges from the Application of Pesticides.

#### **Protection of Upland Resources**

Additional measures shall be employed to prevent contamination of upland areas using appropriate "good housekeeping" BMPs for site management and storm water management BMPs for erosion and sediment control.

- The construction entrance/exit and roadways shall be stabilized to prevent tracking of materials to/from the project site.
- Specific and contained areas shall be designated for vehicle and equipment cleaning and fueling to prevent discharges of polluted wash water, fuel spills or leaks.
- The discharge of pollutants from material delivery and storage areas to the storm water system or marine environment shall be prevented by minimizing the storage of hazardous materials on-site, storing materials in watertight containers and/or a completely enclosing designated areas, installing secondary containment, conducting regular inspections, and training employees and subcontractors.
- Stockpiles shall be located away from the marine environment and any storm water facility. Stockpiles shall be equipped with erosion prevention BMPs such as plastic coverings to protect against wind or rainfall and containment BMPs such as berms, silt fences, or dikes to protect stockpiled material from run-on or runoff discharges.
- Existing vegetation shall be preserved to the extent possible to avoid any unnecessary disturbance to native materials.
- During earthwork activities, sediment control BMPs such as silt fences, fiber rolls/wattles, and sandbags shall be used to prevent discharge of sediment-laden water.
- At the completion of work, hydraulic mulch or hydroseed shall be applied to unpaved areas to encourage re-establishment of vegetation. Turf establishment will be applied to finished slopes and ditches within 14 days after completion.
- Temporary erosion control measures will be maintained in working condition until the project is complete or the measures are no longer needed as outlined in FP Section 15.
- Clearing and grubbing will be held to the minimum necessary to complete the work.
- Temporary soil stabilization shall be applied on areas that will remain unfinished for more than 14 calendar days. Vegetated areas temporarily impacted will be revegetated by planting and seeding with non-invasive trees, shrubs and/or herbaceous perennials and annuals. Permanent soil stabilization shall be applied as soon as practicable after final grading.
- Certified weed free permanent and temporary erosion control measures to minimize erosion and sedimentation during and after construction according to the contract erosion control plan, contract permits, FP Section 107, FP Section 157 and SCR Section 157 will be provided.
- Seeded areas will be protected and cared for, including watering when needed until final acceptance. All damages to seeded areas will be repaired by reseeding, refertilizing and remulching. Revegetation success will be monitored to ensure sufficient vegetation cover has established, consistent with the

National Pollutant Discharge Elimination System permit for the project. Relevant erosion- and sedimentcontrol BMPs will not be removed until sufficient vegetative cover is re-established. If vegetation fails to establish, corrective actions will be taken where necessary.

- Ensure that all areas temporarily impacted, either directly or indirectly, by the project construction activities are fully restored to its pre-construction conditions. For example: Incidental construction debris is cleaned up prior to removal of BMPs.
- Ensure that all temporarily constructed structures, such as the silt containment device(s), floating oil and grease as well as construction debris containment device(s), berm, cofferdam, sheet pile, stream flow diversion structure(s), and/or sediment and soil erosion control structure(s), etc., are properly removed immediately after the completion of the construction work and when the affected water body has returned to its pre-construction condition or better, as demonstrated by the monitoring results, including color photographs.
- Obtain NPDES permit for storm water discharges associated with construction activities when the proposed construction activities will disturb 1 or more acres of land area before initiating any construction activities;
- When it is not possible to schedule work to avoid times of the year when high rainfall is expected, the capacity of existing controls will be enhanced, additional control measures will be added, or contingency measures will be installed.
- A Rain Event Action Plan (REAP) will be developed prior to Notice to Proceed. The REAP will be reviewed and structured to address project specific actions that are needed to prevent pollutants from reaching surface waters during the rain event. The REAP will be executed within 48 hours prior to a forecast rain event of 50% chance of precipitation or more. BMPs in the REAP include:
  - Place temporary stabilization BMPs (such as mulch) on the area that has been cleared to prevent raindrop erosion.
  - Any area that has soil disturbances will be stabilized prior to rain events with mulch, wood chips, or other protective covers.
  - Sediment traps will be placed to collect the water and allow sediment to settle out. If sediment traps are not possible, other settling and filtering devices will be used to slow water down and remove sediments.
  - Fueling and equipment repair areas will be covered and surrounded by a secondary containment BMP (such as an impermeable berm designed to hold volume of fuel stored in area).
  - Exposed soil will be covered and/or stabilized.
  - Treated materials will be covered or placed in a shed.
  - o Dumpsters will be covered at all times.
  - Drain holes will be plugged.
  - o Control perimeters will be established around stockpiles of material.

# **Coastal Zone**

Mitigation is not required due to the lack of significant adverse impacts to the Coastal Resources from the action alternative. Avoidance, minimization, and mitigation measures summarized for Water Resources, Plants and Animals, and Social and Economic Resources would also avoid or minimize impacts to the coastal zone.

# **Natural Hazards**

Impacts to topography, geology, and soils do not require specific mitigation measures. The project would be designed appropriately for site conditions in accordance with the 2014 AASHTO LRFD Bridge Design Specifications, Seventh Edition (AASHTO 2014).

# Noise

No noise abatement is required. Short-term impacts would be minimized through the following commitments.

A Community Noise Permit would be obtained, and all provisions would be complied with. In addition to the noise permit, a noise variance may be requested from HDOH for specific occasions when work hours need to be extended into the evenings and/or on Sundays to implement the overall construction schedule.

Additional BMPs to minimize construction related noise would include, but are not limited to, the following:

- The project team would coordinate with local residents and businesses to inform them of the construction schedule, and when loud construction activities can be expected.
- Enforcement of HDOH occupational noise exposure regulations would be the responsibility of the construction contractor. If workers experience noise exceeding HDOH standards, administrative or engineering controls would be implemented. Use of personal protective equipment such as earplugs or muffs may also be required.
- To reduce nearby residential noise exposure, construction activities would be conducted during normal working hours to the extent possible. For any work that would occur after normal working hours (that is, on weekends), or if permissible noise levels are exceeded, appropriate permitting and monitoring as well as development and implementation of administrative and engineering controls would be employed.
- The contractor is responsible for minimizing noise by properly maintaining noise mufflers and other noise-attenuating equipment, and maintaining noise levels within regulatory limits.

# **Hazardous Materials**

The following measures would be implemented to avoid or minimize the potential for effects.

- A hazardous materials spill plan would be developed that describes spill prevention measures regarding the location of refueling and storage facilities and the handling of hazardous materials. The hazardous materials spill plan would describe actions to be taken in case of a spill. The contents and requirements of the hazardous materials spill plan include the following:
  - The project manager and heavy equipment operators would perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations would be postponed or halted should a leak be detected, and they would not proceed until the leak is repaired and the equipment is cleaned.
  - Absorbent material manufactured for containment and cleanup of small hazardous materials spills would be kept at the project site.
- In the event of a large hazardous materials spill or if unanticipated hazardous materials are encountered within the project site, the HDOH Hazard Evaluation and Emergency Response Office and the HDOT Hazard Evaluation and Environmental Response Office would be contacted immediately.

# **Plants and Animals**

Implementation of the proposed action would include a variety of avoidance, minimization, and/or mitigation measures to reduce or eliminate project-related impacts. Impacts would be less than significant with implementation of the following:

#### Waterbirds

- In areas where vegetated streambanks would be disturbed, waterbird nest searches would be conducted by a qualified biologist before any work is conducted and after any subsequent delay in work of 3 or more days (during which birds may attempt nesting). The results of the pre-construction survey would be submitted to the USFWS.
- If a waterbird nest with eggs or chicks/ducklings is discovered in the construction limits, work would not begin until the chicks/ducklings have fledged.
- Waterbird nests, chicks, or broods found in the survey area before or during construction would be reported to the USFWS within 48 hours.
- A biological monitor will be present on the project site during all construction activities to ensure that Hawaiian waterbirds and nests are not adversely impacted.

#### Nēnē or Hawaiian Goose (Branta sandvicensis)

- A qualified biologist would survey the area for nesting nēnē before construction (in coordination with the waterbird surveys), and after any subsequent delay in work of 3 or more days (during which birds may attempt nesting). The results of the pre-construction survey would be submitted to the USFWS.
- If a nēnē is found in the area during ongoing activities, all activities within 100 feet (30 m) of the bird would cease, and the bird would not be approached. If a nest is discovered, USFWS would be notified. If a nest is not discovered, work may continue after the bird leaves the area of its own accord.
- All regular on-site staff would be trained to identify nene and would know the appropriate steps to take if nene are present on-site. Training would not be necessary if a biological monitor is present for the duration of the construction.
- Temporary construction fencing would be erected around the Wai'oli and Waikoko Bridge construction zones to minimize the potential for nēnē to enter the project area.

#### Seabirds

- Construction activity would be restricted to daylight hours during the seabird peak fallout period (September 15–December 15) to avoid the use of nighttime lighting that could attract seabirds. The limited temporary night time work outside of the peak seabird fallout period will be shielded to prevent upward radiation and directed away from any nearby beach habitats
- All outdoor lights would be shielded to prevent upward radiation. This has been shown to reduce the potential for seabird attraction (Reed et al. 1985; Telfer et al. 1987). A selection of acceptable seabird-friendly lights can be found online at the Kaua'i Seabird Habitat Conservation website (2013).

#### Hawaiian Hoary Bat (Lasiurus cinereus semotus)

- Any fences that are erected as part of the project would have barbless wire to prevent entanglements of the Hawaiian hoary bat on barbed wire. No fences in the survey area were observed with barbed wire during the survey; however, if fences are present, the top strand of barbed wire would be removed or replaced with barbless wire.
- No trees taller than 15 feet (4.6 m) would be trimmed or removed as a result of this project between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

#### Hawaiian Monk Seal (Neomonachus schauinslandi) and Sea Turtles

- All regular on-site staff would be trained to identify the Hawaiian monk seal and sea turtles, and trained on what appropriate steps to take if these species are present on-site.
- Construction activities would not take place if a Hawaiian monk seal or sea turtle is in the construction area or within 150 feet (46 m) of the construction area. Construction can only begin after the animal

voluntarily leaves the area. If a monk seal/pup pair is present, a minimum 300-foot (91-m) buffer would be observed. If a Hawaiian monk seal or sea turtle is noticed after work has already begun, that work may continue only if, in the best judgment of the biological monitor, that there is no way for the activity to adversely affect the animal(s).

- Any construction-related debris that may pose an entanglement threat to Hawaiian monk seals and sea turtles would be removed from the construction area at the end of each day and at the conclusion of the construction project.
- Workers would not attempt to feed, touch, ride, or otherwise intentionally interact with any listed species.
- Shielded lighting would be used to reduce direct and ambient light to potential nearby beach habitat. Lighting would be directed away from the beach.
- In-water work at night would be avoided, unless emergency maintenance and repair of erosion and sediment controls are necessary to meet permit conditions. The CO would be notified prior to any such work.
- All project-related materials and equipment placed in the water should be free of pollutants.
- No project-related materials (fill, revetment rock, pipe, etc.) should be stockpiled in the water (intertidal zones, reef flats, stream channels, etc.).
- No contamination (trash or debris disposal, alien species introductions, etc.) of marine environments (reef flats, lagoons, open ocean, etc.) adjacent to the project site should result from project-related activities.
- Fueling of project-related vehicles and equipment should take place away from the water. A contingency plan to control the accidental spills of petroleum products at the construction site should be developed. Absorbent pads, containment booms, and skimmers will be stored on-site to facilitate the cleanup of petroleum spills.
- Return flow or run-off from material stored at inland dewatering or storage sites should be prevented.

The following BMPs would be implemented to prevent the introduction and/or spread of invasive species:

- The area beyond the construction limits will not be disturbed. Trees, shrubs or vegetated areas temporarily damaged by construction operations will be re-vegetated.
- Temporarily disturbed areas would be revegetated with non-invasive plant species appropriate for the project area.
- To avoid the unintentional introduction or transport of new terrestrial invasive species, all construction equipment and vehicles arriving from outside Kaua'i would be washed and inspected before entering the project area. In addition, construction materials arriving from outside Kaua'i would also be washed and/or visually inspected (as appropriate) for excessive debris, plant materials, and invasive or harmful non-native species (plants, amphibians, reptiles, and insects). When possible, raw materials (gravel, rock, and soil) would be purchased from a local supplier on Kaua'i to avoid introducing non-native species not present on the island. Inspection and cleaning activities would be conducted at a designated location.

In addition to the above measures, the following BMPs would be implemented to protect water quality, as recommended by the NMFS Protected Resources Division (NOAA NMFS 2015a) and USFWS (USFWS 2014b). The applicability of these measures to the proposed project would depend on the site-specific construction means and methods chosen. The project would also adhere to the requirements of all applicable permits.

- Turbidity and siltation from project-related work would be minimized and contained through the
  appropriate use of erosion control practices, effective silt containment devices, and the curtailment of
  work during adverse weather and tidal/flow conditions.
- Erosion and sediment control measures would be in place before initiating earth-moving activities. Functionality would be maintained throughout the construction period.
- When it is not possible to schedule work to avoid times of the year when high rainfall is expected, then
  enhancing the capacity of existing controls, adding additional control measures, or installing contingency
  measures would be implemented.
- Inspection would be documented, and records for all inspections and repairs would be maintained onsite. When a device proves inadequate, it would be immediately redesigned or replaced until it is effective.
- Control measures (i.e., silt fences, sand bag barriers, sediment traps, geotextile mats, and other measures intended for soil/sediment trapping) would be inspected and repaired as needed within 24 hours after a rainfall event of 0.25 inch or greater over a 24-hour period. During periods of prolonged rainfall, a daily inspection would occur, unless extended heavy rainfall makes access impossible or hazardous.
- Construction would be sequenced to minimize the exposure time of the cleared surface area.
- The contractor would be required to prepare a spill prevention, control and countermeasure (SPCC) plan before beginning work. The SPCC would describe preventative measures including the location of refueling and storage facilities and the handling of hazardous material. The SPCC would describe actions to be taken in case of a spill. Hazardous materials would be properly stored and managed in accordance with local, state, and Federal regulations.
- Appropriate materials to contain and clean potential spills would be stored at the work site and be readily available. Spill kits would be available on-site at locations where hazardous materials are used. Spill kits would be inspected regularly and supplies replaced as needed. Staff would be trained on spill prevention and cleanup.
- All project-related materials and equipment placed in the water would be free of pollutants.
- The project manager or heavy equipment operators would perform daily pre-work equipment inspections for cleanliness and leaks. All heavy equipment operations would be postponed or halted should a leak be detected, and they would not proceed until the leak is repaired and the equipment is cleaned.
- Fueling of land-based vehicles and equipment would take place at least 50 feet (15.24 m) away from the water, preferably over an impervious surface. Fueling of vessels would be done at approved fueling facilities.
- Portable toilets for sanitary waste management would be serviced regularly.
- A plan would be developed to prevent debris and other wastes from entering or remaining in the marine environment during the project.
- No project-related materials (fill, revetment rock, pipe, etc.) would be stockpiled in the water (intertidal zones, reef flats, stream channels, wetlands, etc.) or on beach habitats.
- No contamination (trash or debris disposal, invasive species introductions, attraction of non-native pests, etc.) of adjacent habitats (reef flats, channels, open ocean, stream channels, wetlands, beaches, forests, etc.) shall result from project-related activities.

- Any soil exposed near water as part of the project shall be protected from erosion (with plastic sheeting, filter fabric etc.) after exposure and stabilized as soon as practicable (with native or non-invasive vegetation matting, hydroseeding, etc.).
- All debris removed from the marine/aquatic environment shall be disposed of at an approved site. Solid waste and construction and demolition debris would be properly managed.
- Clearing and grubbing would be held to the minimum necessary for grading, access, and equipment operation.
- Revegetation success would be monitored to ensure sufficient vegetation cover has established, consistent with the NPDES permit for the project. Relevant erosion and sediment control BMPs would not be removed until sufficient vegetative cover is re-established. If vegetation fails to establish, corrective actions would be taken where necessary.
- Soil stockpiles would be located away at least 50 feet from concentrated runoff and water features, covered with plastic or other waterproof material when practicable, and surrounded by silt fences or other erosion control BMPs.
- Concrete wash-outs would be located 50 feet from storm drain inlets, open drainage areas, and waterbodies, and would be maintained as needed.
- All in-water work areas would be isolated and confined from open water habitats through the use of approved isolation techniques including filter fabrics, turbidity curtains, K-rails, Cofferdams, Sheet Piles, Gravel/Rock berms, Gravel/Sandbag berms, Stream diversions (Pumped, pipe/flume, or excavated) or other approved means. Frequent inspections of these BMPs would be conducted to determine if devices are operating effectively. When a device proves inadequate, work would cease and it would be immediately redesigned or replaced until it is effective.
- Flow around the isolated and confined in-water work area would be unimpeded to allow for aquatic animal migration and/or to prevent downstream flooding situations. The unimpeded flow shall be equivalent to a two (2) year, 24 hour duration storm event and/or the existing flow capacity of the stream, ditch, or gulch.
- In addition to diversion and isolation of the project area, dewatering of work zones would also be completed. Dewatering would follow the procedures outlined in SM-17 of the 2008 HDOT Construction BMP Field Manual and Section 208 of the FP-14. Treatment of dewatering effluent would conform to Federal, state, and local regulations.

# Archaeological and Historic Architectural Resources

Impacts to archaeological and historic architectural resources would be less than significant. The following measures would be implemented for the project:

- The Wai'oli, Waikoko, and Waipā Bridges would be preserved in place. Special contract requirements would be incorporated into the project to ensure no inadvertent damage occurs to these structures.
- Archaeological monitoring would be performed during ground-disturbing activities. If cultural resources or human remains are inadvertently discovered, work would immediately cease and all laws and administrative rules would be followed.
- Project design elements would continue to be coordinated through final design with the project's consulting parties.
- FHWA-CFLHD would strive to avoid the roadway culvert's basalt and mortared stone feature approaching Bridge 2. However, if it is determined that potential damage is unavoidable, the feature would be documented with photographs, and materials would be salvaged and rebuilt to mimic their

original appearance. If some stone is damaged beyond re-use, materials would be used for repair that match the old in design, color, texture, and other visual qualities and, where possible, materials, consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties.

# **Cultural Resources**

Archaeological monitoring would be performed during ground-disturbing activities. If cultural resources
or human remains are inadvertently discovered, work would immediately cease and all laws and
administrative rules would be followed. Construction personnel would be educated on appropriate
protocols in the event of an inadvertent discovery.

# Social and Economic Resources

- Adequate notification of construction related delays and short-term closures would be provided to the traveling public, local government, and emergency service providers.
- A Traffic Management Plan would be developed and implemented for the project that would identify the location and timing of temporary road closures and delays, signage use and placement, and advanced notification procedures. The plan would also include an Emergency Services component that specifies how the contractor shall maintain access in the event of an emergency.
- A Public Involvement Program would also be developed and implemented in coordination with the contractor. The program would involve extensive public outreach to ensure the public, landowners, businesses, tourism industry, emergency services providers, schools, and local government officials are aware of project activities and scheduling of roadway closures and delays.
- Construction activities would be sequenced and scheduled, when possible, during periods of lower traffic volumes to minimize impacts to the traveling public.

# Visual and Aesthetic Resources

- Aesthetic design elements would continue to be coordinated with the project consulting parties through final design.
- Temporary bridges, bypasses, and other constructed elements would be removed upon completion of the project. Temporarily disturbed areas would be re-vegetated with non-invasive plant species appropriate for the project area.

# Parks, Recreation Facilities, and Section 4(f) Properties

Measures discussed for Social and Economic Resources would minimize impacts adequately. No additional measures have been identified.

# Solid Waste Management

Avoidance and minimization measures would involve the following:

• The contractor would be required to appropriately handle, transport, and recycle and/or dispose of project materials in accordance with local, state, and Federal regulations.

# **Real Property and Utilities**

The following avoidance and minimization measures apply to the project.

 FHWA-CFLHD would attempt to reduce and minimize the amount of right-of-way required for implementation of the Action Alternative. The following provisions would be implemented to ensure fair and consistent treatment:

- Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970 (P.L. 91-646) as amended by the Uniform Relocation Act Amendments of 1987 (P.L. 100-17); and
- 49 CFR Part 24, Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally-assisted Programs.
- Implement a comprehensive community outreach program, including ongoing outreach and coordination with affected property owners to minimize the impacts of access disruption or alterations as part of both project design and during construction.
- Project design would continue to consider the effects to utilities. Conflicts with existing utilities would be minimized in design to the extent practicable. Coordination with utility providers would continue to ensure all conflicts are identified in design and necessary utility relocations are scheduled to minimize potential service disruptions.