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IN REPLY REFER TO:
HWY-DD 2.8432

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October 22, 2002

TO: GENEVIEVE SALMONSON, DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FROM: GLENN M. YASUI
for ADMINISTRATOR
HIGHWAYS DIVISION

SUBJECT: FINDING OF NO SIGNIFICANT IMPACT (FONSI) FOR
FARRINGTON HIGHWAY DRAINAGE IMPROVEMENTS,
VICINITY OF NANAKULI AVENUE TO NANAKULI STREAM, AND
VICINITY OF LUALEI PLACE TO PRINCESS KAHANU AVENUE
PROJECT NOS. 93A-01-01 AND 93A-02-01

The Department of Transportation, Highways Division, has reviewed the comments on the Draft EA received during the (30) day public comment period, which began on April 8, 2002. The Highways Division has determined that the project will have no significant effect on the environment and has therefore issued a Finding of No Significant Impact (FONSI). Please publish this determination in the November 23, 2002, issue of the OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form and four copies of the Final EA. Please call our consultant, Glen Koyama of Belt Collins Hawaii, at 521-5361 if there are any questions.

Enclosure

c: Mr. Glen Koyama, Belt Collins Hawaii

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2002-11-23-OA-FEA-

FINAL ENVIRONMENTAL ASSESSMENT FOR FARRINGTON HIGHWAY DRAINAGE IMPROVEMENTS AT NANAKULI

PROJECT NO. 93A-01-01 & 93A-02-01

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FINAL
ENVIRONMENTAL ASSESSMENT
FOR
FARRINGTON HIGHWAY
DRAINAGE IMPROVEMENTS
AT NANAKULI

PROJECT NO. 93A-01-01 & 93A-02-01

SEPTEMBER 2002

Prepared for

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

Prepared by

BELT COLLINS HAWAII LTD.
Honolulu, Hawaii

TABLE OF CONTENTS

APPENDICES

LIST OF FIGURES

ACRONYMS AND ABBREVIATIONS

AC	asphaltic concrete
BWS	Board of Water Supply, City and County of Honolulu
CZM	Coastal Zone Management
DA	Department of the Army
dBA	decibels, A-weighted
DBEDT	Department of Business, Economic Development, and Tourism, State of Hawaii
DDC	Department of Design and Construction, City and County of Honolulu
DHHL	Department of Hawaiian Home Lands, State of Hawaii
DLNR	Department of Land and Natural Resources, State of Hawaii
DOA	Department of Agriculture, State of Hawaii
DOH	Department of Health, State of Hawaii
DOT-HWY	Department of Transportation, Highways Division, State of Hawaii
DPP	Department of Planning and Permitting, City and County of Honolulu
EA	Environmental Assessment
EIS	Environmental Impact Statement
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
HECO	Hawaiian Electric Company
HFD	Honolulu Fire Department, City and County of Honolulu
HPD	Honolulu Police Department, City and County of Honolulu
HRS	Hawaii Revised Statutes
IARII	International Archaeological Research Institute, Inc.
LUC	Land Use Commission, State of Hawaii
NRCS	Natural Resources Conservation Service
OEQC	Office of Environmental Quality Control, State of Hawaii
OHA	Office of Hawaiian Affairs, State of Hawaii
OR&L	Oahu Railway & Land Co.
SHPO	State Historic Preservation Officer
SMA	Special Management Area
TMK	Tax Map Key
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service, U.S. Department of the Interior

1 PROPOSING AGENCY

The State of Hawaii (State) Department of Transportation - Highways Division (DOT-HWY) is proposing to install a storm water drainage system along Farrington Highway in Nanakuli, Oahu (Figure 1).

The proposed improvement will occur within the existing highway right-of-way at two locations: one comprising an approximately 1,700-foot segment of the highway, known as Area I, extending from the Verizon Hawaii Building to Nanakuli Stream, and the other, known as Area II, comprising an approximately 700-foot segment of the State highway from the Garden Groves town homes entrance road to a point 200 feet Kapolei side of Princess Kahanu Avenue. The two areas of the project site are identified as Tax Map Key (TMK) 8-9-01: Farrington Highway right-of-way, and TMK 8-7-07: Farrington Highway right-of-way, respectively (see Figure 2 and Figure 3).

In Area I, an approximately 2,100 sq. ft. proposed easement over Hawaiian Home Lands property (TMK 8-9-07: 2) will be required for the drainage system's outlet.

The proposed action will use State funds and facilities (no federal funding is involved). Therefore, the proposed action is subject to the provisions of Chapter 343, Hawaii Revised Statutes (HRS), the State environmental review process.

2 ACCEPTING AUTHORITY

The accepting authority for this Environmental Assessment (EA) is the DOT-HWY.

3 AGENCIES CONSULTED

During the early consultation period, input regarding the proposed action was requested from the government agencies listed below. Those agencies that responded and/or provided comments on the project are identified by an asterisk. Comment letters from responding agencies are included in Appendix F.

3.1 Federal Government

- Department of the Army (DA), U.S. Army Corps of Engineers (USACE)*
- U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)*
- U.S. Department of the Interior, Fish and Wildlife Service (USFWS)

3.2 State of Hawaii

- Department of Agriculture (DOA)
- Department of Business, Economic Development, and Tourism (DBEDT)
- Department of Hawaiian Home Lands (DHHL)
- Department of Health (DOH), Environmental Management Division*
- Department of Land and Natural Resources (DLNR), Aquatic Resources Division*

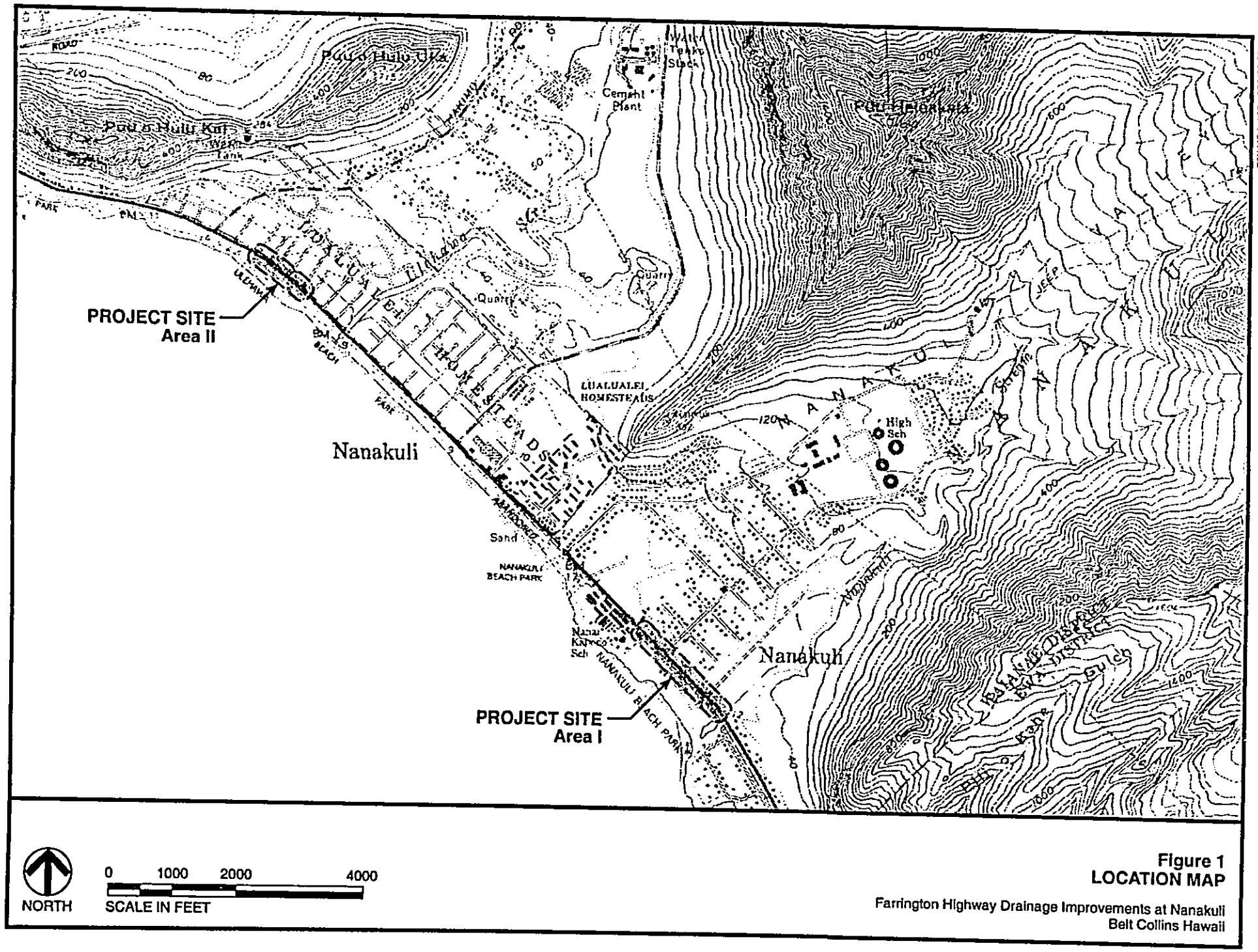


Figure 1
LOCATION MAP

Farrington Highway Drainage Improvements at Nanakuli
Belt Collins Hawaii

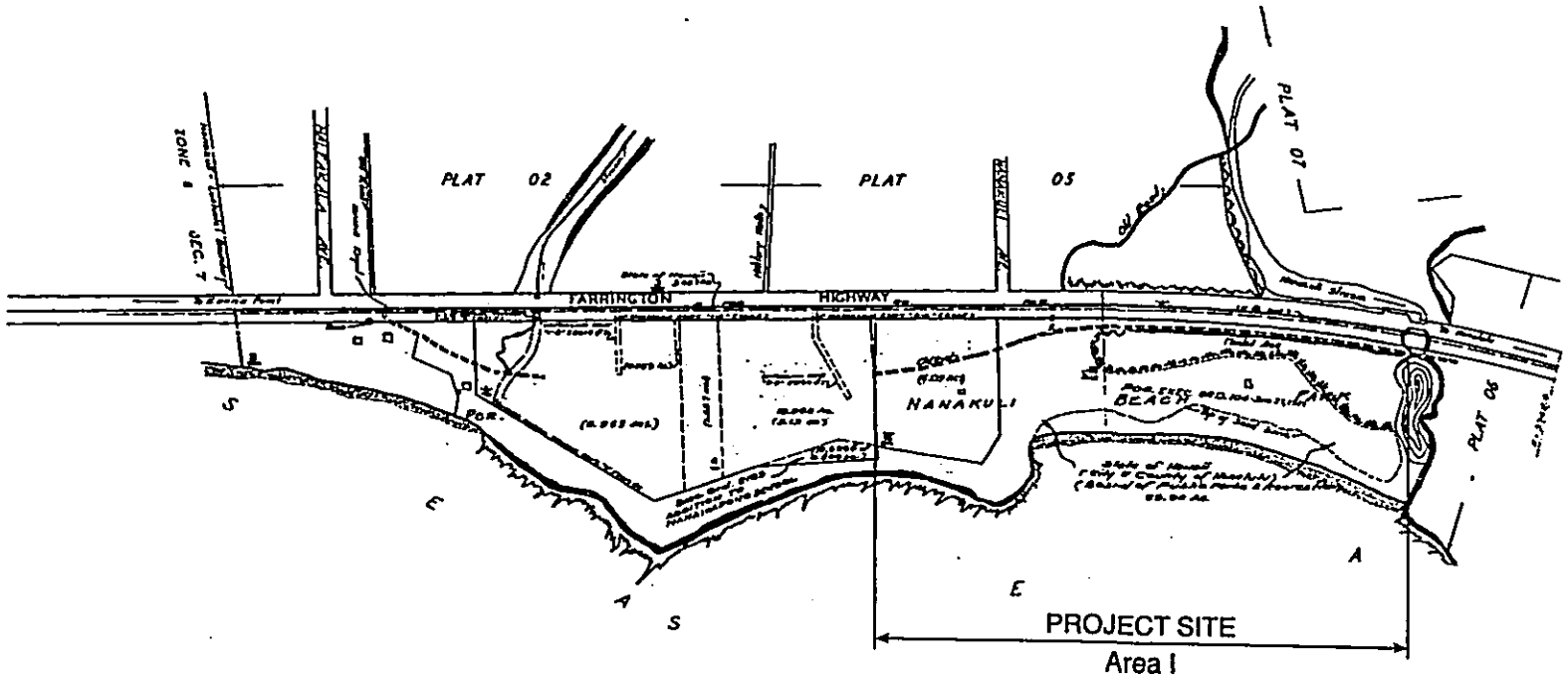
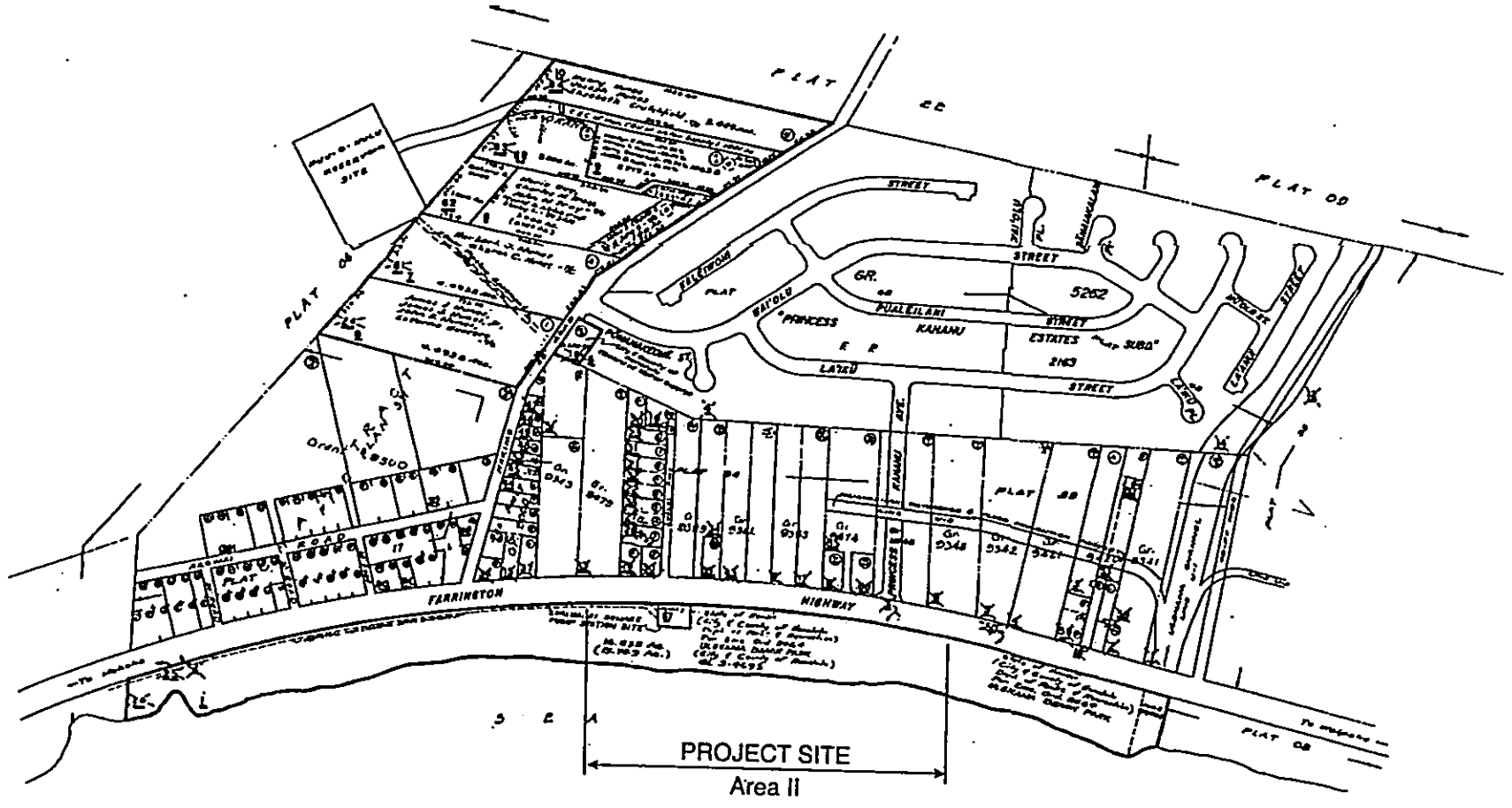


Figure 2
Tax Map Key 8-9-01

Farrington Highway Drainage Improvements at Nanakuli
Belt Collins Hawaii



NORTH

0 300 600 1200

APPROXIMATE SCALE IN FEET

Figure 3
Tax Map Key 8-7-07

Farrington Highway Drainage Improvements at Nanakuli
Belt Collins Hawaii

- DLNR, Commission on Water Resource Management*
- DLNR, Division of State Parks
- DLNR, Land Division*
- DLNR, State Historic Preservation Officer (SHPO)*
- DOH Office of Environmental Quality Control (OEQC)*
- Land Use Commission (LUC)*
- Office of Hawaiian Affairs (OHA)*
- Office of Planning (Coastal Zone Management [CZM] Program)*
- University of Hawaii Environmental Center

3.3 City and County of Honolulu

- Department of Planning and Permitting (DPP)*
- Department of Design and Construction (DDC)
- Department of Parks and Recreation Services*
- Honolulu Fire Department (HFD)*
- Honolulu Police Department (HPD)*
- Board of Water Supply (BWS)
- Department of Environmental Services

3.4 Other Utilities

- Hawaiian Electric Company (HECO)
- Verizon Hawaii
- The Gas Company

3.5 Others

- St. Rita Catholic Church
- State Representative Michael P. Kahikina

4 DESCRIPTION OF PROPOSED ACTION AND GENERAL CHARACTERISTICS

The DOT-HWY is proposing to improve the drainage system along Farrington Highway in Nanakuli. Flooding frequently occurs along the highway after a heavy rainfall. There are no drainage systems presently serving the project area. The land is very level and compacted, and water remains on the ground surface for extended periods of time. On occasions, the standing

water stretches across Farrington Highway as well as into adjacent residential and commercial properties.

4.1 Area I Project Site

In Area I, DOT-HWY is proposing to install an 18"/24" diameter drain line (approximately 3 to 6.5 feet deep at invert) with a series of grated drop inlets spaced approximately 35 to 120 feet apart in the *mauka* (toward the mountains) shoulder or sidewalk area of the highway to collect surface runoff in the area (see Figures 4 and 5). A catchment basin is also proposed at Nanakuli Avenue to connect into the system. The total length of the drain line is approximately 1,300 feet.

Dimensions of the proposed inlets are approximately 5 feet, 4 inches by 6 feet, 4 inches or 8 feet by 4 feet, 4 inches. All inlets will have a depth of approximately 4 to 7 feet, a steel frame, and grate cover.

The system's outlet is proposed to be located in a dry drainageway adjacent to the St. Rita Catholic Church at the southern end of the project site (see Figures 6 and 7). This drainageway eventually connects with Nanakuli Stream approximately 500 feet to the south of the outlet.

After the drainage system is installed, DOT-HWY is proposing to upgrade the sidewalk from asphaltic concrete to concrete along the *mauka* shoulder of the highway.

Also proposed in Area I is the installation of a lined concrete ditch on the *makai* (toward the ocean) side of the road pavement within the highway right-of-way. The ditch will be approximately 2 feet wide, approximately 1 to 2 feet deep, and approximately 280 feet long. It will connect with an existing concrete drainage chute located on the northern bank of the Nanakuli Stream.

4.2 Area II Project Site

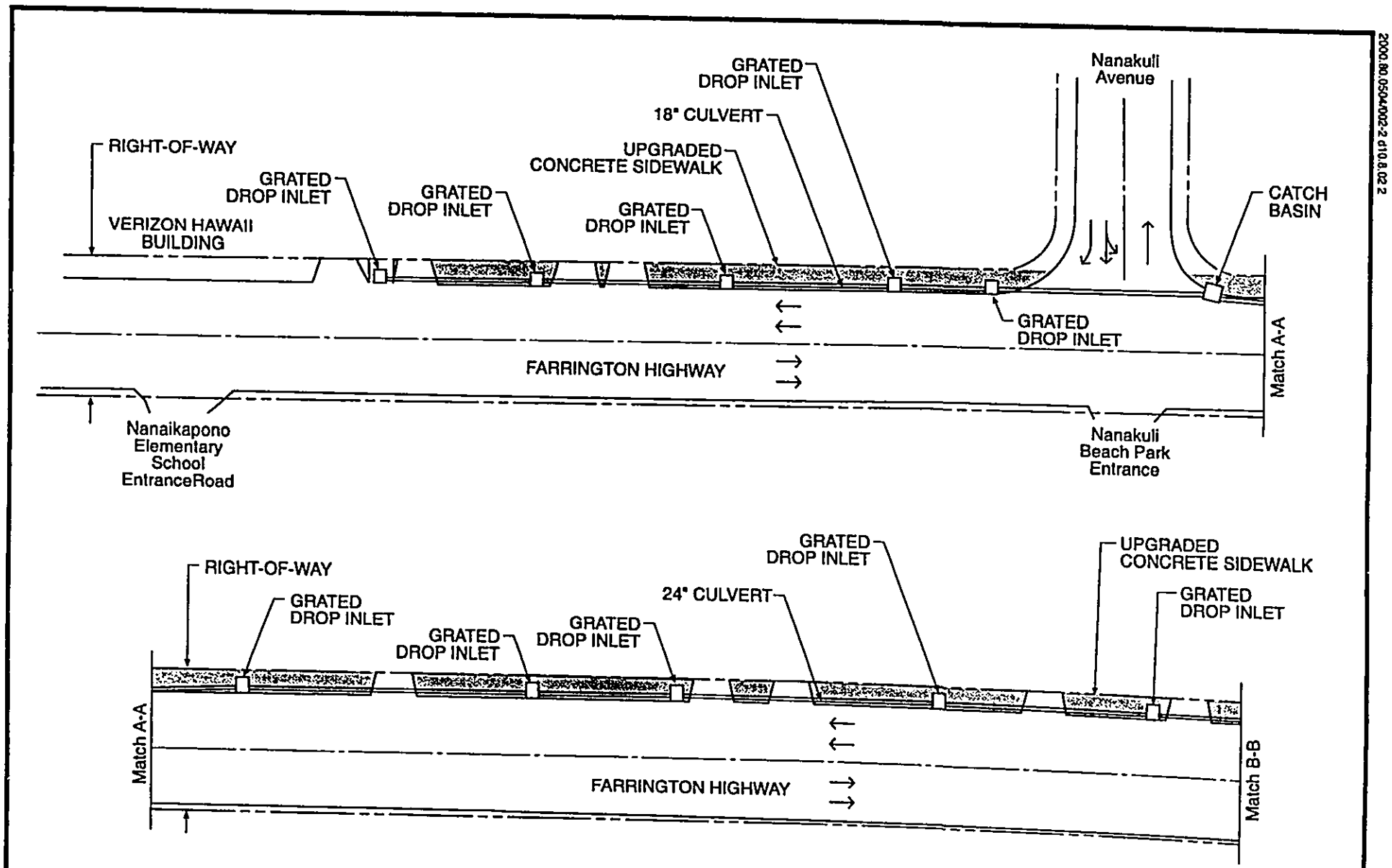
In Area II, four or five dry wells spaced approximately 50 to 110 feet apart will be located in the *mauka* shoulder or sidewalk area of the highway and five or six dry wells spaced approximately 80 to 100 feet apart will be located in the *makai* shoulder (see Figure 8). The dry wells in the *mauka* shoulder area will be independent of each other, while the *makai* dry wells will be connected with a 12" diameter perforated culvert. Each of the approximately 10 dry wells in Area II will be about 5 feet, 7 inches by 5 feet, 7 inches and 10 to 20 feet deep. These wells will have a capacity to discharge water at approximately 2 cubic feet per second.

4.3 Preliminary Development Schedule

Construction of the proposed Area I and Area II highway improvements is expected to begin in the third quarter of 2003 after all government permits and approvals are secured. Completion of improvements in both areas is expected to occur in the third quarter of 2004.

4.4 Development Cost

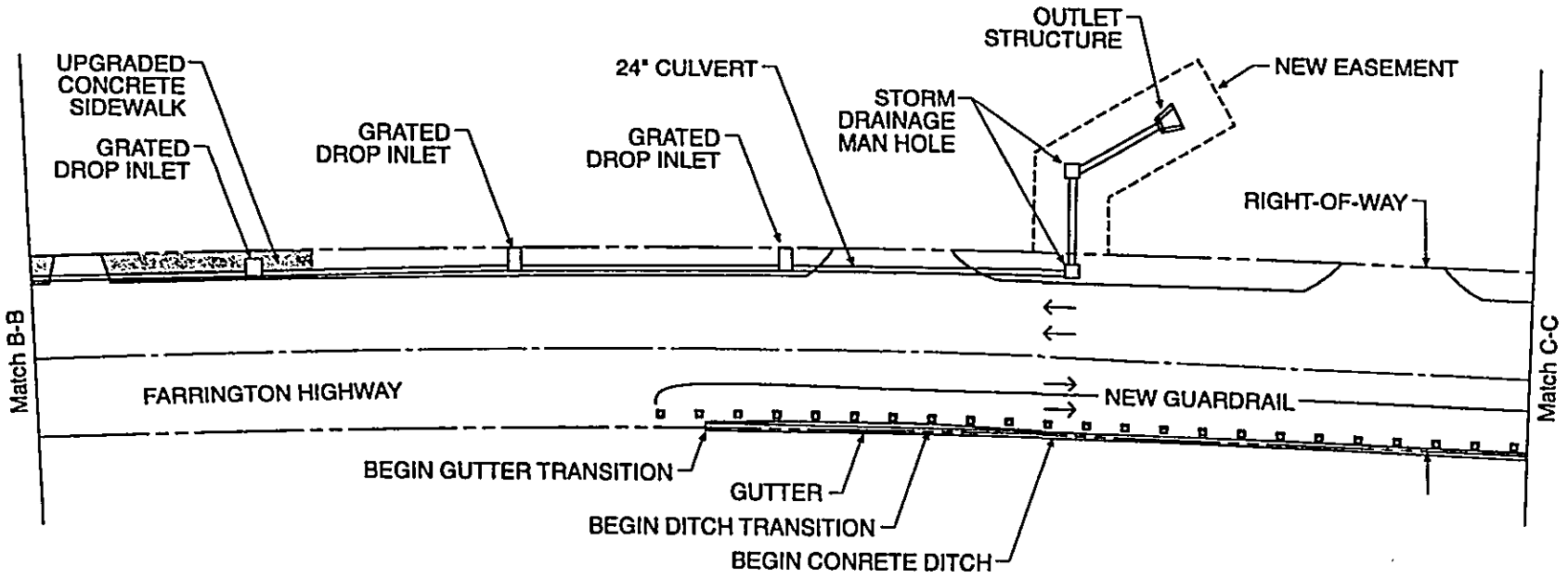
The cost of construction is estimated to be approximately $2.4 million. Planning and design fees are not included in this estimate. The source of funding for the construction work is the State.

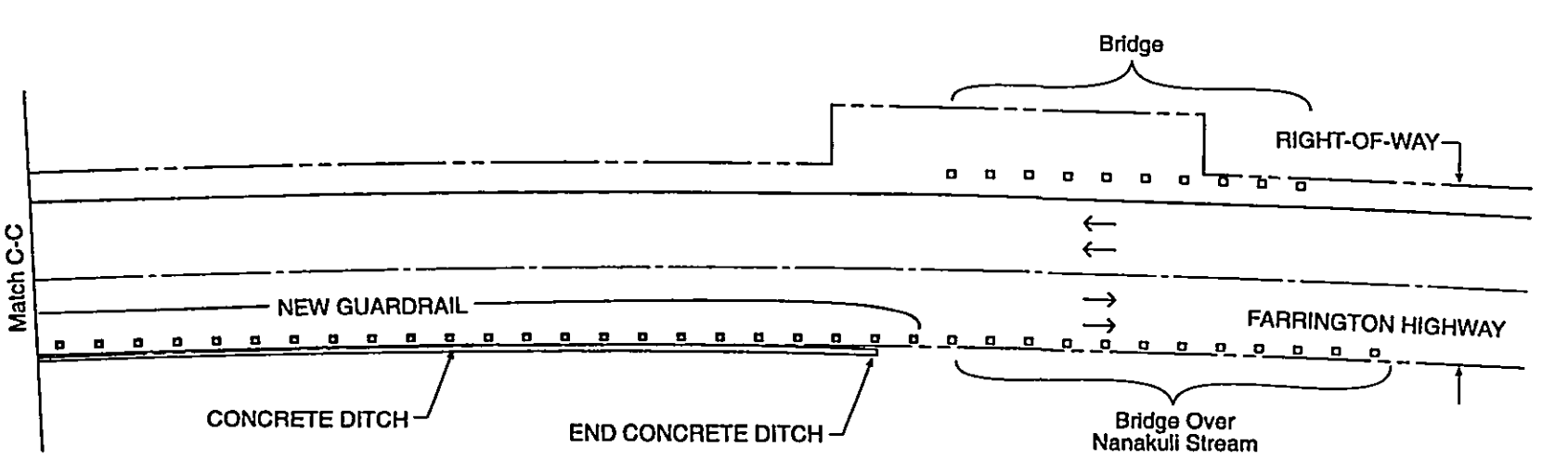


2000.80.0504002-2 d10.8.02 2

Figure 4
AREA I—PROPOSED IMPROVEMENTS

Farrington Highway Drainage Improvements at Nanakuli
Belt Collins Hawaii





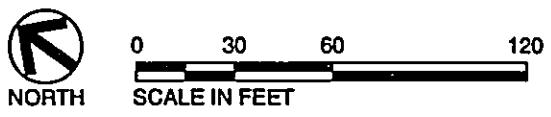


Figure 5
AREA I—PROPOSED IMPROVEMENTS (CONTINUED)

Farrington Highway Drainage Improvements at Nanakuli
Belt Collins Hawaii

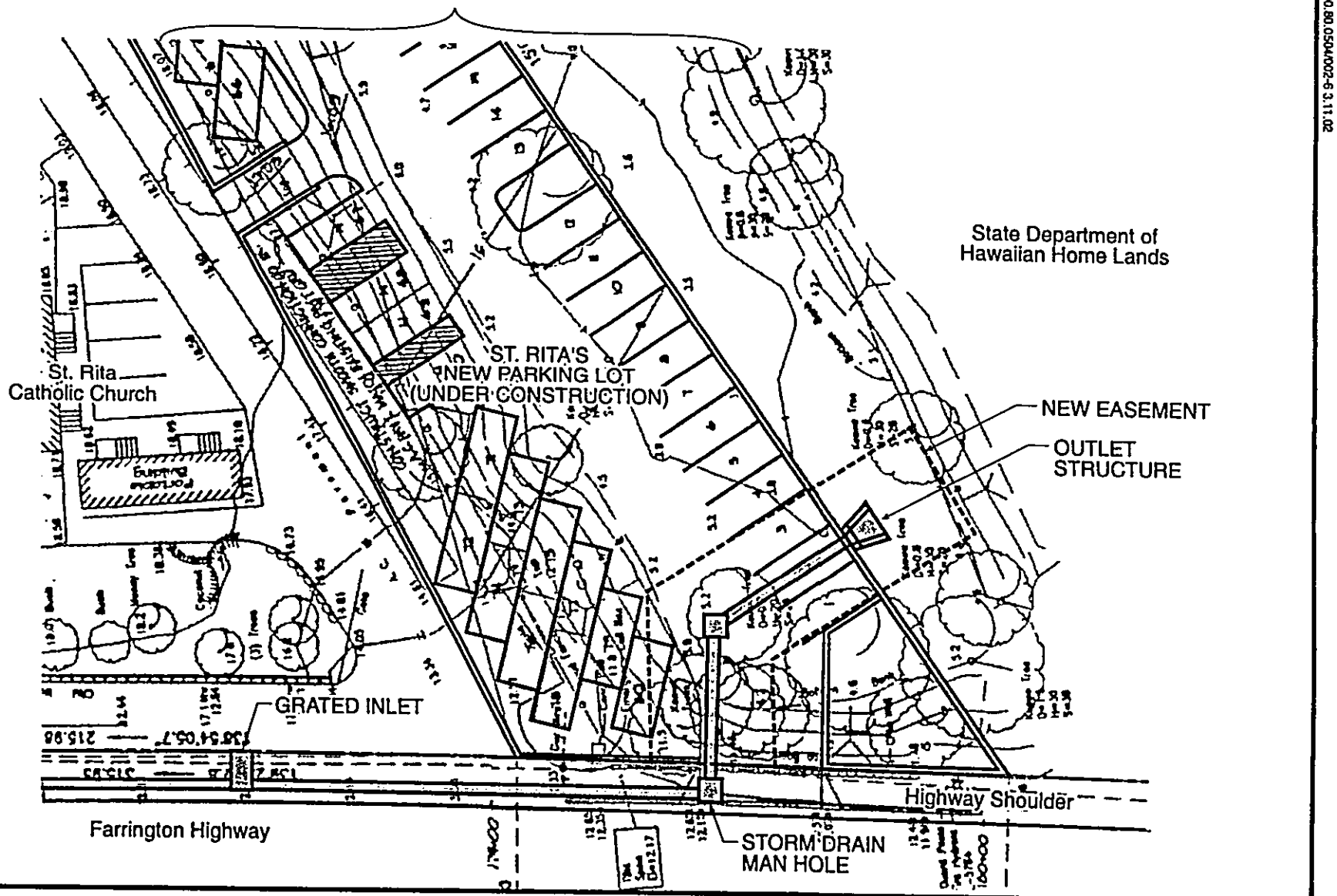
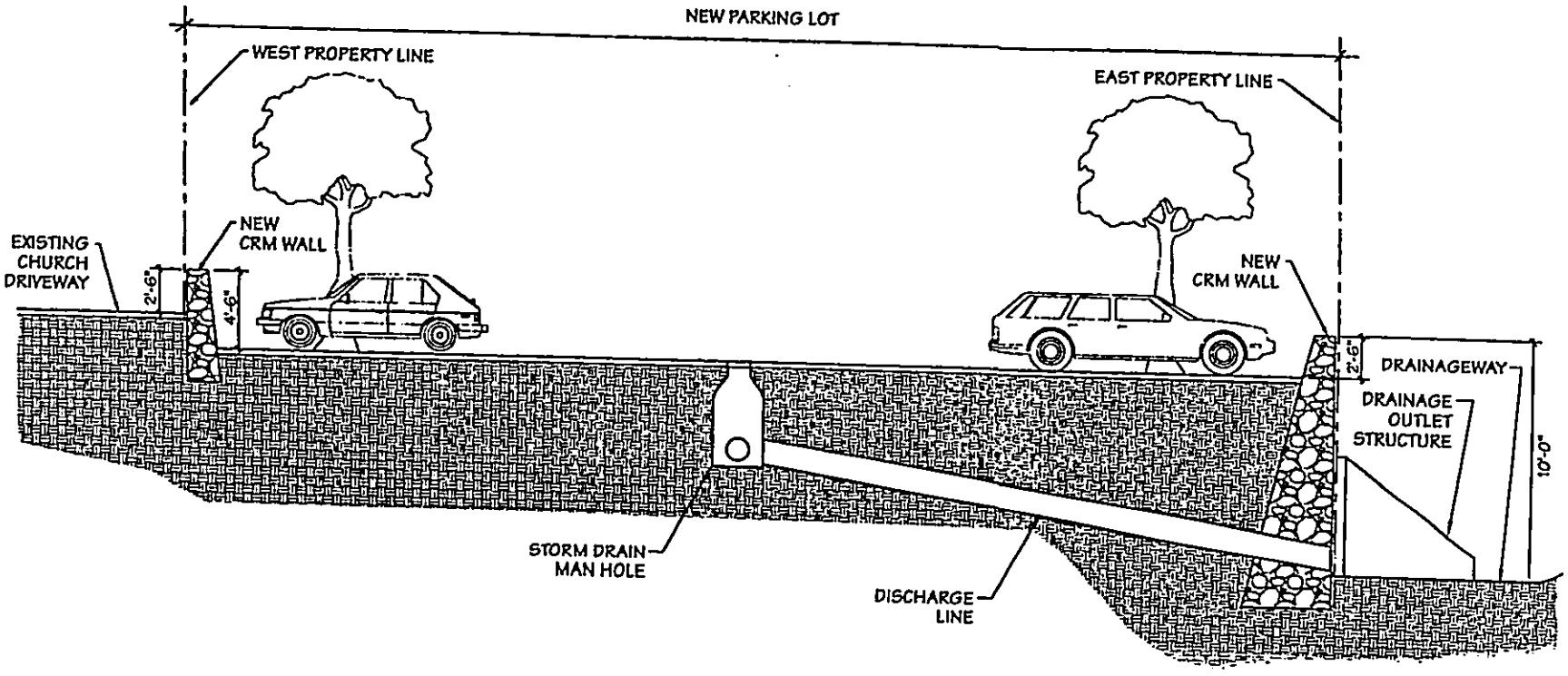


Figure 6
DRAINAGEWAY (AREA I)

Farrington Highway Drainage Improvements at Nanakuli
Belt Collins Hawaii



0 5 10
SCALE IN FEET

Figure 7
ST. RITA'S NEW PARKING LOT SECTION

Farrington Highway Drainage Improvements at Nanakuli
Belt Collins Hawaii

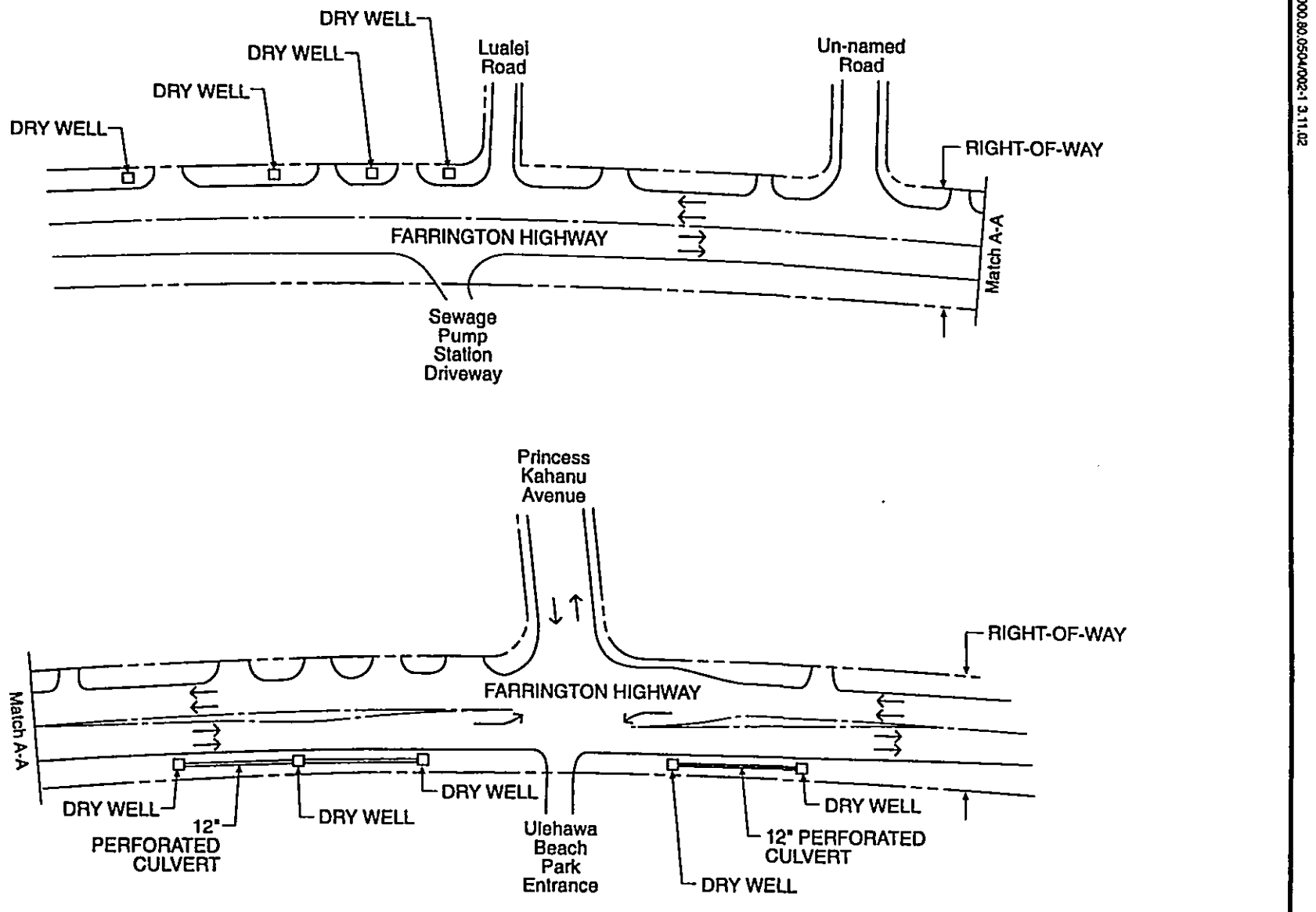


Figure 8
AREA II—PROPOSED IMPROVEMENTS

Farrington Highway Drainage Improvements at Nanakuli
Belt Collins Hawaii

5 DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 Regional and Project Setting

The Waianae Coast of Oahu comprises a number of valleys with communities including Waianae, Maile, Nanakuli, and Makaha. The project site is located in the southernmost residential community of Nanakuli. Part of this community is located in Nanakuli Valley and the remainder is situated in the southern section of Lualualei.

Nanakuli is comprised primarily of single-family residential homes and homestead lands. It also has four public schools: a high school, an intermediate school, and two elementary schools. There are farmlands, a privately owned and operated landfill, and an abandoned cement plant in the valley. A number of commercial uses — including a small shopping center, superette, convenience stores, and gas stations — as well as churches and public utility facilities are located along the *mauka* side of Farrington Highway. Beach parks and open spaces occupy the *makai* side of the right-of-way.

5.2 Existing Land Use

The proposed drainage improvements will be placed entirely within the Farrington Highway right-of-way. Only a small outlet in Area I will extend into the adjacent land, which is owned by the State DHHL and leased to the St. Rita Catholic Church.

The drainage system alignment will be within the shoulder area of the highway where pedestrian walkways and existing utilities are located. The *mauka* shoulder in the Area I segment is approximately 10 feet wide; the shoulder on the *makai* side is approximately 2 to 6 feet wide. In the Area II segment, the shoulder is approximately 17 feet wide on the *mauka* side and approximately 10 to 20 feet wide on the *makai* side.

The proposed drainage outlet will extend from Farrington Highway into an existing drainageway above the State highway right-of-way. This existing drainageway is predominantly dry and unlined. The uniformed sloped embankments along major sections of the channel indicate man-made modification and configuration. Within a portion to this drainageway, St. Rita Catholic Church has begun development of a parking lot for its parishioners. DOT-HWY is coordinating its plans with St. Rita Catholic Church to incorporate the planned drain line and outlet beneath the new parking area in the drainageway.

5.3 Land Tenure

The Farrington Highway right-of-way is owned by the State. Any maintenance or provision of improvements within the right-of-way falls under the jurisdiction of the DOT-HWY. The drainageway adjacent to the St. Rita Catholic Church is owned by the DHHL and leased to the church.

5.4 Physiography

The existing topography of Farrington Highway is relatively level. Overall, it does not have enough of a grade to allow runoff to discharge off site. That is one of the reasons the project area often floods after heavy rainfalls.

Elevations range between approximately 12 and 16 feet above mean sea level. On the adjacent beach lands, the elevations are higher. These coastal areas contain beach berms that were created as part of the natural shoreline process. Thus, runoff in the area does not flow naturally toward the coastline but either flows in an indirect path to the sea, flows through ground percolation, or ponds in low, flat areas behind the coastal berms and within the highway right-of-way.

5.5 Geology

The valleys of Waianae, Lualualei, and Nanakuli are filled with alluvium and marine sediments near the coast.[1] According to Geolabs, Inc., the combination of early island-wide subsidence and Pleistocene Age sea level fluctuations produced submerged river valley systems with coral reef development (see Appendix A). The coral reefs and lithified sand dunes may be found exposed subaerially on Oahu and buried in submarine deposits well offshore of the island. The coral and sand dune deposits were formed in shallow offshore seas and coastlines during periods of higher and lower sea levels associated with the effects of the glacier advances and retreats. These glacier movements affected the volume of water contained in the seas. Today, shallow sea coralline deposits are visible on the coastland and flanks of mountains, or buried beneath terrestrial sediments, all of which are evidence of the higher and lower stands of the sea in prehistoric time.

5.6 Soils

Geolabs, Inc., conducted test borings for the proposed project (see Appendix A). In Area I, the top layer of 5 to 11 inches consists of asphaltic concrete. Beneath this material to a depth of 2 to 3.5 feet is a layer of fill consisting of very dense silty gravel and sand and dense clayey gravel. The fill material is underlain by beach deposits comprised of medium dense to dense coralline sands atop a soft to medium hard coral formation. This layer extends to the maximum depth explored at about 21.5 feet below the ground surface.

In Area II, fill material extends to depths of 2.5 to 4 feet and consists of medium-dense to dense gravel and sands with varying amounts of silt and stiff to very stiff silty clays. The fill material is underlain by coral formation consisting of severely to closely fractured, soft to medium-hard coral and medium-hard cemented sands. This layer extends to the maximum depths explored at about 30.5 to 32 feet below the ground surface.

---

1 Gordon A. Macdonald and Agatin T. Abbott. 1970. *Volcanoes in the Sea: The Geology of Hawaii.*

5.7 Climate

The mean average temperature along the Waianae Coast is 75 to 80 degrees Fahrenheit with variation of plus or minus 5 degrees Fahrenheit between summer and winter months.

Rainfall varies with elevation. In Nanakuli, the average annual rainfall is about 20 to 25 inches, while atop the Waianae Mountain Range, more than three miles from the coast, the median annual rainfall is about 30 to 40 inches. Trade winds are predominantly from the northeast flowing over the southern section of the Waianae Mountain Range to the project area. During the winter months, Kona winds from the southwest are more frequent and dominant.

5.8 Hydrology

The location of Area I drainage improvements is on the coastal land of Nanakuli Valley. Nanakuli Stream, the main natural watercourse in the valley, flows along the southern boundary of the project area. The stream is non-perennial. A field study by AECOS Inc. reveals that Nanakuli Stream has a *muliwai*[2] that extends from approximately 150 to 200 feet above the highway to the beach berm at Nanakuli Beach Park (see Appendix B). The *muliwai* in Nanakuli Stream appears to be a permanent feature, seldom if ever drying up, and occasionally flooding and connecting to the ocean during heavy rainfall in the valley.

Upstream of the *muliwai*, the stream course is dry with no evidence of recent stream flows. The bottom is flat, dusty, and lacking rounded stones or boulders. Very little vegetation grows in the dry streambed. Kiawe (*Prosopis pallida*) and bufflegrass (*Cenchrus ciliaris*) are the dominant vegetation in the riparian zone.

Immediately *makai* of the highway on the Waianae side of the stream, the *muliwai* and associated flood-prone land are far more extensive, according to the field study. A depression in the area is a remnant of wetlands that once lay behind Nanakuli Beach and were fed by intermittent flooding from the stream and/or high ocean tides. The coastal wetland complex has been partly obliterated by sand movement inland and by fill for the transportation infrastructure that crosses the stream. This area is inhabited predominantly with pickleweed (*Batis maritima*).

Approximately 500 feet to the north of the stream is the drainageway that includes the proposed outlet. It was previously modified by man and includes a shaped configuration with built-up embankments. The original stream course extended across the highway toward the beach rather than its present course, which bends laterally and follows the *mauka* boundary of the State right-of-way until it connects with Nanakuli Stream. It appears that the construction of the highway resulted in the changed drainage alignment.

Vegetation inhabits the drainageway with less intensity farther from its connection with Nanakuli Stream. The predominant species is pickleweed. The *muliwai* and the wetland would seem to qualify as jurisdictional waters of the USACE. The presence of pickleweed can be used to define the extent of the wetland in the area. However, it is possible for pickleweed to extend into marginal areas, such as the drainageway, that are outside of official wetlands as defined under rules established by the USACE. Marginal areas dominated by pickleweed are unlikely to satisfy

[2] A *muliwai* is a pond that forms at the mouth of a stream when the mouth is blocked by a beach deposit.

the soil and hydrology requirements of a genuine wetland. The USACE rules require that all three wetland criteria (wetland indicator plant species, soil, and hydrology) be present for a given location to fit the definition of a jurisdictional wetland. Therefore, the drainageway would be outside a wetland boundary, despite the presence of pickleweed extending into it from the lower areas.

During heavy rainfalls, the stream channel fills up and then backs up from the beach berm, sending water into the wetland and drainageway before topping over and breaching the sand berm. Once the floodwater breaks through the beach berm, it discharges into the ocean.

In the Area II project site, a lined drainage channel crosses Farrington Highway approximately 800 feet south of the site. The man-made channel collects water from a major portion of the Lualualei Valley. There are no other drainage features within or adjacent to the Area II project site.

The water table in Area I and Area II is near the surface of the ground. According to the boring data taken by Geolabs, Inc., the water table is between 10.8 feet and 15.4 feet below the existing ground surface at Area I. In Area II, the groundwater is at a depth ranging between 6.3 feet and 11.5 feet.[3].

5.9 Water Quality and Aquatic Biota

Water quality measurements taken in the *muliwai* by AECOS Inc. reveal a hyperhaline[4] body of water that was previously known to be brackish (see Appendix B). The poikilohaline[5] characteristic of this *muliwai* limits the diversity of aquatic biota that is able to inhabit the water feature. This poikilohaline condition generally would not present a problem for native stream animals, which exit as eggs or larvae during flood flows and migrate inland during dry periods, if suitable habitats exist at the higher elevations of the stream. The *muliwai* of Nanakuli Stream, however, does not appear to provide for this type of condition. The very high salinity of the water during the dry season make the *muliwai* quite unsuitable for even those more euryhaline native species such as *opae oehaa (Macrobrachium grandimanus), hapawai (Theodoxus vespertinus)* and *oopu akupa (Eleotris sandwicensis).* Thus, the Nanakuli Stream *muliwai* is unlikely to support a breeding population of any native aquatic species of microfauna.

The larger inhabitants of the *muliwai* are mostly the euryhaline fishes (e.g., tilapia *[Orechromis niloticus]* and Mexican molly *[Poecilia mexicana]*) and amphibians (e.g., buffo marine toads *[Bufora marinus]*). The AECOS survey also noted a small fish trap in the *muliwai* that contained several mullet (*Mugil cephalus*). No other fish or aquatic macroinvertebrates were observed in the water. None of the aquatic species recorded during the survey are federally or State-listed protected, threatened, or endangered species.

A dragonfly (*Odonata-Anisoptera*) was seen in the vicinity, but the salinity of the *muliwai* would make it impossible for this type of species to breed successfully in the water.

[3] Boring test reports by Geolabs, Inc., 2001.

[4] Hyperhaline refers to a water condition that is more saline than seawater.

[5] A water condition that shifts from slightly brackish in the wet season to very saline in the dry season.

5.10 Flora and Fauna

There is no vegetation in the *mauka* shoulder of Farrington Highway. In the *makai* shoulder, the land is compacted by frequent vehicular movement and pedestrian access between the highway and beach land. No vegetation, except stray weeds, presently occupies the area.

In the isolated drainageway above the highway, the only vegetation that occurs is pickleweed. When construction of the parking lot adjacent to St. Rita Catholic Church is completed, a portion of the pickleweed species in the drainageway will be covered. The proposed drainage outlet will be built within the fill foundation of the new parking facility.

Nanakuli Stream, which abuts the southern boundary of the project site, was surveyed by AECOS Inc. in September of 2001. The survey included identification of biotic species in and near the stream. The predominant species recorded in the streambed was pickleweed. On the banks and adjacent land, pickleweed also was the dominant species.

On the *makai* side of Farrington Highway is a marshland occupied predominantly by pickleweed (see Appendix B). The proposed action will not involve any work in this sensitive area.

Other than the domestic species (e.g., cats and dogs), fauna is very scarce along the highway, which is very active with vehicles and pedestrians. The predominant species in this area are birds associated with lowland urban settings, including common myna *(Acridotheres tristis),* barred dove (*Geopelia maugeus*), spotted dove *(Streptopelia chinensis*), house sparrow *(Passer domsesticus)*, house finch (*Carpodactus mexicanus*), and bulbul (*Pycnotus cafer*). All of these species are introduced; none is indigenous to the Hawaiian Islands, nor are any federally or State-listed rare, threaten, or endangered species.

The survey by AECOS Inc. also noted observations of two wandering tattlers (*Heteroscelus incanus*) around the *muliwai* near the project site. In an earlier study by AECOS Inc.[6] two other indigenous migrant species — ruddy turnstone (*Arenaria interpres*) and Pacific golden plover (*Pluvialis fulva*) — were observed. The impact on these mobile water birds would be minimal, if any. The project's construction area is very visible and heavily used by motorists and pedestrians. Native species normally do not occupy or frequent this specific area.

5.11 Archaeological and Historic Resources

In July of 2001, International Archaeological Research Institute, Inc. (IARII) conducted an archaeological assessment of the project site (see Appendix C). Its field investigation revealed that two significant archaeological features exist in the project area.

In the Area I project site is a railroad track built in the 1890s by Oahu Railway and Land Company (OR&L). The OR&L continued its rail business until 1946, when it shut down its operations. The old track, which is evident along the entire length of Area I, is in relatively good condition.

A subsurface cultural deposit occurs just beyond the Area II project site. The deposit is comprised of pit features, midden, and artifacts such as shell fishhooks, volcanic glass flakes,

[6] AECOS Inc. 2000. *Biological Resources Survey for the Leeward Bikeway Environmental Assessment.*

basalt flakes, and a chert fragment. According to the IARII survey, this site is a traditional Hawaiian cultural deposit. The railroad track in the Area I project site may also extend into the Area II project site, where it is no longer visible on the surface, but may be buried under the sand and fill of Farrington Highway's *makai* shoulder area.

Historic maps and documents indicate that a historic trail was located along the Waianae Coast and probably followed a route along Farrington Highway or near its present highway alignment. In its field inspection, the IARII report indicated that no signs of the trail remain.

No other archaeological sites were found in either Area I or Area II of the project site.

Containing primarily coral and limestone, the project site is susceptible to buried deposits and human remains. Past studies in the general area have provided some evidence of such cultural resources (see Section 5.12). Hence, the IARII report recommends that a monitoring plan be prepared and approved by the State Historic Preservation Officer (SHPO) before construction is implemented.

5.12 Cultural Impact Assessment

IARII conducted a cultural impact assessment of the project area in September 2001 (see Appendix D). The study included a documentary research and oral interviews with resource persons to assess the possible impacts of the proposed project on traditional and historic cultural features, practices and beliefs.

Research found that Nanakuli was a place where early missionaries and other Europeans did not wander very much nor deviate from their track through the area, and that the few early historical references to settlements in Nanakuli reported only small coastal villages.

Nanakuli was found to be a dry valley. It would be easy to conclude that its only important resources were coastal and maritime. Recent archaeological surveys have shown that while the resident population was small, it was not limited to the coastal zone. A 1997 study by Ross Cordy[7] recorded 26 habitation sites in the upper valley. Dating of organic remains suggests that scattered farms appeared in the valley between AD 1200 and AD 1400 and that by AD 1400 to AD 1700, the entire upper valley was in cultivation.

From 1853, the upper valley was devoted solely to cattle ranching, while residents continued to live along the coast and lower valley.

In the late 1800s, sugar production became an important industry to the islands. The Waianae Sugar Company established a plantation in Waianae in 1878. By 1895, the Oahu Railway and Land Company (OR&L) constructed a new line between Waianae and Honolulu. The OR&L played an important role in the economic development of Leeward Oahu. It not only hauled commercial freight to and from the sugar plantations in Ewa and Waianae, but also provided dependable transportation for Leeward Oahu residents.

In 1901, portions of the public lands (previously classified as Crown Lands) in Lualualei were opened to homesteading. In 1930, additional homesteads in Nanakuli were opened to settlement.

[7] Cordy, Ross. 1997. *Learning about Nanakuli's Past: the 1988-1991 Archaeological Survey of Nanakuli.*

The military later became a presence in the region with the installation of the U.S. Naval Ammunition Depot in Lualualei and Camp Andrew and Camp Beaumont in Nanakuli in the early 1900s. Camp Andrew and Camp Beaumont are no longer in operation, but Nanakuli has continued to the present day to develop into a growing residential community.

Interviews conducted by the study (including four personal and two via telephone with community resource persons) and numerous discussions provided an intimate look at the early days of Nanakuli. Listening to the oral history through these interviews provides a vivid portrait of the lives of some of the residents in the community during the early 1900s.

The stories and memories that relate to the project area portray a difficult life for Nanakuli residents, with no modern conveniences such as paved roads, accessible transportation, readily available water, and electricity. Other accounts relate to favorite fishing spots and local activities. One informant indicated that there was a popular fishing area at the wetland site adjacent to the Nanakuli Stream *makai* of Farrington Highway. Another informant mentioned that there might have been a fishpond and possibly taro plantings near the Ulehawa Stream on the *makai* side of the highway. Still another informant identified a site of early historic and prehistoric Hawaiian habitation. This is the same site identified in IARII's archaeological study[8] as Site 50-80-07-5763 and is outside of the project area.

Other informants indicated that there might be burials in the project area and that careful monitoring should occur. The abandoned railroad track, as well as the former Camp Andrews, has an important place in the memories of old-time Nanakuli residents. One informant expressed a desire to preserve the original coral rock pillar at the camp's main entrance, particularly if Nanaikapono Elementary School were to move to that location.

IARII also noted that there are sites in the area associated with sacred beliefs. These include fishing shrines, a stone feature connected with a Polynesian god, a pathway for "night marchers," and *kapu* areas. According to IARII, however, none of the sacred aspects or associations of these areas will be impacted by the proposed project.

5.13 Natural Hazards

As previously described, the most obvious potential natural hazard in the project area is the ponding of water in the low flat areas along the highway. Flooding from overflow in the Nanakuli Stream would not be a probable hazard to the project site. Except for the drainage outlet, the proposed drywells will be located above the limits of the stream overflow.

According to the Flood Insurance Rate Maps (FIRM), Area I is located in Flood Zones X, D and AE. Zone X is an area determined to be outside of the 500-year flood; Zone D is an area where flood hazards are undetermined; and Zone AE is a flood hazard area inundated by 100-year floods and where flood elevations are determined. The FIRM designates a portion of Area I at Nanakuli Stream as a "floodway" susceptible to actual floodwater flows. The "flood fringe area" borders the floodway area and is specifically inundated by floodwaters. The proposed action would not be adversely affected or physically damaged by any riverine floods.

[8] International Archaeological Research Institute, Inc. October 2001. *Archaeological Reconnaissance for Farrington Highway Drainage Improvement Project, Nanakuli, Oahu.*

Area II is located in Zone AE. There are no riverine floods that will affect the drainage system in this location.

The coastal lands of Nanakuli are susceptible to hurricane and tsunami inundation. Since the proposed improvements will consist of surface and below-grade improvements, there would be no wind damage from hurricanes. Tsunami inundation damage to the drainage system would be very minimal. Debris in the system left by the inundation will result in the need for maintenance cleanup, but no major structural repairs are anticipated due to these storms.

Although brush fire is a potential threat to the open Waianae lands, which contain dry vegetation, the project site is remote from these exposed areas.

5.14 Acoustical Environment

An *Environmental Noise Assessment Study* was conducted to assess the effects of environmental noise during the construction of the drainage improvements (see Appendix E). Noise-sensitive areas along Farrington Highway are currently exposed to ambient noise levels of 64.7 decibels based on an A-weighted scale (dBA) to 75.3 dBA, with the dominant noise source being traffic.[9] Existing noise-sensitive areas include residential uses and churches along the highway. The noise measurements were taken at approximately 30 feet from the highway. The daytime (7 AM to 10 PM) equivalent sound levels (L_{eq}) were between 71.1 dBA and 74.7 dBA. The nighttime (10 PM to 7 AM) L_{eq} were between 65.6 dBA and 75.3 dBA.

The dominant sources of noise during the project construction period would be construction equipment including backhoes, trenching machines, bulldozers, graders, generators, and pavement saws, as well as diesel-powered machinery involved in excavation, trenching, grading, and paving. The anticipated noise from these construction activities may impact noise-sensitive areas along Farrington Highway.

5.15 Visual Resources

The visual characteristic of Farrington Highway is that of an urban street with a high volume of vehicles traveling in two directions. There are built-up residential and commercial/public facilities on the *mauka* side of the highway and open space/recreational uses on the *makai* side. Utility poles and overhead electrical, telephone, and cable television lines occupy the above air space, while street appurtenants — including street signs, traffic signals, fire hydrants, and parked vehicles — occupy the ground level.

The *makai* shoreline provides the best views for motorists traveling on the highway. Nanakuli Beach Park and Ulehawa Beach Park comprise the major use in the area. Its visual qualities include grass lawns, mature trees, sand berms, off-street parking areas and glimpses of the beach and ocean. In the *mauka* direction, the views also are spectacular and include the backdrop of the Waianae Mountain Range, Puu o Hulu Kai/Puu o Hulu Uka, Puu Heleakala and the South Ridge of Nanakuli Valley looming over the valley floor and coastal land.

[9] D.L. Adams Associates, Ltd. August 23, 2001. *Environmental Noise Assessment Study, Farrington Highway Drainage Improvements, Nanakuli, Hawaii* (see Appendix E).

6 SOCIOECONOMIC SETTING

6.1 Local Economy

The Waianae Coast of Oahu encompasses the communities of Makaha, Waianae, Maile, and Nanakuli. The 1994 population of the Waianae region was estimated at 37,900 residents (*1990 U.S. Census and Federal-State Cooperative Program for Population Estimates*). This estimate represents a population increase of approximately 20 percent from 1980 to 1994.

Within the Waianae region are low-density residential communities, livestock farms, diversified agriculture, strip commercial development, public facilities, military installations, and vacant lands. Waianae town, the commercial/civic center of the Waianae Coast, has commercial/ shopping facilities, government offices, public facilities, and recreational amenities.

Employed residents who do not work in the region on the local farms, in government agencies, or in the retail/service industries, are employed in Ko Olina, Kapolei, Ewa, the Pearl Harbor area, and Honolulu. This population commutes to its work places via Farrington Highway.

6.2 Social Environment

The proposed action will occur along Farrington Highway, the main transportation corridor through the Waianae Coast. Traffic on this road is associated with commerce, personal trips, work-related commuting, and recreation. The right-of-way is heavily used and is the primary route for motorists traveling through the region. Side streets provide access into the valleys, and Kolekole Pass, across federal lands and the Waianae Mountain Range, provides access between the Waianae Coast and Central Oahu only during emergency conditions and when authorized by the U.S. military.

Temporary closures of some lanes or sections of the highway due to traffic accidents, traffic fatalities, public safety emergencies, downed utility lines, fallen debris, or flooding have caused extreme hardship for area residents and businesses. Alternative routes are limited or nonexistent. The communities along the Waianae Coast depend on Farrington Highway to be open at all times.

6.3 Government Revenues

The State and City will receive additional revenues from taxes paid in the community as a result of the new improvements. The project will mobilize employment in the construction industry, which will generate new income for construction employees. This new income is taxed as personal income resulting in additional government revenues. A portion of the new income also will be spent in retail stores and other business establishments, and these sales are subject to State excise tax.

6.4 Community Issues and Concerns

The primary concern of area residents and businesses is that vehicular traffic on Farrington Highway is not disrupted and pedestrian access is not impeded during construction of the new

drainage system. As the primary route through the Waianae Coast, it is important that Farrington Highway continue to operate efficiently in its function to provide adequate vehicular access through the region.

7 PUBLIC FACILITIES AND SERVICES

7.1 Circulation and Traffic

Farrington Highway is a State right-of-way designed to serve the entire Waianae Coast. At the project site in Nanakuli, the highway has four lanes (two northbound and two southbound) within a 60-foot-wide right-of-way through the Area I project area and a 90-foot right-of-way through the Area II project area. The posted speed limit along the highway is 35 miles per hour, but at Nanakuli Avenue, the speed limit is reduced to 25 miles per hour while the school zone warning light flashes. Access to Farrington Highway is unrestricted as a number of cross streets and driveways connect with the State right-of-way.

Along the *mauka* side of Area I project site, there are one street (Nanakuli Avenue) and 13 driveways that connect with the highway. On the *makai* side, there are one driveway serving Nanakuli Beach Park and another serving Nanaikapono Elementary School. There are no connecting streets on this side of the highway.

The lone intersection (Farrington Highway-Nanakuli Avenue) within the Area I project site is a signalized T-intersection. The highway portion of the intersection is not channelized, but Nanakuli Avenue, a 56-foot-wide collector street, has a dedicated right-turn approach lane and a through/left-turn lane (the through lane enters a driveway to Nanakuli Beach Park).

Along Area II of the project, there are three connecting streets (Princess Kahanu Avenue, Lualei Place, and an unnamed road) and 11 driveways on the *mauka* side, and two driveways (but no connecting streets) on the *makai* side. Farrington Highway-Princess Kahanu Avenue is the only intersection that is channelized and signalized.

The typical weekday traffic on Farrington Highway is approximately 38,200 vehicles.[10] During the morning peak hour, which occurs between 6:30 AM and 7:30 AM, traffic reaches a volume of approximately 2,700 vehicles. During the afternoon peak hour, which occurs between 3:15 PM and 4:15 PM, the traffic volume is also approximately 2,700 vehicles.

Crosswalks occur at one location (the Nanakuli Avenue intersection) along Farrington Highway in the Area I project site. In the Area II project site, a crosswalk occurs at each of the three streets connecting with Farrington Highway.

Along Farrington Highway, a number of street appurtenants and utility infrastructure occupy the shoulder area. On the *mauka* side of the highway are utility poles with overhead electrical, telephone, and Cable TV lines, traffic signals, street signs and fire hydrants. Streetlights are attached to the utility poles. There are underground water and sewer lines at both the Area I and Area II project sites. The *makai* side of the highway includes utility poles with overhead lines,

[10] 24-hour traffic count taken by DOT, Highway Planning Branch, on April 25-26, 2001 at Farrington Highway-Lualualei Naval Road intersection.

traffic signals, and street signs. The State is currently installing additional streetlights along the highway. The only underground utility lines in the *makai* area are sewer lines.

7.2 Water

In Area I of the project site, there is an 8-inch water line that increases to a 12-inch line along the *mauka* edge of the highway and a 24-inch water line that is located within the pavement alignment of Farrington Highway. In the Area II project site, an 8-inch water line is located within the *mauka* shoulder and a 24-inch line runs under the road pavement. These lines are owned and maintained by the BWS.

7.3 Sewer

Sewage collection occurs in sewer lines located on both sides of Farrington Highway in the Area II project site, with an 8-inch sewer line located in the *mauka* shoulder and a 30-inch line that runs just *makai* of the highway right-of-way. There are no sewer lines within the highway right-of-way in the Area I project site. The sewage collection system is owned and maintained by the City's Department of Environmental Services.

7.4 Electricity

Overhead electrical lines occur on the *mauka* side of the highway in both Area I and Area II of the project site. These lines are owned and maintained by HECO.

7.5 Telephone

Overhead telephone lines, owned and maintained by Verizon Hawaii, are located on the *mauka* side of Farrington Highway within the Area I project site and on both sides of the highway within the Area II project site.

7.6 Cable TV

Overhead cable television lines are owned by Oceanic Cable and are located on the *mauka* side of Farrington Highway.

7.7 Solid Waste Disposal

Solid waste generated by residential properties along the highway is collected by the City Refuse Division every Monday and Thursday of the week by trucks with automatic loaders. The waste material is then taken to the H-POWER waste-to-energy facility in the Campbell Industrial Park.

Commercial property owners contract with private collectors to haul away trash. Garbage containers from commercial properties are left on-site within designated areas of the parking lot or near the commercial buildings.

The PVT Landfill on Lualualei Naval Station Road is a privately owned solid waste disposal facility. This landfill, which receives over 20 percent of Oahu's solid waste stream,[11] is available for construction solid waste disposal, such as dirt, concrete, lumber, etc.

7.8 Police and Fire Protection

The project site falls within the service area of the HPD's Waianae Substation, which is located approximately 4.5 miles from Nanakuli. The Kapolei substation, which is located approximately 5.5 miles from Nanakuli, covers the adjacent district. Emergency response time to the project site is less than 10 minutes from the Waianae substation, and less than 5 minutes from any police mobile unit.

The nearest fire station is on Nanakuli Avenue in Nanakuli Valley. It is equipped with a tank truck and ladder truck. It is manned 24-hours a day by full-time personnel. Response time to a fire emergency at the project site is less than 5 minutes.

8 RELATIONSHIP TO PUBLIC LAND USE POLICIES

8.1 Hawaii State Plan

The proposed project is consistent with the Hawaii State Plan objectives to "encourage the design and development of transportation systems sensitive to the needs of affected communities and the quality of Hawaii's natural environment" (Section 226-17[b.10]) and "reduce the threat to life and property from erosion, flooding, tsunamis, hurricanes, earthquakes, volcanic eruptions, and other natural or man-induced hazards and disasters" (Section 226-13[b.5]). Development of a Farrington Highway drainage system in Nanakuli will help to remove a hazardous flooding condition that hinders vehicular traffic and pedestrian travel, as well as threatens private property and the quality of life in the community.

The State Land Use District Maps, administered by the LUC, designate the State highway right-of-way as Urban. *Mauka* of Farrington Highway in the Area I project site, the adjacent drainageway is located within the Agricultural District. The proposed drainage improvement is a permitted use in both the Urban and Agricultural land use districts.

8.2 State Functional Plans

8.2.1 Transportation Functional Plan

The proposed project is consistent with the functional plan policies to "construct facility and infrastructure improvements in support of Hawaii's thriving economy and growing population base" and to improve the State's transportation maintenance programs.

The new drainage system will be both an improvement to the Farrington Highway infrastructure as well as a necessity to maintaining the right-of-way in proper working condition so traffic movement is efficient through the area. Moreover, it will improve the safety of the right-of-way and enhance the general welfare of the community.

[11] City and County of Honolulu. July 2000. *Waianae Sustainable Communities Plan.*

8.2.2 Historic Preservation Functional Plan

The proposed project is consistent with the functional plan policy to identify and protect historic properties. An archaeological study was performed to identify the presences of any archaeological or historic features specifically in the project area. Findings of the study revealed sites in the area and made recommendations for protection of those sites. The study recommendations will be reviewed by the SHPO for concurrence.

8.3 State Environmental Policy

The proposed action is consistent with the State Environmental Policy (Chapter 344, HRS) to "conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawaii."

The proposed project will provide an improved safeguard to protect the community and environment from the threat of flooding. The natural flow and discharge of water into the ground and into the surrounding areas of the highway after a heavy rainfall have been altered with the development of an urban environment. The new drainage system will improve the means of discharging water into the ground.

8.4 Hawaii Coastal Zone Management Program

The proposed project is consistent with the objectives and policies of the Hawaii CZM Program. A discussion of the proposed project and its relationship to the 10 environmental elements of the CZM is provided below.

8.4.1 Recreational Resources

The objective and policies of the "recreational resources" element of the CZM Program relate to the provision of coastal recreational opportunities accessible to the public. The proposed action will not interfere with any public access to the shoreline and its associated recreational opportunities. It will help remove a hazardous condition that hinders vehicular access along the Waianae Coast, particularly after a heavy rainfall.

8.4.2 Historic Resources

The CZM's objective and policies regarding "historic resources" relate to the protection, preservation, and restoration of significant natural and man-made Hawaiian and American historic and prehistoric resources in the CZM area. Archaeological reconnaissance and literature research reveal that a historic railroad track is located in Area I and may be buried under sand fill in Area II. An assessment of the proposed project notes that the railroad track will not be altered or adversely affected by the new drainage system. A Hawaiian cultural deposit found in the Area II project site also will not be impacted by the proposed improvements.

In addition to the archaeological reconnaissance study, a cultural impact assessment was conducted. This study revealed that the proposed improvements would not interfere with any traditional gathering of natural resources in the area. If any burials are encountered during construction, work will be temporarily suspended in the immediate area and the SHPO will be contacted. Work will not resume until the site has been appropriately treated and SHPO approves the completed remedial action.

8.4.3 Scenic and Open Space Resources

The CZM's objective and policies regarding "scenic and open space resources" relate to the protection, preservation and restoration or improvement of the quality of coastal scenic and open space resources. The proposed action is located within an existing right-of-way and does not include any aboveground structures. Hence, scenic or open space amenities will not be adversely affected by the proposed project.

8.4.4 Coastal Ecosystems

The CZM's objective and policies regarding "coastal ecosystems" relate to the protection of valuable coastal ecosystems, including coral reefs, and to the minimization of adverse impacts on all coastal ecosystems. The proposed action is located within the Farrington Highway right-of-way and immediate adjoining areas. It will not disrupt any valuable coastal ecosystems of the Waianae Coast.

8.4.5 Economic Uses

The CZM's objective and policies regarding "economic uses" relate to the provision of public or private facilities and improvements important to the State's economy in suitable locations. The proposed action is not coastal dependent and will occur in a suitable location to remove recurring floodwaters from a State highway right-of-way.

8.4.6 Coastal Hazards

The CZM's objective and policies regarding "coastal hazards" relate to the reduction of hazards to life and property from tsunami, storm waves, stream flooding, erosion, subsidence, and pollution. The proposed improvements are design to reduce hazardous flooding along the highway and protect life and property in the adjacent areas.

8.4.7 Managing Development

The CZM's objective and policies regarding "managing development" relate to the improvement of the development review process and the communication and public participation in the management of coastal resources and hazards. This proposed action is subject to the requirements of Chapter 343, HRS, environmental review process, which includes public participation in project review. During this process, community interaction with the applicant is provided, and the management of coastal resources and hazards is addressed.

8.4.8 Public Participation

The CZM's objective and policies regarding "public participation" relate to the stimulation of public awareness, education, and participation in coastal management and are directed at public agencies. The proposed action includes participation in the public review process by complying with all coastal zone and associated shoreline land use rules and regulations.

8.4.9 Beach Protection

The CZM's objective and policies regarding "beach protection" relate to the protection of beaches for public use and recreation. The proposed action will not involve the construction of structures, including erosion-protection facilities, in the shoreline area.

8.4.10 Marine Resources

The objective and policies of "marine resources" relate to the implementation of the State's ocean resources management plan. Implementation of the proposed action will exercise overall conservation ethics during the planning process and, although not on the shoreline, will respect the use and development of marine and coastal resources in the area.

8.5 Lualualei Flood Study

A preliminary flood study of Lualualei was prepared in September 2001 by Belt Collins Hawaii for the USACE and NRCS. The study was prompted by a recent flooding, one of the worst in more than 50 years, to address an ongoing flooding problem in the valley.

Flooding in the area is attributed to the absence of a storm water drainage system within the agricultural areas and to partially blocked existing culverts and other drainage structures in the residential areas. The study performed hydrologic and hydraulic investigations of drainageways and provided recommendations to minimize or eliminate future flooding.

At the Farrington Highway Area II site, the study is recommending a 24-inch-diameter drain line, manholes, and catch basins along Farrington Highway and side streets *mauka* of the highway. The drain line would connect with a concrete-lined drainage channel parallel to and *mauka* of the highway. (The Area I site is not covered by the Lualualei drainage study.) Plans for implementation of the recommendations are still under review and have not yet been finalized.

8.5.1 City and County General Plan

The proposed project is consistent with Objective D of the Transportation and Utilities goal of the City's General Plan "to maintain transportation and utility systems which will help Oahu continue to be a desirable place to live and visit." The proposed drainage improvements will help maintain Farrington Highway as the major transportation corridor along the Waianae Coast. It will, moreover, improve the safety of the right-of-way and enhance the general welfare of the community.

8.5.2 Waianae Sustainable Communities Plan

The City's Sustainable Communities Plan for the Waianae District, adopted by the Honolulu City Council in 2000, states that a comprehensive plan needs to be developed for specific drainage and roadway improvements to alleviate local flooding problems.[12] The Sustainable Communities Plan further states a need for an emergency bypass road for the Waianae Coast. This emergency route can be used as an alternate to Farrington Highway for those times when one or more sections of the highway are impassable due to storm drainage or damage problems. Although the proposed action is not part of a comprehensive plan, it is part of a long-studied project by the State DOT.

8.6 Waianae Coast Emergency Routing Plan

The City is currently planning an emergency vehicular route through the Waianae district to accommodate traffic in the event of a natural hazard, accident, or other public safety emergency along Farrington Highway. Preliminary plans call for new roads to connect existing roads in the valleys to bypass sections of the highway (including Area I and II of the project site), which may be temporarily or partially closed. The City plan is being coordinated with community groups, private interests, landowners, and local organizations, and will be implemented in phases beginning at the Nanakuli end.

8.6.1 City and County Zoning (Land Use Ordinance)

The proposed improvements are located within the State highway right-of-way, which does not have a City zoning district designation. The adjacent drainageway in the Area I project site is located in Agricultural and Country zoning districts. Under the City's current Land Use Ordinance, infrastructure and utilities are permitted uses in these districts.

8.6.2 Special Management Area

The proposed improvements are located within the Special Management Area (SMA) and, thus, are subject to the City's SMA Rules and Regulations. A discussion of the proposed improvements in relation to the objectives and policies of the Hawaii CZM Program is provided above. The CZM Program establishes the basis for the SMA.

8.7 Subdivision/Consolidation

The proposed project will require an easement in the drainageway for the drainage outlet. The easement will be for drainage purposes in favor of the State DOT. The remainder of the drainage improvements is located within the Farrington Highway right-of-way.

[12] City and County of Honolulu. 2000. "Environmental Criteria for Land Use Planning" in *Sustainable Communities Plan.*

8.8 Summary of Required Permits

The Army Corps of Engineers has reviewed the project and has indicated that once detailed plans are available, consultation with the Corps would be appropriate to determine specifically if a Department of Army Permit and a Section 401 Water Quality Certification are required.

Prior to construction, the proposed action may require approval of a Special Management Area Use Permit from the City for improvements that are in the SMA but outside of the existing highway right-of-way.

The State will require an easement from the State DHHL for its drainage outlet in the drainageway and approval from the St. Rita Catholic Church for installation of the outlet under its new parking facility. Additionally, the State Department of Health (DOH) has indicated that the proposed project will be subject to applicable provisions of the National Pollutant Discharge Elimination System requirements and Administrative Rules of DOH, Chapter 111-46 on "Community Noise Control" and Chapter 11-26 on "Vector Control."

Finally, a grading permit will be required from the City's DPP for earthwork associated with the drainage system installation.

9 SUMMARY OF MAJOR IMPACTS

9.1 Construction Impacts

Heavy equipment will be used during construction of the drainage improvements. Drillers, backhoes, power saws, dump trucks, boom-mounted flatbed trucks, asphaltic concrete (AC) hauling trucks, and mini pavers or rollers will be employed to dig the pits for the dry wells and trenches for the connecting culverts, discharge line and drainage outlet. The trenches for the 24-inch culverts will be approximately 30 inches wide and about 7 to 8 feet deep. Approximately 1,700 cubic yards of material at the Area I site and 500 cubic yards at the Area II site will be excavated. The excavated material will be temporarily placed in a contractor's storage or staging area adjacent and on the *makai* side of the highway. The material would then be taken to the PVT Landfill in Nanakuli, which is located less than one mile inland of the highway.

After the pits for the dry wells are dug, the casing and iron grill covers for the dry wells will be installed. The connecting culverts will be laid in the trenches and covered with a layer of control low strength material and permeable base course. These layers will then be compacted and a final layer of AC pavement is placed. The backfill is expected to be clean material from a DOT-HWY approved source.

At the outlet, the backfill and cover layers will match the design and material of the new parking facility being constructed by the St. Rita Catholic Church.

At the end of each work day, open pits or trenches will be covered with a heavy-duty steel plate and fixed in place with an AC pavement. Construction vehicles, equipment, materials and supplies will be stored in the contractor's storage yard.

When the construction work is completed, the storage yard will be removed and the site will be returned to its pre-construction condition.

During construction, the various stages of operation are expected to generate noise and dust. Noise impacts will be most noticeable during the excavation, backfilling, and paving phases. Heavy diesel-powered vehicles and equipment are anticipated to be in operation during this period. Dust impacts during this same period will also be most pronounced. Noise and dust impacts will also occur when the contractor returns the site to its pre-construction condition.

Potential runoff from the construction site to adjacent streams or drainageways may occur during heavy rainfall. Hence, runoff control measures are planned to prevent or reduce discharge to existing watercourses. These measures are discussed in Section 14, Proposed Mitigation Measures.

The proximity of the new drainage system to the highway will require possible lane closures during construction. Street cones will be placed in advance and around the construction area during the day and removed at the end of the day when steel plates are temporarily installed for the night, weekends and holidays. The placement of the street cones will be scheduled to avoid the morning and afternoon peak-hour traffic periods.

Driveways to adjacent private properties will also be affected during construction. Coordination calling for specific schedules and temporary provisions of access will have to be arranged between the contractor and affected property owners.

Construction of the drainage improvements will not require removal of any existing mature trees or vegetation. However, the DOT-HWY will need to coordinate installation of the drainage improvements with the presence and operations of any existing utilities in the area. As previously described, water lines, sewer lines, and utility poles with overhead electrical, cable TV, and telephone lines occur in the narrow shoulder area of the highway. There are also traffic signals, traffic control boxes, street signs, and streetlights that may be affected.

The proposed highway improvements will not impact any critical habitat occupied by federally or State-listed rare, threaten, or endangered wildlife species. Overall, fauna species are noticeably absent because of the high level of human activity, including vehicular and pedestrian traffic that occurs in the area.

The historic railroad track identified by IARII on the *makai* side of Farrington Highway will not be removed, relocated, or altered by the new drainage system. The cultural deposit in the Area II project area is located outside of the proposed drywell locations and will not be impacted by any activities associated with the new improvements.

9.2 Operational Impacts

The proposed action will result in a permanent underground drainage system. It will not result in an active operational activity except for periodic maintenance. Once completed, the only physical evidence of the project will be the dry well covers, drain outlet at the existing drainageway, and lined ditch near Nanakuli Stream. These improvements will not generate adverse visual effects or disrupt any visual corridors toward the sea. The AC pavement over the backfilled trenches is expected to simulate the existing condition prior to construction.

It is anticipated that the new drainage system will vastly improve drainage in the area. Most notable will be the absence of frequent flooding over the highway and pedestrian walkways, which has slowed or delayed vehicular traffic through the area after heavy rainfalls.

10 PROPOSED MITIGATION MEASURES

Mitigation measures will be employed by the construction contractor to remove or minimize project impacts on the surrounding environment. Construction of the proposed improvements will occur along the highway, which abuts residential, commercial, public facility, and public beach park properties. Therefore, implementation of noise and dust control measures would be appropriate.

Noise from construction activities should be short-term, localized to the immediate vicinity of the actual construction activity, and approved through a community noise permit from the State DOH. If nighttime construction work is planned, a public informational meeting should be held before all residents and property owners who could be impacted by the construction. DOH's maximum permissible noise level for construction equipment during night hours in residential areas is 45 dBA (55 dBA during daytime hours or the ambient noise level whichever is higher). If the generated noise is expected to exceed DOH's maximum permissible noise level, a noise variance from the DOH is required.

Construction equipment and on-site vehicles or devices that emit gas or air during their operation (excluding pile hammers and pneumatic hand tools weighing less than 15 pounds) must be equipped with mufflers.

Compliance with the DOH noise standards will be part of the construction contract and the responsibility of the selected contractor.

Dust control measures would include the use of dust screens, if necessary, frequent water sprinkling of exposed dirt areas, and temporary ceasing of operations during high-wind periods.

The construction contractor will prepare a traffic control plan and submit it to the DOT-HWY for review and approval. The plan will include provisions and schedules for any necessary lane closures as well as provisions for temporary access to adjacent private, public, and commercial properties during construction.

The construction contractor is also expected to coordinate construction of the drainage improvements with all utility companies having facilities within the construction site. The cost of any concessions or required alterations to the affected utilities will be borne by the State DOT.

Containing primarily coralline deposits, the project site is susceptible to buried deposits and human remains. Past studies in the general area have provided some evidence of these sites. As a precaution, IARII is recommending that a monitoring plan be prepared and approved by the SHPO and that it be implemented during construction.

Prior to construction, the DOT-HWY or its construction contractor through an archaeology consultant will prepare an archaeological monitoring plan for review and acceptance by the SHPO. During construction, the plan will be implemented to ensure that an archaeologist

monitors the construction activity in the project area and that, if any sites are uncovered during construction, SHPO is notified and the site is appropriately treated.

IARII also is recommending that the contractor avoid or at least exercise caution to avoid any impact on the historic railroad track and traditional Hawaiian cultural deposit on the *makai* side of the highway.

Erosion and sedimentation control measures and best management practices, such as berming, silt screens, and sedimentation basins, will be erected, if necessary, to ensure that no runoff from the construction site flows into Nanakuli Stream. If water is encountered during trenching operations for the connecting drain line, a dewatering process involving discharge of the water back into the completed trenches or into a sedimentation pond will be employed. No trench water is planned to be discharged into any nearby streams.

All solid waste or debris generated at the job site during construction will be collected and hauled away from the property to a nearby public landfill.

11 ALTERNATIVES CONSIDERED

11.1 No Action

If no action occurs in the project area and current conditions are allowed to continue, sections of Farrington Highway right-of-way will continue to flood during and after heavy rainfalls. Such occurrences would affect the movement of vehicles using Farrington Highway.

11.2 Storm Water Wastewater System

This alternative calls for construction of an underground street drainage system in Area I that would include curbs, gutters, drainage inlets, underground storm water drainage lines, manholes, and culverts. It would be a major capital improvement project requiring significant public funds. The discharge from this system would be an outfall in the ocean or in an existing drainage channel. The anticipated impact from this major system would extend from Farrington Highway and encompass the adjacent drainage channel, nearby stream, beach land and ocean. In the final analysis, the cost of this alternative and its environmental effect would not justify the effectiveness of the system and its sensitivity to the environment compared to the project's current proposal. This alternative was dismissed from further consideration.

In Area II, a series of independent drywells was considered but not pursued. The drainage capacity of this system would be limited to the individual drywells. The proposed plan for an interconnection of drywells would provide improved capacity for the system, as a whole, and greater efficiency.

11.3 Alternative Alignment

Installation of the drainage system on the *makai* side of the highway, away from the narrow *mauka* shoulder and residential, commercial, and public facilities, would be in an area with more space for the proposed improvements and would cause less disruption to existing utilities and adjacent land uses. Runoff from the highway flows away from the crown toward the sides of the

road and collects in the shoulder area. A drainage system, thus, must be provided on both sides of the highway.

A system of catchment basins that transport storm water runoff from the *mauka* highway shoulder via a drain line to a connected or independent system of dry wells in the *makai* shoulder will only result in a series of cross road construction that will be expensive and disruptive to the Waianae Coast community. This alternative was dismissed early in the selection process.

12 DETERMINATION

This Final EA demonstrates that the proposed action will have no significant adverse impact on the environment and that an Environmental Impact Statement (EIS) is not warranted. A Finding of No Significant Impact (FONSI) is, therefore, determined for this project.

13 FINDINGS AND REASONS SUPPORTING DETERMINATION

The following findings and reasons demonstrate that the proposed action will have no significant adverse impact on the environment and, consequently, support the above determination.

- Alternative designs were considered to provide the best solution for a storm water drainage system without creating an irrevocable commitment to loss or destruction on the area's natural resources. An archaeological monitoring plan will be prepared prior to construction and implemented during project construction to ensure that no significant archaeological features are adversely impacted.
- The proposed action calls for installation of a storm water drainage system to remove an existing potential flood condition. No new uses are planned. The proposed infrastructure does not call for changes that would curtail the range of beneficial uses of the environment.
- As demonstrated in this document, the proposed action is consistent with the State's long-term environmental policies and guidelines as expressed in Chapter 344, HRS
- The proposed action is expected to sustain and improve the positive economic effects that a utility provides to a community. Moreover, the construction activity associated with the proposed improvements will generate jobs and infuse business and personal income into the local economy. No negative effects on the social welfare of the local community are anticipated.
- The proposed improvements will not result in the use of hazardous materials or construction methodology that would be detrimental to the public health and safety of the area residents.
- There will be no significant adverse social impact generated by the proposed project. The proposed action will not change the existing land use nor generate increased resident population. It will not result in significant long-term negative impacts on traffic or overburden existing public facilities and services.
- The proposed action is intended to improve the drainage conditions along the highway. No long-term degradation of the natural environment or negative impact from a larger project is anticipated.

- No federally or State-listed rare, threatened, or endangered wildlife or flora species will be affected by the proposed action.
- The anticipated impacts associated with project construction, such as dust and noise, are short-term and temporary. These impacts will be minimized by implementation of mitigation measures in accordance with applicable laws, statutes, ordinances, and rules and regulations of the federal government, State, and City. Erosion and sedimentation control measures and best management practices will be implemented to prevent construction-related runoff from impacting adjacent water resources.
- Although the project site is subject to periodic floods, the proposed improvements are designed to efficiently remove floodwaters from the area.
- The proposed action consists of ground improvements that do not disrupt existing view corridors.
- The proposed action will not require excessive energy consumption during its operation.

14 COMMENTS FROM AND RESPONSES TO PUBLIC AGENCIES, ORGANIZATIONS, PUBLIC OFFICIALS, AND PROPERTY OWNERS

A Draft Environmental Assessment for this project was transmitted to the following agencies, organizations, public officials, and property owners for review and comment. The parties that responded are indicated below and a copy of their correspondence with a response from the proposing agency is attached to this section. Comments from these agencies, organizations and individuals that are applicable have been incorporated into this Final EA.

Federal Agencies	Agencies Responded	Agencies Responding w/No Comment	Agency Letters & Responses Attached in this Section
U.S. Department of Agriculture, Natural Resources Conservation Service		X	X
U.S. Department of the Army, Army Engineer District, Honolulu	X		X
U.S. Department of the Interior, Fish and Wildlife Services			
State Agencies			
Department of Business, Economic Development and Tourism			
Department of Health	X		X
Department of Land and Natural Resources, Commission on Water Resource Mgmt	X		X

State Agencies (cont.)	Agencies Responded	Agencies Responding w/No Comment	Agency Letters & Responses Attached in this Section
Department of Land and Natural Resources, Historic Preservation Division	X		X
Department of Land and Natural Resources, Land Division	X		X
Land Use Commission	X		X
Office of Hawaiian Affairs	X		X
City and County of Honolulu Agencies			
Department of Design and Construction		X	X
Department of Environmental Services			
Department of Facility Maintenance	X		X
Department of Parks and Recreation	X		X
Department of Planning and Permitting	X		X
Department of Transportation Services	X		X
Fire Department	X		X
Police Department	X		X
Board of Water Supply	X		X
Utility Companies			
Hawaiian Electric Company, Inc.	X		X
Oceanic Cable	X		X
The Gas Company	X		X
Verizon Hawaii			
Community Groups			
Waianae Coast Neighborhood Board No. 24			
Public Officials			
State Senator Colleen Hanabusa			
State Representative Michael Kahikina			
Councilmember John DeSoto			

Property Owners	Agencies Responded	Agencies Responding w/No Comment	Agency Letters & Responses Attached in this Section
Nanaikapono Elementary School Nanakuli Ranch St. Rita Catholic Church	X		X

United States Department of Agriculture

NRCS Natural Resources Conservation Service

P.O. Box 50004
Honolulu, HI 96850
Phone: 808-541-2600
FAX: 808-541-1335

Our People...Our Islands...In Harmony

May 21, 2002

Mr. Glen T. Koyama
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Subject: Reference 2000-80-0504/02P-71 - Draft Environmental Assessment (DEA) – Farrington Highway Drainage Improvements at Nanakuli, Waianae, Hawaii

We have reviewed the above mentioned document and have no comments to offer at this time.

Thank you for the opportunity to review this document.

Sincerely,

KENNETH M. KANESHIRO
State Conservationist

The Natural Resources Conservation Service works hand-in-hand with the American people to conserve natural resources on private lands.

AN EQUAL OPPORTUNITY EMPLOYER

Belt Collins

August 15, 2002
2000-80-0504 / 02P-181

Mr. Kenneth M. Kaneshiro
State Conservationist
Natural Resources Conservation Service
U.S. Department of Agriculture
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Kaneshiro:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of May 21, 2002 regarding the Draft Environmental Assessment for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

We acknowledge you have no comments to offer at this time and appreciate your time and effort in reviewing the document.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

Honolulu
Australia
Guam
Hong Kong
Malaysia
Philippines
Seattle
Singapore
Thailand

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DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

April 25, 2002

Regulatory Branch

Mr. Glen T. Koyama
Project Planner
Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Mr. Koyama:

This responds to your request for written comments to the Draft Environmental Assessment (dEA) addressing activities proposed for the Farrington Highway Drainage Improvements Project, Nanakuli, Oahu Island. The dEA identified 2 areas of proposed work with specific activities and structures relative to the location of waters of the United States, such as Nanakuli Stream and wetlands for Area I and Ulehawa Stream for Area II. As documented, the Least Environmentally Damaging Project Alternative (LEDPA) of the project that will entail ground disturbance, construction, and alteration in Area II will not require a Department of Army (DA) permit. The drainage outlet in the vicinity of Nanakuli Stream (Area I) however, may require a Department of Army (DA) permit since it appears to involve the placement of fill material within the limits of jurisdictional waters.

Please contact Mr. Farley Watanabe of my staff at 438-7701, or fax at 438-4060, if you have any questions or need additional information. Please refer to File Number 200000186 in any future correspondence with us.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

Belt Collins

August 15, 2002
2000-80-0504 / 02P-180

Mr. George P. Young, P.E., Chief
Regulatory Branch
U.S. Army Engineer District, Honolulu
Department of the Army
Fort Shafter, Hawaii 96858-5440

Dear Mr. Young:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of April 25, 2002 regarding the Draft Environmental Assessment for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

We acknowledge your determination that a Department of Army (DA) permit is not required for the proposed drainage improvements in Area II.

In Area I, we are proposing a drainage outlet in an existing drainage channel that has been modified. Your letter indicated that our project may require a DA permit since it appears to involve the placement of fill material within the limits of jurisdictional waters. We will be coordinating final design of our drainage outlet with the St. Rita's Catholic Church, which is also proposing improvements within the same drainage channel. Upon completion of the design, we will consult your office regarding the need for a DA permit.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

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BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

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

BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

In reply, please refer to:
File:
02-099/cpo

May 14, 2002

Mr. Glenn T. Koyama
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, 1st Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Subject: Draft Environmental Assessment (DEA)
Farrington Highway Drainage Improvements at Nanakuli, Waianae
Tax Map Key: 8-9-001, 8-7-007, and 8-9-007:02.

Thank you for the opportunity to review and comment on the subject proposal. The DEA was routed to the various branches of the Environmental Health Administration. We have the following comments.

Clean Water Branch

1. The applicant should contact the Army Corps of Engineers to identify whether a federal permit (including a Department of Army permit) is required for this project. A Section 401 Water Quality Certification is required for "Any applicant for Federal license or permit to conduct any activity including, but not limited to, the construction or operation of facilities, which may result in any discharge into the navigable waters...", pursuant to Section 401(a)(1) of the Federal Water Pollution Act (commonly known as the "Clean Water Act");

2. A National Pollutant Discharge Elimination System (NPDES) general permit coverage is required for the following discharges to waters of the State:

   a. Discharge of storm water runoff associated with industrial activities, as define in Title 40, Code of Federal Regulations, Sections 122.26(b)(14)(i) through 122.26(b)(14)(ix) and 122.26(b)(14)(xi);

   b. Discharge of storm water runoff associated with construction activities that involve the disturbance of five (5) acres or greater, including clearing, grading, and excavation;

   c. Discharge of treated effluent from leaking underground storage tank remedial activities;

   d. Discharge of once through cooling water less than one million gallons per day;

   e. Discharge of hydro-testing water;

   f. Discharge of construction dewatering effluent;

   g. Discharge of treated effluent from petroleum bulk stations and terminals; and

   h. Discharge of treated effluent from well drilling activities.

   Any person requesting to be covered by a NPDES general permit for any of the above activities should file a Notice of Intent with the Department of Health, Clean Water Branch (CWB) at least thirty (30) days prior to commencement of any discharges to State waters;

3. If construction activities involve the disturbance of one acre or greater, including clearing, grading, and excavation, and will take place or extend after March 10, 2003, an NPDES general permit coverage is required for discharges of storm water runoff into State waters; and

4. The applicant may be required to apply for an individual NPDES permit if there is any type of activity in which wastewater is discharged from the project into State waters.

If you have any questions, please contact the Clean Water Branch at (808) 586-4309.

Noise, Radiation and Indoor Air Quality (NRIAQ) Branch

All project activities shall comply with the Administrative Rules of the Department of Health, Chapter 11-46, on "Community Noise Control".

Vector Control Branch (VCB)

The property may be harboring rodents, which will be dispersed to the surrounding areas when any buildings are demolished or the site is cleared. The applicant is required by Hawaii Administrative Rules, Chapter 11-26, "Vector Control", to eradicate any rodents prior to demolition or site clearing activities and to notify the Department of Health by submitting Form VC-12 to the local Vector Control Branch when such action is taken. Rodent traps and/or rodenticides should be set out on the project site for at least a week or until the rodent activity ceases.

During construction activities, any collection of water standing for more than a week must be pumped out so as not to create mosquito breeding sources.

If you have any questions, please contact the Vector Control Branch at (808) 831-6767.

Sincerely,

GARY GILL
Deputy Director
Environmental Health Administration

c: CWB
NRIAQ
VCB

BelfCollins

August 15, 2002
2000-80-0504 / 02P-187

Mr. Gary Gill, Deputy Director
Environmental Health Administration
Department of Health
State of Hawaii
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Gill:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of May 14, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

Clean Water Branch

The Army Corps of Engineers have reviewed the project and have indicated that once detailed plans have been prepared consultation with the agency would be appropriate to determine specifically if a Department of Army Permit and a Section 401 Water Quality Certification are required. We intend to follow through with this request.

A Notice of Intent for coverage under the National Pollutant Discharge Elimination System (NPDES) general permit for discharge of storm water runoff associated with construction activities will be filed with the Department of Health, Clean Water Branch.

Noise, Radiation and Indoor Air Quality Branch

During construction, the proposed project will comply with the Administrative Rules of the DOH, Chapter 11-46, on "Community Noise Control."

Vector Control Branch

The proposed project will comply with Administrative Rules of the DOH, Chapter 11-26, "Vector Control," to eradicate any rodents prior to any demolition or site clearing activity on the property. Any water collecting on the project site and left pending for more than one week will be pumped out so as not to create a source for mosquito breeding.

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We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

BENJAMIN J. CAYETANO

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

APR 26 2002

Mr. Glen T. Koyama
Belt Collins Hawaii, LTD.
680 Ala Moana Blvd, First Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Thank you for the copy of the Draft Environmental Assessment for the Farrington Highway Drainage Improvements at Nanakuli. Based on your telephone conversation with our staff, a stream channel alteration permit will not be required for the proposed drainage modification system.

We understand that the proposed dry wells will not be located in the Nanakuli Stream channel, and the discharge structure will discharge at a portion of a dry watercourse at St. Rita's Church.

Thank you for coordinating with us on permit requirements. Please call David Higa at 587-0249 if you have any questions.

Sincerely,

LINNEL T. NISHIOKA
Deputy Director

DH:sd
c. DOT Highways Division

G:\WORK\REGULATE\TEMP\DCA\Farrington\DW drainage rfd.doc

BeltCollins

August 15, 2002
2000-80-0504 / 02P-182

Ms. Linnel T. Nishioka, Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Nishioka:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of April 26, 2002 regarding the Draft Environmental Assessment for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

We acknowledge your assessment of the proposed project and determination that a stream channel alteration permit is not required.

Thank you for your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

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BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

GILBERT S. COLOMA-AGARAN, CHAIRPERSON
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COMMISSION ON WATER RESOURCE MANAGEMENT

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AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

May 31, 2002

MEMORANDUM

LOG NO: 29967 ✓
DOC NO: 0205EJ25

To: Dierdre Mamiya, Administrator
Land Division

From: Don Hibbard, Administrator
Historic Preservation

SUBJECT: Chapter 6E-8 Historic Preservation Review – Draft Environmental Assessment for Farrington Highway Drainage Improvements at Nanakuli (DOT) Project. No 93A-04-01&93A-02-01
Nanakuli, Wai`anae, O`ahu
TMK: (1) 8-7-007, 8-9-001, 8-9-007:002

Thank you for the opportunity to comment on the proposed DEA for the Farrington Highway Improvements. Our review is based on historic reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was made of the project areas.

SHPD provided comment in July 2000 during the DEA preparation phase. Our comments, that this project may have an adverse effect on significant historic sites and recommendation for archaeological monitoring following an acceptable archaeological monitoring plan, are included in full in Appendix F of the DEA.

Section 5.11 Archaeological and Historic Resources. It is unclear where the statement made on page 17 (paragraph 1) is derived: "The archaeological consultant concluded that no further archaeological research or work would be warranted." The archaeological reconnaissance report clearly states that because of the possibility cultural deposits, including burials, within the drainage project area archaeological monitoring is recommended. Please refer to pages 17 (paragraph 3) and 20 (paragraphs 4 and 5) of the archaeological report contained in Appendix C. Given these statements, Section 5.11 of the DEA should be revised accordingly, and the second sentence of paragraph 1 on page 17 should be deleted.

We concur with the findings of the archaeological reconnaissance and reiterate our request that archaeological monitoring be conducted following an approved monitoring plan. SHPD has not yet received the archaeological monitoring plan for review and approval although DOT has committed to submitting an archaeological monitoring plan (memo to SHPD from DOT HWY-D, Unit E, dated October 17, 2001). Thus, if the work described in the DEA is undertaking with a qualified archaeological monitor present, in accordance with an approved monitoring plan, then we believe that the proposed drainage improvements will have "no adverse effect" on significant historic sites.

Should you have any questions about archaeology, please feel free to call Sara Collins at 692-8026 or Elaine Jourdane at 692-8027. Should you have any questions about burial matters, please feel free to contact Kai Markell at 587-0008. Should you have any questions about cultural matters or the OR & L, please feel free to contact Nathan Napoka at 587-0040.

EJ:jk

c: ✓Mr. Glen T. Koyama, Belt Collins Hawaii, Ltd., 680 Ala Moana Boulevard, First Floor, Honolulu, HI 96813
Mr. A. Van Horn Diamond, Chair, O`ahu Island Burial Council
Mr. Kai Markell, Burial Sites Program

BeltCollins

August 15, 2002
2000-80-0504 / 02P-185

Mr. Don Hibbard, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
State of Hawaii
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Hibbard:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

We thank you for your memorandum of May 31, 2002 to Ms. Dierdre Mamiya of the Land Division, Department of Land and Natural Resources, regarding the Draft Environmental Assessment for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

In response to your comments on the Draft Environmental Assessment (DEA), we will prepare and submit an archaeological monitoring plan to the State Historic Preservation Division for approval. An archaeologist will be present to monitor any earth-disturbing activities during construction.

We concur with your notation on the statement shown on page 17 of the DEA, and we will make all necessary modifications.

We acknowledge your determination that if the archaeological monitoring work is performed in accordance with an approved monitoring plan, there will be no adverse effect on significant historic sites.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

May 22, 2002

LD-NAV
L2219/2353/2311/2385/2442/2964
Ref.: DEAHWY-DD28048.RCM

Belt Collins Hawaii LTD
Glen T. Koyama
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Subject: Draft Environmental Assessment (Route 93) Farrington Highway Drainage Improvements at Nanakuli, Waianae, Oahu, Hawaii - TMK: 8-9-1, 8-7-7 and 8-9-7: 02

Thank you for the opportunity to review and comment on the subject matter.

A copy of the document covering the proposed project was distributed to the following Department of Land and Natural Resources' Divisions for their review and comment:

- Division of Aquatic Resources - Division of Forestry and Wildlife - Na Ala Hele Trails - Division of State Parks - Division of Boating and Ocean Recreation - Historic Preservation Division - Commission on Water Resource Management - Land Division Planning and Technical Services - Land Division Engineering Branch - Oahu District Land Office

Attached herewith is a copy of the Land Division Engineering Branch and Commission on Water Resource Management comment.

The Department of Land and Natural Resources has no other comment to offer on the subject matter based on the attached responses. Should additional comments be received, they will be forwarded to you at that time

Should you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 587-0438.

Very truly yours,

for DIERDRE S. MAMIYA
Administrator

C: Oahu District Land Office

DIVISION OF AQUATIC RESOURCES
DD 528
AT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

AQUATIC RESOURCES
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RESOURCES ENFORCEMENT
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LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

April 19, 2002

LD/NAV
DEAHWY-DD28048.COM

Suspense Date: 05/15/02

2002 MAY -6 P 12:14
STATE OF HAWAII
DEPT. OF LAND & NATURAL RESOURCES
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MEMORANDUM:

TO:
XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Na Ala Hele Trails
XXX Division of State Parks
XXX Division of Boating and Ocean Recreation
XXX Historic Preservation Division
XXX Commission on Water Resource Management
Land Division Branches of:
XXX Planning and Technical Services
XXX Engineering Branch
XXX Oahu District Land Office

RECEIVED
APR 22 2002
AQUATIC RESOURCES

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment (Route 93) Farrington Highway Drainage Improvements at Nanakuli, Waianae, Oahu, Hawaii - TMK: 1st/ 8-9-01, 8-7-07 and 8-9-07: 02

Please review the Draft Environmental Assessment covering the subject matter and submit your comments (if any) on Division letterhead signed and dated within the time requested above. Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0438.

NOTE: One (1) copy of the Draft Environmental Assessment is available for review in the Land Division Office, room 220.

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

(✓) We have no comments. ( ) Comments attached.

Signed:

Date: 5-8-02

RECEIVED
LAND DIVISION

2002 MAY 17 A 9:09

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

April 19, 2002

LD/NAV
DEAHWY-DD28048.COM

L-2219
Suspense Date: 05/15/02

MEMORANDUM:

TO:
XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Na Ala Hele Trails
XXX Division of State Parks
XXX Division of Boating and Ocean Recreation
XXX Historic Preservation Division
XXX Commission on Water Resource Management
Land Division Branches of:
XXX Planning and Technical Services
XXX Engineering Branch
XXX Oahu District Land Office

FROM: Dierdre S. Mamiya, Administrator
Land Division

'02 APR 22 AM 07:56 WATER & LAND

SUBJECT: Draft Environmental Assessment (Route 93) Farrington Highway Drainage Improvements at Nanakuli, Waianae, Oahu, Hawaii - TMK: 1st/ 8-9-01, 8-7-07 and 8-9-07: 02

Please review the Draft Environmental Assessment covering the subject matter and submit your comments (if any) on Division letterhead signed and dated within the time requested above. Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0438.

NOTE: One (1) copy of the Draft Environmental Assessment is available for review in the Land Division Office, room 220.

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

( ) We have no comments. (X) Comments attached.

Signed:

Date:

DEPARTMENT OF LAND AND NATURAL RESOURCES
Land Division
Engineering Branch

COMMENTS

Please note that Project Area I is located in Zones X (Not Shaded), D and AE while Project Area II is located in Zone AE. Zone X is an area determined to be outside of the 500-year flood; Zone D is an area where flood hazards are undetermined; and Zone AE is an area where flood elevations are determined.

The proposed project must comply with rules and regulations of the National Flood Insurance Program (NFIP) and all applicable County Flood Ordinances. If there are questions regarding the NFIP, please contact the State Coordinator, Mr. Sterling Yong, of the Department of Land and Natural Resources at 587-0248. If there are questions regarding flood ordinances, please contact applicable County representative.

St. Rita's Catholic Church Proposed Improvements are currently under review with the City and County, Department of Planning and Permitting. The County has still not issued any permits for the project, pending verification of a "NO-RISE certification for the proposed encroachment within the floodway. Therefore, the Department of Transportation should periodically check on the status and/or any revisions to the proposed parking lot in order to coordinate efforts to install the proposed drainage improvements through the church property.

Signed: Andrew M. Monden
ANDREW M. MONDEN, CHIEF ENGINEER

Date: 5/16/02

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556

RECEIVED
LAND DIVISION
2002 APR 24 A 11:47

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

April 19, 2002

TO:
ADMINISTRATOR
ASST ADMIN
DEV BR
PLANNER
PES./AGT BR
CLERICAL
ADMIN ASST
INTERP BR
CHF/POST/STAFF PLNR
COMMENTS & REC
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AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

LD/NAV
DEAHWY-DD28048.COM

L-2219
Suspense Date: 05/15/02

MEMORANDUM:

TO: XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Na Ala Hele Trails
XXX Division of State Parks
XXX Division of Boating and Ocean Recreation
XXX Historic Preservation Division
XXX Commission on Water Resource Management
Land Division Branches of:
XXX Planning and Technical Services
XXX Engineering Branch
XXX Oahu District Land Office

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment (Route 93) Farrington Highway Drainage Improvements at Nanakuli, Waianae, Oahu, Hawaii - TMK: 1st/ 8-9-01, 8-7-07 and 8-9-07: 02

Please review the Draft Environmental Assessment covering the subject matter and submit your comments (if any) on Division letterhead signed and dated within the time requested above. Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0438.

NOTE: One (1) copy of the Draft Environmental Assessment is available for review in the Land Division Office, room 220.

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

(✓) We have no comments. ( ) Comments attached.

Signed:

Date: 4/22/02

RECEIVED
LAND DIVISION
2002 APR 23 A 8:46

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

April 19, 2002

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

LD/NAV
DEAHWY-DD28048.COM

L-2219
Suspense Date: 05/15/02

MEMORANDUM:

From: ~~TO:~~ XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Na Ala Hele Trails
XXX Division of State Parks
XXX Division of Boating and Ocean Recreation
XXX Historic Preservation Division
XXX Commission on Water Resource Management
Land Division Branches of:
XXX Planning and Technical Services
XXX Engineering Branch
XXX Oahu District Land Office

To: ~~FROM:~~ Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment (Route 93) Farrington Highway Drainage Improvements at Nanakuli, Waianae, Oahu, Hawaii - TMK: 1st/ 8-9-01, 8-7-07 and 8-9-07: 02

Please review the Draft Environmental Assessment covering the subject matter and submit your comments (if any) on Division letterhead signed and dated within the time requested above. Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0438.

NOTE: One (1) copy of the Draft Environmental Assessment is available for review in the Land Division Office, room 220.

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

(✓) We have no comments. ( ) Comments attached.

Signed:

Date: 4/22/02

13c

RECEIVED
LAND DIVISION
2002 APR 24 A 11:34

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

April 19, 2002

LD/NAV
DEAHWY-DD28048.COM

L-2219
Suspense Date: 05/15/02

MEMORANDUM:

TO:
XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Na Ala Hele Trails
XXX Division of State Parks
XXX Division of Boating and Ocean Recreation
XXX Historic Preservation Division
XXX Commission on Water Resource Management
Land Division Branches of:
XXX Planning and Technical Services
XXX Engineering Branch
XXX Oahu District Land Office

FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment (Route 93) Farrington Highway Drainage Improvements at Nanakuli, Waianae, Oahu, Hawaii - TMK: 1st/ 8-9-01, 8-7-07 and 8-9-07: 02

Please review the Draft Environmental Assessment covering the subject matter and submit your comments (if any) on Division letterhead signed and dated within the time requested above. Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0438.

NOTE: One (1) copy of the Draft Environmental Assessment is available for review in the Land Division Office, room 220.

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

(X) We have no comments.

( ) Comments attached.

Signed:
DOFAW Administrator

Date: 4/22/02

RECEIVED
LAND DIVISION
2002 APR 25 A 11:52
DEPARTMENT OF LAND AND NATURAL RESOURCES P 4:05

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

April 19, 2002

LD/NAV
DEAHWY-DD28048.COM

L-2219
Suspense Date: 05/15/02

MEMORANDUM:

TO: FR:
XXX Division of Aquatic Resources
XXX Division of Forestry & Wildlife
XXX Na Ala Hele Trails
XXX Division of State Parks
XXX Division of Boating and Ocean Recreation
XXX Historic Preservation Division
XXX Commission on Water Resource Management
Land Division Branches of:
XXX Planning and Technical Services
XXX Engineering Branch
XXX Oahu District Land Office

TO: FROM: Dierdre S. Mamiya, Administrator
Land Division

SUBJECT: Draft Environmental Assessment (Route 93) Farrington Highway Drainage Improvements at Nanakuli, Waianae, Oahu, Hawaii - TMK: 1st/ 8-9-01, 8-7-07 and 8-9-07: 02

Please review the Draft Environmental Assessment covering the subject matter and submit your comments (if any) on Division letterhead signed and dated within the time requested above. Should you need more time to review the subject matter, please contact Nicholas A. Vaccaro at ext.: 7-0438.

NOTE: One (1) copy of the Draft Environmental Assessment is available for review in the Land Division Office, room 220.

If this office does not receive your comments on or before the suspense date, we will assume there are no comments.

( ) We have no comments.

(X) Comments attached.

Signed:

Date: 4/25/02

a stream channel alteration permit will not be required.

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

June 12, 2002

LD-NAV
L-3373
Ref.: DEAHWY-DD28048.RCM2

Belt Collins Hawaii LTD
Glen T. Koyama
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Subject: Draft Environmental Assessment (Route 93) Farrington Highway Drainage Improvements at Nanakuli, Waianae, Island of Oahu, Hawaii
TMK: 1st/ 8-9-1, 8-7-7 and 8-9-7: 02

This is a follow-up to our letter (Ref.: DEAHWY-DD28048.RCM) to you dated May 22, 2002, pertaining to the subject matter.

Attached herewith is a copy of the Historic Preservation Division's comment.

The Department of Land and Natural Resources has no other comment to offer on the subject matter.

Should you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 587-0438.

Very truly yours,

Charlene E. Unoki
for DIERDRE S. MAMIYA
Administrator

C: Oahu District Land Office

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION
KAKUHIHEWA BUILDING, ROOM 555
601 KAMOKILA BOULEVARD
KAPOLEI, HAWAII 96707

GILBERT S. COLOMA-AGARAN, CHAIRPERSON
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COMMISSION ON WATER RESOURCE MANAGEMENT

DEPUTIES
ERIC T. HIRANO
LINNEL NISHIOKA

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COMMISSION ON WATER RESOURCE MANAGEMENT
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CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND
STATE PARKS

May 31, 2002

MEMORANDUM

LOG NO: 29967 ✓
DOC NO: 0205EJ25

To: Dierdre Mamiya, Administrator
Land Division

From: Don Hibbard, Administrator
Historic Preservation

SUBJECT: Chapter 6E-8 Historic Preservation Review – Draft Environmental Assessment for Farrington Highway Drainage Improvements at Nanakuli (DOT) Project. No 93A-04-01&93A-02-01
Nanakuli, Wai'anae, O'ahu
TMK: (1) 8-7-007, 8-9-001, 8-9-007:002

Thank you for the opportunity to comment on the proposed DEA for the Farrington Highway Improvements. Our review is based on historic reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was made of the project areas.

SHPD provided comment in July 2000 during the DEA preparation phase. Our comments, that this project may have an adverse effect on significant historic sites and recommendation for archaeological monitoring following an acceptable archaeological monitoring plan, are included in full in Appendix F of the DEA.

Section 5.11 Archaeological and Historic Resources. It is unclear where the statement made on page 17 (paragraph 1) is derived: "The archaeological consultant concluded that no further archaeological research or work would be warranted." The archaeological reconnaissance report clearly states that because of the possibility cultural deposits, including burials, within the drainage project area archaeological monitoring is recommended. Please refer to pages 17 (paragraph 3) and 20 (paragraphs 4 and 5) of the archaeological report contained in Appendix C. Given these statements, Section 5.11 of the DEA should be revised accordingly, and the second sentence of paragraph 1 on page 17 should be deleted.

We concur with the findings of the archaeological reconnaissance and reiterate our request that archaeological monitoring be conducted following an approved monitoring plan. SHPD has not yet received the archaeological monitoring plan for review and approval although DOT has committed to submitting an archaeological monitoring plan (memo to SHPD from DOT HWY-D, Unit E, dated October 17, 2001). Thus, if the work described in the DEA is undertaking with a qualified archaeological monitor present, in accordance with an approved monitoring plan, then we believe that the proposed drainage improvements will have "no adverse effect" on significant historic sites.

Should you have any questions about archaeology, please feel free to call Sara Collins at 692-8026 or Elaine Jourdane at 692-8027. Should you have any questions about burial matters, please feel free to contact Kai Markell at 587-0008. Should you have any questions about cultural matters or the OR & L, please feel free to contact Nathan Napoka at 587-0040.

EJ:jk

c: Mr. Glen T. Koyama, Belt Collins Hawaii, Ltd., 680 Ala Moana Boulevard, First Floor, Honolulu, HI 96813
Mr. A. Van Horn Diamond, Chair, O`ahu Island Burial Council
Mr. Kai Markell, Burial Sites Program

Belt Collins

August 15, 2002
2000-80-0504 / 02P-186

Ms. Dierdre S. Mamiya, Administrator
Land Division
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Mamiya:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letters of May 22, 2002 and June 12, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

Regarding the comment made by your Engineering Branch of DLNR on the flood zones in Project Area I, the DOT is coordinating its design of the drainage outlet with the St. Rita's Catholic Church. The church is currently securing permits for its planned parking lot, which is located in the same area. The DOT is planning to coordinate its final design on the drainage outlet with the St. Rita's when the church's proposed parking facility is completed.

DOT's project, which is only a small feature within the existing drainageway, will comply with the National Flood Insurance Program and all applicable Flood Ordinance requirements of the City and County of Honolulu.

We have received a comment letter from the Commission on Water Resource Management and a copy of the State Historic Preservation Division letter to you and have responded directly to those agencies. Copies of our response letters are attached.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf
cc: Duane Taniguchi, DOT-Highways Division
Attachment

Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200 • Honolulu, Hawaii 96819 USA
T/808 521 5361 • F/808 538 7819 • honolulu@beltcollins.com • www.beltcollins.com
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August 15, 2002
2000-80-0504 / 02P-182

Ms. Lisael T. Nishioka, Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Nishioka:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of April 26, 2002 regarding the Draft Environmental Assessment for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

We acknowledge your assessment of the proposed project and determination that a stream channel alteration permit is not required.

Thank you for your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200 • Honolulu, Hawaii 96819 USA
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August 15, 2002
2000-80-0504 / 02P-185

Mr. Don Hibbard, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
State of Hawaii
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

Dear Mr. Hibbard:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

We thank you for your memorandum of May 31, 2002 to Ms. Dierdre Mamiya of the Land Division, Department of Land and Natural Resources, regarding the Draft Environmental Assessment for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

In response to your comments on the Draft Environmental Assessment (DEA), we will prepare and submit an archaeological monitoring plan to the State Historic Preservation Division for approval. An archaeologist will be present to monitor any earth-disturbing activities during construction.

We concur with your notation on the statement shown on page 17 of the DEA, and we will make all necessary modifications.

We acknowledge your determination that if the archaeological monitoring work is performed in accordance with an approved monitoring plan, there will be no adverse effect on significant historic sites.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

Belt Collins Hawaii Ltd.
2153 North King Street, Suite 200 • Honolulu, Hawaii 96819 USA
T/808 521 5361 • F/808 538 7819 • honolulu@beltcollins.com • www.beltcollins.com
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BENJAMIN J. CAYETANO
GOVERNOR

ANTHONY J.H. CHING
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
P.O. Box 2359
Honolulu, HI 96804-2359
Telephone: 808-587-3822
Fax: 808-587-3827

May 20, 2002

Mr. Glen T. Koyama
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Subject: DRAFT ENVIRONMENTAL ASSESSMENT ("DEA") REVIEW
Farrington Highway Drainage Improvements at Nanakuli
TMK Nos.: (1) 8-9-001
(1) 8-7-007
(1) 8-9-007: 002
Nanakuli, Oahu, Hawaii

We have reviewed the subject DEA as transmitted by your memorandum dated April 17, 2002, for proposed drainage improvements along Farrington Highway at Nanakuli, Oahu, Hawaii.

Upon review of the subject DEA, we have the following comments:

1. We confirm that Area I is within the State Land Use Agricultural and Urban Districts, and Area II is within the Urban District.

2. Pursuant to the State Department of Health's letter dated May 9, 2000, regarding the potential need for a National Pollutant Discharge Elimination System permit for Area I, we recommend that the Applicant clarify if there will be any impacts upon Nanakuli Stream during construction or if an overflow should occur in the adjacent drainage chute.

Thank you for the opportunity to provide comment on the subject application.

Should you require clarification or further assistance in this matter, please contact Russell Kumabe of my staff at 587-3822.

Sincerely,

ANTHONY J. H. CHING
Executive Officer

BeltCollins

August 15, 2002
2000-80-0504 / 02P-183

Mr. Anthony J.H. Ching, Executive Officer
Land Use Commission
Department of Business, Economic Development & Tourism
State of Hawaii
P.O. Box 2359
Honolulu, Hawaii 96804-2359

Dear Mr. Ching:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of May 20, 2002 regarding the Draft Environmental Assessment for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

Construction of the drainage outlet in the existing drainageway will be conducted in a controlled fashion so no impact will occur in Nanakuli Stream, a watercourse located at the end of the drainageway approximately 500 feet from the proposed outlet. During the project's construction phase, best management practices involving erosion and sedimentation control measures will be employed.

Any flow that occurs in the drainage chute will come from runoff collected in the proposed concrete ditch makai of Farrington Highway. This ditch is designed to receive runoff from the highway and abutting shoulder. The chute is confined to an area just off the shoulder between the highway and abandoned railroad track. Overflow of the chute will not spill into any other adjacent lands.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

Honolulu
Australia
Guam
Hong Kong
Malaysia
Philippines
Seattle
Singapore
Thailand

Belt Collins Hawaii Ltd
2153 North King Street, Suite 200 • Honolulu, Hawaii 96819 USA
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Belt Collins Hawaii is an Equal Opportunity Employer

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

HRD02-519

May 14, 2002

Glen Koyama
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, HI 96813

Subject: Draft Environmental Assessment—Farrington Highway Drainage Improvements at Nanakuli, Wai'anae, Hawai'i, TMK 8-9-01, 8-7-07 & 8-9-07:2

Dear Mr. Koyama:

We are in receipt of your request for comments on the above-referenced project. OHA offers the following comments on the draft environmental assessment (DEA).

Burials

The archeological and cultural impact reports included in the DEA indicate that this project may affect Hawaiian burials. OHA therefore requests that a cultural monitor be present during ground-disturbing activities. We also ask that the applicant prepare a cultural monitoring plan for O'ahu Island Burial Council and OHA review. The plan should include protocol for evaluation of cultural and archeological findings, notification, and site management, as well as quality control measures and guidelines for work stoppage.

To mitigate for potential harms to Hawaiian burials, the applicant should also develop a contingency burial treatment plan in consultation with the Burial Council, the State Historic Preservation Division, and the Office of Hawaiian Affairs.

Fauna

While the draft EA states that two native species of birds are present in the project area, the draft EA does not provide an analysis of the project's impacts on these birds. OHA requests that the final EA assess the impacts of the drainage improvements on native birds and propose appropriate remedies.

Thank you for the opportunity to comment on the above-referenced project. If you have any questions, please call Sharla Manley, Policy Analyst, at 594-1944.

Sincerely,

Jalna S. Keala
Acting Director, Hawaiian Rights Direction

CC: Board of Trustees
Clyde W. Namu'o, Administrator

BeltCollins

August 15, 2002
2000-80-0504 / 02P-184

Ms. Jaina S. Keala, Acting Director
Hawaiian Rights Direction
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813

Dear Ms. Keala:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of May 14, 2002 regarding the Draft Environmental Assessment for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

The State DOT is planning to have a cultural monitor present during ground-disturbance activities. A cultural monitoring plan will be prepared and submitted to the Oahu Island Burial Council, State Historic Preservation Division, and Office of Hawaiian Affairs for review.

The native seabirds were identified in the adjacent land outside of the project site. The impact on these mobile water birds will be minimal, if any. Notably, the project's construction area is very visible and heavily used by motorists and pedestrians. Native species normally do not occupy or frequent this area.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

Belt Collins Hawaii Ltd
2153 North King Street, Suite 200 • Honolulu, Hawaii 96819 USA
T/808 521 5361 • F/808 538 7819 • honolulu@beltcollins.com • www.beltcollins.com
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DEPARTMENT OF DESIGN AND CONSTRUCTION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 11TH FLOOR
HONOLULU, HAWAII 96813
PHONE: (808) 523-4564 , FAX: (808) 523-4567
WEB SITE ADDRESS: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

RAE M. LOUI, P.E.
DIRECTOR
ERIC G. CRISPIN, AIA
DEPUTY DIRECTOR
GEORGE T. TAMASHIRO, P.E.
ASSISTANT DIRECTOR

CDEP 02-0145

May 30, 2002

Mr. Glen T. Koyama
Belt Collins Hawaii, Ltd.
2153 North King Street, Suite 200
Honolulu, Hawaii 96819

Dear Mr. Koyama:

Subject: Draft Environmental Assessment, Farrington Highway Drainage Improvement at Nanakuli, Waianae, Hawaii, TMK: 8-7-07; 8-9-01; 8-9-07: 2

We have reviewed the above draft EA and have no comments to offer. Thank you for the opportunity to comment.

If there are any questions, please contact Gregory Sue at 527-6304.

Very truly yours,

RAE M. LOUI, P.E.
Director

GS:dk

Belt Collins

August 15, 2002
2000-80-0504 / 02P-189

Ms. Rae M. Loui, P.E., Director
Department of Design and Construction
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Dear Ms. Loui:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of May 30, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

Although you have no comment to offer at this time, we appreciate the time and effort you spent reviewing the DEA.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

Honolulu
Australia
Guam
Hong Kong
Malaysia
Philippines
Seattle
Singapore
Thailand

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

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DEPARTMENT OF FACILITY MAINTENANCE

CITY AND COUNTY OF HONOLULU

1000 ULUOHIA STREET, SUITE 215, KAPOLEI, HAWAII 96707
TELEPHONE: (808) 692-5054 FAX: (808) 692-5857

JEREMY HARRIS
MAYOR

ROSS S. SASAMURA
DIRECTOR AND CHIEF ENGINEER

ALVIN K. C. AU
DEPUTY DIRECTOR

IN REPLY REFER TO:
DRM02-395

May 8, 2002

Mr. Glen T. Koyama
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Subject: **Draft Environmental Assessment**
Farrington Highway Drainage Improvements at Nanakuli, Waianae
TMK: 8-9-01, 8-7-07 (Farrington Highway), and 8-9-07:2

We have reviewed the subject Environmental Assessment and provide the following comment:

Please refer to "Issue 2: Discharge of Runoff into Nanakuli Stream" on Page 23 of Appendix D "Cultural Impact Assessment for Farrington Highway Drainage Improvements in Nanakuli and Lualualei": "The runoff is likely to contain such pollutants as motor oil. These enter the stream drainage directly rather than being filtered by vegetation and percolating through the soil."

In compliance with NPDES Permits Phase II, we recommend installing an oil/water separator in the manhole at Farrington Highway (see attached Figure), to filter the storm water before it enters Nanakuli Stream.

Should you have any questions, please contact Hugh Liu of the Division of Road Maintenance at 527-5337.

Very truly yours,

ROSS S. SASAMURA, P.E.
Director and Chief Engineer

Attachment

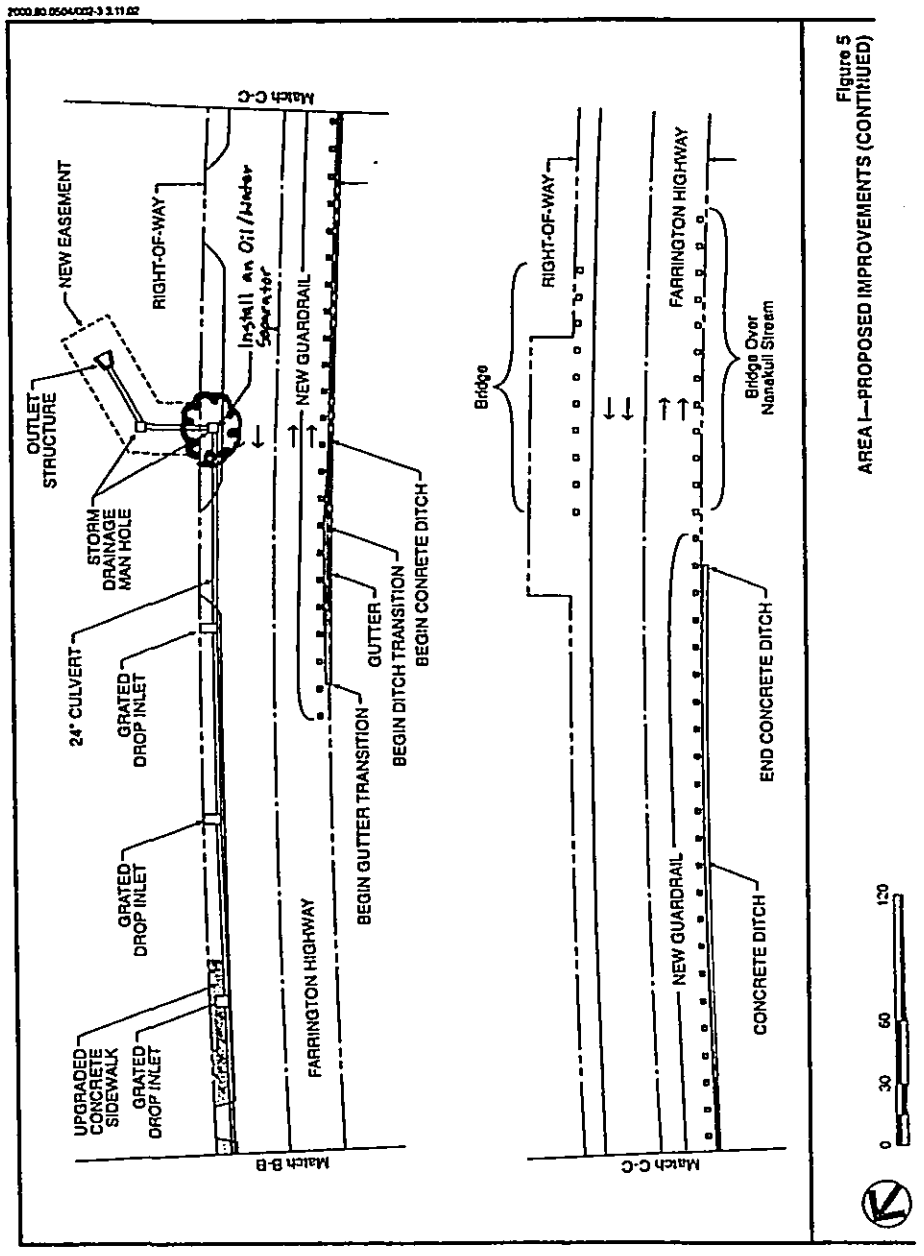

Figure 5
AREA I—PROPOSED IMPROVEMENTS (CONTINUED)

Belt Collins

August 15, 2002
2000-80-0504 / 02P-191

Mr. Ross S. Sasamura, P.E., Director
Department of Facility Maintenance
City and County of Honolulu
1000 Uluohia Street, Suite 215
Kapolei, Hawaii 96707

Dear Mr. Sasamura:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of May 8, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

The discharge from the proposed drainage outlet will not directly enter Nanakuli Stream. It will flow into a dry drainageway adjacent to the St. Rita's Catholic Church. This dry drainageway eventually connects with the Nanakuli Stream, but there is a distance of approximately 500 feet between the proposed drainage outlet and the existing stream.

At this time, DOT is not planning to install an oil/water separator in the manhole at Farrington Highway to filter the storm water before it enters the dry drainageway.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

Honolulu
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Hong Kong
Malaysia
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Singapore
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DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
1000 ULUOHIA STREET, SUITE 309, KAPOLEI, HAWAII 96707
PHONE: (808) 692-5561 • FAX: 692-5131 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

WILLIAM D. BALFOUR, JR.
DIRECTOR

EDWARD T. "SKIPPA" DIAZ
DEPUTY DIRECTOR

April 26, 2002

Mr. Glen T. Koyama
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Subject: Draft Environmental Assessment
Farrington Highway Drainage Improvements at Nanakuli,
Waianae, Hawaii, TMK: 8-9-01, 8-7-07 (Farrington
Highway), and 8-9-07:2

Thank you for the opportunity to review and comment on the Draft Environmental Assessment relating to the Farrington Highway Drainage Improvements at Nanakuli.

The Department of Parks and Recreation requests that special attention be given to maintaining public vehicular access to Nanakuli Beach Park during construction.

Should you have any questions, please contact Mr. John Reid, Planner, at 692-5454.

Sincerely,

W. D. Balfour

WILLIAM D. BALFOUR, JR.
Director

WDB:cu (10703)

cc: Mr. Don Griffin, Department of Design and Construction

BeltCollins

August 15, 2002
2000-80-0504 / 02P-188

Mr. William D. Balfour, Jr., Director
Department of Parks and Recreation
City and County of Honolulu
1000 Uluohia Street, Suite 309
Kapolei, Hawaii 96707

Dear Mr. Balfour:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of April 26, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

Provisions will be made to provide continued vehicular access between Farrington Highway and both Nanakuli Beach Park and Ulehawa Beach Park during construction.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

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DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
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JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

May 31, 2002

2002/ELOG-1047 (TH)

Mr. Brian K. Minaai, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Minaai:

Draft Environmental Assessment (DEA)
Farrington Highway Drainage Improvements
Nanakuli, Oahu, Tax Map Key: 8-9-01, 8-7-07 & 8-9-07:02

We have reviewed the subject DEA and offer the following comments.

The proposed 10-foot high wall shown in Figure 7 does not correspond with the construction plans for the Saint Rita Catholic Church's new parking lot currently being reviewed by our Site Development Division. Before the proposed 10-foot high wall can be constructed, drainage calculations showing a "no rise" in the flood elevation must be submitted to the Site Development Division's Civil Engineering Branch for approval.

Plans for all work within or affecting city-controlled streets should be submitted to our Site Development Division's Traffic Review Branch for review and comment. Traffic control plans during construction should also be submitted to the Traffic Review Branch for review and approval as required.

Thank you for the opportunity to comment on this matter. Should you have any questions, please contact Tim Hata of our staff at 527-6070.

Sincerely yours,

RANDALL K. FUJIKI, AIA
Director of Planning & Permitting

RKF:js

cc: Office of Environmental Quality Control
Belt Collins Hawaii Ltd., Attn: Mr. Glen T. Koyama
g:/Planning/Div Function/ea-eis/2002/elog1047.doc

BENJAMIN J. CAYETANO
GOVERNOR

BRIAN K. MINAAI
DIRECTOR

DEPUTY DIRECTORS
JEAN L. OSHITA
JADINE Y. URASAKI

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

IN REPLY REFER TO:

HWY-DD 2.6912

June 14, 2002

Mr. Randall K. Fujiki, AIA
Director of Planning and Permitting
Department of Planning and Permitting
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Attention: Mr. Tim Hata

Dear Mr. Fujiki:

Subject: Comments to Draft Environmental Assessment (DEA)
Farrington Highway Drainage Improvements, Nanakuli Stream
to Verizon Building, and Ulehawa Stream to Ulehawa Beach Park
Project Nos. 93A-01-01 and 93A-02-01

Thank you for your letter of May 31, 2002, commenting on the above DEA.

Figure 7 of the DEA was based upon the second redesign of the parking lot which included a 10-foot high wall for Saint Rita Catholic Church's parking lot. The original proposed parking facility and the newest redesign incorporates a fill slope at the edge of the parking facility. The new design of the outlet structure (six sets of plans were submitted to the City and County for review) is based upon an undefined fill slope parking area, which is based upon the Catholic Church's most current proposal before the City and County of Honolulu.

In any event, the design of the outlet structure will be determined by the final Saint Rita Church's as-built parking area that is determined as acceptable by the City and County of Honolulu by your Site Development Division's Civil Engineering Branch; or the outlet will be redesigned through another area if the construction of the parking area interferes with the construction timetable of this project.

Our final plans will be submitted to your Site Development Division's Traffic Review Branch for review and comment. A traffic control plan will also be submitted to the Traffic Review Branch for review and approval, as required

Should you have any questions concerning this matter, please contact Duane Taniguchi, Design Section, Design Branch, Highways Division at 692-7582 and reference HWY-DD 2.6912.

Very truly yours,

GLENN M. YASUI
Administrator
Highways Division

c: Belt Collins (Glen Koyama)

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4529 • FAX: (808) 523-4730 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

CHERYL D. SOON
DIRECTOR

GEORGE "KEOKI" MIYAMOTO
DEPUTY DIRECTOR

May 20, 2002

TPD4/02-01515R

Mr. Glen T. Koyama
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Subject: Farrington Highway Drainage Improvements at Nanakuli

In response to your April 17, 2002 letter, we reviewed the draft environmental assessment (EA) for the subject project. The following comments are the result of this review:

1) Subject to State Department of Transportation approval to remove a segment of existing guardrail, the City is planning to install a bus shelter in the area behind the existing guardrail at the bus stop adjacent to the sewage pump station.

2) The proposed upgraded sidewalk area must comply with Americans with Disabilities Act (ADA) standards. The pedestrian paths to both the mauka and makai bus stops should also comply with ADA standards.

3) Although the portion of Farrington Highway where the improvements are proposed is under the jurisdiction of the State Department of Transportation, we have the following comments regarding pedestrian and bicyclist safety:

   a) Figure 4 of the draft EA (Page 7) shows a catch basin and a grated drop inlet near the intersection of Nanakuli Avenue and Farrington Highway. To improve pedestrian safety, wheelchair ramps should be designed at the corners of the intersection and catch basins/drop inlets should be appropriately placed around/adjacent to the ramps. The safety of bicycle and pedestrian traffic over the inlets should be considered in the design of the proposed grated drop inlets.

   b) Figure 5 of the draft EA (Page 8) shows a gutter/concrete ditch section along with a new guardrail. The provisions for pedestrian/bicycle traffic safety in this area should be described.

Should you have any questions regarding these comments, please contact Faith Miyamoto of the Transportation Planning Division at 527-6976.

Sincerely,

CHERYL D. SOON
Director

Belt Collins

August 15, 2002
2000-80-0504 / 02P-190

Ms. Cheryl D. Soon, Director
Department of Transportation Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Ms. Soon:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of May 20, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

The planned bus shelter at the sewage pump station will not be in the project construction area and, thus, will not be impacted by the installation of the proposed drainage system.

The proposed upgraded sidewalk and pedestrian paths to the mauka and makai bus stops will comply with the Americans with Disabilities Act standards. Plans of the proposed project were sent to the Commission on Persons with Disabilities in June 2002 for review. For safety purposes, the design of the catch basin and grated drop inlets near the intersection of Nanakuli Avenue and Farrington Highway will include pedestrian-safe grates.

A pedestrian walkway/bicycle path is located more than 20 feet makai of the gutter/concrete ditch. It is in a safe area away from the travel lanes of the State highway. At Nanakuli Stream, the pedestrian path/bicycle path crosses the stream via a small concrete bridge that is separate from the Farrington Highway vehicular bridge.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

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FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

3375 KOAPAKA STREET, SUITE H425
HONOLULU, HAWAII 96819-1869

JEREMY HARRIS
MAYOR

ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARK
DEPUTY FIRE CHIEF

April 30, 2002

Mr. Glen T. Koyama
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Subject: Draft Environmental Assessment (DEA)
Farrington Highway Drainage Improvements at Nanakuli
Waianae, Hawaii
Tax Map Keys: 8-9-01, 8-7-07 (Farrington Highway), and 8-9-07: 2

We received your letter dated April 17, 2002, requesting our comments for the above-mentioned project.

The Honolulu Fire Department requests that you comply with the following:

1. Maintain fire apparatus access throughout the construction site for the duration of the project.

2. Notify the Fire Communication Center (523-4411) of any interruption in the existing fire hydrant system during the project.

Should you have any questions, please call Battalion Chief Kenneth Silva of our Fire Prevention Bureau at 831-7778.

Sincerely,

JOHN CLARK
Acting Fire Chief

JC/DL:jl

cc: Duane Taniguchi

Belt Collins

August 15, 2002
2000-80-0504 / 02P-193

Mr. John Clark, Acting Fire Chief
Fire Department
City and County of Honolulu
3375 Koapaka Street, Suite H425
Honolulu, Hawaii 96819-1869

Dear Mr. Clark:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of April 30, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

During construction of the drainage improvements, DOT will maintain access to all fire apparatus and will notify the Fire Communication Center, in advance, of any interruption in the existing fire hydrant system.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

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POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111
http://www.honolulupd.org
www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

LEE D. DONOHUE
CHIEF

ROBERT AU
GLEN KAJIYAMA
DEPUTY CHIEFS

OUR REFERENCE CS-KP

May 9, 2002

Mr. Glen T. Koyama
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment for the Farrington Highway Drainage Improvements at Nanakuli project.

The proposed mitigation measures may alleviate some of the complaints relative to construction dust, odors, noise, and traffic. We are concerned that any lane closures will have a negative impact on traffic flow, as well as impede ingress and egress at driveways along the route. This, in turn, may result in vehicles making left turns at these driveways to cause backups and delays along Farrington Highway. These actions normally have a negative impact on calls for police service to the area.

If there are any questions, please call Ms. Carol Sodetani of the Support Services Bureau at 529-3658.

Sincerely,

LEE D. DONOHUE
Chief of Police

By
KARL GODSEY
Assistant Chief of Police
Support Services Bureau

Serving and Protecting with Aloha

Belt Collins

August 15, 2002
2000-80-0504 / 02P-192

Mr. Lee D. Donohue, Chief of Police
Police Department
City and County of Honolulu
801 South Beretania Street
Honolulu, Hawaii 96813

Dear Chief Donohue:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of May 9, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

We will submit a traffic plan to your office for review. The plan will include provisions for maintaining continuous traffic flow on Farrington Highway during construction. It will also describe how ingresses and egresses at all driveways along the highway will remain unimpeded.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

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BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HI 96843

May 9, 2002

Mr. Glen T. Koyama
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Mr. Koyama:

Subject: Your Letter of April 17, 2002 on the Draft Environmental Assessment for the Farrington Highway Drainage Improvements at Nanakuli, TMK: 8-9-1, 8-7-7, 8-9-7; 2

Thank you for the opportunity to review the subject document for the proposed drainage improvements.

The construction schedules for all projects in the area should be coordinated to minimize impacts to the community and our water system. In conjunction with the project scheduling, the construction plans for the drainage improvement project should be submitted for our review. Please also note that we have the following projects scheduled for construction in the area:

1. Nanakuli Water System Improvements, Part III (In construction, scheduled to be completed by August, 2003)
2. Farrington Highway Water System Improvements, Part I, Phase A (2003 construction)
3. Farrington Highway Water System Improvements (2003 construction)

If you have any questions, please contact Joseph Kaakua at 527-6123.

Very truly yours,

for CLIFFORD S. JAMILE
Manager and Chief Engineer

Belt Collins

August 15, 2002
2000-80-0504 / 02P-195

Mr. Clifford S. Jamile, Manager
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Jamile:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07; 2

Thank you for your letter of May 9, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

We acknowledge the construction schedules for your 2003 projects and will coordinate our project schedule with yours. Plans of the drainage improvements will be submitted to your office for review.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

Belt Collins Hawaii Ltd.
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Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

GEN-6 (EIS)

June 7, 2002

Mr. Glen T. Koyama
Belt Collins Hawaii, Ltd.
680 Ala Moana Boulevard - First Floor
Honolulu, HI 96813

Dear Mr. Koyama:

Re: **Farrington Highway Drainage Improvements**

Thank you for the opportunity to comment on the February 2002 Draft EA for the Farrington Highway Drainage Improvements at Nanakuli. We have reviewed the subject document and have the following comments:

1. Please note that HECO facilities are located within the vicinity of the proposed drainage improvement area.

2. We would appreciate the earliest opportunity to review the preliminary construction plans to determine whether the project will impact our facilities, and any work requiring their temporary or permanent relocation should be coordinated among the Department of Transportation, its consultant and HECO.

3. A Utility Agreement with the Department of Transportation will be necessary to go forward with the project.

Our point of contact for this project is Francis Hirakami (543-7536), principal engineer. I suggest your staff and consultant deal directly with Francis to coordinate HECO's continuing input in this project.

Sincerely,

Kirk S. Tomita
Senior Environmental Scientist

cc: OEQC
Duane Taniguchi (DOT/Hwys Div)

Belt Collins

August 15, 2002
2000-80-0504 / 02P-194

Mr. Kirk S. Tomita
Senior Environmental Scientist
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Tomita:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of June 7, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

The DOT is aware of HECO facilities in the area and will coordinate, at the earliest possible date, review of its preliminary construction plans with your company. We acknowledge that a Utility Agreement between HECO and DOT will be needed for the project to move forward.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

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Oceanic CABLE

200 Akamainui Street • Mililani, Hawaii 96789-3999 • Telephone: (808) 625-2100

May 2, 2002

Belt Collins Hawaii Ltd
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Attn: Mr. Glen T. Koyama

Subject: Draft Environmental Assessment
Farrington Highway Drainage Improvements at Nanakuli
Waianae, Hawaii, TMK 8-9-01, 8-7-07 (Farrington Highway), & 8-9-07:2

Dear Mr. Koyama,

Thank you for giving Oceanic Cable the opportunity to review the above project. After reviewing the document, Oceanic Cable has the following comments.

As was stated in your document, Oceanic's facilities run aerially on the mauka side of Farrington Highway through both areas of the project. It should be noted, however, that there are two aerial to underground transitions in Area II of the project; one at the entrance to the Garden Groves townhouse complex and the other at the corner of Farrington Highway and Princess Kahanu Avenue. Caution should be exercised when doing any work in those two areas.

If you have any questions or require more information, please call me at 625-8458.

Sincerely,

Darryl Osato

jf

Belt Collins

August 15, 2002
2000-80-0504 / 02P-196

Mr. Darryl Osato
Oceanic Cable
200 Akamainui Street
Mililani, Hawaii 96789-3999

Dear Mr. Osato:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of May 2, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

We acknowledge the presence of the two aerial to underground transitions in Project Area II. Our plans will take into account the location of these cable transitions.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

Honolulu
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Guam
Hong Kong
Malaysia
Philippines
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P.O. Box 3000 Honolulu, Hawaii 96802-3000
Telephone 808.535.5900 Facsimile 808.594.5630 Sales

THE GAS COMPANY
Citizens Energy Services

April 24, 2002

Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, 1st Floor
Honolulu, Hawaii 96813

Attention: Mr. Glen T. Koyama

Gentlemen:

Subject: Draft Environmental Assessment for
Farrington Highway Drainage Improvements at Nanakuli

Please be advised that The Gas Company maintains underground utility gas mains in the project vicinity, which serves commercial and residential customers in the area and is interconnected with the utility network in Waianae. We would appreciate your consideration during the project planning and design process to minimize any potential conflicts with the existing gas facilities in the project area.

Thank you for the opportunity to comment on the Draft Environmental Assessment. Should there be any questions, or if additional information is desired, please call Chris Anderson at 594-5564.

Sincerely,

Charles E. Calvet, P.E.
Manager, Engineering

CEC:lcs
02-166

Belt Collins

August 15, 2002
2000-80-0504 / 02P-197

Mr. Charles E. Calvet, P.E., Manager
Engineering Branch
The Gas Company
515 Kamakee Street
Honolulu, Hawaii 96814

Dear Mr. Calvet:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of April 24, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

We will coordinate with your office the design and installation of our drainage improvements with the presence of your underground utility gas system.

We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

Honolulu
Alaska
Guam
Hong Kong
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May 13, 2002

Mr. Glen T. Koyama
Belt Collins Hawaii LTD.
680 Ala Moana Boulevards
Honolulu, Hawaii 96813

Subject: Draft Environmental Assessment
Farrington Highway Drainage Improvements at Nanakuli
Waianae, Hawaii TMK 9-9-01, 8-9-07 (Farrington Highway), & 8-9-07:2

Attention: Mr. Koyama

This is in response to the Draft Environmental Assessment relating to the drainage outlet located in the overflow drainage along side of ST Rita's Catholic Church.

Please be in form that there are revisions to St. Rita's New Parking Lot. These revisions will have a direct affect to your design as shown in the draft.

St. Rita's will not construct a large retaining wall as shown on the draft instead will create a 2-1 slope that will be landscaped. This revision will cause your drainage outlet to be extended further out into the drainage area. The drain outlet extending into the existing drainage area will create a back flow or restriction of water from the valley area.

What is the anticipated gpm out of the drainpipe? Based on the 100-year flood what affects will the existing ditch walls have?

What erosion control measures are being made to prevent further pollution into the ocean?

What effects will the drain outlet have on the parking lot slope easement? Will erosion take place now that there will be addition thousands of gallons of water being dumped into the ditch.

Recommend you investigate moving the drain outlet about 100' +/- to the other side of the road that goes to Nanakuli Ranch. Also recommend that the outlet be design to prevent bank erosion and follow the flow path of the ditch.

Should you have any questions please feel free to call me at 527-6313.

Thank You,

Patrick B. Gomes, Project Manager
St. Rita's Catholic Church

CC:
Duane Taniguchi, DOT-HWY
Jeffery Goeggel, Hawaii Engineering Group, Inc
Alapaki Kim, Pastor, St. Rita's Catholic Church.

BeltCollins

August 15, 2002
2000-80-0504 / 02P-198

Mr. Patrick B. Gomes, Project Manager
St. Rita's Catholic Church
89-025 Laumania Avenue
Waianae, Hawaii 96792

Dear Mr. Gomes:

Environmental Assessment
Proposed Farrington Highway Drainage Improvements
Nanakuli, Oahu, Hawaii TMK 8-9-01, 8-7-07 and 8-9-07: 2

Thank you for your letter of May 13, 2002 regarding the Draft Environmental Assessment (DEA) for the proposed drainage improvements along Farrington Highway in Nanakuli, Oahu, Hawaii.

In the past, we have coordinated our drainage system design with your church. We anticipate that final coordination of DOT's construction plans with St. Rita's will be conducted once your new parking area is constructed and finished grade is completed.

We want to assure that the final location and alignment of DOT's proposed drainage system will minimizes the excavation and restoration of your parking area's pavements, curbs, and landscape features. The outlet will be constructed outside of your parking area at the invert of the parking area embankment or wall in the existing drainage channel.

The anticipated peak flow rate from our drainage outlet for a 50-year storm is 6 cubic feet per second. Based on a 100-year flood, the outlet walls will have minimal effect. They will be designed at an angle to the drainageway, so the effect on the floodwater would be insignificant.

Best management practices involving erosion and sedimentation control measures, such as temporary berms or sedimentation basins, will be employed. Application of such measures, however, may be minimal considering the size of the project, short construction period, distant location of project site from Nanakuli Stream, and relatively dry condition of the area.

After reviewing alternative locations for the outlet, the present site was determined to be the most feasible. One of DOT's original plans proposed the construction of the drainage outlet away from your church's parking area, but as-built plans showed that existing 24-inch and 8-inch water lines along the highway would be in direct conflict with DOT's proposed drainage system. That alternative plan was no longer considered.

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We appreciate your comments on the project.

Sincerely yours,

BELT COLLINS HAWAII LTD.

Glen T. Koyama

GTK:lf

cc: Duane Taniguchi, DOT-Highways Division

15 REFERENCES

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AECOS Inc. 2000. *Biological Resources Survey for the Leeward Bikeway Environmental Assessment.*

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Appendix A

Geotechnical Engineering Exploration, Farrington Highway Drainage Improvements, Ewa and Waianae, Oahu, Hawaii

Geolabs, Inc.

November 2001

GEOTECHNICAL ENGINEERING EXPLORATION
FARRINGTON HIGHWAY DRAINAGE IMPROVEMENTS
NANAKULI RANCH TO GTE BUILDING (PHASE I)
ULEHAWA STREAM TO ULEHAWA BEACH PARK (PHASE III)
PROJECT NO. 93A-08-98
EWA AND WAIANAE, OAHU, HAWAII

W.O. 4764-00(Rev.) NOVEMBER 19, 2001

Prepared for

BELT COLLINS HAWAII

and

STATE OF HAWAII
DEPARTMENT OF TRANSPORATION
HIGHWAYS DIVISION

GEOLABS, INC.
Geotechnical Engineering and Drilling Services
2006 Kalihi Street • Honolulu, HI 96819

Hawaii • California

GEOTECHNICAL ENGINEERING EXPLORATION
FARRINGTON HIGHWAY DRAININAGE IMPROVEMENTS
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ULEHAWA STREAM TO ULEHAWA BEACH PARK (PHASE III)
PROJECT NO. 93A-08-98
EWA AND WAIANAE, OAHU, HAWAII
W.O. 4764-00(Rev.) NOVEMBER 19, 2001

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Our field exploration generally encountered fill materials consisting of medium dense to dense gravel and sands and stiff to very stiff silty clays extending to depths of about 2 to 4 feet below the existing ground surface. The fill materials were underlain by beach deposits consisting of medium dense to dense sands and gravel, coralline detritus consisting of loose to medium dense silty and clayey gravel, coral formation consisting of soft to medium hard coral and cemented sands extending to the maximum depths explored of about 20.1 to 32 feet below the existing ground surface. Groundwater was encountered at depths ranging from about 6.3 to 11.5 feet below the existing ground surface.

Field permeability tests were conducted to evaluate the infiltration characteristics of the subsurface materials. Based on the results of our field permeability tests, the subsurface materials encountered at the site possess moderate permeability characteristics. Based on our analyses, we believe that a disposal capacity of up to 115 gallons per minute may be used for the design of a drywell with a diameter of 42 inches and a depth of about 30 feet below the existing ground surface. The drywells should consist of 24-inch diameter (PVC) perforated casings consisting of slotted screens with 0.125-inch slots. A minimum 9-inch thick filter material should be placed around the PVC casing to reduce the amount of significant intrusion of the fine-grained material from the soil formation into the filter material. Considering the potential for variable disposal capacities of the drywells due to the variable subsurface conditions across the project site, we recommend testing of the drywells be performed during construction to confirm the design disposal capacities.

It should be noted that potentially difficult drilling conditions may be encountered during excavation of the borehole for the drywells, due to the medium hard coral and cemented sands encountered in our borings. Therefore, special drilling tools for coring into the medium hard coral and cemented sands may be required to reach the desired bottom elevation of the drywell. In addition, we anticipate some caving-in of the sandy materials may occur during the drilling operations and will likely require the use of temporary casing.

The text of this report should be referred to for detailed discussion and specific recommendations for the design of this project.

END OF SUMMARY OF FINDINGS AND RECOMMENDATIONS

SECTION 1.0 - GENERAL

1.1 Introduction

This report presents the results of our geotechnical engineering exploration performed for the Farrington Highway Drainage Improvements Project from Nanakuli Ranch to GTE Building (Phase I) and Ulehawa Stream to Ulehawa Beach Park (Phase III) located in the Districts of Ewa and Waianae on the Island of Oahu, Hawaii. The general location and vicinity of the project site are shown on the Project Location Map, Plate 1.

This report summarizes the findings from our field exploration and laboratory testing and presents our geotechnical recommendations derived from our analyses for the project. These recommendations are intended for design input only. The findings and recommendations presented herein are subject to the limitations noted at the end of this report.

1.2 Project Considerations

The Farrington Highway Drainage Improvements Project from Nanakuli Ranch to GTE Building (Phase I) and Ulehawa Stream to Ulehawa Beach Park (Phase III) are located in the Districts of Ewa and Waianae on the Island of Oahu, Hawaii. We understand that Phases I and III of the project will include drainage improvements on both sides (mauka and makai sides) of Farrington Highway. Based on the available information, 13 grated drop inlet structures with drywells are planned for the Phase I project. The drywells will be generally located on the mauka side of the highway. Overflow pipes will be used to connect to each drywell where it will lead to an outlet structure. In addition, we understand that a gutter and concrete ditch are planned on the makai side of the highway as part of the Phase I project.

We understand that 10 grated drop inlet structures with drywells are planned for the Phase III project. The drywells for the Phase III project will be located on both the mauka and makai sides of the highway. Based on the current plans, we understand that four drywells will be constructed on the mauka side of the highway and six drywells will be constructed on the makai side of the highway.

Based on the available information, we believe that minimal site grading will be required to achieve the finished grades for the project. It should be noted that large quantities of new pavements will not be required for this project; therefore, pavement designs were not included in our scope of work.

1.3 Purpose and Scope

The purpose of our exploration was to obtain an overview of the surface and subsurface conditions at the project site. The subsurface information obtained was used to develop a soil/rock data set for the formulation of geotechnical recommendations pertaining to the proposed drainage improvements project. In order to accomplish this, we conducted an exploration program consisting of the following tasks and efforts:

1. Research and review of available in-house soils and geologic information pertaining to the project site and its vicinity.

2. Procurement of a permit for excavation in the public right-of-way and clearance from underground utilities. In addition, traffic control safety measures were implemented during the course of our field exploration.

3. Mobilization and demobilization of truck-mounted drill rigs and operators to the project site and back. .

4. Drilling and sampling of four borings extending to depths of about 20.1 to 21.5 feet below the existing ground surface for the Phase I project and four borings extending to depths of about 30.5 to 32 feet below the existing ground surface for the Phase III project. In addition, two additional borings were drilled to depths of about 30.5 and 31.5 feet below the existing ground surface for the Phase III project to confirm the subsurface conditions encountered and the field permeability tests conducted in our initial exploration.

5. Performance of eight field permeability tests at various depths for the Phase III project. Six additional field permeability tests were performed in the two additional borings drilled for the Phase III project.

6. Coordination of the field exploration and logging of the borings by a field engineer/geologist from our firm.

7. Laboratory testing of selected soil samples obtained during the field exploration as an aid in classifying the materials encountered and evaluating their engineering properties.

8. Analyses of the field and laboratory data for the formulation of geotechnical engineering recommendations pertaining to the design of the proposed drainage improvements project.

9. Preparation of this report summarizing our work on the project and presenting our findings and recommendations.

10. Coordination of our overall work on the project by an engineer from our firm.

11. Quality assurance of our work and client/design team consultation by a principal engineer from our firm.

12. Miscellaneous work efforts such as drafting, word processing, and clerical support.

Detailed descriptions of our field exploration and the Logs of Borings are presented in Appendix A of this report. Results of the laboratory tests performed on selected soil samples are presented in Appendix B.

END OF GENERAL

SECTION 2.0 – SITE CHARACTERIZATION

2.1 Regional Geology

The Island of Oahu, encompassing approximately 604 square miles of land area, may be divided into four basic geographic provinces. The provinces include the Wai'anae Mountains, Ko'olau Mountains, Leilehua Plateau, and Coastal Plains. The Island of Oahu was formed by the merging of basaltic lavas erupted from the two prominent volcanoes, the Wai'anae and Ko'olau Volcanoes. Of the two, the Wai'anae Volcano is the older having breached the ocean surface nearly 4 million years ago. The Ko'olau Volcano rose above the sea level approximately 2.7 million years ago making it the younger of the two volcanoes.

In general, the two volcanoes were built by the long-term eruption of thinly bedded a'a and pahoehoe lava flows, which erupted from elongated and linear trending volcanic vents associated with the prominent rift zones of each of the volcanoes. The Ko'olau lavas banked against the lava flows of the Wai'anae Volcano to form the Leilehua Plateau of the central interior portion of Oahu. The Wai'anae Mountains, which form the western third of the Island of Oahu, contain the oldest basalt rock formations on the Island of Oahu. The Ko'olau Mountains form the eastern two-thirds of the island and include the rock layers exposed along the Ko'olau Pali extending from Waimanalo to Kahuku.

During the final stages of eruption and continuing well after the cessation of the Wai'anae and Ko'olau Volcano eruptions, the island mass began to subside thousands of feet under the tremendous weight of the rock. In addition to the subsidence of the island, the force of stream erosion worked in conjunction with the large-scale fracture and slumping of portions of the landmass to form the topography of today. Between 850,000 and 70,000 years ago, volcanic activity returned to the Island of Oahu with the eruption of ash, cinder, and basaltic lavas from vents located throughout the eastern and southeastern portions of the island. These most recent eruptions are collectively known as the Honolulu Volcanic Series. Subsequently, erosion by streams and ocean waves have continued to work on the exposed land surfaces to form the topography of the present day.

The Island of Oahu is no longer sinking beneath the sea; however, the effects of the early whole-island subsidence combined with the added effect of major Pleistocene Age sea level fluctuations worked to create drowned river valley systems with the development of coral reefs. The coral reefs and lithified sand dunes may be observed exposed subaerially on Oahu and buried in submarine deposits well offshore of the island. The coral reefs and sand dune deposits were formed in shallow offshore seas and coastlines during periods of higher and lower sea levels associated with the effects of the advance and retreat of glaciers, which controlled the volume of water contained in the seas. Today, some of the shallow sea coralline deposits are visible on the flanks of mountains or buried beneath terrestrial sediments, evidence of the higher and lower stands of the sea in prehistoric time.

2.2 Site Description

The Farrington Highway Drainage Improvements (Phase I and Phase III) project is located in the Districts of Ewa and Waianae on the Island of Oahu, Hawaii. The approximate location of the project sites is shown on the General Site Plan, Plate 2. Phase I of the project begins near the vicinity of Nanakuli Ranch and ends near the vicinity of the GTE Building. Phase III of the project begins near the vicinity of Ulehawa Stream and ends near the vicinity of Ulehawa Beach Park. An enlarged view of each of the two project sites is shown on the Site Plans, Plates 3.1 through 3.6.

Farrington Highway, along Phases I and III of the project, is a two-lane undivided highway with asphaltic concrete pavements. The ground surface at the Phase I project is relatively level ranging from about Elevation +12 to +16 feet Mean Sea Level (MSL). The ground surface at the Phase III project is also relatively level ranging from about Elevation +7 to +12 feet MSL.

2.3 Subsurface Conditions

The subsurface conditions at the Phase III portion of the project site were explored by drilling and sampling four borings, designated as Boring Nos. 1 through 4 extending to depths of about 30.5 to 32 feet below the existing ground surface. In addition, two additional borings (designated as Boring Nos. 1A and 3A) were drilled extending to depths

of about 30.5 to 31.5 feet below the existing ground surface to confirm the subsurface conditions and permeability test data obtained from the initial borings. The subsurface conditions at the Phase I portion of the project were explored by drilling and sampling four borings, designated as Boring Nos. 5 through 8, extending to depths of about 20.1 to 21.5 feet below the existing ground surface. The approximate locations of the borings drilled are shown on the Site Plans, Plate 3.1 through 3.6.

Our field exploration at the Phase III portion of the project generally encountered fill materials consisting of medium dense to dense gravel and sands with varying amounts of silt and stiff to very stiff silty clays extending to depths of about 2.5 to 4 feet below the existing ground surface. The fill materials were underlain by beach deposits consisting of dense sands and gravel, coralline detritus consisting of medium dense clayey coralline gravel, and coral formation consisting of severely to closely fractured, soft to medium hard coral and medium hard cemented sands extending to the maximum depths explored of about 30.5 to 32 feet below the existing ground surface.

Our field exploration at the Phase I portion of the project generally encountered 5 to 11 inches of asphaltic concrete underlain by fill materials consisting of very dense silty gravel and sand and dense clayey gravel extending to depths of about 2 to 3.5 feet below the existing ground surface. The fill materials were underlain by beach deposits consisting of medium dense to dense coralline sands, coralline detritus consisting of loose to medium dense silty gravel, and coral formation consisting of soft to medium hard coral extending to the maximum depths explored of about 21.5 feet below the existing ground surface. It should be noted that clay seams were encountered and observed within the coral formation encountered during our field exploration.

Groundwater was encountered in the borings drilled at depths ranging from about 6.3 to 11.5 feet below the existing ground surface at the time of our field exploration. The groundwater levels encountered generally correspond to about Elevations +0.2 to +2.3 feet MSL. However, groundwater levels can fluctuate depending on factors such as seasonal rainfall, storm surge conditions, and other factors. Detailed descriptions of the materials encountered during our field exploration are presented on the Logs of Borings,

Plates A-1 through A-10 of Appendix A. Results of the laboratory tests performed on selected soil samples are presented in Appendix B.

END OF SITE CHARACTERIZATION

SECTION 3.0 - DISCUSSION AND RECOMMENDATIONS

As indicated previously, our field exploration generally encountered fill materials consisting of medium dense to dense gravel and sand and stiff to very stiff silty clays extending to depths of about 2 to 4 feet below the existing ground surface. The fill materials were underlain by beach deposits consisting of medium dense to dense sands and gravel, coralline detritus consisting of loose to medium dense silty and clayey gravel, coral formation consisting of soft to medium hard coral and cemented sands extending to the maximum depths explored of about 20.1 to 32 feet below the existing ground surface. Groundwater was encountered in the borings at depths ranging from about 6.3 to 11.5 feet below the existing ground surface.

Field permeability tests were conducted to evaluate the infiltration characteristics of the subsurface materials encountered at the project sites. Based on the results of our field permeability tests, the subsurface materials encountered at the site possess moderate permeability characteristics. Based on our analyses, we believe that a disposal capacity of up to 115 gallons per minute may be used for the design of a drywell with a diameter of 42 inches and a depth of about 30 feet below the existing ground surface. The drywells should consist of 24-inch diameter PVC casings with slotted screens of 0.125-inch slots. A minimum 9-inch thick layer of filter material should be placed around the screened PVC casing to reduce the potential for significant intrusion of the fine-grained material from the soil formation into the filter material. Considering the potential for variable disposal capacities of the drywells due to the variable subsurface conditions across the project site, we recommend that the drywells be tested to confirm their capacities during construction.

It should be noted that the filter material should be designed to avoid inhibiting the flow of surface water runoff from infiltrating the soil formation at the site and to reduce the potential for significant intrusion of fine-grained material from the soil formation into the filter material.

It should be noted that potentially difficult drilling conditions may be encountered during excavation of the borehole for the drywell due to the presence of the medium hard

coral and cemented sands. Special drilling tools for coring into the medium hard coral and cemented sands may be required to reach the desired bottom elevation of the drywell. In addition, unconsolidated sand deposits were encountered in our borings. We anticipate some caving-in of the unconsolidated sand materials may occur during the drilling operations. Therefore, temporary casing of the borehole may be required to reduce the potential for caving in of the unconsolidated sand materials. Detailed discussion of these items and our geotechnical engineering recommendations for design are presented in the following sections of this report.

3.1 Storm Water Runoff Disposal Systems

As mentioned previously, grated drop inlet structures with drywells are planned for Phases I and III of the project. We understand that 13 drywells are planned for the Phase I project. The 13 drywells will be connected using overflow pipes leading to an outlet structure. In addition, we understand that 10 drywells with no overflow pipes are planned for the Phase III project.

3.1.1 Permeability Testing

Field permeability tests were conducted in the four borings drilled for Phase III of the project to evaluate the infiltration characteristics of the subsurface materials. A total of eight field permeability tests (two at each boring location) were performed in the borings. In addition, six field permeability tests (three at each boring location) were performed in the two additional borings (Boring Nos. 1A and 3A) to confirm the test results from the initial field permeability testing. Both falling and constant head permeability tests were performed to determine the hydraulic conductivity of the underlying subsurface materials. The subsurface materials encountered at the project site consisted of sands and gravel with varying amounts of silt and clay, severely to closely fractured coral formation and cemented sands. The locations of the percolation tests conducted are shown on the Site Plans, Plates 3.1 through 3.6. Results of our field permeability tests and the calculated hydraulic conductivity for each test are presented on Plates C-1 through C-14 of Appendix C.

Based on both the falling and constant head field permeability test results, the calculated hydraulic conductivity (k-value) at each test location is summarized in the following table. It should be noted that the calculated hydraulic conductivity (k-value) for each of the test indicated that the subsurface materials generally consist of moderately permeable materials. The moderate hydraulic conductivity values (compared to higher values for similar type granular materials) are likely due to the presence of fines (silts and clays) in the voids of the subsurface materials and the presence of cementation in the coralline materials encountered at the site.

FIELD PERMEABILITY TEST RESULTS

Test Location	Test Depth (feet)	Hydraulic Conductivity k-value (feet/minute)
Boring No. 1	10.5	0.0020
	20.5	0.00038
Boring No. 2	10.5	0.0062
	20.0	0.014
Boring No. 3	10.0	0.0076
	20.5	0.0093
Boring No. 4	15.0	0.0014
	25.5	0.0062
Boring No. 1A	10.2	0.0021
	21.1	0.00074
	31.4	0.0060
Boring No. 3A	10.5	0.035
	20.5	0.0080
	30.5	0.042

3.1.2 Drywell Capacities

Based on our field permeability test results, we recommend that drywells with depths of about 30 feet below the existing ground surface be used as part of the drainage improvements project. Our field test results indicate that the drywells will be constructed in the sandy and gravelly materials with varying amounts of silts and clays, medium hard, cemented sands, and severely to closely fractured coral. Based on the subsurface conditions encountered at the site, we recommend that 24-inch diameter (PVC) casings consisting of perforated screens with 0.125-inch

slots be placed in a borehole with a minimum diameter of 42 inches to accommodate the PVC casing and a minimum 9-inch thick filter material around the PVC casing. A typical section of the recommended drywell detail is provided on Plate 4 for reference.

Based on the calculated hydraulic conductivity, we believe that a disposal capacity of up to 115 gallons per minute may be used for the design of each drywell with a diameter of 42 inches and a depth of about 30 feet below the existing ground surface. It should be emphasized that the hydraulic conductivity of the coral formation and the cemented sands at the site is highly variable due to the presence (or absence) of significant voids, which greatly affect the disposal capacity of the drywell. In general, the greater the number of voids (or inter-connected pore spaces) encountered in a drywell excavation, the higher the overall permeability and disposal capacity of the drywell.

Considering the potential for variable disposal capacities of the drywells due to variable subsurface conditions across the project site, we recommend that the drywells be tested to confirm the design disposal capacities during construction. We also recommend that the drywell installation and testing program should be conducted under the observation of a representative from Geolabs. This would allow our firm to monitor the subsurface conditions, to evaluate the storm water disposal capacity of the drywells, and to allow for additional recommendations to be made. The drywell design recommendations presented herein are contingent upon such observations and additional tests. The owner/client should be aware that substantial variations in subsurface conditions may occur. Therefore, a contingency fund is recommended to accommodate these potential extra costs.

3.1.3 Filter Material

The filter material recommended around the PVC casing should be designed to avoid inhibiting the flow of surface water runoff from infiltrating the soil formation at the site. In addition, the filter material should be designed to reduce the potential for significant intrusion of fine-grained material from the soil formation into the filter

material. Improper design of the filter material around the PVC casing may lead to clogging of the filter material and reducing the disposal capacity of the drywell.

The filter material grain size (15 percent passing) may be determined by multiplying the 15 percent passing grain size of the soils encountered at the drywell location to be filtered by at least 5. This determines the minimum size of the 15 percent passing grain size of the filter material to be used. In addition, multiplying the 85 percent passing grain size of the soils encountered at the drywell location by not more than 5 also determines the maximum size of the 15 percent passing grain size of the filter material to be used. In addition, the coefficient of uniformity (the size of the sieve that passes 60 percent of the sample divided by the size that passes 10 percent) of the filter material should not be greater than 3. The filter material should be free of particles larger than 2 inches and should have no more than 5 percent passing the No. 200 sieve.

Based on these requirements and the sieve analysis test results of the underlying soils encountered at the project site, the following are the requirements for the filter material around the PVC perforated casing.

0.06 inches > D_{15} > 0.01 inches
Coefficient of Uniformity less than 3 (C_u < 3)
Percent Passing No. 200 Sieve < 5
Percent Passing 2-Inch Sieve = 100

3.1.4 Construction Considerations

Based on the generally limited space at the site, we believe that the proposed drywells for the project will need to be installed by drilling methods. In general, the type of drilling operation may alter the hydraulic characteristics of the soil formation at the edges of the borehole and may result in significant reduction of the hydraulic conductivity of the drilled hole. We recommend that polymer-type or mineral slurry drilling fluids (with the exception of water) should not be used for the drilling operations because the drilling fluid may seal the permeable surfaces of the drywell.

Based on our field exploration, the project site is underlain by beach deposits consisting of medium dense to dense sands and gravel, coralline detritus consisting of loose to medium dense silty and clayey gravel, coral formation consisting of soft to medium hard coral and cemented sands extending to the maximum depths explored. In addition, groundwater was encountered at depths ranging from about 6.3 to 11.5 feet below the existing ground surface.

It should be noted that medium hard coral and cemented sands were encountered in our borings. Therefore, special drilling tools for coring into the medium hard coral and cemented sands may be required. Loose to medium dense sands and gravel were also encountered in our borings. Therefore, we anticipate that caving-in of the unconsolidated granular materials are likely during the drilling operations. To reduce the potential for caving-in of the drilled holes, temporary casing of the drilled holes may be required during the excavation of the borehole.

3.2 Grated Drop Inlet Structure

We understand that the grated drop inlet structures will likely consist of precast concrete structures; therefore, we recommend that the structures bear on a minimum 6-inch thick cushion layer consisting of drain rock (AASHTO M 43, Size No. 67). An allowable bearing pressure of 3,000 pounds per square foot (psf) may be utilized for the manhole structures bearing on the drain rock cushion layer. This bearing value is for dead-plus-live loads and may be increased by one-third (1/3) for transient loads, such as those caused by wind or seismic forces.

It should be noted that some of the grated drop inlet structure excavations might encounter soft and/or loose materials near the bottom of the excavations. In addition, groundwater may also be encountered at these locations. Soft and/or loose materials encountered at the bottom of the structure should be over-excavated and replaced with well-compacted fill materials. In general, backfill below the groundwater level below the grated drop inlet structures may consist of drain rock material (AASHTO M 43, Size No. 67) wrapped in a non-woven filter fabric (Mirafi 180N or equivalent).

3.3 Concrete Ditch

Based on the available information, we understand that a concrete ditch is planned on the makai side of Farrington Highway for the Phase I project. To provide a firm an unyielding base for support of the concrete ditch, we recommend that the concrete ditch subgrade soils be compacted to a minimum of 95 percent relative compaction. In addition, we recommend that a cushion layer consisting of a 6-inch thick layer of aggregate subbase course be provided below the concrete ditch. The aggregate subbase course should be compacted to a minimum of 95 percent relative compaction. In addition, areas adjacent to the concrete ditch should be backfilled tightly against the ditch with relatively impervious soils (on-site soils) to reduce the potential for water ponding on the sides of the concrete ditch.

3.4 Site Preparation

In general, the area within the contract grading limits should be thoroughly cleared at the on-set of earthwork. Unsuitable materials within the grading limits should be removed and disposed of properly off-site. Soft and yielding areas encountered during clearing should be over-excavated to expose firm or dense material, and the resulting excavation should be backfilled with well-compacted fill. The excavated soft and/or organic soils should be properly disposed of off-site. Contract documents should include additive and deductive unit prices for over-excavation and compacted fill placement to account for variation in the over-excavation quantities.

Existing underground utilities to be abandoned should be removed, and the resulting excavation should be properly backfilled with on-site fill materials. The on-site fill materials should be moisture-conditioned to above the optimum moisture content, placed in 6 to 8-inch loose lifts, and compacted to a minimum of 90 percent relative compaction. Utilities to be abandoned in-place may be backfilled by pumping lean concrete under low pressure.

The soils encountered at fill areas and finished subgrade areas should be scarified to a minimum depth of about 8 inches, moisture-conditioned to above the optimum content, and compacted to a minimum of 90 percent relative compaction. The relative

compaction should be increased to at least 95 percent relative compaction in areas subjected to vehicular traffic. Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same soil established in accordance with AASHTO T-180 test procedures. Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density.

Fill and backfill materials may consist of the excavated on-site soils provided that deleterious materials and particles greater than 3 inches in maximum dimension are removed. Aggregate base course and aggregate subbase materials should meet the material requirements for Base Course and Subbase Course as specified in the Hawaii Standard Specifications for Road, Bridge, and Public Works Construction (1994). Imported fill material should be tested for conformance with these recommendations prior to delivery to the project site for the intended use.

Fill and backfill materials should be moisture-conditioned to above the optimum moisture content, placed in level lifts not exceeding 8 inches in loose thickness, and compacted to a minimum of 95 percent relative compaction. Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same soil established in accordance with AASHTO T-180 test procedures. Optimum moisture is the water content (percentage by dry weight) corresponding to the maximum dry density.

3.5 Utility Installation

We envision that new drain lines will be installed as part of the proposed project. Based on the subsurface conditions encountered at the project site, it is likely that soft to medium hard coral formation may be encountered during the trench excavations. In general, the coral formation encountered may be severely to closely fractured. It is anticipated that conventional excavation techniques may be used for the proposed excavations. However, excavation in the coral formation may encounter localized hard areas; therefore, the use of hoerams or chipping may be required in these areas. In addition, it should be noted that existing abandoned underground utilities and other below grade concrete structures may exist at the site and would require heavy equipment for

excavation. In general, the method and equipment to be used for excavation should be determined by the contractor, subject to practical limits and safety considerations.

In general, granular bedding consisting of 6 inches of No. 3B Fine gravel (AASHTO M 43, Size No. 67) is recommended under the pipes for uniform support. Free-draining granular materials, such as No. 3B Fine gravel (AASHTO M 43, Size No. 67), should also be used for the initial trench backfill up to about 12 inches above the pipes to provide adequate support around the pipes. It is critical to use this free-draining material to reduce the potential for formation of voids below the haunches of pipes and to provide adequate support for the sides of the pipes. Improper trench backfill could result in settlement of the backfill and damage to the pipes.

The upper portion of the trench backfill from the level 12 inches above the pipes to the top of the subgrade or finished grade may consist of the excavated on-site soils with a maximum particle size of 6 inches. The backfill materials should be moisture-conditioned to above the optimum moisture content, placed in about 8-inch loose lifts, and mechanically compacted to a minimum of 90 percent relative compaction to reduce the potential for appreciable future ground subsidence. Where trenches are located below pavement areas, the upper 3 feet of the trench backfill below the pavement grade should be compacted to a minimum of 95 percent relative compaction.

3.6 Design Review

Preliminary and final drawings and specifications for the proposed construction should be forwarded to Geolabs for review and written comments prior to advertisement for bids. This review is necessary to evaluate conformance of the plans and specifications with the intent of the geotechnical engineering recommendations provided herein. If this review is not made, Geolabs cannot be responsible for misinterpretation of our recommendations.

3.7 Construction Monitoring

It is recommended that Geolabs be retained to provide geotechnical services during construction of the proposed project. The items of construction monitoring that are critical requiring "Special Inspection" include the following:

- Observation of the drywell construction and testing
- Observation of foundation excavations and construction

Other aspects of earthwork construction should also be observed by a representative from Geolabs. This is to observe compliance with the intent of the design concepts, specifications, or recommendations and to expedite suggestions for design changes that may be required in the event that subsurface conditions differ from those anticipated at the time this report was prepared. The recommendations provided in this report are contingent upon such observations.

If the actual exposed subsurface conditions encountered during construction are different from those assumed or considered in this report, then appropriate modifications to the design should be made.

END OF DISCUSSION AND RECOMMENDATIONS

SECTION 4.0 - LIMITATIONS

The analyses and recommendations submitted in this report are based, in part, upon information obtained from field borings. Variations of subsurface conditions between and beyond the borings may occur, and the nature and extent of these variations may not become evident until construction is underway. If variations then appear evident, it will be necessary to re-evaluate the recommendations provided in this report.

The locations of the field borings indicated in this report are approximate, having been taped from features shown on the site plan provided by the State of Hawaii – Department of Transportation, Highways Division. Elevations of the borings were estimated based on interpolation between the spot elevations shown on the same plan. The physical locations and elevations of the borings should be considered accurate only to the degree implied by the methods used.

The stratification lines shown on the graphic representations of the borings depict the approximate boundaries between soil/rock types and, as such, may denote a gradual transition. Water level data from the borings were measured at the times shown on the graphic representations and/or presented in the text of this report. These data have been reviewed and interpretations made in the formulation of this report. It should be noted that groundwater levels can fluctuate depending on factors such as seasonal rainfall, storm surge conditions, and other factors.

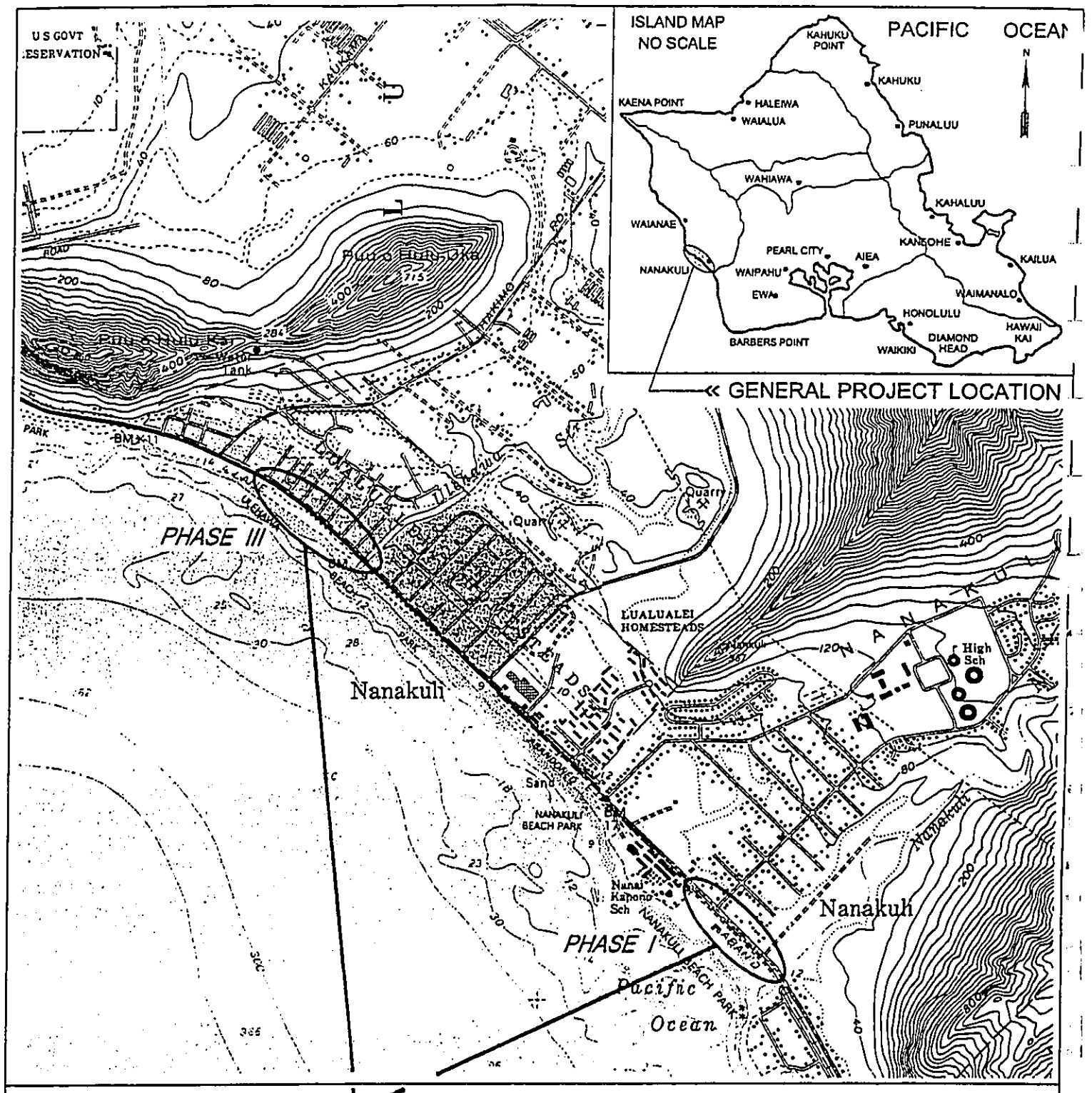
This report has been prepared for the exclusive use of Belt Collins Hawaii and the State of Hawaii – Department of Transportation, Highways Division for specific application to the Farrington Highway Drainage Project from Nanakuli Ranch to GTE Building (Phase I) and from Ulehawa Stream to Ulehawa Beach Park (Phase III) planned in the Districts of Ewa and Waianae (as described in this report) in accordance with generally accepted geotechnical engineering principles and practices. No warranty is expressed or implied.

This report has been prepared solely for the purpose of assisting the architect and engineer in the design of the proposed project. Therefore, this report may not contain

sufficient data, or the proper information, to serve as the basis for preparation of construction cost estimates. A contractor wishing to bid on this project is urged to retain a competent geotechnical engineer to assist in the interpretation of this report and/or in the performance of additional site-specific exploration for bid estimating purposes.

The owner/client should be aware that unanticipated soil/rock conditions are commonly encountered. Unforeseen soil conditions, such as perched groundwater, soft deposits, hard layers, or cavities, may occur in localized areas and may require additional probing or corrections in the field (which may result in construction delays) to attain a properly constructed project. Therefore, a sufficient contingency fund is recommended to accommodate these possible extra costs.

END OF LIMITATIONS



PROJECT LOCATION MAP

FARRINGTON HIGHWAY DRAINAGE IMPROVEMENTS
NANAKULI RANCH TO GTE BUILDING (PHASE I)
ULEHAWA STREAM TO ULEHAWA BEACH PARK (PHASE III)
PROJECT NO. 93A-08-98
EWA AND WAIANAE, OAHU, HAWAII

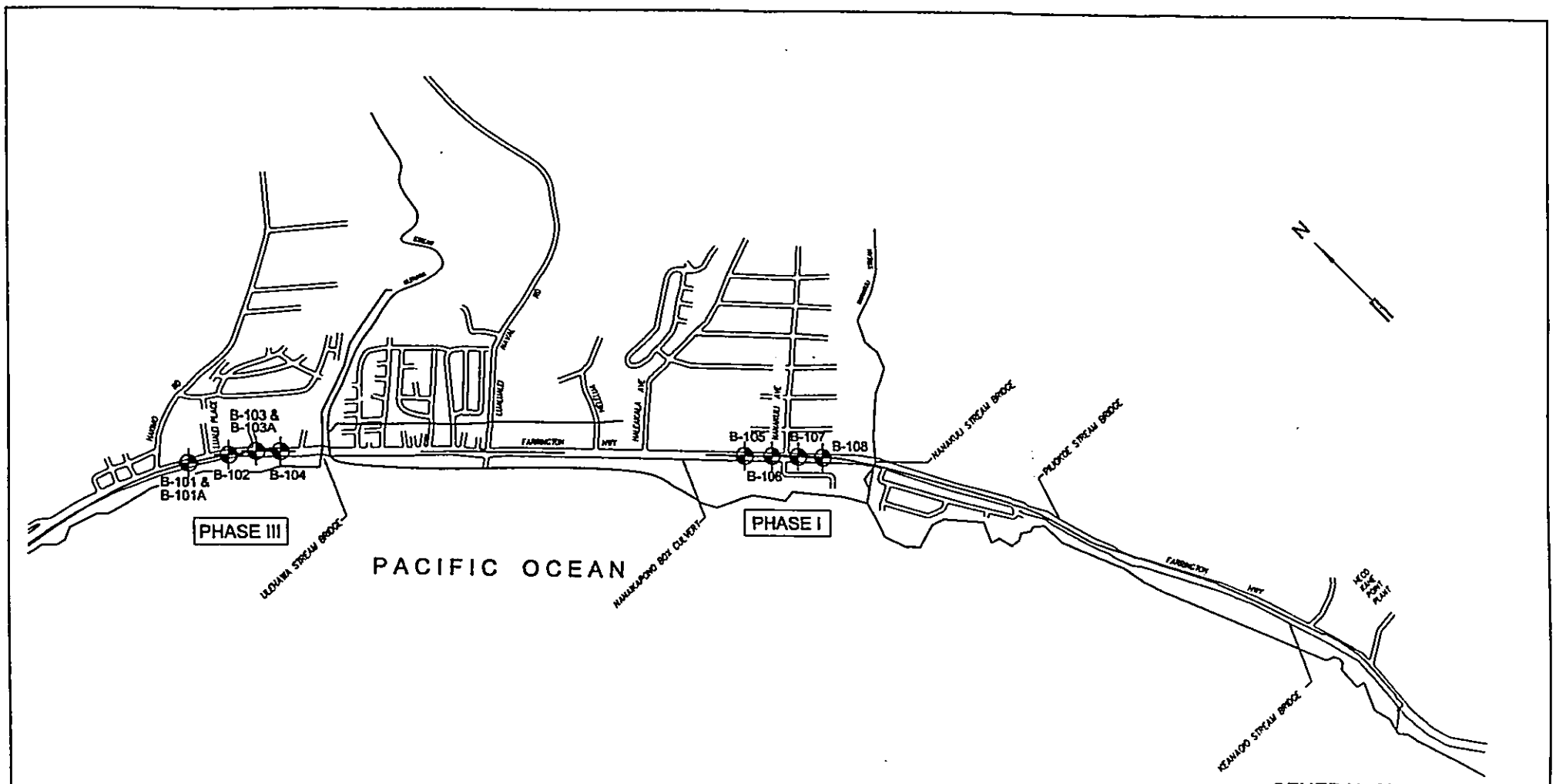
2000 1000 0 2000
GRAPHIC SCALE

N

REFERENCE: U.S.G.S. QUADRANGLE MAPS; WAIANAE & SCHOFIELD BARRACKS, OAHU, HAWAII (1983).

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
NOVEMBER 2001	KHN	1
SCALE	W.O.	
1" = 2,000'	4764-00	



LEGEND:

APPROXIMATE BORING LOCATION

0 750 1500 3000 4500 FT.

GRAPHIC SCALE

GENERAL SITE PLAN

FARRINGTON HIGHWAY DRAINAGE IMPROVEMENTS
NANAKULI RANCH TO GTE BUILDING (PHASE I)
ULEHAWA STREAM TO ULEHAWA BEACH PARK (PHASE III)
PROJECT NO. 93A-08-98
EWA AND WAIANAE, OAHU, HAWAII

GEOLABS, INC.
Geotechnical Engineering

DATE	DRAWN BY	PLATE
NOVEMBER 2001	LW	2
SCALE: 1" = 1500'	W.O.: 4764-00	

NOTE

Plates 3.1 to 3.6, Plate 4, and Report Appendices are not attached. If you wish to receive copies, please contact Belt Collins Hawaii (Glen Koyama) at 521-5361.

Appendix B

Aquatic Resources Survey for Nanakuli Stream at Farrington Highway, Nanakuli, Oahu

AECOS, Inc.

October 2001

AECOS No. 983

Aquatic resources survey for Nanakuli Stream at Farrington Highway, Nanakuli, O`ahu

AECOS, Inc., 45-939 Kamehameha Highway, Room 104
Kaneohe, Hawai'i 96744

Aquatic resources survey for Nanakuli Stream at Farrington Highway, Nanakulu, O`ahu[1]

October 17, 2001 DRAFT *AECOS* No. 985

AECOS, Inc. 45-939 Kamehameha Highway, Room 104
Kaneohe, Hawai'i 96744
Phone: (808) 234-7770 Fax: (808) 234-7775 Email: guinther@aecos.com

Introduction

Nanakuli Stream (State ID No. 3-5-01) drains Nanakuli Valley, a large valley some 5.88 km (3.6 mi) long and up to 3.12 km (1.9 mi) wide. Although listed as a perennial stream, no part of Nanakuli Stream, which has numerous branches in the back end of the valley, is shown as having continuous flow on the USGS topographic map (Schofield Barracks Quadrangle, 1983). The Wai`anae Coast of the Island of O`ahu (Figure 1) is a leeward coast with respect to moisture-giving Trade Winds and therefore generally quite dry. The Wai`anae mountain, especially the southern aspect, lies in the lee of the Ko`olau mountain, further reducing average rainfall received from Trades-generated (orographic) precipitation. Although parts of the watershed reach an elevation of 900 m (3000 ft), median annual rainfall does not exceed 760 mm (30 in) in the wettest parts of the valley (Taliaferro, 1959). Median rainfall in the lower part of the valley is 500 mm (20 in) or less. The Hawaii Stream Assessment (HAS) database at the State's Aquatic Resources Division (Department of Land and Natural Resources or DLNR) contains no inventory records for Nanakuli Stream (Annette Tagawa, DLNR, pers. comm.), indicating stream segments with perennial flow are either absent or very difficult to access.

The Hawaii Stream Assessment document (Hawaii Cooperative Park Service Unit, 1990) lists Nanakuli Stream as an interrupted perennial stream, which suggests there should be at least one upper reach that is perennial. This reach would likely be well above the developed portion of the valley and certainly far upslope of the project area. However, the "perennial stream" designation in this case could also rest solely on the presence of a body of water at the mouth of the Nanakuli Stream. This feature is a large

[1] Report prepared for Belt Collins for an environmental assessment entitled: "Proposed Farrington Highway Drainage Improvements in Nanakuli, Hawaii." This report will become part of the public record.

muliwai — a pond that forms at the mouth of a stream when the mouth is blocked by a beach deposit (the Hawaiian term also translates as "estuary"). Streams typically reach the ocean shore between headlands, in areas where the shore is a beach deposit. The stream mouth and the configuration of the beach become a dynamic system of sediment deposits responding to forces of flowing stream water, waves breaking on the shore, and nearshore currents. Where stream flow is strong and constant, the beach may be formed into bars that only partially block the stream mouth. However, where stream flow is minimal, as with intermittent streams during the dry season, a beach may form completely across the mouth. This is the case at Nanakuli, where a substantial beach, reflecting abundant sources of sand and strong wave action, completely obscures the stream outlet (Figure 2).

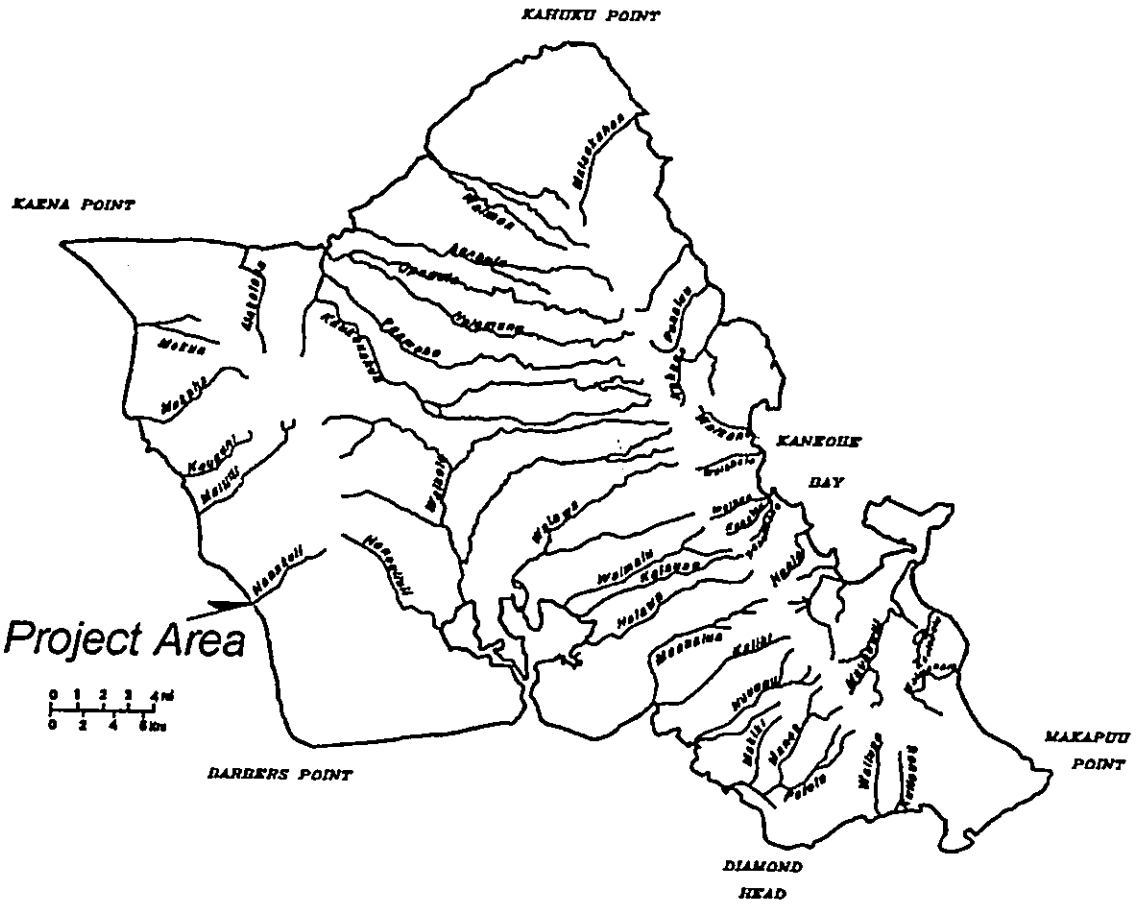


Figure 1. Map of O`ahu perennial streams showing project location on the leeward side of the Island.

This report presents the results of a reconnaissance survey of the muliwai of Nanakuli Stream that included both biological observations and water quality measurements. Although an attempt was made to access parts of the stream midway inside Nanakuli Valley, observations indicated that neither flowing nor standing water would be found.

Conditions for the survey were thus limited by the very dry conditions that had pertained for many months prior to the September 2001 field effort. Observations from an earlier survey (*AECOS*, 2000) during a wetter period suggest that the potential short-coming of extreme dry condition did not compromise conclusions made as part of this report.

Figure 2. The south end of the beach at Nanakuli Beach Park is a substantial sand barrier blocking the mouth of Nanakuli Stream.

Survey Methods

Biology — A survey of the muliwai of Nanakuli Stream was conducted on September 21, 2001, limited to an existing aquatic environment between the beach and property line fence some upstream of Farrington Highway. The area around the old Oahu Railroad & Land Company (OR&L) right-of-way (r-o-w) was surveyed previously by the biologists for an unrelated project (*AECOS*, 2000).

Water Quality — Water quality measurements were made in three locations in the muliwai: one immediately behind the beach berm, one beneath Farrington Highway bridge, and one near the upper (mauka) end of the muliwai. A full suite of basic water quality parameters was measured in order to characterize the aquatic environments present. All measurements represent conditions at a single point in time and may not be representative of average conditions.

The methods pertaining to the water quality analyses are given in Table 1. All water samples (assigned laboratory Log No. 14843) were taken to *AECOS* laboratory in Kailua immediately after collection and either preserved or analyzed immediately as required by standard methodology for each analysis. Salinity (by refractometer), temperature, pH, and dissolved oxygen were measured with instruments or probes *in situ*.

Table 1. Analytical methods and instruments used for the April 20, 2001 sampling in Hospital and Ki`i Ditches, Kahuku.

Analyses List	Method	Reference	Instrument
Ammonia	alkaline phenol	Koroleff in Grasshoff et al. (1986)	Technicon AutoAnalyzer II
Chlorophyll α	Method 10200H	Standard Methods, 18th Edition (1992)	Turner Model 112 fluorometer
Dissolved Oxygen	EPA 360.1	EPA (1979)	YSI Model 550 DO meter
Nitrate + Nitrite	EPA 353.2	EPA (1993)	Technicon AutoAnalyzer II
pH	EPA 150.1	EPA (1979)	pHep 3
Salinity (field)	refractive index	---	handheld, temperature compensating refractometer
Temperature	thermister calibrated to NBS cert. Thermometer (EPA 170.1)	EPA (1979)	YSI Model 550 DO meter
Total Nitrogen	persulfate digestion /EPA 353.2	D'Elia et al. (1977) / EPA (1993)	Technicon AutoAnalyzer II
Total Phosphorus	persulfate digestion /EPA 365.1	Koroleff in Grasshoff et al. (1986) / EPA (1993)	Technicon AutoAnalyzer II
Total Suspended Solids (TSS)	Method 2540D (EPA 160.2)	Standard Methods 18th Edition (1992); EPA (1979)	Mettler H31 balance
Turbidity	Method 2130B (EPA 180.1)	Standard Methods 18th Edition (1992); EPA (1993)	Hach 2100P Turbidimeter

D'Elia, C.F., P.A. Stendler, & N. Corwin. 1977. *Limnol. Oceanogr.* 22(4): 760-764.
EPA. 1979. Methods for Chemical Analysis of Water and Wastes. U.S. Environmental Protection Agency, EPA 600/4-79-020.
EPA. 1993. Methods for the Determination of Inorganic Substances in Environmental Samples. EPA 600/R-93/100.
EPA. 1994. Methods for Determination of Metals in Environmental Samples, Supplement 1. EPA/600/R-94/111. May 1994.
Grasshoff, K., M. Ehrhardt, & K. Kremling (eds). 1986. Methods of Seawater Analysis (2nd ed). Verlag Chemie, GmbH, Weinheim.
Standard Methods. 1992. Standard Methods for the Examination of Water and Wastewater. 18th Edition. 1992. (Greenberg, Clesceri, and Eaton, eds.). APHA, AWWA, & WEF. 1100 p.

Stream Description

Nanakuli Stream muliwai — At the project site, Nanakuli Stream is crossed by Farrington Highway, a pedestrian bridge, and an old railroad trestle that was part of the OR&L tracks that ran between Honolulu and Kahuku around Kaena Point. The muliwai in this area appears to be a permanent feature (see Figure 4, upper

photograph), seldom if ever drying up, and occasionally flooding and connecting to the ocean during high rainfall events in Nanakuli Valley.

Directly upstream from the Farrington Highway bridge, the stream alignment runs directly mauka in a northeasterly direction. The muliwai is confined between steep banks some 2 m (6 ft) high and extending perhaps 50 m (160 ft) up the realigned stream, although this distance could vary considerably dependent upon water level. The end of the water did coincide with the inland extent of pickleweed or `akulikuli kai (*Batis maritima*) observed in September 2001. This part of the stream represents a man-made channel. Upstream of the flooded portion (see Figure 4, lower photo), the stream course was dry, with no evidence of any recent stream flows having disturbed the bed (Figure 3). The bottom is flat, dusty, and lacking rounded stones or boulders. There is very little vegetation growing in the dry stream bed. Kiawe (*Prosopis pallida*) and bufflegrass (*Cenchrus ciliaris*) are the dominant vegetation in the riparian zone.

Old TMK maps show Nanakuli Stream on the mauka side of Farrington, flowing southeast parallel with the highway for a distance before turning towards the beach at the highway bridge. In this area now occurs a drainage ditch overgrown with pickleweed.

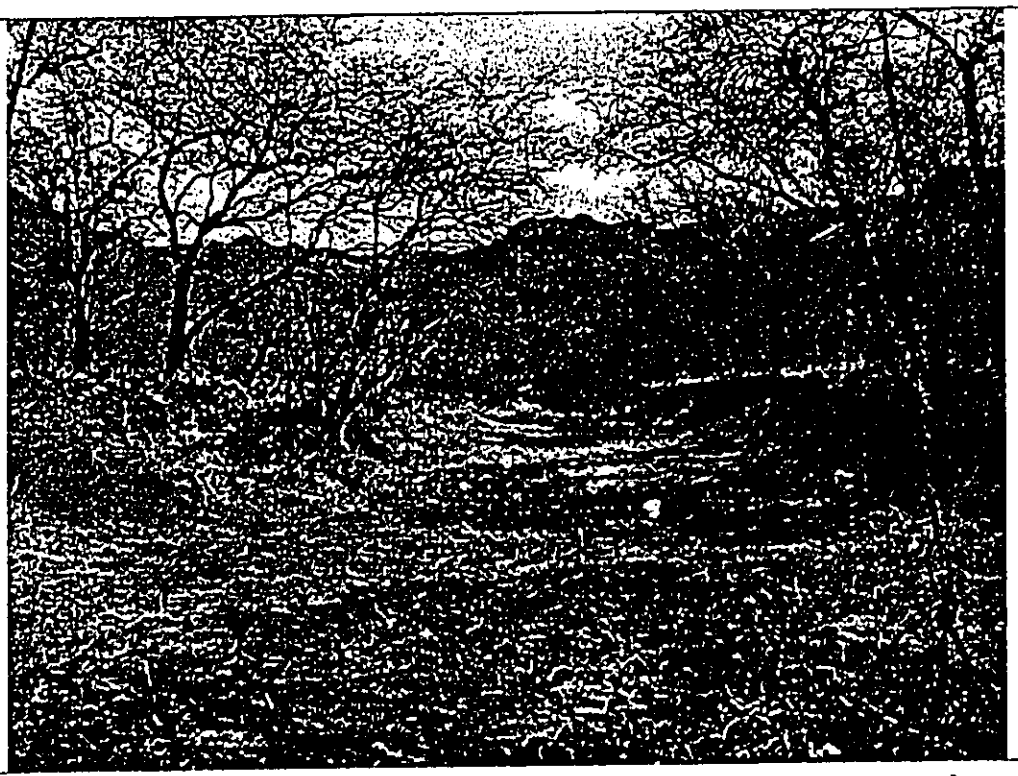


Figure 3. The dry bed of Nanakuli Stream just above the muliwai. Darker soil in the foreground is wetted by the muliwai.

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At one time, the muliwai and associated flood-prone lands were far more extensive in the area. A depression that lies between the pedestrian walkway (parallel to Farrington Highway and the OR&L r-o-w) and Nanakuli Beach west of the muliwai is a remnant of wetlands that once lay behind Nanakuli Beach and were fed by intermittent flooding from Nanakuli Stream and/or high ocean tides. This coastal wetland complex has been partly obliterated on the makai side by sand movement inland and by fill for the transportation infrastructure that crosses Nanakuli Stream.

Water Quality

Samples for describing the general water quality in Nanakuli Stream were made at three locations along the muliwai, which extends inland some 100 m (330 ft) behind the beach as a long, shallow pool. Station 1 was located directly behind the beach at the makai end of the muliwai. Station 2 was located off the right bank between the old railroad bridge and the modern pedestrian bridge. This location was close to where a sample was collected in January 2000 (see AECOS, 2000). Station 3, representing water inland of the Kamehameha Highway bridge, was situated about 8 m (25 ft) short of the mauka end of the muliwai. The water quality results are presented in Table 2.

Table 2. Water quality characteristics of Nanakuli Stream muliwai, sampled February 2000 and September 2001.

	Time	Temp. (°C)	DO (mg/l)	DO Sat. (%)	Sal. (ppt)	pH	Chl α (µg/l)
01-08-00							
Sta. 2	~1300	23.9	5.64	70	8	—	—
09-21-01							
Sta. 1	1110	29.8	7.05	129	59	7.9	10
Sta. 2	1105	27.5	5.32	95	61	7.8	20
Sta. 3	1055	27.0	3.90	70	62	7.8	13

	Turbidity (ntu)	TSS (mg/l)	Ammonia (µg N/l)	Nitrate + nitrite (µg N/l)	Total N (µg N/l)	Total P (µg P/l)
01-08-00						
Sta. 2	22.8	22.9	9	< 1	1260	122
09-21-01						
Sta. 1	31.6	48.2	12	< 1	2050	89
Sta. 2	24.4	36	10	< 1	2030	81
Sta. 3	20.8	34	15	< 1	2060	91

The most significant result of the water quality measurements are the salinity values. The water in the muliwai is very saline: roughly twice as salty as sea water. This circumstance reflects the absence of any significant runoff (or fresh ground water)

entering the system for the many months of a long dry summer. Water confined within the basin has been evaporating, leaving salts behind. Water level may be preserved by seepage through the beach berm from the adjacent ocean, and this seepage contributes more salts to the system. It is interesting to note that the salinity of the muliwai in January 2000 (close to middle of the wet season) was 8 ppt — slightly brackish. Fresh or brackish ground water would seem to be a significant source of water during the wet season, and this input establishes a dominant flow through the beach berm in the seaward direction. In September, a small gradient of increasing salinity is evident in the upstream direction, demonstrating that only minimal input from the ground water is occurring and this is likely sea water seeping through the beach berm, lowering slightly the salinity at the makai end of the muliwai.

Given that the muliwai is a somewhat stagnant body of water, it is not surprising that both temperature and pH values were elevated in comparison with typical stream values. Given the high salinity, however, pH values are not as high as might be expected. Ocean water pH is typically around 8.2 to 8.3. Dissolved oxygen values in the muliwai, on the other hand, varied from one end to the other. Values were relatively high in the more open lower portion of the muliwai between the highway and the beach berm and lowest at the upstream end of the muliwai. Levels of saturation are generally high (DO at Station 1 was supersaturated) because both high temperature and high salinity reduce the ability of water to hold DO. Supersaturation reflects output from phytoplankton during the day; the greenish color of the water indicates that an algal bloom was present.

Turbidity and TSS values obtained on September 21 were also moderately high, although as these samples came from a pond with considerable inert suspended matter and phytoplankton, comparisons with stream values and the State of Hawaii, Department of Health (HDOH, 1992) regulatory limits are of no real value.

The presence of nutrients in the muliwai encourages phytoplankton development in the confined water. This potential eutrophication of the water body can lead to wide swings in DO content — from very high in the daylight, to very low at night — and consequent adverse impacts on aquatic animals. Eventually high nutrient content or the organic material generated by high nutrient subsidies to the aquatic plant communities are swept out of the system, contributing to coastal pollution.

Nitrates were essentially missing from the muliwai, suggesting primary productivity (algal growth) efficiently removed any nitrites or nitrates entering the system. The total N and total P values reflect mostly organic forms of nitrogen and phosphorus either dissolved in the water or in particulate form. Usually the conditions of low nitrate and high organic nitrogen suggest eutrophication and this might be supported by high chlorophyll values. However, on September 21, chlorophyll was not especially elevated. This may be because eutrophic systems can cycle between growth periods

and "crashes" of the primary producers caused by low night-time DO and nutrient limitation. The high salinity also can limit the density and diversity of the phytoplankton. Without a temporal series of water quality measurements, attempting to describe the dynamics of the system is speculative.

The following description of the water quality in the muliwai pertains to the January 2000 measurements and observations (AECOS, 2000):

> The muliwai was sampled on January 8 and the results of water quality testing presented in Table [3]. The water was found to be brackish (8 ppt) with moderately low DO content (70 % saturation). The water was quite turbid, caused by an algal bloom present at the time of sample collection. Dissolved nutrients (such as nitrate and ammonia) were low, while total N and total P were both elevated. This situation occurs when an algal bloom utilizes most of the available inorganic nutrients in the water (the algal cells themselves are included in the total N and total P analyses).

Biological Observations

The high salinity of water in the muliwai of Nanakuli Stream defines it's character at the time of our biological survey. Fortunately, observations were available from a brackish phase (*AECOS*, 2000). On an annual basis, salinity swings widely from wet season to dry season. We use the term poikilohaline for aquatic features that show this pattern of changing from nearly fresh water to hyperhaline (more saline than sea water). Poikilohaline features generally support only a limited number of aquatic species because of the difficulty most species have to adjusting to salinity extremes. Most marine species are stenohaline, that is adapted to a narrow range of salinity, because ocean salinity is fairly constant. Most fresh water and even estuarine species cannot survive at salinities as high as those recorded in the Nanakuli muliwai. As a consequence, the flora and fauna of such areas is notably depauperate (see Table 3), although during a brackish phase, some fresh water species of fishes and insects might well invade the muliwai.

At Nanakuli Stream muliwai, the dominant vegetation is pickleweed (*Batis maritima*), a plant of salt flats that was introduced to the Hawaiian Islands around 1859 (Wagner, Herbst, & Sohmer, 1990). Pickleweed dominates not only the banks of the muliwai, but other low-lying ground adjacent to the muliwai, including a narrow ditch on the mauka side of Farrington Highway and the larger depression extending north from the stream mouth between the beach and the pedestrian walkway/bikeway. This latter area is likely a jurisdictional wetland because it is dominated by *Batis* (an obligate wetland species; USFWS, 1988) and appears to be a remnant of more extensive wetlands that once occupied this area. The bottom of this adjacent basin appears to lie a foot or two above the flooded muliwai basin, but such one-time observations can be misleading. A

restricted hydraulic connection between the muliwai and the ocean is likely given the breadth of the sand deposit fronting Nanakuli Stream. Evaporation has certainly lowered the water level without significant influx from the sea. Indeed, the fact that salinity is nearly twice that of sea water could straight forward indicate a loss of half the water from a previous state of flooding with sea water (although the situation is likely to be much more complex). Several stumps of kiawe trees that have been removed are evident in the pickleweed wetland.

Table 3. Checklist of aquatic biota observed or reported from wetlands and streams along the Leeward Bikeway route.

Species	Common name	Status	QC Code	Ref.
ALGAEAQUATIC PLANTS				
SPERMATOPSIDA, DICOTYLEDONS				
BATIDACEA				
Batis maritima L.	*`akulikuli-kai*, pickleweed	nat.	10	AECOS
INVERTEBRATES				
ARTHROPODA, INSECTA	(insects)			
ODONATA, LIBULELLIDAE				
Pantala flavescens (Fabricius)	globe skimmer, adult	nat.	10	
VERTEBRATES				
VERTEBRATA, PICES	(fishes)			
CICHLIDAE				
?Oreochromis sp.	ukw. tilapia	nat	10	AECOS
POECILIIDAE				
Poecilia mexicana (Steindachner)	Mexican mollie	nat	10	AECOS
VERTEBRATA, AMPHIBIA	(frogs & toads)			
BUFONIDAE				
Bufo marinus (L.)	marine toad, tadpole	nat.	11	AECOS
VERTEBRATA, AVIA	(birds)			
CHARADRIIDAE				
Pluvialis fulva Gmelin	Pacific golden plover	**ind.**	11	AECOS
SCOLOPACIDAE				
Heteroscelus incanus (Gmelin)	wandering tattler	**ind.**	10	AECOS

KEY TO SYMBOLS USED:

Status:

nat. - naturalized. An introduced or exotic species.
ind. - indigenous. A native species also found elsewhere in the Pacific.
end. - endemic - A native species found only in the Hawaiian Islands.

QC Code:

10 -Observed in the field by biologist on September 21, 2001.
11- Observed in the field by biologist on January 6-8, 2000
20 - Collected; identified in the laboratory; specimen(s) not saved.
21 - Collected; identified in the laboratory; voucher specimen(s) saved.

References

AECOS – reported in *AECOS*, 2000 from this location.

The inhabitants of the muliwai are mostly the euryhaline fishes: tilapia (*?Oreochromis* sp.) and Mexican molly (*Poecilia mexicana*). A small fish trap in the muliwai was observed to contain several sickly looking mullet (*Mugil cephalus*). No other fishes or aquatic macroinvertebrates were noted in the water (Table 3). A dragonfly (*Pantala flavescens*) was seen in the vicinity, but the high salinity of the water would make it impossible for this or any other local dragonfly to breed successfully breed in the muliwai. Two wandering tattlers (*Heteroscelus incanus*) were also observed on bars around the muliwai in September 2001 and were observed in January 2000 also (*AECOS*, 2000). The following statement is from that report (*AECOS*, 2000; p. 23):

> The habitat within this section [railroad right-of-way, Waianae Coast] is extremely dry, with no standing water, except small wetlands (*na muliwai*) at the mouths of Keone`o`io Gulch and Nanakuli Stream. A total of 14 avian species, representing 11 families was detected within this section of the r-o-w ..... All but three of the species recorded are alien to the Hawaiian islands. These three species: ruddy turnstone, wandering tattler, and Pacific golden plover are common indigenous migrants.

Conclusions

Water quality measurements reveal a hyperhaline body of water that was previously (AECOS, 2000) shown to be a brackish water muliwai. The poikilohaline nature of this body of water, shifting from slightly brackish in the wet season and very saline in the dry season, clearly limits the diversity of aquatic biota able to inhabit the feature. This would not normally present a problem to native stream animals, which exit as eggs or larvae during flood flows (freshets) and migrate inland during dry periods, as long as suitable habitat exists at higher elevations. This appears not to be the case for Nanakuli Stream. The high salinity of the dry season muliwai is likely to be unsuitable for even those more euryhaline natives (*`opae oeha`a* or *Macrobrachoium grandimanus*, *hapawai* or *Neritinia vespertinus*, and *`o`opu akupa*, or *Eleotris sandwicensis*, for examples). Thus, the habitat that is present would unlikely support a breeding population of any native stream species of macrofauna.

Of the aquatic fauna observed during the field reconnaissance, the only native species was a wetland bird. All other aquatic species observed — both fishes and invertebrates — were alien species widely naturalized throughout the Hawaiian Islands and generally common inhabitants of lowland streams on O`ahu.

Endangered Species — No aquatic species listed as protected, threatened or endangered were observed in the project area (DLNR, 1986; Federal Register, 1999, 2001). A possible exception is the State protected heron (black-crowned night heron; *Nycticorax nycticorax hoactli*) that might visit the project vicinity.

Wetlands — The muliwai and at least the wetland northwest of the muliwai and makai of Farrington Highway would seem to qualify as jurisdictional waters (USACOE, 1987). The clear predominance of a wetland indicator plant species (USFWS, 1988), pickleweed, can be used to define the extent of the wetlands in this area. However, a wetlands delineation was not performed and it is clear that in marginal areas, pickleweed can extend well outside of what could be defined as a wetland under rules established by the U.S. Army Corps of Engineers (USACOE, 1987). Marginal areas dominated by pickleweed are unlikely to satisfy the soil and hydrology requirements. Corps rules require that all three wetland criteria be present for a given location to fit the jurisdictional wetlands definition. While flooding will result in an inundation of the adjacent pickleweed-dominated lowlands, and this area should have hydric soils, other areas marginal to these wetlands, are either seldom, if ever, flooded and would not have hydric soils. Therefore, these areas would be outside a wetlands boundary despite the presence of pickleweed extending in from lower areas. The easiest way to differentiate these areas is to consider that the wetland ends where a bank rises steeply out of the wetland. The ditch parallel to Farrington Highway on the mauka side is now a man-made drainage feature and not the old stream bed that early maps show as being in this area. This ditch would likely not have wetlands status and has no wetlands resource values despite a heavy growth of pickleweed.

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Appendix C

Archaeological Reconnaissance for Farrington Highway Drainage Improvement Project, Nanakuli, Oahu

International Archaeological Research Institute, Inc.

October 2001

Archaeological Reconnaissance for Farrington Highway Drainage Improvement Project, Nānākuli, O'ahu

by
Coral M. Magnuson

INTERNATIONAL ARCHAEOLOGICAL RESEARCH INSTITUTE, INC.
OCTOBER 2001

ARCHAEOLOGICAL RECONNAISSANCE FOR FARRINGTON HIGHWAY DRAINAGE IMPROVEMENT PROJECT, NĀNĀKULI, O'AHU

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I. INTRODUCTION

At the request of Belt Collins Hawaii (BCH), International Archaeological Research Institute, Inc. (IARII) conducted an archaeological assessment for the Farrington Highway Drainage Improvement Project. The purpose of this report is to provide preliminary information on the presence or absence of significant archaeological or historical sites within the designated work area for preparation of an Environmental Assessment.

The drainage improvement work area, in which a series of dry wells will be excavated, is located along Farrington Highway, in two non-continuous areas near Nānākuli (Fig. 1 and 2). These are designated the "north project area" and the "south project area," respectively. Ten dry wells are planned for the north project area, four of which will be excavated in the east side of Farrington Highway, approximately 50 to 80 ft. apart. They will be situated between the pavement and the property line; a width of approximately 17 ft. Six dry wells, approximately 70 to 120 ft. apart, will be excavated on the west side of the highway at the edge of the pavement. Also, 13 dry wells and one catch basin are planned on the east side of the south project area along the edge of the pavement. These dry wells will be connected by pipes, with an outlet in the drainage channel near Nānākuli Stream. No excavation will be conducted on the west side of Farrington Highway. However, in this area a concrete gutter will be installed on the surface along the outside edge of the pavement.

In addition to the construction areas, there will be two construction staging areas, one at Ulehawa Beach Park for the north project area, and one Nānākuli Beach Park for the south Beach Park project area. Each staging area will comprise about 15,000 to 20,000 square ft.

The survey was conducted on 27 July 2001, under the direction of Coral M. Magnuson, M.A., with the assistance of Rona Ikehara-Quebral, M.A. No new traditional Hawaiian materials or historic sites were observed on the property. Two sites were previously recorded. One site, 50-80-07-5763, was revealed during subsurface testing at Ulehawa Beach Park by Cultural Surveys Hawaii (McDermott and Hammatt 2000a). It consists of a subsurface cultural deposit dating to 230±60 BP (before present). It is located between the comfort station and Ulehawa Drainage, ca. 20 to 40 m west of Farrington Highway. This area of Ulehawa Beach Park should not be used for the construction staging area.

The other site, 50-80-12-9714, consists of the Oahu Railway and Land Company (OR&L) railroad line. This site was only observed at the south project area, on the west side of Farrington Highway, near Nānākuli Beach Park. This site may be buried in the sand in the north project area, and thus not visible as a surface feature. Care should be taken to avoid this site. Although no additional archaeological surface features were observed at Nānākuli Beach Park, it is possible that subsurface sites are present; possibly cultural deposits and human remains.

PROJECT AREA DESCRIPTION

The project area is located in two *ahupua'a*: Nānākuli and Lualualei (Figs. 1 and 2), along Farrington Highway, south of Pu'u o Hulu Kai and north of Nānākuli Stream. The elevation of the project area is between 3 and 4 m above sea level, and approximately 50 to 170 m from the Pacific Ocean. The project area is divided into two project parcels: the north project area, which is along Ulehawa Beach Park; and the south project area, along Nānākuli Beach Park. The area immediately adjacent to Farrington Highway has been previously graded during construction of the Highway. In addition, the section of Nānākuli Stream on the east side of Farrington Highway has been previously modified, and the beach berm that separates Farrington Highway from the Pacific Ocean appears to have been modified for erosion control.

The west side of the project area consists of developed beach parks, which have comfort stations, parking, irrigation, showers, and landscaped trees and grass. The sediment at the beach parks consists of beach sand, with some soil brought in for landscaping purposes. Inland of the beach sand is Mamala Stony Silty Clay Loam with occasional coral outcroppings (U.S. Department of Agriculture Soil Conservation Service 1972:plate 36). Pulehu Clay Loam may be found along Nānākuli Stream.

Most of the vegetation in the project area consists of landscaping plants, such as coconut trees, grass, and *naupaka*. *Kiawe* trees also grow in both the park and on the upland side of Farrington Highway. A wetland, dominated by pickle weed (*Batis maritima*) is present at the mouth of Nānākuli Stream (Photo 1).

Photo 1. Thick growth of pickle weed (*Batis maritima*) plants in marshy area near Nānākuli Stream.

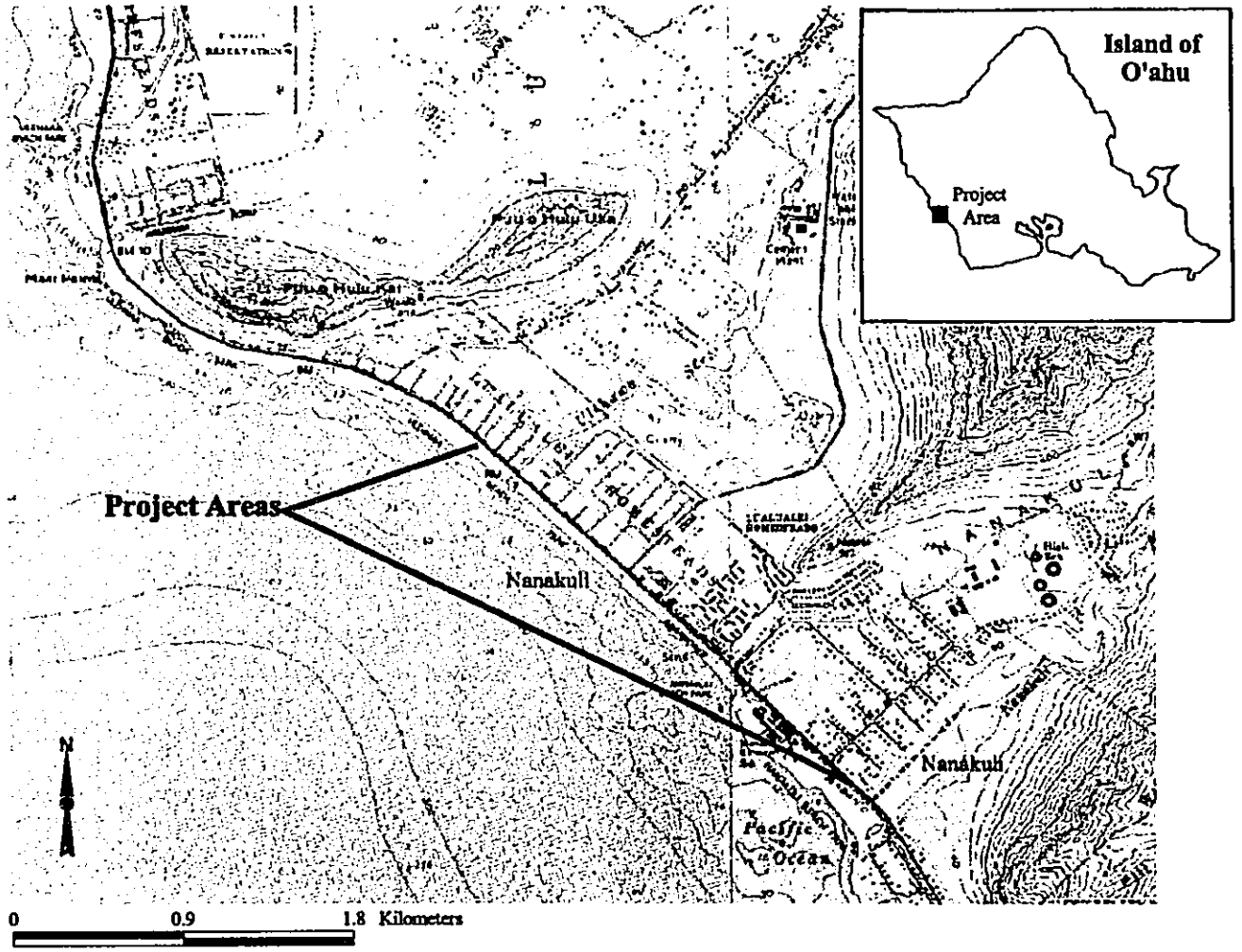
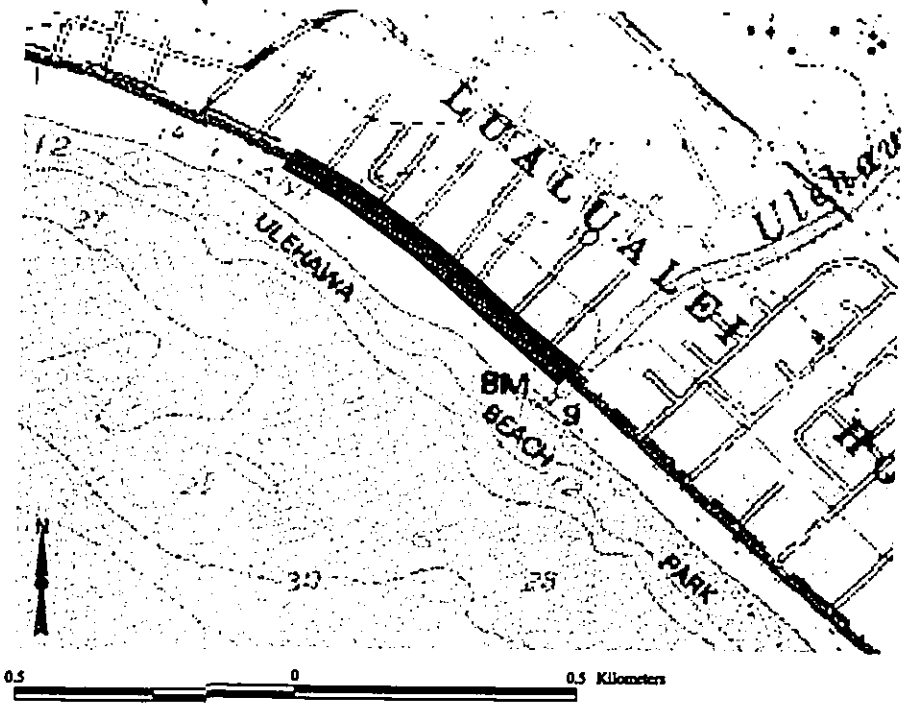


Figure 1. Project area location for Farrington Highway Drainage Improvement Project.

North Project Area



South Project Area

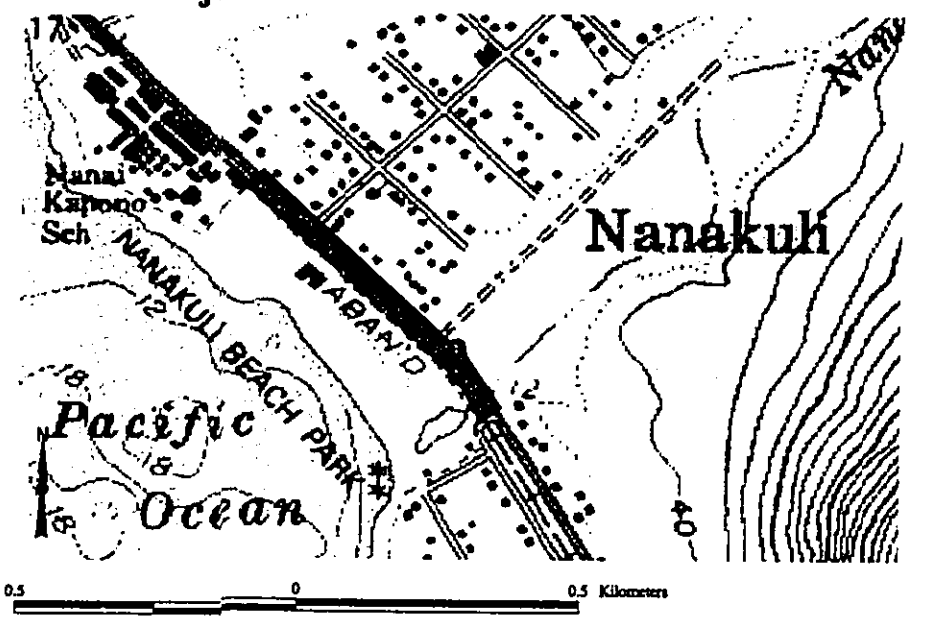


Figure 2. North project area, shown at the top of the page, and south project area, shown at the bottom of the page.

II. BACKGROUND

The project area is located on the leeward or west coast of O'ahu. The north project area is located in Lualualei *ahupua'a*,[1] which is the largest *ahupua'a* located within Wai'anae District (Fig. 3). It includes the area between Pu'u Pahe'ehe'e and Pu'u Haleakala and extends back into the valley. Ulehawa Stream flows through the south end of the *ahupua'a*, along the south border of the north project site.

The south project area is located in Nānākuli *ahupua'a*, which begins at the south boundary of Lualualei *ahupua'a* (Pu'u Haleakala) and continues south to Pili o Kahe, and follows the ridge to Pu'u Manawahua and Mauna Kapu. It extends into the valley of Nānākuli. Nānākuli Stream is located near the center of Nānākuli *ahupua'a* and flows out towards the ocean, near the south boundary of the south project area.

There is a question concerning the *ahupua'a* status of Lualualei and Nānākuli, since both land areas are not listed in the *Indices of Awards* (Hawai'i [Ter.] Commissioner of Public Lands; Nakamura and Pantaleo 1994:5-6). However, both Lualualei and Nānākuli are considered as *ahupua'a* of Wai'anae by historians Sterling and Summer (1978) and Kelly (1991:313), and will be referred to as such in this report.

The average annual rainfall in the project area varies between 15 and 30 inches, with most rain falling between November and April (U.S. Department of Agriculture Soil Conservation Service 1972:6). More rainfall is common in the back of the valleys, with an average of ca. 40 inches falling annually. The annual coastal temperatures are between 73 and 75 degrees F (Sanderson 1993:55). The temperature increases inland; up to 90 degrees F (Armstrong 1893:64).

TRADITIONAL GEOGRAPHY

The project area is located in the Wai'anae District. Although the origin of the name, Wai'anae, is uncertain, ethnologists Handy and Handy (1972:468) suggest it is derived from Pueha Fishpond in which mullet were raised "*Wai* (water) –*'anae* (full grown mullet), or Water-of-the-mullet." This pond is located west of the Wai'anae Stream. Sterling and Summers (1978:68), however, suggest the name is derived from the abundant supply of fish off the coast of Wai'anae. Only one species of 'fish' was taboo in Lualualei and Nānākuli, the squid (Land Matters n.d. in Sterling and Summers 1987:68).

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1. An *ahupua'a* is a traditional land division smaller than a district which extended from the uplands to the sea (Pukui et al. 1989:9).

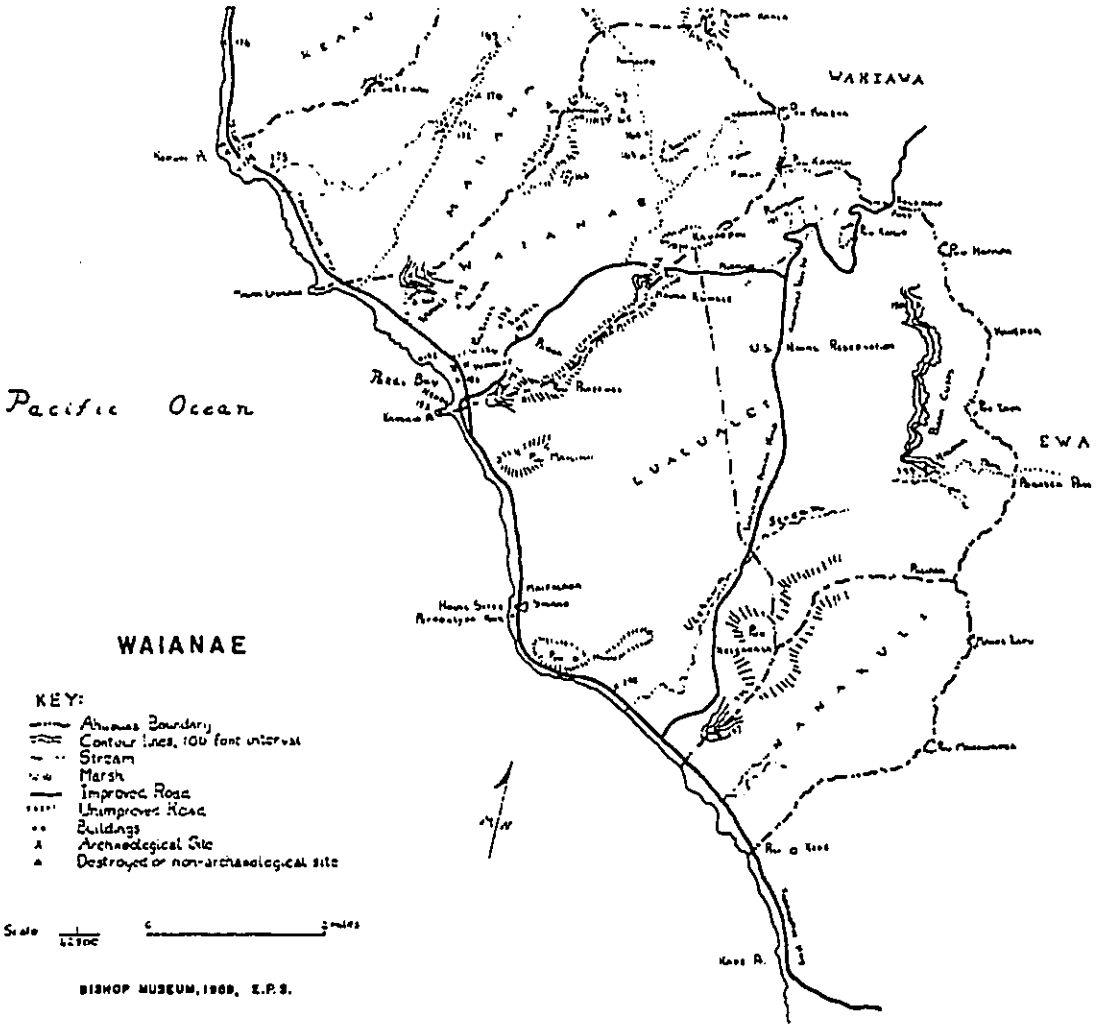

Figure 3. Portion of Wai'anae Map, showing the *ahupua'a* of Lualualei and Nānākuli (Bishop Museum 1959 in Sterling and Summers 1978:80).

Wai'anae may have been settled by defeated inhabitants of O'ahu following King Kamehameha's invasion in 1795. Sterling and Summers say that, "the conquered Oahuans were driven from their homes, their lands seized and divided amongst the friends of Kamehameha—the despoiled people in large numbers fled to Wai'anae and settled there. This part of Oahu being hot, arid, and isolated, with little water, was not coveted by the invaders..." (Sterling and Summers 1987:68).

Nine *ahupua'a* are located within Wai'anae District. They include, from north to south, Keawa'ula, Kahanahaiki, Makua, 'Ohikilolo, Kea'au, Makaha, Wai'anae, Lualualei, and Nānākuli. The project area falls within two of the *ahupua'a*, Lualualei and Nānākuli. Lualualei, which means the valley of the flexible wreath, refers to the "clever strategy of the famous Maile-kukahi, a high chief of Oahu, whose flexible flanks of warriors surrounded four invading armies from Hawaii and Maui at the great battle of Kipapa (Kipapa, paved) where the corpses of the slain paved the bottom of this ravine, about A.D. 1410" (Mouritz 1934 in Sterling and Summers 1987:68).

The project area also falls within Nānākuli *ahupua'a*. Four different meanings of Nānākuli are reported in Sites of O'ahu (Sterling and Summers 1987:61-62). The word is made up of "Ku- meaning stand, Nana- meaning looking, Kuli- meaning deafening" (Sterling and Summers 1987:62). One possible interpretation of the name says that the people of Nānākuli had little food and water, and acted deaf when strangers approached because they were ashamed at their inability to be hospitable. Another interpretation of the story describes two women who went up a hill to dry their *kapa*. Upon descending the hill for water, they heard dogs barking; the sound was deafening. Another explanation which refers to "knee examination" says women used to go to the top of a hill to dry their *kapa*, and when they got there they looked at their knees—*nana kuli*. There is also an interpretation that says royalists of the valley used to sit with their knees up, which they proceeded to watch. The fourth interpretation relates to an incident in the travels of King Kuali'i in which his attendants looked at and pressed his knees to relieve fatigue.

Places of significance located near the project area include two hills or *pu'u* near the coast of Lualualei *ahupua'a*: Pu'u o Hulu, just north of the project area, and Pu'u Ma'iliilii, further north. Hulu is said to have been a chief in love with a twin sister named Ma'iliilii. Since he could not tell her apart from her sister, a *mo'o* (enchanter) changed them into mountains (Holt 1954 in Sterling and Summers 1987:67).

Another significant landmark is Pu'u Haleakalā, "the place said to be the one on which the rays of the sun was broken"[2] (Kuokoa 1899 in Sterling and Summers 1987:62), is located in Nānākuli, between the two project areas. This hill contained the cave in which Hina made *tapa* (bark cloth).

A large rock (Site 148), named 'Maui,' after the Hawaiian demi-god, is located on the upland side of Farrington Highway, across from the north project area (see Fig. 3). Although this rock was not visible during the survey, McAllister (1933 in Sterling and

2. Pukui suggests the name Haleakalā is incorrect since it means where the sun is snared (Pukui 1953 in Stering and Summers 1987:67).

Summers 1987:64) noted that the rock was split in half and adorned by many small, oddly shaped rocks. The rock was the place Maui used to sun himself. Maui's shelter was located northeast of the rock, a spring was nearby.

Although many *heiau* (traditional places of warship) were constructed in Wai'anae District, only five were recorded within Nānākuli and Lualualei *ahupua'a*: Ilihune, Nioiula, Kakioe, Pu'uahe'ehe'e, and Kuilioloa (McAllister 1933:110-112; Sterling and Summers 1987:60-87). Ilihune Heiau (Site 147) is destroyed, however, it used to be "A small walled heiau of *po'okanaka* (human head) class; used about 1860 by Frank Manini as a cattle pen, for which natives prophesied his poverty and death" (Thrum in McAllister 1933:110). Nioiula Heiau (Site 149) is mostly destroyed, the stone having been used for a cattle pen. It was probably of *po'okanaka* class with three enclosures and three platforms open to the west side. The *heiau* is said to be very ancient, belonging to Chief Kakuihewa. Kakioe Heiau (Site 151), also destroyed, was located at Puhawai. It was a small *heiau* at which a sacred spring was located. Pu'uahe'ehe'e Heiau (Site 152), was located on the seaward end of Pu'u Pahe'ehe'e Ridge. It was destroyed with the construction of a nearby cemetery. According to Thrum it was of *luakini* (human sacrifices offered) class. This *heiau* had two or three divisions. Its slopes were once used for sledding contests. The final *heiau*, Ku'ilioloa (Site 153), is located on the extreme tip of Kane'ilio Point. Three sides of the *heiau* are surrounded by water. This *heiau* has three platforms. Ku'ilioloa was the name of a legendary dog who was known in ancient times as a protector of travelers. Later on, the bad qualities of another dog were transferred to Ku'ilioloa, "so that he became known as evil which was not true at all" (Pukui 1954 in Sterling and Summers 1987:69).

Three traditional Hawaiian trails were described by John Papa I'i (1957:97) as passing through Wai'anae "one by way of Pu'u o Kapolei, another by way of Pohakae, and the third by way of Kolekole." Only the Pu'u o Kapolei Trail stayed near the coast and likely passed over the project area (Fig. 4).

THE HISTORY OF LAND USE IN NĀNĀKULI AND LUALUALEI *AHUPUA'A*

Traditional Hawaiians living in Nānākuli and Lualualei *Ahupua'a* planted sweet potato (*'uala*) on the dry slopes of Nānākuli, Lualualei, Wai'anae-kai, and other small valleys as far as Makua (Handy 1940:155-156). The abundant supply of fish (Handy and Handy 1972:467-468) and seaweed (Kamana in McDermott and Hammatt 2000a:45) off the Wai'anae coast supplemented the Hawaiian diet. Early European travelers to the Wai'anae coast found sparse coastal settlements. Vancouver observed "few inhabitants" in "the barren, rocky waste" (Vancouver 1785 in McGrath et al. 1973:17). It is likely that most of the people were living in the upper valleys (Cordy 1997:5).

During the mid 19th century, the traditional Hawaiian land tenure system was codified, with crown lands divided among the king, chiefs, and government. Commoners were given the opportunity to claim those lands which they used. Six Land Commission Awards (LCAs) were granted within Lualualei *ahupua'a*. All six LCAs were located in the *'ili* of Pūhāwai (near the northern edge of Lualualei *ahupua'a*). Information provided on the

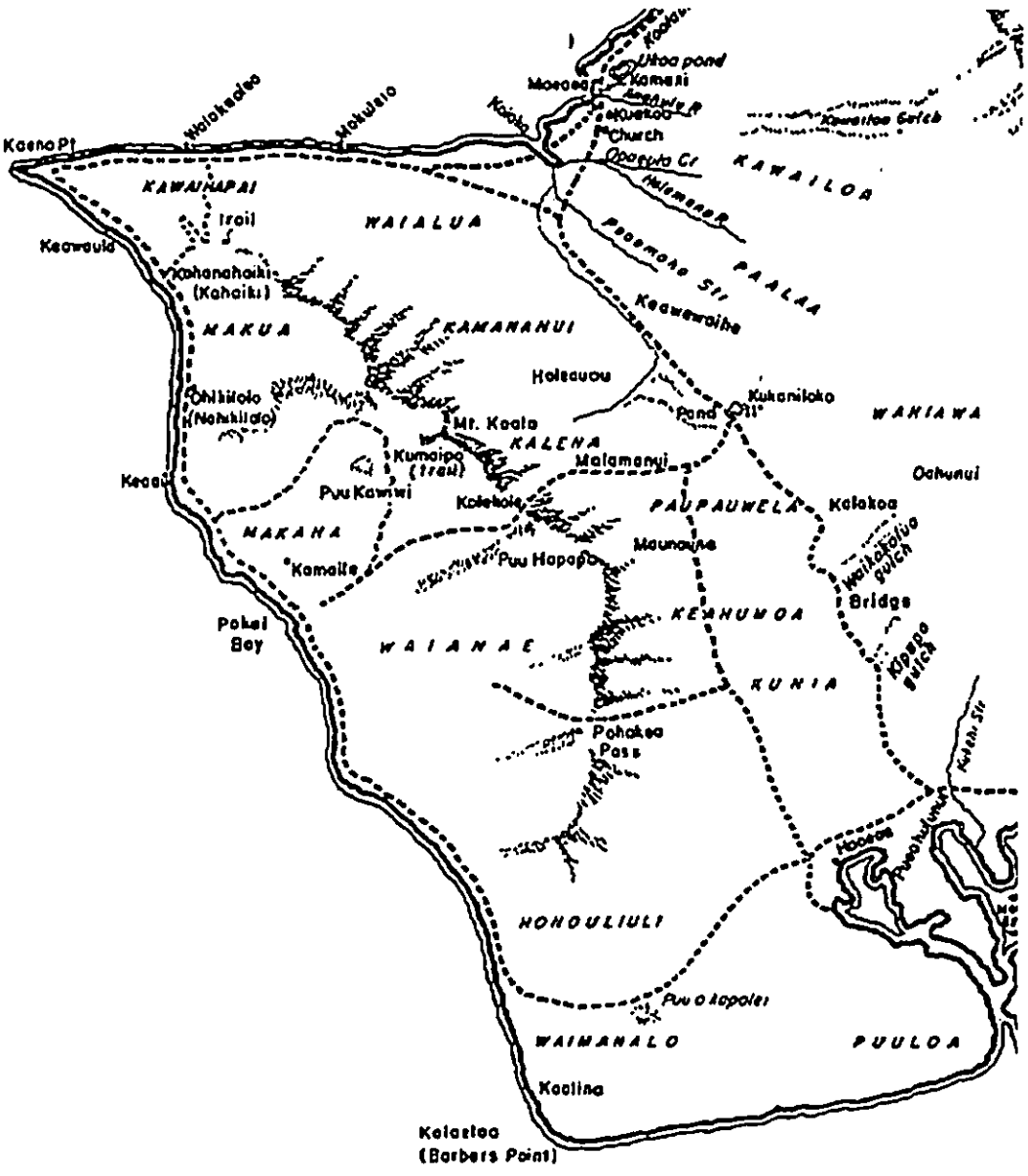

Figure 4. Trails of Leeward Oahu (portion of map from Rockwood in I'i 1957:96).

LCA documents indicate that at least eight families were living in Pūhāwai near the stream in 1848. Farmers cultivated *lo'i* (taro pondfields), dryland crops, and *wauke* (*Broussonetia papyrifera*) (McDermott and Hammatt 2000a:26). The remaining portion of Lualualei was Crown Land, 17,000 acres of which was leased to William Jarrett for cattle ranching. Jarrett owned the Lualualei Ranch.

Although no LCAs were granted within Nānākuli, one application was submitted.

> To the Land Commissioners: *'Ili* of Hapai, *Ahupua'a* Nānākuli, Wai'anae District, O'ahu. I, the one whose name is below, have a *muliwai*, a pond, a cultivated *kula*, and for firewood also, a valley planted in *wauke mauka*, [and] a houselot. Kulauahi, X his mark (Schilz et al. 1995:10; Cordy 1997:6; McDermott and Hammatt 2000a:25).

Nānākuli became Crown Lands, which subsequently was leased to high chiefs and foreigners for ranching. Leases were held by members of the Manini, Jarrett, Robinson, Judd, and Dowsett families (McDermott and Hammatt 2000a: 25).

In the latter half of the 19th century, cattle ranching, sugarcane cultivation, and coffee plantations were begun in Wai'anae. One of the first cattle ranches on the Wai'anae coast was located in Lualualei. It was begun by Paul F. Manini, son of Don Francisco de Paula Marin, confidant of King Kamehameha. Following Manini's death in 1869, the ranch passed to James Isaac Dowset, descendant of a British Sea Captain. In 1880, George Bowser traveled along the Wai'anae coast, and noted that Lualualei Valley,

> is occupied as a grazing farm by Messrs. Dowsett & Galbraith, who lease some sixteen thousand acres from the Crown... From the Lualualei Valley to the Nānākuli Valley I had a rather dreary ride of three miles. The intervening country towards the sea is barren, with a little pasturage at the base of the mountains (Bowser 1880:493-494 in Haun and Kelly 1984:32; Nakamura and Pantaleo 1994:21).

Waianae Sugar Plantation was established in 1879 in Wai'anae Valley. Several years later, the sugar plantation expanded into Lualualei Valley. By 1890, Waianae Sugar Company had 600 acres under cultivation, with an estimated yield of 2,500 tons of sugar that year. The plantation continued until 1946, when operations finally ended.

In 1889, Benjamin Franklin Dillingham started the Oahu Railway and Land Company (OR&L) rail line. The railroad, which was begun in Honolulu, reached the Wai'anae Coast in 1895. The OR&L continued operations until 1946, when it shut down operations.

The Crown Lands in Nānākuli and Lualualei became Public Lands in 1893 following the overthrow of the Hawaiian monarchy. Two years later, the Republic of Hawai'i decided to open up these lands for homesteading. The lots were auctioned off in three series, beginning in 1903. Lualualei attracted more homesteaders because there was more water. However, the beaches at Nānākuli drew people to the area where they camped, some all year round (McGrath et al. 1973:103 in McDermott and Hammatt 2000a:31).

In the 20th century, the U.S. Government condemned a large portion of Lualualei Valley for use as an ammunition depot. In addition, Camp Andrew was constructed in Nānākuli, on the upland side of Farrington Highway, north of the south project area (Fig. 5). Its buildings were camouflaged to blend into the surrounding *kiawe* trees. It was utilized as a recreation area for military personnel before and during WWII. Local residents were prohibited from using the nearby beach. Camp Andrew was conveyed back to the State of Hawai'i in 1962.

PREVIOUS ARCHAEOLOGICAL RESEARCH

Over the past 30 years numerous archaeological studies have been undertaken in Wai'anae Valley. Table 1 summarizes previous work in the vicinity of the project area, and Figure 6 shows the locations of nearby archaeological projects.

Cordy (1997) describes the settlement patterns of Nānākuli Valley. Archaeological evidence suggests first settlements in leeward O'ahu began ca. A.D. 900 to 1000. Permanent settlements likely began along the coast near water sources. Cordy hypothesizes that Nānākuli and Lualualei Valleys were settled last. The population of O'ahu grew rapidly by the 12th century, and scattered farms and houses were established in upper valleys. Radiocarbon evidence indicates permanent habitation in Nānākuli Valley by A.D. 1200 to 1400. Sweet potato, taro, and banana were likely grown in upland farms. Birds and forest items may have also been collected from upland areas. In addition, fishermen and their families lived along the coast, probably near the shoreline trail.

Five *heiau* were recorded within Nānākuli and Lualualei *ahupua'a*: Ilihune, Nioiula, Kakioe, Pu'uahe'ehe'e, and Kuilioloa by McAllister (1933:110-112)(see above, Traditional Geography). Only one, Ku'ilioloa, remains intact. It is located on the extreme tip of Kane'ilio Point, at the northwest end of Lualualei *ahupua'a*. The other four have been either destroyed or partially destroyed. Ilihune Heiau, located at the southwest end of Pu'u Haleakala, was the closest *heiau* to the project area. This *heiau* was a small, walled *po'okanaka heiau*.

McAllister (1933:110) also recorded a large rock (Site 148), which was named Maui. It is located on the upland side of Farrington Highway, across from the north project area (see Fig. 3). It was not observed during the current survey project.

An historic trail extended along the Wai'anae coast (I'i 1957:97) by way of Pu'u o Kapolei. This trail likely passed over the project area (see Fig. 4) and probably was located near or at the same place as Farrington Highway. No sign of the trail remains.

Two archaeological sites have been recorded within or adjacent to the present project area. These include a traditional Hawaiian deposit and an historic railroad track. Site 50-80-07-5763, is located on the west side of Farrington Highway, just north of Ulehawa Stream (McDermott and Hammatt 2000a). This archaeological site, at the edge of the north project site, is ca. 975 square feet in area (Fig. 7). It consists of a traditional Hawaiian cultural

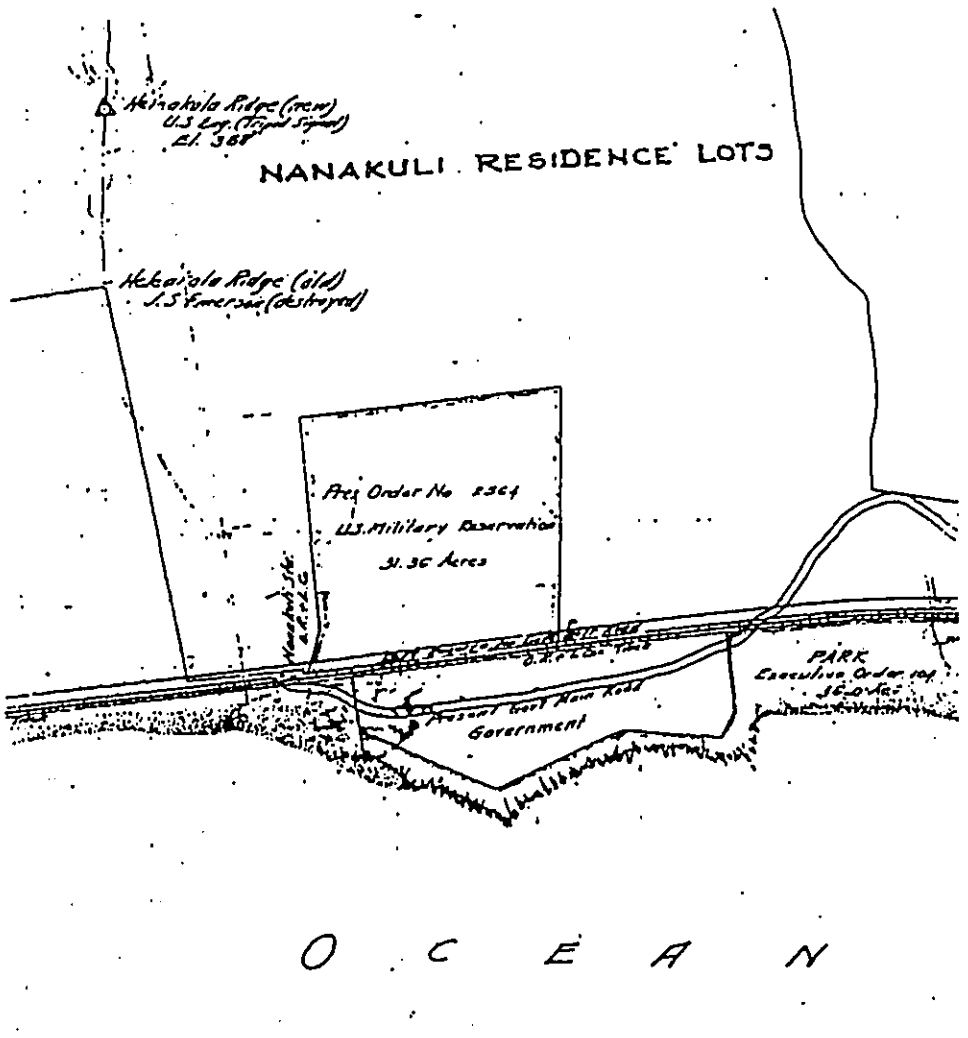

Figure 5. Camp Andrew Military Reservation, located north of the south project area (1929 Territorial Map, Reg. 2535).

Table 1. Previous Archaeological Projects Near the Farrington Highway Drainage Improvement Project.

References	Type	Location	Archaeological Sites
McAllister 1933	Reconnaissance	Lualualei and Nānākuli	Ilihune Heiau (147), Nioiula Heiau (149), Kakioe Heiau (151), Pu'uahe'ehe'e Heiau (152), and Kuilioloa Heiau (153), large rock named Maui (148).
Cordy 1975	Excavation	Mā'ili	Nineteen sites: walls, highly disturbed from ranching or bulldozing, and historic.
Barrera 1975	Excavation	Mā'ili	Excavation of Site CH-Oa-1: this structure found to be an historic structure, constructed ca. 1930-1940.
Cordy 1976	Survey	Mā'ili	Six sites; 1 possible religious structure (CH-Oa-1), 1 C-shaped feature, 2 house features, 1 possible site, 1 midden scatter.
Bordner 1977	Reconnaissance	Nānākuli	No sites found at Nānākuli Landfill Site.
Kennedy 1983	Reconnaissance	Lualualei	No sites found at Waianae Yard.
Mayberry and Rosendahl 1988	Reconnaissance	Mā'ili	Twenty-six sites at Mā'ili Kai.
Cordy et al. 1990	Survey	Nānākuli	Thirty-eight sites: agricultural, habitation, and historic in Nānākuli Valley.
Pak and Cordy 1990	Survey	Nānākuli	Seven sites: temporary habitation, agricultural, and lithic scatters; A.D. 1300-A.D.1400s.
Sinoto and Pantaleo 1990	Reconnaissance	Lualualei	No sites were found.
Cleghorn 1991	Reconnaissance	Lualualei	No sites were found in Lower Lualualei Valley.
Hammatt et al. 1991	Monitoring	Mā'ili	Seven burials were found in the calcareous beach sand.
Haun et al. 1991	Reconnaissance	Lualualei	Reconnaissance survey of the entire Lualualei Valley: 131 sites located, radiocarbon date of A.D. 1400.
Cleghorn and Andersen 1992	Survey	Lualualei	No sites found.
Chiogioji and Hammatt 1993	Survey and Testing	Lualualei	No sites were found.
Hammatt et al. 1993	Survey	Lualualei	Eight sites: traditional habitation complex and wall; historic ranching and military features.
Jimenez 1994	Survey and Testing	Lualualei	Survey of 5 sites, with testing at 2 of them: intact prehistoric and historic deposits.

Table 1 (cont.). Previous Archaeological Projects Near the Farrington Highway Drainage Improvement Project.

Mayberry and Rosendahl 1994	Survey	Lualualei	Twenty-six sites: prehistoric and historic.
Nakamura and Pantaleo 1994	Archaeological and Historical Literature Review	Nānākuli and Lualualei	Review for Nanakuli III Elementary School and Nanakuli Public Library.
Sinoto and Pantaleo 1994a	Reconnaissance	Nānākuli	No sites were found at the 6 proposed Nanakuli III Elementary School sites.
Sinoto and Pantaleo 1994b	Reconnaissance	Nānākuli	No sites were found at the 5 proposed Nanakuli Public Library sites.
Schilz et al. 1995	Testing	Lualualei	No sites were found.
Welch 1995	Archaeological Assessment	Lualualei	One sinkhole in the project area with possible pre-contact cultural remains (needs formal testing) and an enclosure observed outside the project area.
Cordy 1997	Survey	Nānākuli	Extensive sites revealed in Nānākuli Valley: agriculture, religious, and habitation.
Dega 1998	Reconnaissance	Nānākuli	Cultural deposit and 3 bunkers and building foundations relating to WWII at Ulehawa Beach Park.
Robins 1998	Reconnaissance	Lualualei	Three archaeological sites: 2 traditional Hawaiian sites (permanent habitation and rock mound) and 1 sugarcane feature (ditch).
Hammatt et al. 1999	Archaeological Assessment	Nānākuli	Military features on the surface; abundant sinkholes (not tested).
McDermott and Hammatt 1999	Survey	Nānākuli	No sites were found.
McDermott and Hammatt 2000a	Survey	Lualualei	Four archaeological sites: railroad track, WWII military bunkers and foundations, 2 traditional Hawaiian cultural deposits.
McDermott and Hammatt 2000b	Testing	Nānākuli	Abundant filled sinkholes; 2 excavated sinks, one with human remains and the other with a cultural deposit.
McGuire and Hammatt 2000	Cultural Impact Statement	Nānākuli	Limited oral and historical record: 1 Land Commission not awarded, cattle ranching, and Camp Andrews.

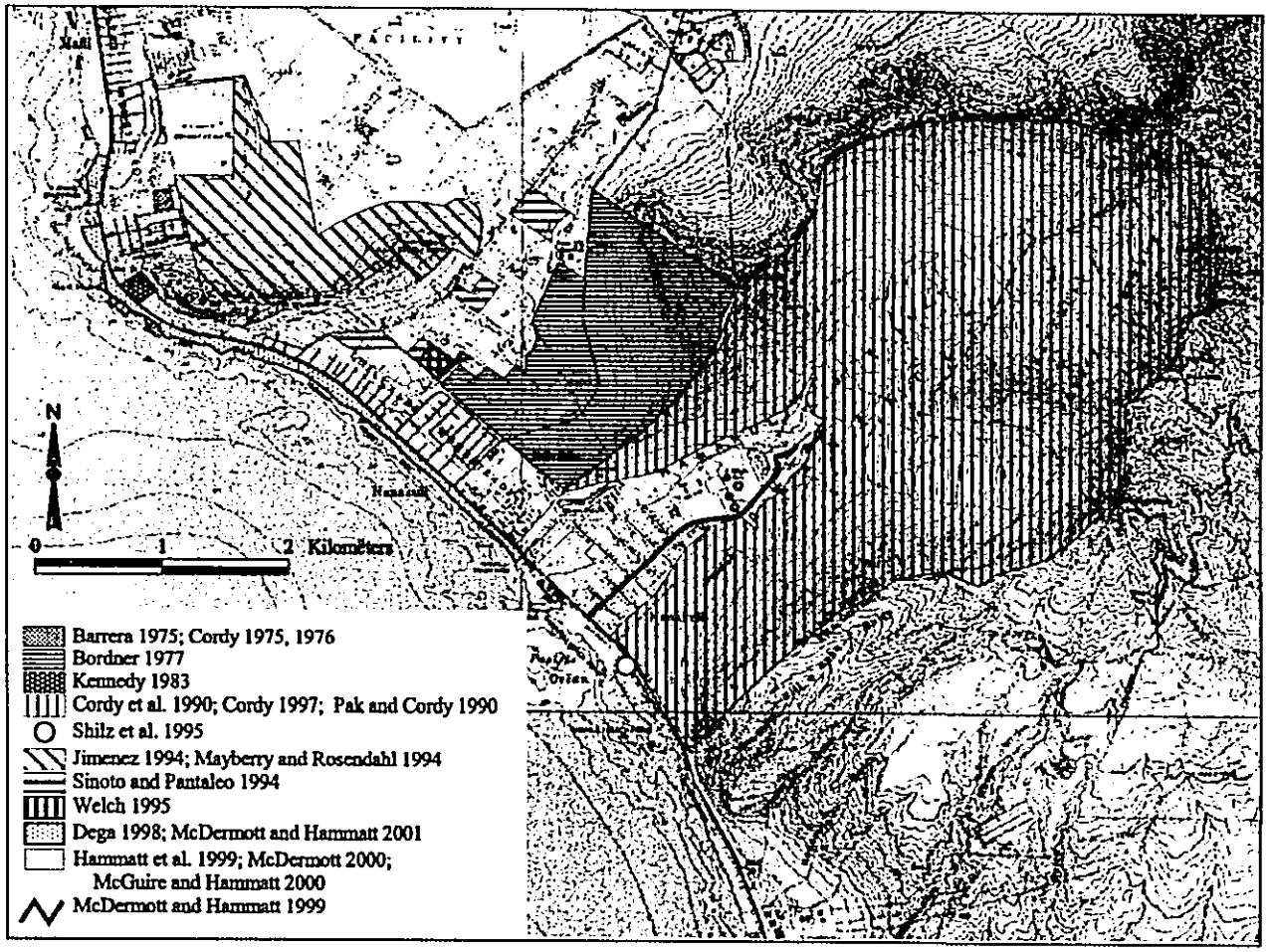

Figure 6. Locations of previous archaeological projects near the Farrington Highway Drainage Improvements Project.

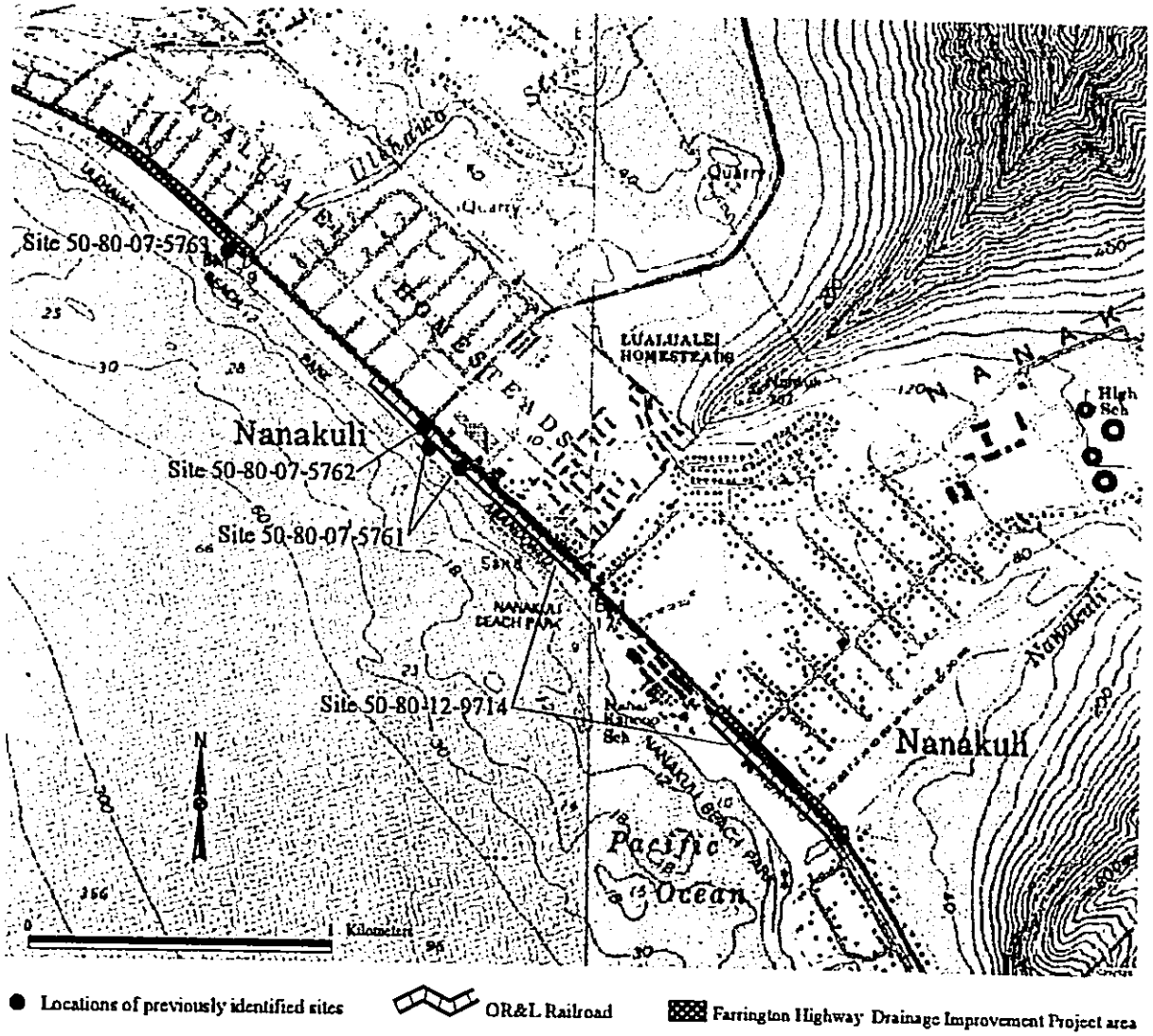

Figure 7. Archaeological sites located near the current project area.

deposit containing pit features, midden, and artifacts such as shell fishhooks, volcanic glass flakes, basalt flakes, and a chert fragment. A radiocarbon date from Feature 2 yielded a date of 230±60 BP. A local informant, Mr. Kamana, described a fishing *koa* (shrine) that used to stand in the area, as well as noting he had been told as a child that a prehistoric/early historic village also existed in the area (McDermott and Hammatt 2000a:43-44, 147).

Site 50-80-12-9714 consists of the former OR&L Railroad line, which extends along the Wai'anae coast, around Ka'ena Point (McDermott and Hammatt 2000a:149). The track was only visible in the south project area, along the west side of Farrington Highway. The track is 1.04 m wide, with the distance between ties (crib) between 38 and 43 cm. The railroad bed was formed by laying crushed basalt gravel over sand and beach gravel.

Four additional sites are located near the project area. Two of the sites were recorded by McDermott and Hammatt (2000a) and two by Pak and Cordy (1997). Site 50-80-07-5762, recorded by McDermott and Hammott (2000a) consists of a traditional Hawaiian deposit similar to Site 50-80-07-5763. It is located along Ulehawa Beach Park, adjacent to Lualualei Naval Road, between the two current project sites. Charcoal, pit features, and midden were recovered. Site 50-80-07-5761 consists of five features relating to WWII activities: three bunkers and two concrete building foundations. Additional features may be buried in the beach sand.

An inventory survey was performed in a large portion of Nānākuli Valley (Pak and Cordy 1990; Cordy et al. 1990; Cordy 1997). The survey area was divided into seven areas for survey purposes. Area VI is located on the east side of Farrington Highway, just east of the current south project area. Two sites, 50-80-07-4234 and 50-80-07-4235, were found ca. 150 to 250 m east of Farrington Highway. Site 50-80-07-4234 is a midden scatter with volcanic glass and basalt flakes. Site 50-80-07-4235 is an historic refuse pile. The pile has been disturbed, and both early 20th century materials and modern materials are present.

Additional sites are located further up the valleys of Nānākuli and Lualualei, and indicate permanent habitation and cultivation existed in these valleys. See Table 1.

III. ARCHAEOLOGICAL SURVEY RESULTS

This section presents the results of archaeological reconnaissance survey at the Farrington Highway Drainage Improvement Project area. Two sites, previously recorded by McDermott and Hammatt (2000a), are located within or near the project area. No new sites were observed.

FIELD METHODS AND INVESTIGATIONS

Prior to fieldwork, background research was conducted at the State Historic Preservation Division (SHPD) library on O'ahu. The library contains numerous archaeological reports regarding projects located within Lualualei and Nānākuli *ahupua'a*. Only one report (McDermott and Hammatt 2000a), however, documented sites within or adjacent to the project area (see Previous Archaeology section). These consist of two sites: an historic railroad track (Site 50-80-12-9714) and a traditional Hawaiian cultural deposit (Site 50-80-07-5763).

During fieldwork, two archaeologists surveyed the parcel on foot in regular transects 10 m apart. The ground surface, which varied from an open field with grass cover to sandy beach to disturbed fill land lacking vegetation, was carefully examined. The survey revealed that the area adjacent to Farrington Highway has been graded and leveled during road construction (Photo 2). The area between the beach and highway is modified by park beautification. Comfort stations, sprinkler systems, and parking areas have been constructed. The beach itself consists of a raised sand berm.

The project area was divided into the north project area, which is along Ulehawa Beach Park; and the south area, which is along Nānākuli Beach Park. Site 50-80-07-5763 is located on the west side of the north project area. A prior inventory survey conducted at Ulehawa Beach Park (McDermott and Hammatt 2000a) uncovered subsurface deposits within the site area. The present survey revealed no additional cultural materials or features on the surface. However, based on the results of the previous subsurface testing, it is possible that cultural remains may be buried in the beach sand near Farrington Highway. In addition, Mr. Kamana, a local informant whose ancestors have lived in Nānākuli for at least seven generations, said that burials will likely be found in this section of the project area. He indicated that the area near Ulehawa Stream was used for *loi* (McDermott and Hammatt 2000a:43-44).

Site 50-80-12-9714, the OR&L Railroad line, was only visible in the south project area (it is likely buried beneath sand and fill in the north area). A railroad trestle is constructed over Nānākuli Stream (Photo 3). Much of the area on the west side of Farrington Highway has been extensively modified for Nānākuli Beach Park. However, a marshy area

Photo 2. Overview of Farrington Highway, showing the north project area. Note the graded roadbed on either side of the highway and the beach park to the west (left of the photo).

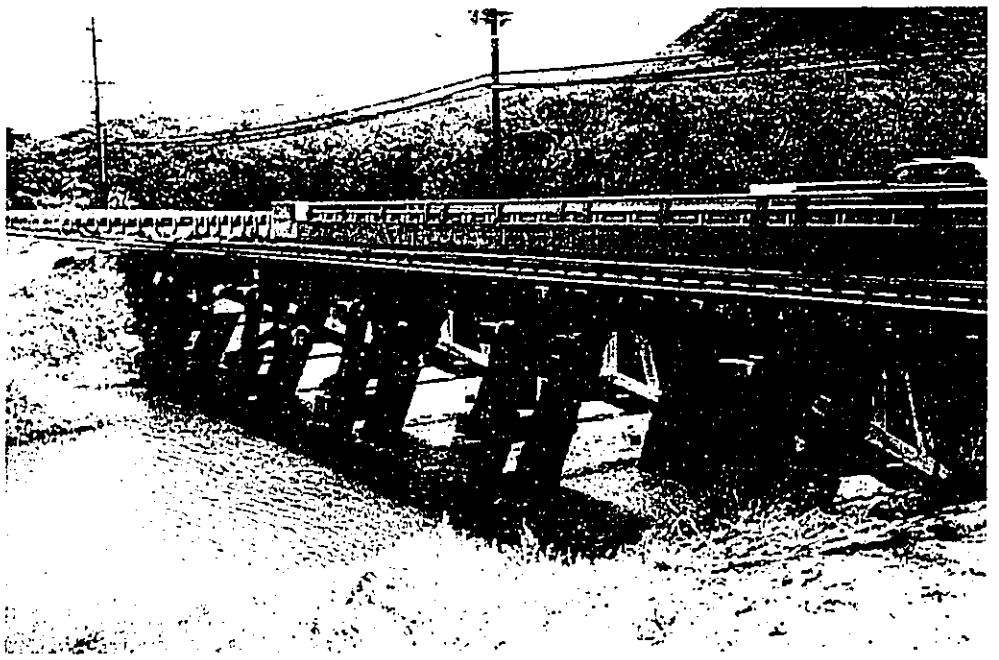

Photo 3. Railroad trestle (Site 50-80-12-9714) over Nānākuli Stream, in the south project area.

near Nānākuli Stream does not appear to have been disturbed. No cultural deposits were visible on the surface of this area because of the thick growth of plants (see Photo 1). The east side of the project area, near Nānākuli Stream is forested in *kiawe* and *koa haole.* No archaeological sites were found in this area. A local resident, Rey Quebral, however, is concerned that burials may be present in this area, since he had heard as a child that burials were located between the nearby church and the stream.

DISCUSSION

The archaeological reconnaissance survey of the Farrington Highway Drainage Improvement Project disclosed no new Hawaiian prehistoric or historic archaeological remains. However, two previously recorded sites are present either near the project area (Sites 50-80-07-5763, a traditional Hawaiian cultural deposit near the north project area) or within the project area (Site 50-80-12-9714, the OR&L Railroad line in the south project area). Although no new archaeological sites were observed on the surface, it is possible that subsurface deposits and human burials are located beneath the surface in the beach sand. No subsurface testing has been conducted at Nānākuli Beach Park, and the subsurface testing at Ulehawa Beach Park was focused in the area ca. 30 m from Farrington Highway, outside the designated work area.

Map data and historic documents (I'i 1957) also indicate that an historic trail was located along the Wai'anae coast, probably following a route along Farrington Highway or very near to the present highway alignment. No sign of the trail remains.

RECOMMENDATIONS

Archaeological and historical research indicates the possibility of burials within the drainage improvement area, therefore archaeological monitoring should be conducted during construction activities relating to dry wells, trenches, and the construction staging area. Since dry well excavations are going to occur near Farrington Highway, the excavations will probably contain fill materials relating to road construction above the natural beach sand. Cultural deposits and/or human burials may be present in the beach sand below the fill materials.

During construction activities, Sites 50-80-12-9714 (OR&L railroad berm) and 50-80-07-5763 (subsurface cultural deposit) should be avoided. The construction staging area should be positioned away from both of these sites so that inadvertent damage does not occur.

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Appendix D

Cultural Impact Assessment for Farrington Highway Drainage Improvements in Nanakuli and Lualualei

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International Archaeological Research Institute, Inc.

October 2001

CULTURAL IMPACT ASSESSMENT FOR FARRINGTON HIGHWAY DRAINAGE IMPROVEMENTS IN NĀNĀKULI AND LUALUALEI

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I. INTRODUCTION

The State Department of Transportation, Highways Division, is proposing drainage improvements along portions of Farrington Highway. Belt Collins Hawaii has been contracted to carry out environmental studies of the proposed improvements, which are needed to minimize flooding during occasional heavy rainfalls. Belt Collins Hawaii, in turn, subcontracted with International Archaeological Research, Inc. (IIARI) to conduct the cultural impact assessment as required by Chapter 343, Hawai'i Revised Statutes, and other state laws.

The proposed project will affect two stretches of Farrington Highway (see Figs. 1 and 2). The "north" project area is approximately 1,800 feet in length and stretches from Lualei Place to Ulehawa Stream. The project description calls for a series of dry wells on either side of the highway. They will lie within the highway right-of-way, and no runoff will be discharged directly into state waters. The "south" project area is approximately 2,000 feet in length and extends from the site of the GTE building to Nānākuli Stream. At this location the project plan calls for a series of drainage inlets and a drain line on the landward side of Farrington Highway. Runoff flowing into the drainage inlets will be discharged into a drainage way near Nānākuli Stream.

The project areas are within the *ahupua'a* of Lualualei and Nānākuli, respectively. Neither area encompasses the entire length of the *ahupua'a* coast, but for the purposes of the cultural impact assessment, the study area was defined as the entire shoreline and back beach locations of Lualualei and Nānākuli.

The land immediately seaward of the two project areas consists of compacted beach sand and dunes within the borders of Ulehawa, Kalaniana'ole, and Nānākuli Beach Parks. Residents of the Wai'anae coast use these recreational areas. Railroad tracks of the Oahu Railroad and Land Company (OR&L) parallel the highway right-of-way on the seaward side of Farrington Highway. Nānāikapono Elementary School is at the western end of the southern project area and directly in front of Kalaniana'ole Beach Park. On its landward side the highway right-of-way abuts Nānākuli Ranch, St. Rita's Catholic Church, Camp Andrews, and numerous residential and commercial properties. The current uses of land and in-shore areas in the study zone are diverse; these same areas would have been important to the prehistoric and early historic residents of the two *ahupua'a*.

This report presents the results of documentary research and oral interviews conducted to assess the possible impacts on traditional and historic cultural features, practices and beliefs that might result from the proposed drainage improvements in Nānākuli and Lualualei.

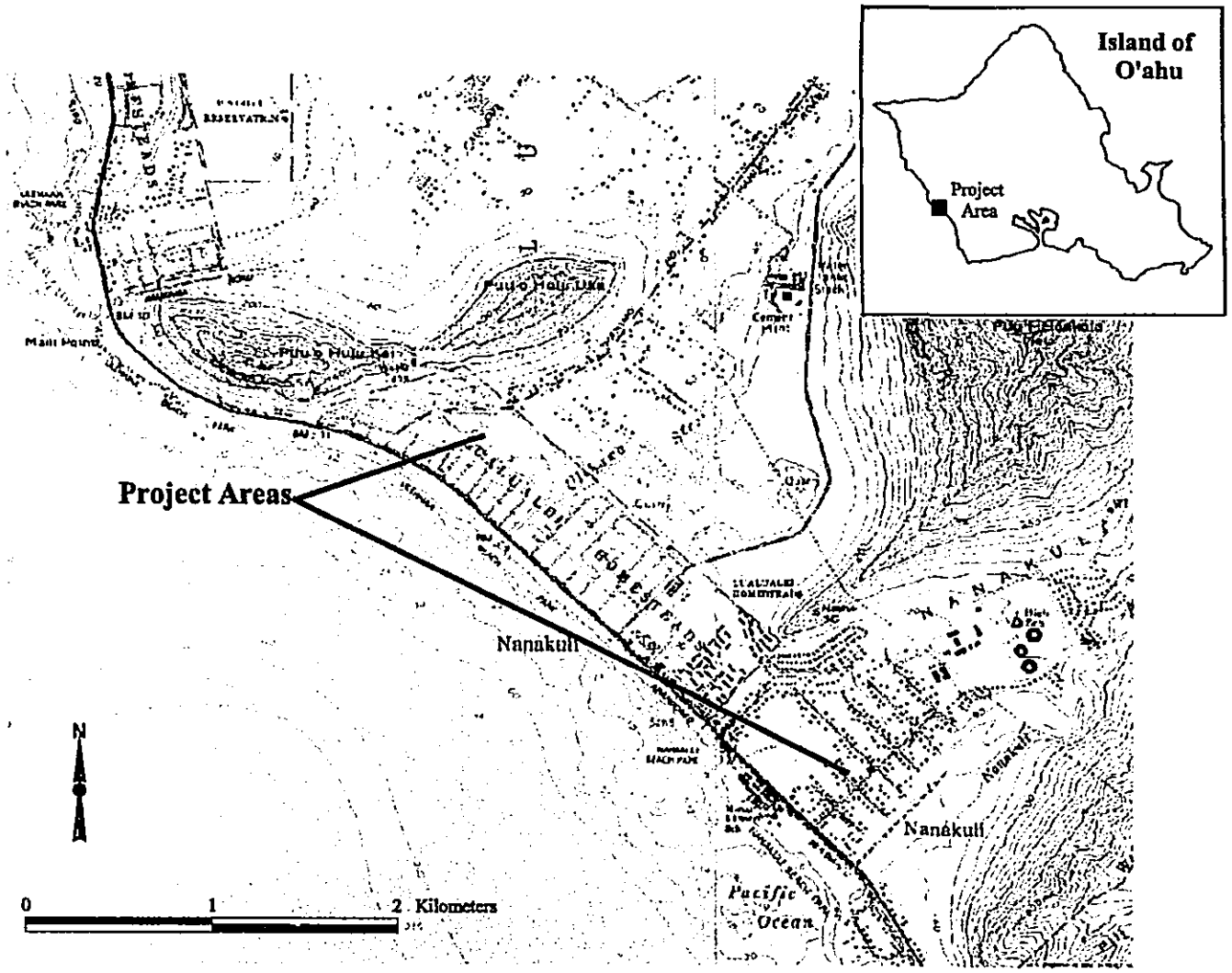
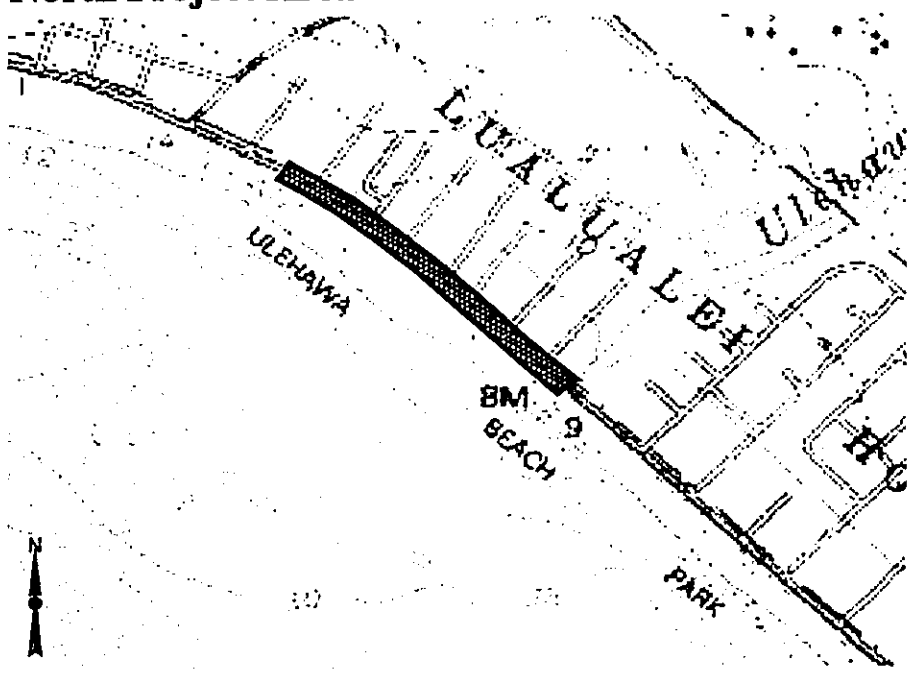


Figure 1. Project area location for Farrington Highway Drainage Improvement Project.

North Project Area



South Project Area

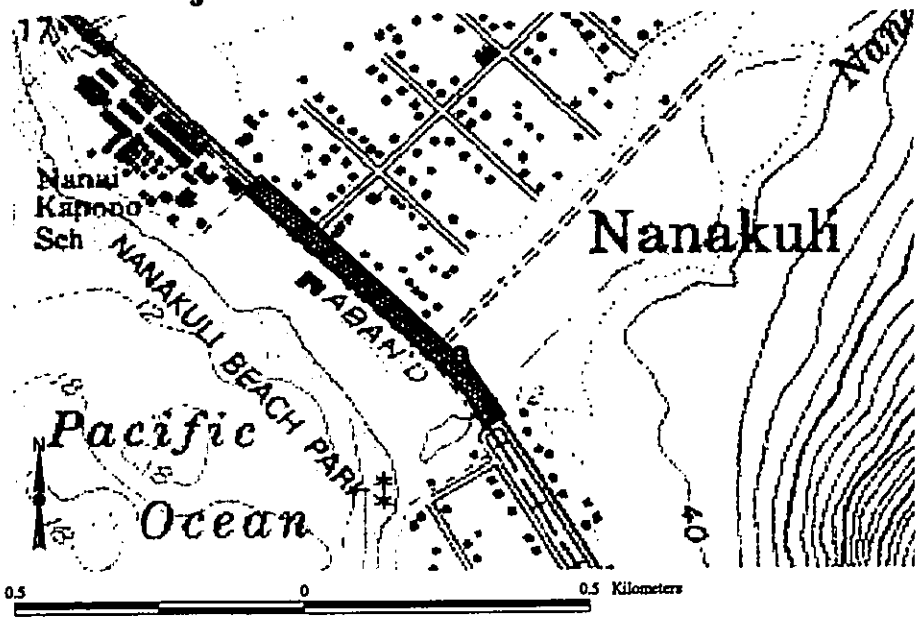


Figure 2. North project area, shown at the top of the page, and south project area, shown at the bottom of the page.

II. PROJECT METHODOLOGY

Research conducted for this project was designed to meet the Environmental Council's guidelines for conducting cultural impact assessments. A description and evaluation of the efforts undertaken to meet the council's protocol can be summarized as follows:

1. Efforts were made to contact organizations and individuals that have expertise concerning the types of cultural resources, practices, and beliefs found within Nānākuli and Lualualei *ahupua'a*. Discussions were held with knowledgeable members of the Hawai'i State Historic Preservation Office, Nānāikapono Elementary School and Museum, 'Alu Like, Lili'uokalani Children's Foundation, and Ke Ola Mamo.

2. With guidance from individuals in these organizations and using references garnered from documentary sources, efforts were made to identify, locate, and talk with individuals who have knowledge of the project areas. A master list of potential informants was developed, indicating their positions and/or areas of expertise and contact information (see Appendix A).

3. First contacts with selected informants were made either in-person (through attendance at meetings, personal introductions, or visits to work sites) or through telephone calls. Those who agreed to be interviewed for this project were informed about the rationale and scope of the proposed drainage project and the uses of this research. In addition, they were asked for their informed consent. The context of the interviews—that is, location, time, pacing, and method of recording—was of the informants' choosing.

4. The research instrument developed was two-fold. The first portion included a standardized collection of an informant's personal background. The second portion was a chronologically arranged, open-ended interview schedule. Interviews were conducted in an informal "talk-story" format and questions were not necessarily asked in a rigid order. Follow-up questions were asked when appropriate.

5. Consulted primary and secondary written sources were located in the Hawai'i State Archives, Hawai'i State Library, Bishop Museum Library, and the Hawai'i State Historic Preservation Office. These materials included Māhele and Land Court documents, census and tax records, previously recorded or published ethnographic interviews and oral histories, community studies, historic maps and photographs, newspapers, and periodicals. Secondary source materials included published and unpublished historical, anthropological, and archaeological texts.

Information garnered from these materials was used in several important ways. They helped to provide a general background for understanding the prehistoric and historic contexts of Nānākuli and Lualualei *ahupua'a*. These data were used to develop the interview schedule. They also provided a good understanding of the foci of earlier historical, anthropological, and archaeological research. For example, with respect to Nānākuli, topics such as prehistoric sites and early historic land claims have been given more attention than later historic uses of these areas. The development of a research instrument and the selection of informants were

guided by a desire to both add to these topics as well as provide information on more recent historic uses and activities.

This report is organized both geographically and chronologically. That is, information on cultural features, practices, and beliefs in each *ahupua'a* is summarized separately. For each *ahupua'a* this information is organized by major time periods. Wherever possible this information is cross-referenced with the interviews, which are summarized separately (see Appendix B).

III. A CULTURAL HISTORY OF NĀNĀKULI

NĀNĀKULI'S MYTHOLOGICAL ASSOCIATIONS AND SACRED SITES

In contrast to Lualualei, which is the setting for various feats of the demigod Maui, Nānākuli has few such associations. The hill that forms the western boundary of the *ahupua'a*, Heleakalā, is an exception. The name means "snare of the sun" and refers to an incident in which Maui snared the sun to keep it stationary so that his mother's tapa would dry. His mother, Hina, is said to have lived in a cave on the hill (Sterling and Summers 1978:62). Presumably the hill gave its name to Haleakalā ("house of the sun") Avenue, one of the two main thoroughfares that extend from Farrington Highway to the upper valley. People in Nānākuli suspect that city planners simply substituted the more familiar name derived from the island of Maui.

In his *Archaeology of O'ahu* (1933) McAllister quotes Thrum about a small *heiau* ("place of worship") named Ilihune, of which nothing remained at the time of McAllister's writing. Thrum referred to it as "a small walled *heiau* of *pookanaka* (sic) class. It was used about 1860 by Frank Manini as a cattle pen, for which natives prophesied his poverty and death" (quoted in Sterling and Summers 1978:62). Alika Silva suggests that some human remains associated with victims of human sacrifice may be found in the beach, dune, and swampy backbeach areas near Nānākuli Stream (see interview). He noted about 60 reburials in the area from Auyong Homestead Road to Haleakalā Avenue.

Sterling and Summers also reproduce an account from the Kalaniana'ole Collection concerning a fish attracting stone in Nānākuli (1978:63). The stone made itself known to a Nānākuli man by speaking to him in a dream. The man was lazy and lived off the generosity of others. He also ignored the gods, and so he would seem like an unlikely candidate for communications from the supernatural realm. He found the stone in the place indicated in his dream, and the next night the stone spoke to him again, telling him that a large school of fish was just offshore. Lacking a canoe and nets, the man told the *konohiki*, or overseer of the *ahupua'a*. The *konohiki* followed the instructions in the dream, and the catch was enormous.

Lehua Kapaku, the director of the museum at Nānāikapono Elementary School, told McGuire and Hammatt (2000) about a fish attracting stone that lies in the gulch through which Nānākuli Stream flows. It lies just landward of the end of Pua Avenue (called "First Road") on land belonging to Nānākuli Ranch. She described it as "the home of *'āweoweo*," the red fish known as "big eyes," for which, she said, Nānākuli is famous. Mrs. Kapaku was an initial contact for the present study and a source of names and contact numbers for additional interviews. She confirmed the location of the stone. From her description it is a large stone, not the small portable stone referred to in the account reproduced by Sterling and Summers (1978), but like the latter it reflects the reputation of Nānākuli as a location of prime fishing sites.

As it happens, Pua Avenue, which lies one block landward of Farrington Highway is the site where two other "stones of power" are located. According to local residents, when the construction crew were cutting and paving Pua Avenue, the larger of the two stones could not

be moved. They were able to remove the smaller stone only to find the next day that the stone had somehow returned (see McGuire and Hammatt 2000:54). According to Lehua Kapaku the construction equipment failures and dissension had plagued the crew, and the behavior of the stones was taken as an indication that there were powers present that had to be respected. Apparently the neighbors and construction crew organized a feast (*pā'ina*) and altered the course of the roadbed slightly. The stones are enclosed in small concrete slab on one of the lots on the seaward side of Pua Avenue.

While talking to other people from Nānākuli, similar stories were told about immovable (or surreptitiously mobile) rocks in other places in Nānākuli. Rather than viewing these accounts as a kind of "urban legend" attributed to different locations, these stories should probably be regarded as products of a traditional process of attributing power to stones that are seen as unusual in shape, color, or location.

THE EARLY HISTORY OF NĀNĀKULI

Early European visitors to the Wai'anae coast were not favorably impressed by the landscape. Vancouver, who sailed along this coast in 1793 reported that, "The face of the country did not promise an abundant supply [of water]; the situation was exposed [to the sea]" (Vancouver 1801). The only village he visited was Wai'anae, which he described as lying in "a grove of coconut and other trees on the southern side of a small bay" (Vancouver 1801:17). John Whitman, who lived in Hawai'i for two years from 1813 through 1815, traveled overland from Wai'anae to Honolulu. "After proceeding for some time over an uncultivated plain," he arrived at "a small village situated on the seashore. It consisted of about twenty huts occupied by fishermen" (Whitman 1979:82). McDermott and Hammatt interpret Whitman's "uncultivated plain" as a reference to Nānākuli and Lualualei (2000:22), though it could also refer to the 'Ewa Plain.

Perhaps the small coastal village visited by Whitman is the same Nānākuli settlement visited in the early 1800s by John Papa Ii. He mentions very little about the village except that there were breadfruit trees near the shore. Apparently the village lay along the coastal trail that passed around the southern end of the Wai'anae mountain range at the hill named Pu'uokapolei. Pu'uokapolei lies on the boundary of the districts of 'Ewa and Wai'anae (where the *ahupua'a* of Honouliuli and Nānākuli meet.) Today residents refer to the spot, not by the name of the hill, but as Black Rocks, for the numerous black volcanic cobbles that lie along the shoreline.)

In 1818, the Honolulu-based trader James Hunnewell (1909) passed "a number of Indian villages" when walking along the coastal trail from Lualualei to Waimānalo Gulch. Presumably one of them was in Nānākuli. The missionary Levi Chamberlain (n.d., cited in Cordy 1997) passed through Nānākuli in 1828, and his comments sheds some light on why there are so few historical references to Nānākuli:

> We passed several kauhale but found no [mission] schools, nor did we meet any persons who seemed to feel an interest in our object. As we thought it unlikely that we

> should be welcome guests at *any of the settlements* in this district, or at least at any place where no school had been established, we quickened our pace over a barren country, in some places sandy, and in other places rocky...(Chamberlain n.d., quoted in Cordy 1997:5).

Nānākuli was a place where early missionaries and other Europeans did not tarry long or deviate from the coastal track, and the few early historical references to settlements in Nānākuli mention only small coastal villages. Nānākuli is a dry valley, and it would be easy to conclude that the valley's only important resources were coastal and maritime. One interpretation of the meaning of "Nānākuli" is to "look (*nana*) deaf (*kuli*)." This interpretation points to the dryness of the *ahupua'a*. The residents were said to be so poor in terms of water and plantings that they could not offer passing strangers hospitality. Ashamed of their poverty they hid from passersby on the coastal trail whenever possible. If caught in the open, they would act as if they were deaf.

Recent archaeological surveys have shown that, while the resident population was small, it was not limited to the coastal zone. Cordy (1997) has recorded 26 habitation sites in the upper valley. Dating of organic remains suggests that scattered farms appeared in the upper valley between 1200-1400 AD and by 1400-1700 AD the whole of the upper valley was being cultivated.

Today Nānākuli Stream flows only after heavy rainfall. The joining of two main branches that drain either side of the upper valley forms the stream. Several smaller streams fed by springs in the higher rainfall zone of the upper valley feed these branches, in turn. Precipitation in Nānākuli ranges from 40 inches per year in the upper valley to around 20 inches per year in the lower valley near the coast.

Added to the low precipitation of the lower valley is the fact that from the point where the valley's eastern and western branch streams join, Nānākuli Stream has cut a gully that is as much as 150 feet deep. As the stream approaches the sea there is a small flood plain and natural wetland/intermittent pond, but for a portion of the streams length the water flows many feet below the valley floor (making it unusable for traditional irrigation). Also the soil of the lower valley is thin and sandy with coral outcrops, remnants of an ancient reef.

It seems, then, that there were two main zones within the valley suitable for human exploitation: the upper valley and the coastal zone. The settlements in the latter are the only ones that caught the attention of the few early observers. But the evidence is that the coastal zones of O'ahu's leeward valleys were settled earlier than the upper valleys. Excavation of coral sink holes on the military reservation (the former Camp Andrews) yielded a human burial, fragments of bone from a human infant, and midden (Myron Brumaghin, pers. comm.; see also McGuire and Hammatt 2000), and it is likely that archaeologically significant sites lie within the zone to be affected by this project. As noted below such sites have already been confirmed in Lualualei.

THE GREAT MĀHELE IN NĀNĀKULI

The Great Māhele of 1848 divided the lands of the Hawaiian Islands between the king and 252 chiefs, called *konohiki* because they held land by grant from the king. Under the general land reform process ordinary Hawaiians could apply for titles to land that they were already using. These *kuleana* claims had to be submitted to the Board of Commissioners as Quiet Land Titles, or "Land Commission" (Chinen 1958).

Only one such claim was submitted for all of Nānākuli. A man named Kuluahi claimed a *muliwai* (a pool near the mouth of a stream), a cultivated *kula* (dry land), "and for firewood also, a valley planted in wauke (paper mulberry) mauka, and a kula houselot" (Commissioner of Public Lands 1929, Native Register, Vol. 5:341, No. 7455). The claim of a *muliwai* is interesting. The likely place for this is the wet land that lies beside Nānākuli Stream on the Wai'anae side. When it contains water it is referred to locally as "Stink Pond," but Daisy Lewis remembers its waters being clear when she was a girl (see interview below); it was a favorite fishing spot for her father who caught mullet and *'ōpelu* (mackerel scad.) Kuluahi's claim is identified as lying in the *'ili* (subdivision of *ahupua'a*) of Hapai in the *ahupua'a* of Nānākuli. Assuming that the *muliwai* lay in the same *'ili*, perhaps Hapai included the small floodplain of Nānākuli Stream.

In any case, Kuluahi's claim was disallowed, and the entire *ahupua'a* of Nānākuli was declared Crown Land. From 1853 through 1900 the Crown leased and mortgaged the valley to a succession of occupants who used it for ranching. The first leaseholder was Frank Manini, the son of Don Francisco de Paula Marin. Manini's lease refers to a "little stone house on [a] raised promontory on [the] sea beach" (Cordy 1997:7). Myron Brumaghin, principal of Nānāikapono school points out that today the highest point on the beach front of the *ahupua'a* is where the bath house of Kalaniana'ole Beach Park stands today.

Cordy (1997:7) notes that Manini later built a new house somewhere in the lower valley and within his fenced property he cultivated peaches, apples, coffee, oranges, grapefruit, and *'ōhelo* (*Vaccinium reticulatum*). Apparently, Manini's ranching operation prospered. In 1858 he wrote that he could see cattle, horses, pigs, and sheep wherever he looked on the property (Cordy 1997). In 1862, Manini signed the lease back over to Kamehameha IV (Department of the Interior, Kingdom of Hawai'i, 1862, May 3). Later leaseholders include William Jarrett, J. Robinson, and members of the Judd and Dowsett families. After 1865 ranching operations were no longer headquartered in the valley, as they had been in Manini's day. Nānākuli land was leased to supplement ranching operations based elsewhere on the island.

From 1853, onwards the upper valley was devoted solely to cattle ranching, but Hawaiians continued to live along the coast and in the lower valley. In 1855, 10 adult men and their families are listed in tax roles as residing in Nānākuli. Assuming five persons per household, there would have been a resident population of 50 (Cordy 1997). From 1860 through 1879, the population of the valley gradually declined and, after 1880, it dropped sharply. The Hawaiian Island Directory for 1888 lists only four persons as residing in Nānākuli.

After 1853, the resident population of the *ahupua'a* was overwhelmingly Hawaiian. Cordy (1997) calculated that among 50 taxpayers that are listed over the years, only nine were non-Hawaiians. The nine included two Hawai'i-born Europeans, six non-native born Europeans (including four Portuguese), and one Chinese.

1900 THROUGH WORLD WAR II IN NĀNĀKULI

Under the Reciprocity Treaty, signed in 1876, sugar grown in the Kingdom was admitted duty free into the United States. This was a great incentive to increase sugar production in the islands. In 1861, there were 22 sugar plantations and mills in the islands; by 1878, there were 44 (Thrum 1875:39, cited in Kelly 1991). One of those new plantations was the Wai'anae Company established in 1878 by Herman Widemann, a former justice of the Kingdom's Supreme Court. By 1880, the Wai'anae plantation was producing 500 tons of cane on 120 cultivated acres. To expand production it was necessary to obtain water for irrigation. The McCandless brothers were contracted to drill artesian wells. The three wells that produced usable water could irrigate 30 to 40 acres of cane each. Production expanded accordingly. By 1880, a sugar mill was in operation and by 1884 the Hawaiian Directory could report that, after Honolulu, Wai'anae was the largest settlement on O'ahu (Krauss 1973:41-42) because of the labor required by the expanding operation. Photo 1, below, is an aerial view of Wai'anae Valley ca. 1930, that shows the sugarcane operation of the Wai'anae Company.

Photo 1. Aerial view of Wai'anae, O'ahu, Hawai'i, ca. 1930 (Photo provided by Bishop Museum Archives).

Meanwhile another entrepreneur, Benjamin Franklin Dillingham, along with James Castle, was buying up land in leeward O'ahu for leasing and resale. The land was considered too distant from Honolulu to be desirable. To increase the value of his investments, Dillingham decided to build a railroad to the plantation in 'Ewa, which had been established in 1890, and on to Wai'anae and around Ka'ena point to link O'ahu's north shore to Honolulu. After initial difficulty in obtaining financial backing, Dillingham finally succeeded in obtaining the necessary funding. The OR&L tracks linked Wai'anae to Honolulu by 1895. Photo 2 shows the OR&L train "depot" in Nanakuli in 1942 with military and other passengers.

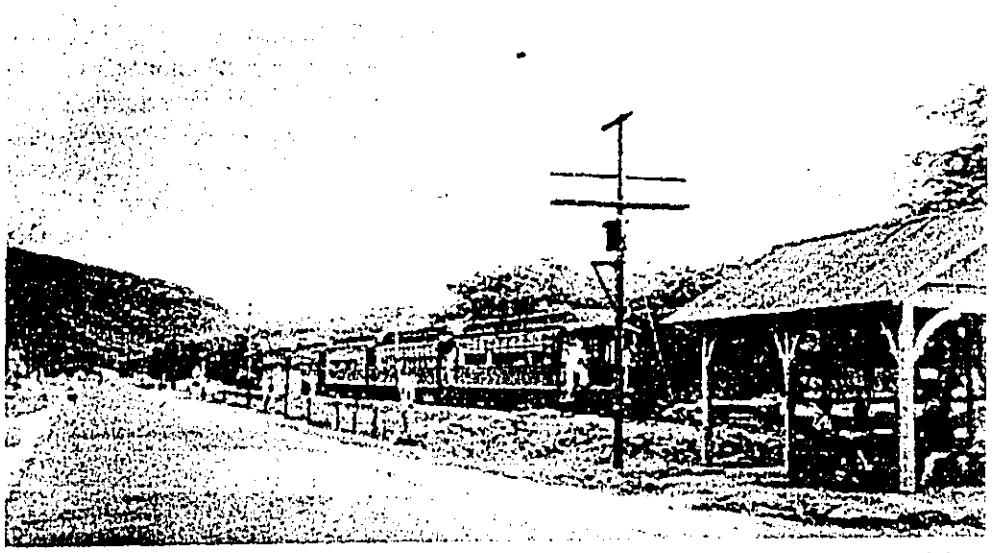


Photo 2. OR&L route, Nānākuli, O'ahu, 1942 (Photo provided by Bishop Museum).

The OR&L played an important role in the economic development of leeward O'ahu. It not only hauled freight to and from the sugar plantations of 'Ewa and Wai'anae, it also provided dependable transportation for leeward residents at a reasonable price. When the Hawaiian homelands were opened in 1930, many of the families residing in Nānākuli and Lualualei did not have cars. There was a locally owned bus service run by the Hoouli family, but the OR&L was an alternative source of public transportation, and the scream of its whistle was a familiar background sound. Though it discontinued service in 1946, it is still important in the memories of older Wai'anae residents, and the tracks which still remain in Nānākuli are symbolically important to the community (see interview with Myron Brumaghin).

The history of the OR&L is linked to another important institution in the Nānākuli-Lualualei area, the U.S. Naval Ammunition Depot at Lualualei. The Depot was built on land of the McCandless Cattle Ranch. After the government of Queen Lili'uokalani was overthrown, Crown Lands became Public Lands. The government of the new Republic

opened some of these lands for homesteading in the hopes of attracting more Euro-American residents from the U.S.

Lincoln McCandless had purchased one of the lots in Lualualei in 1909 for $2,325. In 1915, he purchased additional plots from Alika Dowsett for a total of $18,000. The Navy purchased 8,814 acres of this land in 1929 (Kelly 1991:339), though unsatisfied with the amount of compensation offered to him, McCandless initiated legal proceedings.

The Naval Ammunition Depot was commissioned in 1934. A spur line linked the facility to the OR&L. According to a story that the *Honolulu Star-Bulletin* ran in 1957, the Depot itself had 88 miles of track, 16 diesel-electric locomotives, and 1,600 pieces of rolling equipment (cited in Kelly 1991). Edna Williams' husband worked as an engineer on this internal railroad system (see interview with Edna Williams). He was one of many homestead residents who were employed at the Naval Ammunition Depot.

The military presence in the general research area was not limited to the Naval Ammunition Depot. As early as 1916, the Territorial Governor transmitted to the Commissioner of Public Lands a request from the U.S. government for a parcel of land in Nānākuli to be used as a camp for the Army (Hawai'i State Archives, card files). In 1917, the land was surveyed along with parcels in Aiea and Waimānalo also requested for military purposes (Hawai'i State Archives, card files). In 1917, the plot in Nānākuli was set aside for military use by Presidential Order (Hawai'i State Archives, card files). It is labeled as a "Military Reservation" on a 1922 map of the Wai'anae district (see map in McGuire and Hammatt 2000:34).

This military reserve later became Camp Andrews, a recreation center for Navy personnel serving on ships during WWII. It is just landward of Farrington Highway across from Nānāikapono Elementary School. Today it is covered once again with *kiawe* (algaroba) trees and strewn with trash, but when it was in use it had cabins and a large assembly hall where dances and shows were held. The camp itself, as well as local businesses, became meeting grounds for interaction between local residents and service men from all over the U.S. Local people attended the entertainment functions, and Daisy Lewis remembers climbing trees outside the camp along with other children to catch a glimpse of the entertainment inside (see interview with Daisy Lewis). The large cement slab of the assembly hall is still there, just inside the coral rock pillars that mark what had been the main entrance.

Directly across Farrington Highway from Camp Andrews, beside the old Nānāikapono School building, was a smaller recreation camp for the Marine Corps, Camp Beaumont. For a brief time after the war the recreation department of the City and County of Honolulu ran a summer camp for boys in the former Camp Beaumont. As part of the summer playground program, boys could stay in one of the 12 cabins, each equipped with eight or nine cots, at the cost of 50 cents a day (Anonymous 1947).

The time that sailors and marines spent at these camps during the war must have been a welcome respite from front line stations. Daisy Lewis tells of meeting an elderly man from the mainland at the grocery store. He asked her if she knew where Kalaniana'ole Beach Park

was located. She said that she did, and the man and his family made arrangements to follow Daisy, who said she would be passing the park on her way home. She pulled her car into the beach parking lot, and the other car followed. It turned out that the elderly man had spent time at Camp Andrews during the war and had wanted to show it to his family. Daisy said that he had tears in his eyes (Daisy Lewis, pers. comm.).

There were some costs to local residents associated with the two military camps, however. Walter Kamana recalled trading fish that he caught along the Nānākuli-Lualualei coastline to the cook at Camp Andrews in return for such things as butter and condensed milk. He pointed out that the military personnel spent money in the community, but not everyone benefited from this. One family that did was the Mahelonas, who had a store near the corner of Nānākuli Avenue and Farrington Highway (McGuire and Hammatt 2000). Water had always been in short supply for the residents of the Nānākuli Hawaiian Homesteads, but when questioned about whether the camps aggravated this situation, everyone interviewed for the present study said that they did not. However, Walter Kamana pointed out that the disposal of the camps' sewage was another matter.

He claimed that the sewer line from the camps carried sewage out into the ocean near the Nānākuli Stream outlet, damaging the reef and harming local fishing (McGuire and Hammatt 2000:82).

The Hawaiian homesteads in Nānākuli were opened for settlement in 1930. At that time the lots were still covered with *kiawe* and had to be cleared before people could construct houses. There was no electricity and an inadequate water supply. Not all of the roads were paved. The road that was to become Farrington Highway was still unpaved in the 1920s when Genevieve Nahulu's family came out for summer visits (Yarber 1991: 24-26). Families adopted different strategies with respect to construction. Some lived in tents on their lots while the work of clearing and construction was in progress. Daisy Lewis's family was living in Kalihi and lived and worked at their lot on the weekends (see interview with Daisy Lewis). Edna Williams' family continued to live in Waikīkī while her grandfather cleared the lot and a contractor built the house (see interview with Edna Williams).

Homesteaders came from various parts of O'ahu as well the outer islands. For most, connections to the valley and its history go back no further than the 1930s. Yet because of the nature of conditions during that early settlement period, their knowledge of resource use in the lower valley and beach zones is very good. How extensively they utilized local sea resources varied from one family to another, but it appears that those resources were there when they wanted them. However, the residents believe that this is no longer true to the same extent.

IV. A CULTURAL HISTORY OF LUALUALEI

LUALUALEI'S MYTHOLOGICAL ASSOCIATIONS AND SACRED SITES

Lualualei is a larger valley than Nānākuli; indeed, it is the largest valley on O'ahu's leeward coast. Like Nānākuli, it is a dry valley. Most of Lualualei receives less than 30 inches of rain per year, though higher elevations receive almost twice as much rainfall. Two permanent streams drain the valley (Haun 1991). One has its source in a dike spring just below Kolekole Pass. This section of the valley, an *'ili* known as Pūhāwai ("water bursting out"), has been agriculturally productive in the past. All of the *kuleana* tracts awarded in the *ahupua'a* of Lualualei were located there (see below). The second stream drains the western wall of the valley. Lower in the valley these streams become intermittent. There are other intermittent streams as well.

In the lower valley the natural drainage has been directed into concrete channels which merge and flow out into the ocean at the outlet to Ulehawa Stream. The translation of this stream's name is "dirty penis" and is said to refer to an ancient chief (Pukui, et al. 1974:214-215). The land section through which it flows, also Ulehawa, is rich in associations with the demigod Maui. Maui and his brothers are said to have been born here, and the cave in which his mother, Hina, made her tapa lies on Heleakalā, the ridge that separates Nānākuli and Lualualei. The ridge takes its name ("snare of the sun") from an episode in which Maui stopped the sun in mid-course so that his mother's tapa would dry. Near Maui obtained fire from the shape-shifting woman/mudhen, *'alaehuapī* (Kamakau1993, vol.1, Ch. 5, p.45; quoted in Sterling and Summers 1978:64-65).

In the lower valley, too, is the giant rock that Maui is said to have used as a headrest. It stands today on the grounds of the Garden Groves apartments at 87-1550 Farrington Highway. This remnant of an ancient pyroclastic event stands on an ancient reef.[1] Like the lower valley of Nānākuli, this ancient reef formation is probably honey combed with fissures and sinkholes. One of McDermott and Hammatt's consultants, Clarence Lopez, reported that in boyhood he and some friends found a cave in this area with a canoe and human skeletons (McDermott and Hammatt 2000).

At least two *heiau* are known to have existed in Lualualei. One of them, Kakioe, a small *heiau* of which nothing remains, was located in Pūhāwai; the *'ili* associated with the spring that flows near Kolekole Pass. The second, Nioiula *heiau*, stood on Hālona ridge in the extreme upper valley, to the southwest of the present forest reserve. This was a *heiau poo kanaka*, a *heiau* at which human sacrifices were offered. McAllister (1933) provides a schematic drawing of the *heiau* reproduced in Sterling and Summers (1978:66). Lincoln McCandless, who ranched in Lualualei, is said to have used rocks from the *heiau* to construct a cattle pen. The cattle became infected with "worms all along their backs" (Adrian Silva, McCandless's grandson, quoted in Krauss 1973:68). McCandless asked his Hawaiian ranch

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1. McDermott and Hammatt (2000:47) write that the reef probably dates to the Pleistocene.

hands what should be done. They recommended that a feast (*pā'ina*) be held within the enclosure. He followed their advice, and the problem went away.

Walter Kamana, a long time resident of the Wai'anae coast, has identified important traditional sites along the coastline of Lualualei. Just beyond Hakimo Road, on the seaward side of Farrington Highway, there is a rectangular shaped rocky inlet. At the time that Mr. Kamana was interviewed by Matt McDermott (McDermott and Hammatt 2000), there was a Japanese shrine or commemorative marker on the northwest corner of the rectangle. It was described during the current project as a short wooden post on which Japanese characters were painted. A concrete foundation with a square shaped socket or indentation in which such a post might have been set was located, but no marker. In any case, Walter Kamana also identified this as the site of a Hawaiian fishing shrine as well, a *koa* for *nenue* (also "*nenuwe,*" club fish). He also referred to it as "a point to point burial ground" (McDermott and Hammatt 2000:44). The possibility of human remains (including those of victims of human sacrifice) in the beach, dune, and even the swampy grounds adjacent Ulehawa Stream was also mentioned by Alika Silva (see interview).

Mr. Kamana also identified locations of other *koa* along Lualualei's coastline. One of them stood near the sea grape trees that stand just north of Ulehawa Stream. This falls within the immediate project area and is the location of a confirmed cultural site (Site 50-80-07-5763; see Magnuson 2001:17, for a description). The *koa* here was for *weke 'ula* (*Mulloidichthys auriflamma*) a *kapu* fish in traditional times, probably because of its bright red color (see also Valeri 1985:353-354). Mr. Kamana said that this *koa* was destroyed by the tidal wave of 1946.

Further down Farrington Highway, across from the Sack 'n Save supermarket, was the site of a *koa* for *moi*, or threadfish (Site 50-80-07-5762). As the name *moi* ("king") suggests, the threadfish was esteemed as good eating (Hosaka 1973:91). Mr. Kamana said that it was here that Hawaiians "put their sacrifices to the *moi* ground" (McDermott and Hammatt 2000:45).

Walter Kamana pointed out that the construction of the concrete drainage for Ulehawa Stream altered the ecology along the adjoining coastline. Prior to its construction people gathered various edible seaweeds nearby. These included *lipoa* (*Dictyopteris plagiogramma, D. australis*), *limu 'ele'ele* (*Enteromorpha prolifera*), and *manauea* (*Gracilaria coronopifolia*), *līpe'epe'e* (*Laurencia parvipapillata, L. dotyi, L. succisa*), *limu kohu* (*Asparagopsis taxiformis*), and *wāwae'iole* (*Lycopodium cernuum)* (see also interviews with Edna Williams and Daisy Lewis). These, too, had their *koa* along the Lualualei coastline, according to Mr. Kamana. The *koa* for *līpoa* was located between the pumping station and the Japanese shrine discussed above. The *koa* for *līpe'epe'e*, *limu kohu*, and *wāwae'iole* were by the Japanese shrine itself (McDermott and Hammatt 2000).

Lualualei is known to have had one fishpond; John Papa 'I'i referred to it as being on the plain—that is, in the lower valley. Marion Kelly (1991:317) suggested that the pond mentioned by 'I'i was probably destroyed by sugar cultivation in the lower valley. Mr. Kamana said that before the concrete drainage for Ulehawa Stream was constructed, the area "behind" (seaward of) the drainage was a swampy, low-lying area with fishponds and taro

plantings. Before houses could be built in the area, fill material had to be laid down to make the area higher and drier (McDermott and Hammatt 2000).

THE EARLY HISTORY OF LUALUALEI

Like Nānākuli, Lualualei seems to have been a place that early foreign travelers simply passed through on their ways to other places. There were three main trails that connected Lualualei with other parts of O'ahu. One split off from the Kunia trail and climbed through Pōhākea Pass into the upper Lualualei valley from where it descended to the main coastal trail. A second trail linked Wai'anae Kai to Wai'anae Uka and Wahiawā. It began in Kūkaniloko, the "Birthing Place," in Wahiawā, ran through the Mālamanui Valley, climbed through the Kolekole Pass, and descended into Lualualei Valley where it linked up with the coastal trail. Farrington Highway more or less replicates the coastal trail's route.

John Papa 'I'i traveled through Lualualei by each of these trails in the early 19th century. He wrote of sleeping one night of his journey somewhere above Kunia on the Honolulu side of Pōhākea Pass and sleeping the next night "at Lualualei near the fishpond on the plain" ('I'i 1959:23).

In 1835, a mission census listed 1,654 residents along the entire Wai'anae coast. In 1853, a smallpox epidemic swept through O'ahu, and mortality rates were very high. Two years later, in 1855, the tax collector for Wai'anae recorded only 183 taxpayers along the entire coastline, an estimated total population of around 800 (McDermott and Hammatt 2000:25). The smaller *ahupua'a* like Nānākuli and Lualualei must have become very empty places. It is probable that this depopulation made these two valleys suitable for ranching, an economic enterprise requiring large expanses of land. Perhaps such considerations explain why all of Nānākuli and most of Lualualei were declared Crown Lands.

THE GREAT MĀHELE IN LUALUALEI

In contrast to Nānākuli, a small number of *kuleana* awards (six) were made in Lualualei. All six of the *kuleana* were in the upper valley, in the *'ili* of Pūhāwai. The following are the awarded claims:

"To the Land Commissioners: 'Ili of Pūhāwai, Wai'anae District, O'ahu. I, the one whose name is below have 34 lo'i, a cultivated kula, a valley planted in wauke landward. Three lo'i are at Wai'anae, there is also a houselot." January 22, 1848 Kaila'a X his mark (Commissioner of Public Lands 1929, Native Register, Vol. 5:342)
This award, LCA 7456, totaled 6.74 acres.

"To the Land Commissioners: 'Ili of Pūhāwai, Wai'anae District, O'ahu. I, the one whose name is below, have 46 lo'i, also a kula. Six lo'i are in Wai'anae, also there is a lot of wauke, landward, and also a house lot. It is finished." January 22, 1848 Apiki X his mark

(Commissioner of Public Lands 1929, Native Register Vol. 5:474).
This award, LCA 8005, totaled 19.06 acres.

"To the Land Commissioners: 'Ili of Pūhāwai, District of Wai'anae, O'ahu. I, the one whose name is below, have 23 lo'i, also a wauke planting landward, also a kula. In another place there is another planting of wauke" [no date] Ka'ahia X his mark
(Commissioner of Public Lands 1929, Native Register, Vol. 5:340-341.)
This award, LCA 7452, totaled 2.08 acres. [Note that there is no mention of a house site.]

"To the Land Commissioners: 'Ili of Mo'omuku, Wai'anae District, O'ahu. I, the one whose name is below, have 25 lo'i. Eight lo'i are in Wai'anae, 17 lo'i are in Pūhāwai. There is also a cultivated kula, three upland wauke plantings, and a house site at Pūhāwai. It is finished." January 22, 1848. Kailianu X his mark
(Commissioner of Public Lands 1929, Native Register, Vol. 5:340.)
This award, LCA 7451, totaled 2.75 acres.

[Kelly (*1991:321*) pointed out that the 2.75 acres awarded to this claimant was for a houselot and two plots in the *ili* of Mo'omuku in Wai'anae; the 17 lo'i in Pūhāwai were not awarded.]

Kanakahele for Po'omono

"To the Land Commissioners of Pūhāwai, Wai'anae District, O'ahu. I, the one whose name is below, have 21 lo'i, a valley landward, a cultivated kula, and also a house lot." January 22, 1848. Kamakahele (sic) X his mark
(Commissioner of Public Lands 1929, Native Register, Vol. 5:337.)
This award, LCA 7454, totaled 1.154 acres.

"To the Land Commissioners: 'Ili of Pūhāwai, district of Wai'anae, O'ahu. I, the one whose name is below, have thirty-one lo'i, a cultivated kula, and also a valley with wauke. One lo'i is in another place. It is finished." January 22, 1848 Kahi X his mark
(Commissioner of Public Lands 1929, Native Register, Vol. 5:337.)
This award, LCA 7436, totaled 24.836 acres.

Marion Kelly (1991:320) notes that there were at least two and perhaps three persons living in Lualualei who were not awarded land. Two of these persons testified that, even though they registered *kuleana* claims to the land that they had been using, they had since returned the land to the person from whom they had received it, Kahi, the awardee of LCA 7436. Mentioned in Kahi's award is a neighbor named Maui who also failed to receive an award. The disparities in the amounts of land awarded and the fact that some claims were disallowed are interesting but unexplained in the records.

The total acreage awarded is only 56.62 acres in a valley containing 14,700 acres. The remainder of the land in the valley was declared Crown Land. The land in Pūhāwai was the most productive land in the valley since it was suitable for the cultivation of wet taro. Water from the spring could be channeled through a succession of *lo'i*. These *kuleana* lands lie within the Naval Ammunition Depot, however, and are adjacent to the Kolekole Pass Road,

the military road linking the Naval Ammunition Depot to Schofield Barracks. Apparently taro grown there successfully self-propagated. Genevieve Akana Nahulu's mother-in-law used to cross McCandless ranch land to reach the spring at Pūhāwai where she would wash clothes and harvest taro. She would place the taro in the Wai'anae Sugar Company flume, which carried water from the spring to Wai'anae. Children waiting down-valley would retrieve the taro as it came floating past (Yarber 1991:53).

1900 THROUGH WORLD WAR II IN LUALUALEI

The Crown Lands of Lualualei were made available for lease or sale for a variety of economic activities. For example, when the OR&L extended its line as far as the Mikilua Valley in 1896, a Wai'anae resident named Chung Kun Ai leased collecting rights for *kiawe* firewood and charcoal making in Lualualei. He shipped the wood by railroad to Honolulu where he sold it in Chinatown for $12.50 a cord (Krauss 1973:62). Interest in the economic potential of the limestone deposits in Lualualei date back as early as 1903. Land Patent Grant 5006 was awarded to Willard E. Brown for a limestone lot, which was sold at public auction in 1906. Large-scale commercial exploitation of lime did not begin until 1959, however. Henry J. Kaiser purchased 240 acres for 1.5 million dollars and built a cement factory that operated until 1959 (Kelly 1991:325).

Land in the Lualualei valley was also devoted to extensive agricultural operations. In 1851 William H. Jarrett leased Crown Land in the valley for a cattle ranching operation, agreeing to pay $700 per year for the 50-year lease. He assigned half-ownership of the lease to Frank Manini who was then ranching in the neighboring *ahupua'a* of Nānākuli. He later filed suit against Manini, claiming that he was never paid the $1,000 that Manini owed for his half-interest. The court found in favor of Jarrett and his son, who was a co-plaintiff in the suit. Not long after the court's decision, Jarrett took on George Galbraith as a partner, and in 1869 sold his son's remaining half interest in the lease, livestock, and buildings to James Dowsett (Kelly 1991:326-327).

With the establishment of the Republic of Hawai'i in 1895, Crown Lands became reclassified as Public Lands. Galbraith and Dowsett's lease was not affected by the change, but when the lease expired in 1901, it was decided to open the lands to homesteading. Among those who acquired one of the first series of homestead lots was Lincoln McCandless (see Krauss 1973).

Lincoln McCandless and his two brothers had been hired to drill artesian wells for the Wai'anae Sugar Company. The Wai'anae plantation depended on Wai'anae Stream for most of its water needs, diverting the stream flow down an irrigation channel that had been constructed by Hawaiian taro farmers (Krauss 1973:42). This created a conflict with *kuleana* cultivators, and the stream flow was insufficient to supply new fields. By 1892, the plantation had expanded into the Lualualei and Mākaha valleys in addition to Wai'anae. Lualualei is the driest of the three valleys, and the 300 acres there were also the least productive. But in 1901, production in Lualualei was increased when the plantation obtained a five-year lease on 3,332 acres for sugar and ranching (Kelly 1991:335). To meet its demands for water, the Wai'anae

Sugar Company obtained a right-of-way lease transecting the valley for the construction of a flume system (see above).

After 1907, a second series of homestead lots were made available for purchase in Lualualei. They lay in the dry lower valley just landward of the main coastal road. These were smaller than the first series of homestead lots, ranging in size from 42 to 60 acres (Kelly 1991:332). In 1910, a third offering of public lands was made. The affected area amounted to 1,126.4 acres divided into 116 lots. Some of this land had been cultivated by the Wai'anae Sugar Company. This third series of homestead lots ranged in size from 4.86 to 18.18 acres and were made available at reasonable terms. The land was described as "dry and supposed to be suitable for algeroba (sic) trees, etc." (*Pacific Commercial Advertiser,* April 17, 1912, quoted in Krauss 1973:86).

About 40 homesteaders from all over O'ahu took up the offer, but the government did not deliver on its promise to provide water. It was 1921 before the Legislature appropriated funds for a water supply. In 1924, the State made an agreement with the Wai'anae Sugar Company that provided for the plantation to make 112,000 gallons of water available to homesteaders on a daily basis in return for right-of-way privileges for the construction of pipelines along the government road and easements on small plots of government land for a catchment system (Krauss 1973:88). In 1934, the plantation agreed to increase this to 150,000 gallons a day for Mā'ili, Lualualei, and Nānākuli, which was still insufficient for the growing population of the area (*Honolulu Advertiser*, July 7, 1934, cited in Krauss 1973:126).

Demands for water increased with the opening of the Naval Ammunition Depot. In 1935, in an attempt to meet its own needs, the Navy excavated a tunnel at 1,500 feet above sea level and about 168 feet below the spring at Pūhāwai. In 1940, the tunnel was supplying 175,000 gallons of water per day to the Naval Ammunition Depot, the Naval radio station, and Army camp (Stearns 1940:34). The Lualualei Naval Reservation Radio Transmitting Facility was established by Executive Order No. 599 on land adjacent to the Naval Ammunition Depot. The transmitting facility covers 1,748.4 acres on land turned over to the Navy after the condemnation of McCandless property as well as land belonging to the (then) Territory of Hawaii.

World War II had a transforming effect on the entire Wai'anae coast. There was an influx of 15,000 to 20,000 troops into the area to man a string of coastal installations. The demands on available water increased dramatically. Ironically, the severity of the water shortage during the war years brought some long term benefits to the residents of Nānākuli. In 1943, a retired Navy chief, Frederick C. Hart, was trying to help the war effort by selling war bonds door-to-door. When he tried to sell bonds to some Nānākuli residents, they asked why they should help a government that had done nothing to help them. Hart tried to assure them that the Federal government would help them, and they told Hart that, if he succeeded in bringing more water to the valley, they would purchase bonds.

Along with Nānākuli residents, Hart began a campaign to publicize the plight of the homesteaders. He was convinced that the plantation was not making water available in the amounts that it had promised. For example, not only did children at Nānākuli school have to

fill milk cans with sea water to be used in flushing toilets (see interview with Edna Williams), the janitor sometimes worked from 4:00 A.M. to 10:00 P.M. filling pails with water for the school children to drink during the day (Krauss 1973:139). The Territorial governor promised immediate action, and the next day water pressure in the pipes tripled. The Board of Supervisors promised to dig wells in the schoolyard so that the toilets could be flushed. But the measures were inadequate, and it became clear to everybody that meeting the water needs of the Wai'anae coast's growing population would require the closure of Wai'anae plantation.

The war years were difficult for Wai'anae Sugar Company. Some military facilities were placed on prime sugar-growing land, and production suffered. The draft and high paying defense-related jobs made the labor market very tight. The company tried to meet its labor needs by recruiting teenagers to replace workers lured away by higher wages elsewhere. There were several years of drought towards the end of the war, and in 1945, production was only 3,000 tons (Krauss 1973:140). Desperate for more water, the plantation drilled a tunnel in the base of the mountains at the head of the Mākaha Valley. When it was completed, it provided an additional 2,000,000 gallons a day, but in the following year plantation workers voted to join the International Longshoremen's and Warehousemen's Union (ILWU). Higher wages and benefits would have added to the losses that the company was already experiencing. The final blow came with the closure of the OR&L.

V. POSSIBLE CULTURAL IMPACTS OF THE PROPOSED PROJECT

To date, four formal in-person and two telephone interviews have been conducted as well as numerous informal discussions. Through these interviews several issues of concern have been identified. With one exception, these concerns relate to historical and possible archaeological resources rather than current cultural practices.

NĀNĀKULI

Issue 1: Possible Subsurface Features in the Area Adjacent to Nānākuli Stream

It is likely that the only *kuleana* claimed in Nānākuli, or at least a portion of the land claimed, lies next to the Nānākuli Stream outlet on the Wai'anae side of the stream. The claimant, Kuluahi, mentions a *muliwai*, or natural fishpond, and this is the most likely location (see Cordy 1997). The existing wetland and occasional pond was fished for mullet and *'ōpelu* by Daisy Lewis's *hānai* (adoptive) father, and it is likely to have been a favored fishing spot in earlier periods as well. It is not possible to say what other uses the higher ground adjacent to the stream might have been put to, but it should be noted that Rey Quebral, a local resident, mentioned to the archaeological reconnaissance team that he had heard that there were burials located between St. Rita's Catholic Church and Nānākuli Stream. This would include the additional project area on the landward side of Farrington Highway (see Magnuson 2001). This possibility of burials located in the swampy ground of the backbeach area (as well as in the beach and dune areas) was also mentioned in the interview with Alika Silva (see interview below). Both Silva and Enos (see interview below) expressed the need for these areas to be carefully monitored.

Issue 2: Discharge of Runoff into Nānākuli Stream

People interviewed for this study and others (e.g., McDermott and Hammatt 2000) noted that local beach and reef ecology have been altered by pollution and by channeling streams through concrete drainage systems. This has affected such cultural practices as *limu* picking. The proposed drainage improvements on the Nānākuli portion of the project include a series of drainage inlets and a drain line discharging into a drainageway near Nānākuli Stream. The runoff is likely to contain such pollutants as motor oil. These enter the stream drainage directly rather than being filtered by vegetation and percolating through the soil. However, the proposed changes will only contribute in a minor way to this long-standing problem.

Issue 3: OR&L Railroad Tracks

On the seaward side of Farrington Highway for the entire length of the shouth project area, tracks formerly used by the OR&L parallel the roadway (see Photo 2). For the years that it functioned, the railroad was vital to the economy of the Wai'anae coast, and it has an important place in the collective memory of older homestead residents. However, as the

proposed drainage improvements will involve excavation for a series of drainage inlets and a drainline on the landward side of the highway, the tracks will not be disturbed. If there are modifications to the project that will involve excavation on the seaward side of the highway, preservation of the tracks may become an issue.

Issue 4: Camp Andrews

The large tract on which the former Camp Andrews was situated is just beyond the south project area. This is the proposed location of the new Nānāikapono Elementary School. Myron Brumaghin, the school principal, expressed a concern that the original coral rock pillars at the main entrance to the camp be preserved for the future school. Since this is not an area that will be directly affected by excavation, this should not be a problem. However, if it becomes necessary for heavy equipment to maneuver along that area of roadway, care should be taken.

Another issue of concern is the fact that a human burial was found in a sinkhole on the former campgrounds. While it is possible that any existing burials would have been found during previous excavations along the roadway, care should be taken while excavating in the area on either side of Nānākuli Avenue.

LUALUALEI

Issue 1: Possible Subsurface Features in the Area Adjacent to Ulehawa Stream

As noted above in the section on Lualualei's early history, the area adjacent to the stream on the seaward side of the highway may be the site of the one fish pond known to have been in Lualuale and mentioned by John Papa 'I'i (1959:23). Mr. Walter Kamana, a long time area resident, told McDermott and Hammatt (2000) that there used to be fish ponds and taro plantings in this area. The possibility of burials and cultural features in this general area was discussed in the interview with Silva. Both Silva and Enos expressed the need for these areas to be carefully monitored.

Issue 2: Possible Subsurface Features Adjacent to Ulehawa Beach Park

On the seaward side of the highway, a short distance from the stream is a cluster of three sea grape trees. Mr. Kamana identified this as a site of early historic and prehistoric Hawaiian habitation. Exploratory excavation by McDemott and Hammatt revealed a cultural layer 20 to 50 cm thick with pit-type subfeatures. Two pearl shellfish hooks were recovered from one of these pits (McDermott and Hammatt 2000). The site has been designated Site 50-80-07-5763 and has been recommended for preservation (McDermott and Hammatt 2001). The possibility of other such sites along the beachfront cannot be ruled out. While Farrington Highway passes through the backbeach area, no sites have been found in its vicinity.

Issue 3: Sacred Associations

As noted above, Lualualei is rich in associations with Maui. The stone on which he is said to have rested his head stands a short distance from the project area. Other researchers have identified the sites of several fishing shrines along the coastline of Lualualei (McDermott and Hammatt 2000). The same informant who provided them with that information, Kamana, also claimed that the entire area from the bathrooms at Ulehawa Beach Park all the way to Mā'ili Point is *kapu* ground. Another of McDermott and Hammatt's consultants, Mr. Fred Cachola, a former principal of Nānāikapono Elementary School, was told that the area from the Maui stone to the beach is a pathway for Nightmarchers. None of the sacred aspects or associations of this area will be impacted by the proposed project. The sacred associations, however, are suggestive of a rich history and prehistory in the immediate area.

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Appendix E

Environmental Noise Assessment Study, Farrington Highway Drainage Improvements, Nanakuli, Hawaii.

D.L. Adams Associates, Ltd. Acoustical Consultants

August 23, 2001

D. L. ADAMS ASSOCIATES, LTD.
ACOUSTICAL CONSULTANTS

Project No. 01-44

ENVIRONMENTAL NOISE ASSESSMENT STUDY
FARRINGTON HIGHWAY DRAINAGE IMPROVEMENTS
NANAKULI, HAWAII

August 23, 2001

Prepared for
Belt Collins Hawaii.
Honolulu, Hawaii

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CONTENTS

1.0 SUMMARY

1.1 The proposed project involves the installation of drainage systems along two sections of Farrington Highway in Nanakuli. This report assesses the noise impact of construction work during the project. The construction of the drainage systems will involve excavation, backfill, grading, and paving.

1.2 Noise sensitive areas along Farrington Highway are currently exposed to ambient noise levels of 64.7 dBA to 75.3 dBA with the dominant noise sources being traffic.

1.3 Existing noise sensitive areas include residential areas and churches along Farrington Highway.

1.4 The dominant noise sources due to the project will probably be backhoes, trenching machines, bulldozers, graders, generators, pavement sawa, and diesel powered trucks. The noise from construction activities may impact noise sensitive areas along Farrington Highway. Noise from construction activities should be short term, will be localized to the immediate vicinity of the actual construction activity, and must be approved through a community noise permit from the Department of Health.

1.5 If nighttime construction work is planned, a public informational meeting must be held for all residents and property owners that may be impacted by the construction.

1.6 Following the completion of the project, noise levels are expected to return to existing levels.

2.0 PROJECT DESCRIPTION

The proposed project involves the installation of drainage systems along two sections of Farrington Highway as shown in Figure 1. One section, approximately 1,000 feet in length, will include a series of dry wells on either side of the highway and within the highway right-of-way. The second section, approximately 2,000 feet in length, will include drainage inlets on the mauka side of the highway. This section will be almost entirely within the highway right-of-way. The construction of the drainage systems will involve excavation, backfill, grading, and paving along Farrington Highway.

3.0 STATE DEPARTMENT OF HEALTH (DOH), Chapter 46, *Community Noise Control*, Department of Health, State of Hawaii, Administrative Rules, Title 11, September 23, 1996.

The DOH defines three classes of zoning districts and specifies corresponding maximum permissible sound levels due to stationary noise sources such as air-conditioning units, exhaust systems, generators, compressors, pumps, etc., and equipment related to

agricultural, construction, and industrial activities. These levels are enforced for any location at or beyond the property line and shall not be exceeded for more than 10% of the time during any 20-minute period. The specified noise limits which apply are a function of the zoning and time of day as shown in Figure 2. With respect to mixed zoning districts, DOH specifies the primary land use designation shall be used to determine the applicable zoning district class and the maximum permissible sound level.

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

> "No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels...before 7:00 a.m. and after 6:00 p.m. of the same day, Monday through Friday."
>
> "No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels...before 9:00 a.m. and after 6:00 p.m. on Saturday."
>
> "No permit shall allow any construction activities which emit noise in excess of the maximum permissible sound levels on Sundays and on holidays."

A brief description of common acoustic terminology used in DOH rules is presented in Appendix A.

4.0 EXISTING ACOUSTICAL ENVIRONMENT

24-hour noise level measurements were conducted on July 23, 24, and 25, 2001 to assess the existing acoustical environment along Farrington Highway. The measurements were obtained at Locations 1 and 2 as shown in Figure 3, using a Larson-Davis Laboratories, Model 820 Sound Level Meter.

Ambient noise levels at both locations were taken at approximately 30 feet from the highway and were dominated by traffic noise. The daytime (7 AM to 10 PM) equivalent sound levels, L_{eq}, were between 71.1 dBA and 74.7 dBA. The nighttime (10 PM to 7 AM) equivalent sound levels, L_{eq}, were between 65.6 dBA to 75.3 dBA. The following table shows the hourly equivalent sound levels at measurement locations 1 and 2.

Hourly Equivalent Sound Levels in L_{eq}		
Measurement Hour	Location 1	Location 2
0700	74.8	74.1
0800	73.8	73.3
0900	74.0	72.9
1000	73.6	73.1
1100	73.6	72.4
1200	73.5	74.0
1300	73.5	73.2
1400	74.2	73.1
1500	72.4	74.7
1600	70.3	73.5
1700	72.1	73.5
1800	73.1	74.5
1900	72.2	72.4
2000	71.2	74.0
2100	71.1	71.1
2200	70.4	73.1
2300	68.1	73.9
2400	66.8	67.4
0100	64.7	65.6
0200	65.6	65.0
0300	66.8	65.8
0400	70.3	69.7
0500	73.9	72.1
0600	75.3	73.8

5.0 POTENTIAL NOISE IMPACT DUE TO THE PROJECT

5.1 Project Noise Impact

No long-term noise impact should result from the project. Following completion of the construction, noise levels should return to pre-construction levels.

5.2 Project Construction Noise

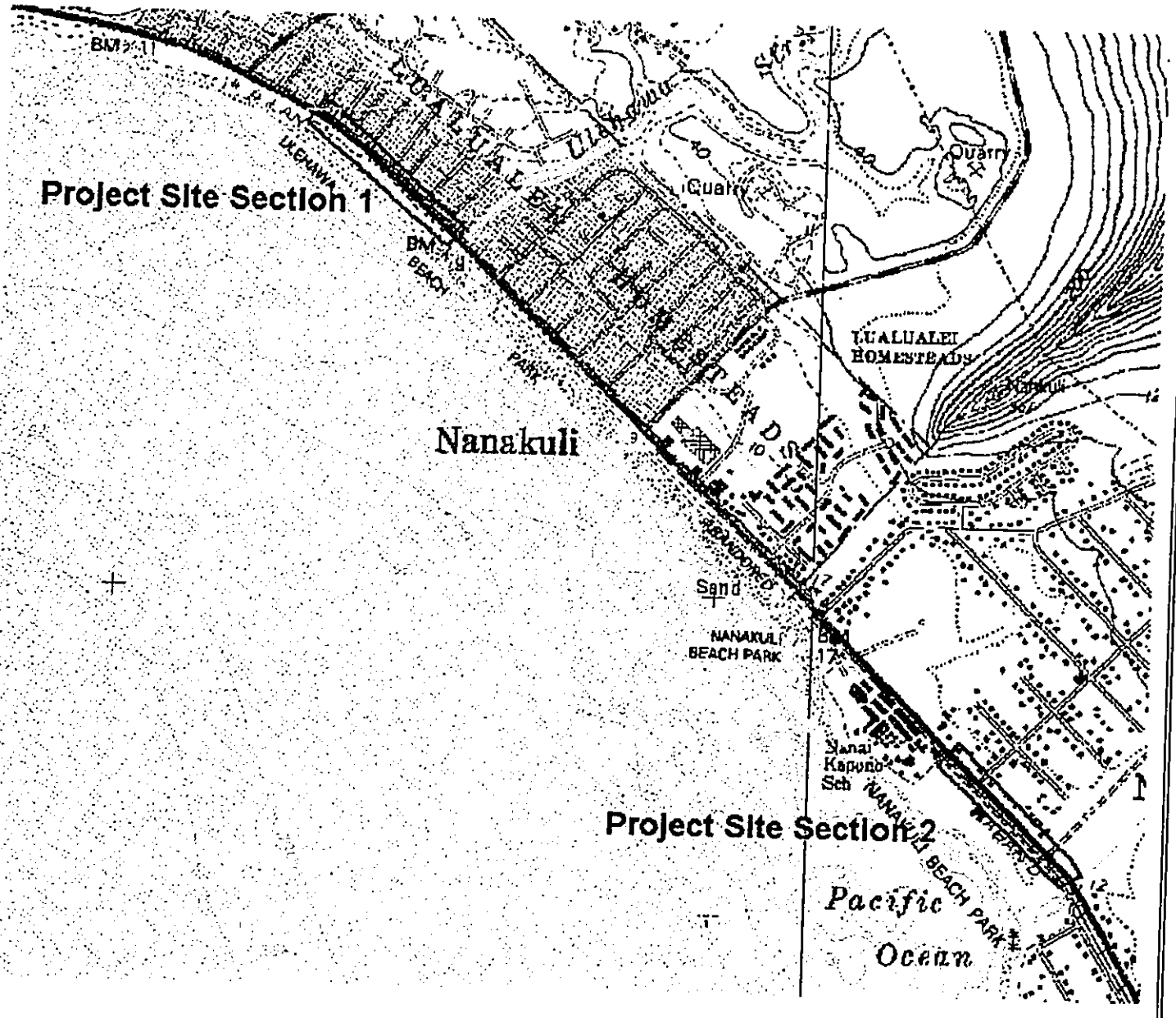
The majority of properties along Farrington Highway in both construction areas are considered to be noise sensitive areas, i.e., residential homes and churches.

Project construction throughout the area covered by this report will involve excavation, trenching, grading, paving, and movement of construction vehicles. The various construction activities may generate significant amounts of noise, which may impact nearby noise sensitive areas. The actual noise levels produced will be a function of the methods employed during each stage of the construction process. Typical ranges of construction equipment noise are shown in Figure 4. Backhoes, front loaders, bulldozers, generators, pavement saws, and diesel-powered trucks will probably be the loudest equipment used during construction. If nighttime construction work is conducted, Ho-rams and jack hammers should not be used. DOH's maximum permissible noise levels for construction equipment during nighttime hours in residential areas is 45 dBA and 55 dBA during daytime hours or the ambient noise level whichever is higher.

In addition, the DOH noise rules state that construction equipment and on-site vehicles or devices whose operations involve the exhausting of gas or air, excluding pile hammers and pneumatic hand tools weighing less than 15 pounds, must be equipped with mufflers.

5.3 Community Noise Permit and Noise Variance

A community noise permit for daytime work and a noise variance for nighttime work must be granted by the Department of Health for projects where the noise levels from construction equipment will exceed the DOH "maximum permissible" property line noise levels. In addition to the noise variance for nighttime work, public notification of to residents and property owners along the construction route must be made in writing and through a public meeting. A letter stating the purpose of the project and indicating the time and place of the public meeting must be delivered to all affected residences and property owners.



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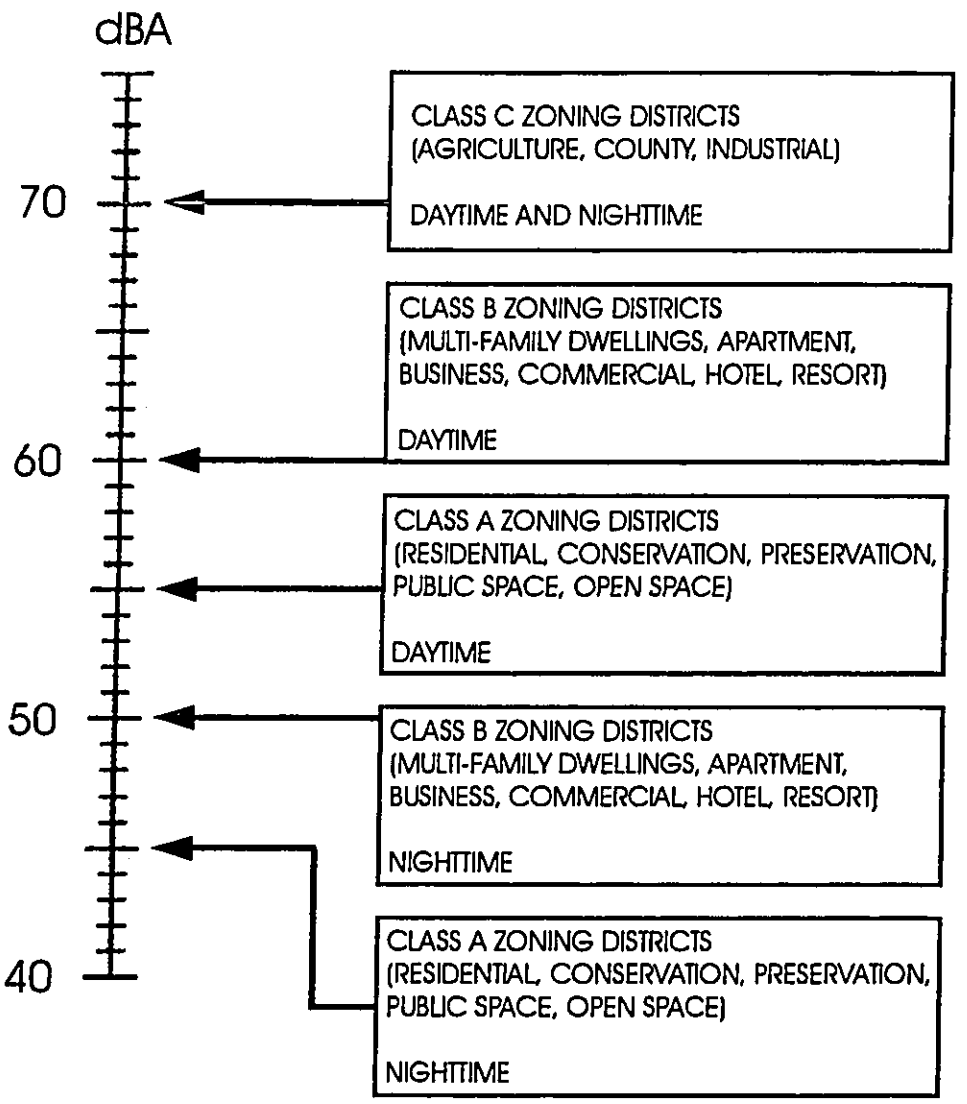
970 N. KALAHEO AVENUE, SUITE A-311, KAILUA, HAWAII 96734
(808)254-3318 FAX: (808)254-5295 EMAIL: hawaii@dlaa.com

FIGURE 1 - PROJECT LOCATION



NOTE: SOUND LEVELS INDICATED BY ZONING DISTRICT ARE THE "MAXIMUM PERMISSIBLE" SOUND LEVELS DUE TO EXCESSIVE NOISE SOURCES SUCH AS STATIONARY MECHANICAL EQUIPMENT AND EQUIPMENT RELATED TO AGRICULTURAL, CONSTRUCTION AND INDUSTRIAL ACTIVITIES THAT SHALL NOT BE EXCEEDED FOR MORE THAN 10% OF THE TIME WITHIN ANY 20-MINUTE PERIOD DURING THE TIME PERIOD SHOWN.

(DAYTIME: 7:00 A.M. TO 10:00 P.M., NIGHTTIME: 10:00 P.M. TO 7:00 A.M.)

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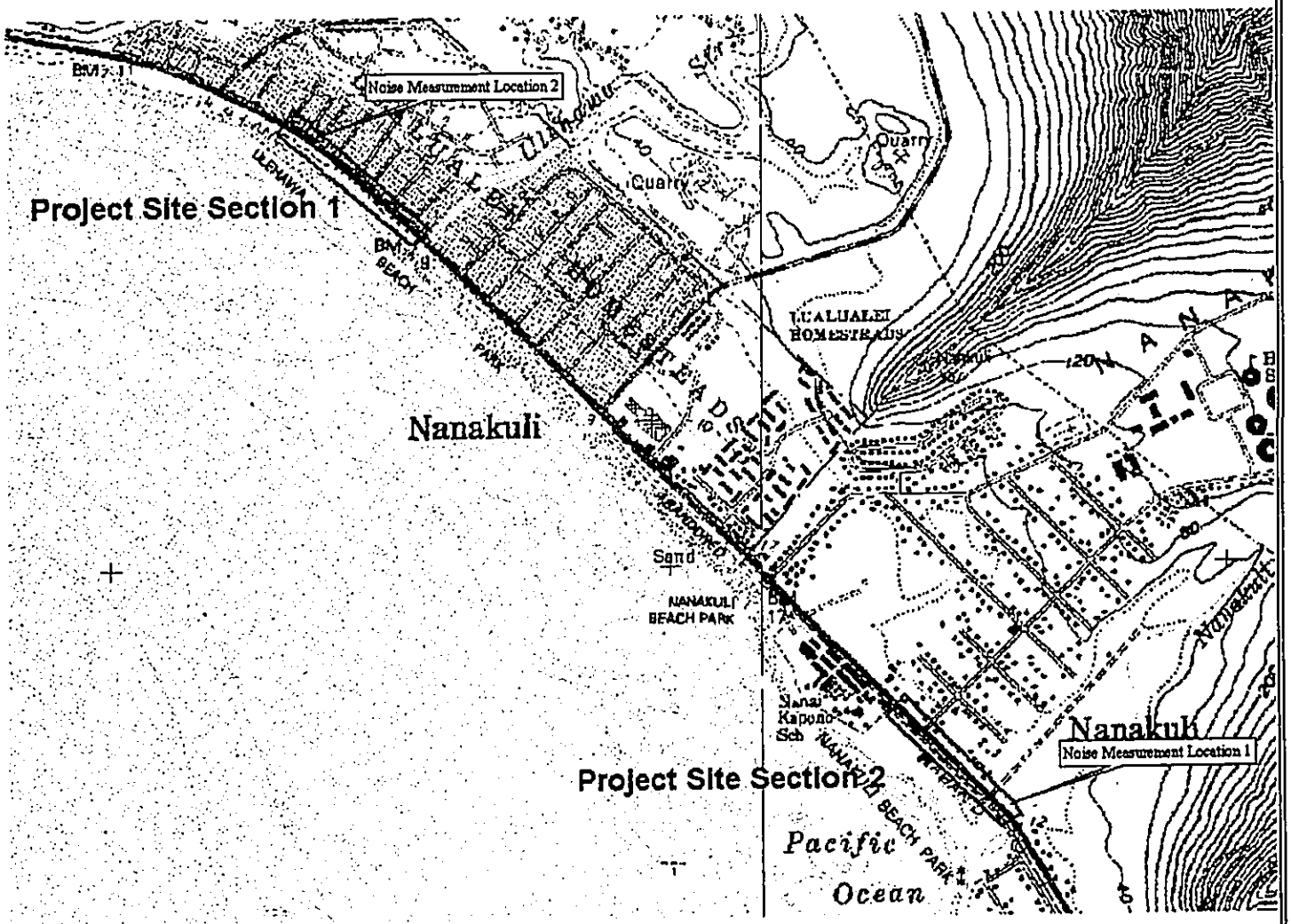
FIGURE 2 - MAXIMUM PERMISSIBLE SOUND LEVELS FOR VARIOUS ZONING DISTRICTS



NOT TO SCALE

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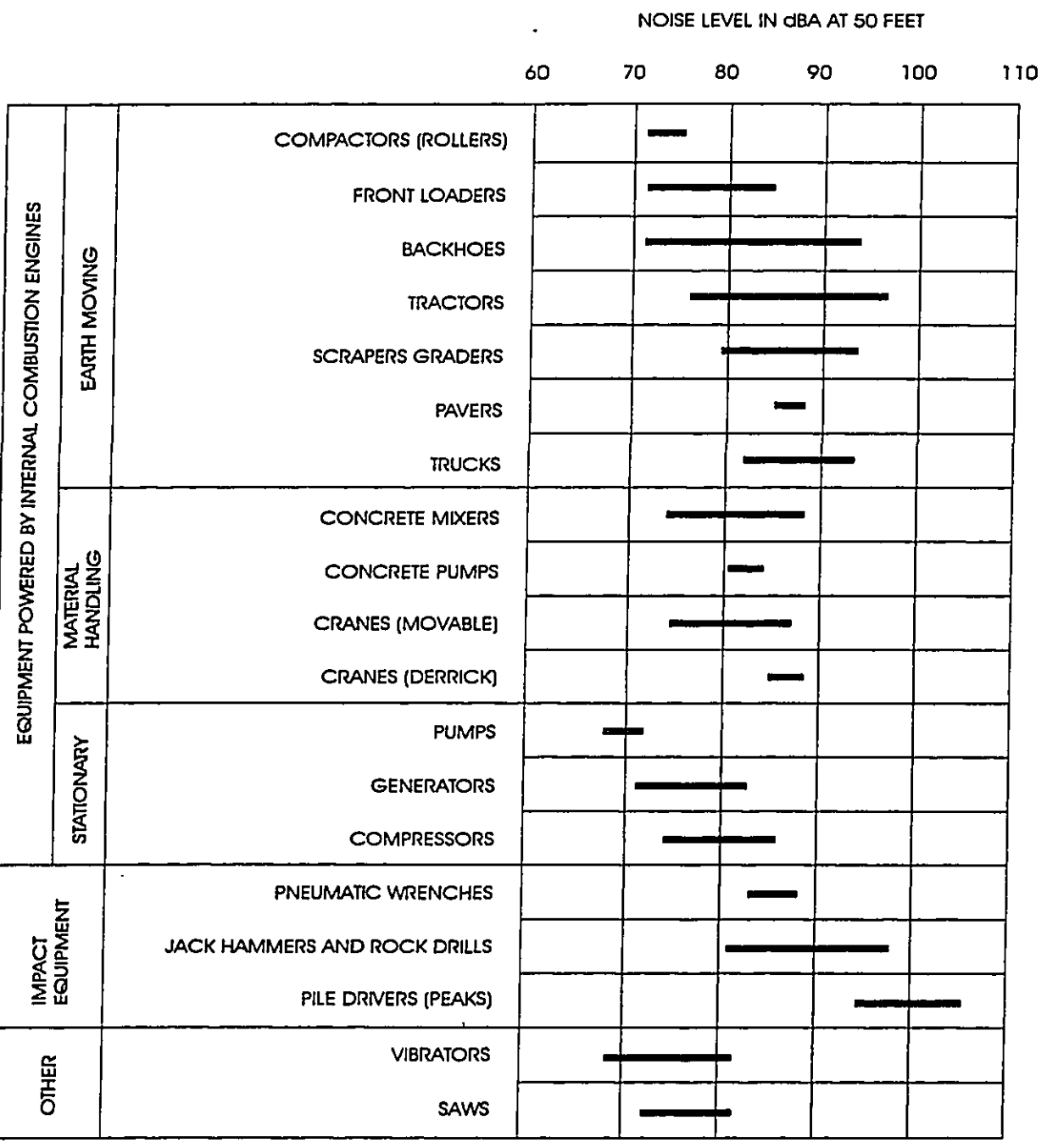
FIGURE 3 - LOCATIONS OF NOISE MEASUREMENT



NOTE: BASED ON LIMITED AVAILABLE DATA SAMPLES

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FIGURE 4 - TYPICAL SOUND PRESSURE LEVELS FROM CONSTRUCTION EQUIPMENT

APPENDIX A

ACOUSTICAL TERMINOLOGY

Sound Pressure Level

Sound or noise consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. It is measured in terms of decibels (dB) using precision instruments known as sound level meters. Noise is defined as "unwanted" sound.

Technically, sound pressure level (SPL) is defined as:

$$SPL = 20 \log (P/Pref) \text{ dB}$$

where P is the sound pressure fluctuation (above or below atmospheric pressure) and Pref is the reference pressure, 20 micropascals, which is approximately the lowest sound pressure that can be detected by the human ear. For example, if P is 20 micropascals, then SPL = 0 dB, or if P is 200 micropascals, then SPL = 20 dB. The relation between sound pressure in micropascals and sound pressure level in decibels (dB) is shown in Figure A-1.

The sound pressure level that results from a combination of noise sources is not the arithmetic sum of the individual sound levels, but rather the logarithmic sum. For example, two sound levels of 50 dB produce a combined level of 53 dB, not 100 dB; two sound levels of 40 and 50 dB produce a combined level of 50.4 dB.

Human sensitivity to changes in sound pressure level is highly individualized. Sensitivity to sound depends on frequency content, time of occurrence, duration, and psychological factors such as emotions and expectations. However, in general, a change of 1 or 2 dB in the level of a sound is difficult for most people to detect. A 3 dB change is commonly taken as the smallest perceptible change and a 5 dB change corresponds to a noticeable change in loudness. A 10 dB increase or decrease in sound level corresponds to an approximate doubling or halving of loudness, respectively.

A-Weighted Sound Level

The human ear is more sensitive to sound in the frequency range of 250 Hertz (Hz) and higher, than in frequencies below 250 Hz. Due to this type of frequency response, a frequency weighting system, was developed to emulate the frequency response of the human ear. This system expresses sound levels in units of A-weighted decibels (dBA). A-weighted sound levels de-emphasizes the low frequency portion of the spectrum of a signal. The A-weighted level of a sound is a good measure of the loudness of that sound. Different sounds having the same A-weighted sound level are perceived as being about equally loud. Typical values of the A-weighted sound level of various noise sources are shown in Figure A-1.

Appendix A
Acoustical Terminology (Continued)

Statistical Sound Levels

The sound levels of long-term noise producing activities, such as traffic movement, aircraft operations, etc., can vary considerably with time. In order to obtain a single number rating of such a noise source, a statistically-based method of expressing sound or noise levels developed. It is known as the Exceedence Level, L_n. The Exceedence Level, L_n, represents the sound level which is exceeded for n% of the measurement time period. For example, L_{10} = 60 dBA indicates that for the duration at the measurement period, the sound level exceeded 60 dBA 10% of the time. Commonly used Exceedence Levels include L_1, L_{10}, L_{50}, and L_{90}, which are widely used to assess community and environmental noise. Figure A-2 illustrates the relationship between selected statistical noise levels.

Equivalent Sound Level

The Equivalent Sound Level, L_{eq}, represents a constant level of sound having the same total acoustic energy as that contained in the actual time-varying sound being measured over a specific time period. L_{eq} is commonly used to describe community noise, traffic noise, and hearing damage potential. It has units of dBA and is illustrated in Figure A-2.

Day-Night Equivalent Sound Level

The Day-Night Equivalent Sound Level, L_{dn}, is the Equivalent Sound Level, L_{eq}, measured over a 24-hour period. However, a 10 dB penalty is added to the noise levels recorded between 10 pm and 7 am to account for people's higher sensitivity to noise at night when the background noise level is typically lower. The L_{dn} is a commonly used noise descriptor in assessing land use compatibility, and is widely used by federal and local agencies and standards organizations. Qualitative descriptions, as well as local examples of L_{dn}, are shown in Figure A-3.

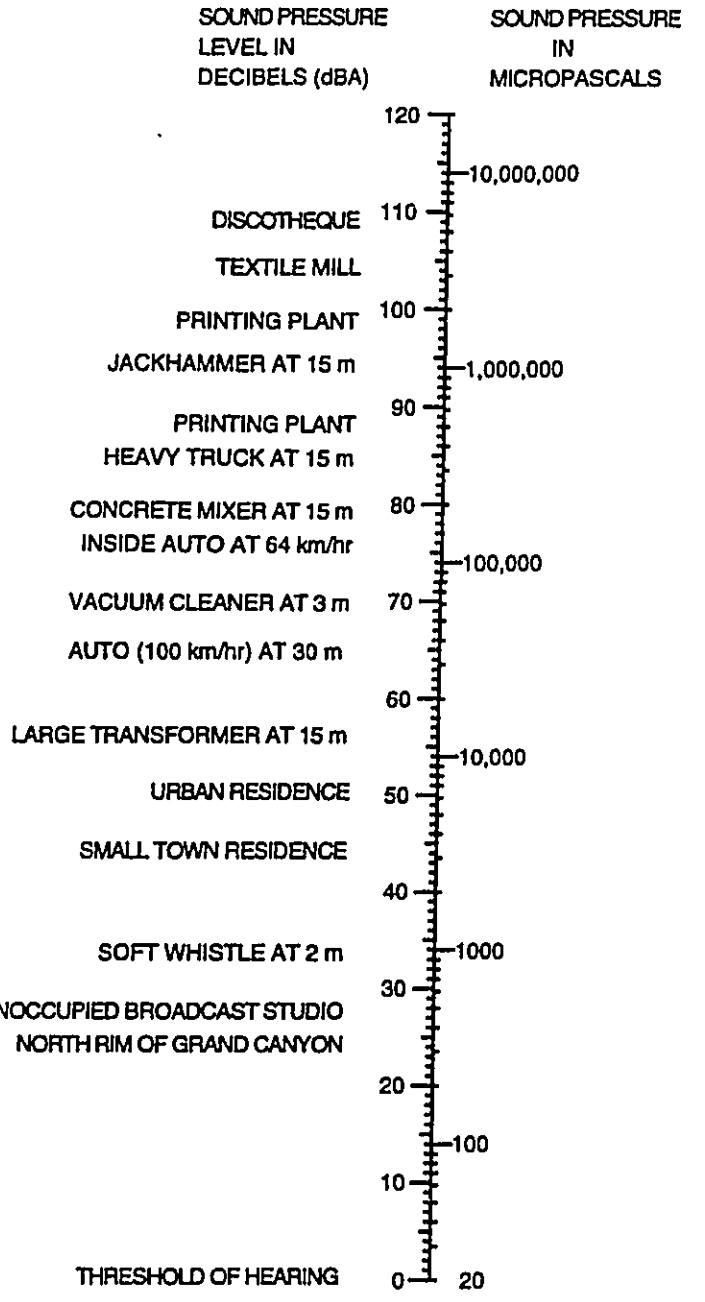

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FIGURE A-1 - THE RELATION BETWEEN SOUND PRESSURE, P, AND SOUND PRESSURE LEVEL, SPL. ALSO SHOWN ARE TYPICAL VALUES OF A-WEIGHTED SOUND LEVELS OF VARIOUS NOISE SOURCES.

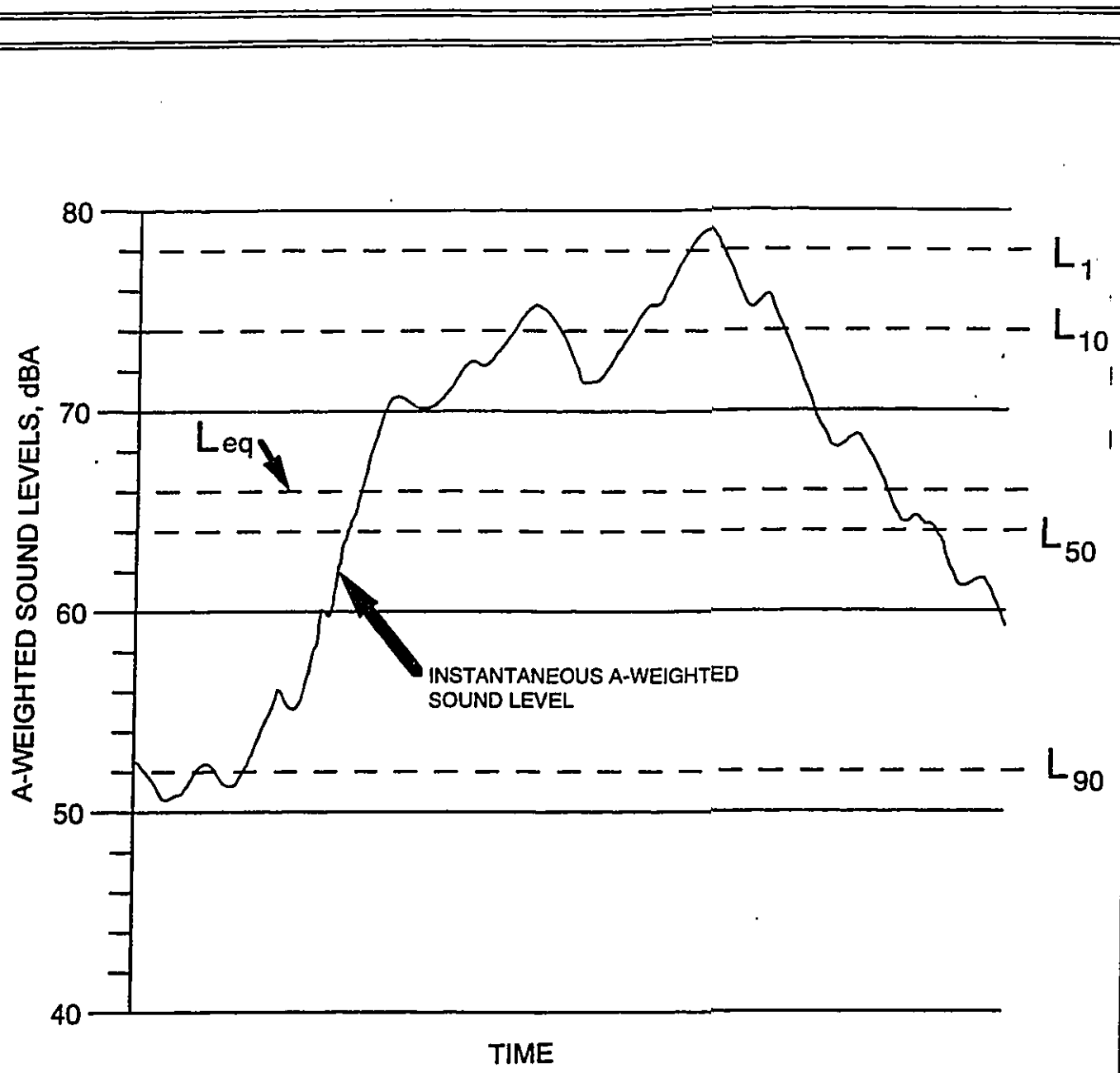

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FIGURE A-2 - COMPARISON OF AN INSTANTANEOUS SOUND LEVEL AND THE CORRESPONDING STATISTICAL SOUND LEVELS

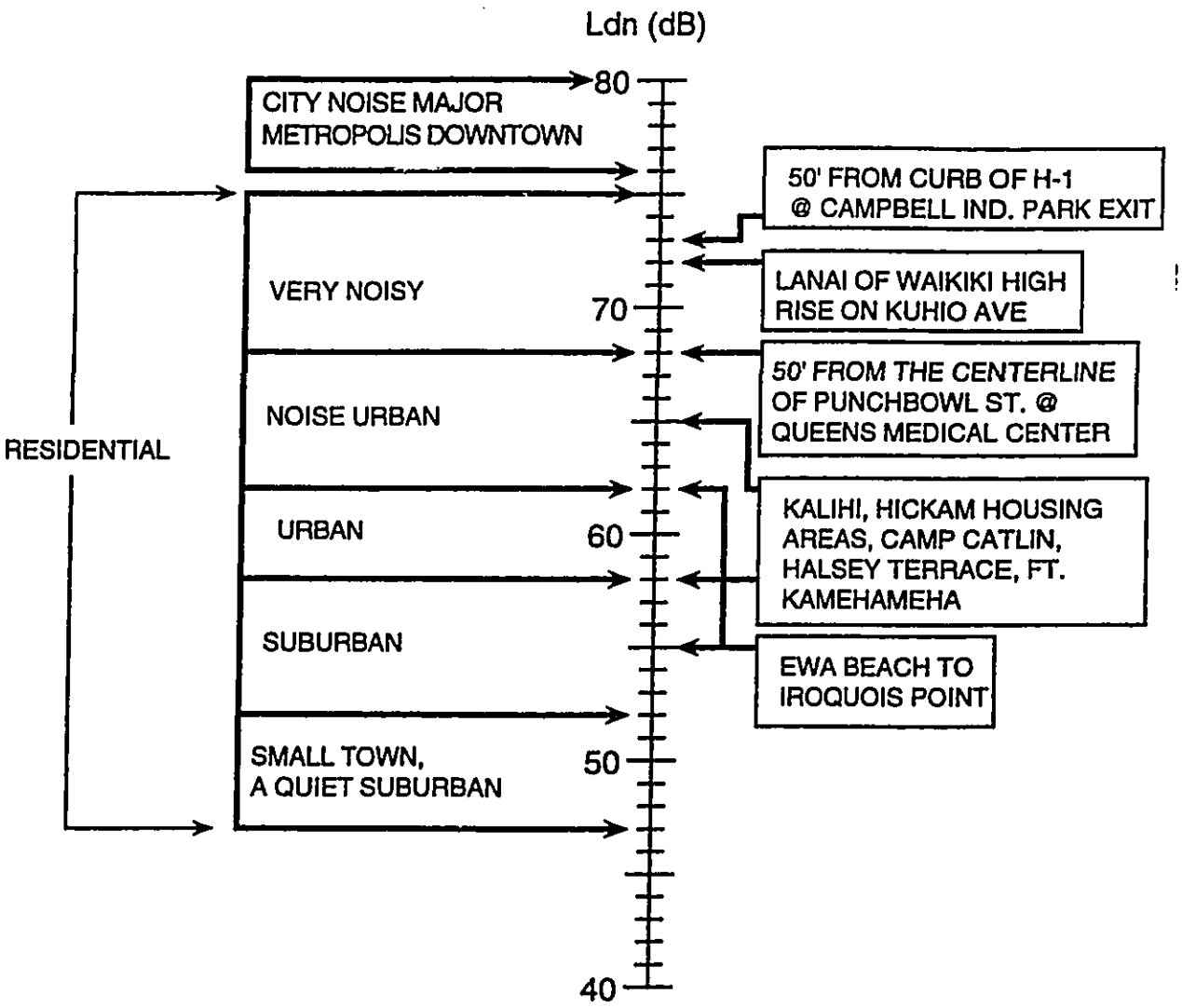

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FIGURE A-3 - QUALITATIVE DESCRIPTION OF THE DAY-NIGHT EQUIVALENT SOUND LEVELS (Ldn) AND EXAMPLE Ldn's AT SELECTED LOCATIONS ON OAHU

Appendix F

Comment Letters from Agencies and Other Parties During Preconsultation Period

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

May 16, 2000

Civil Works Technical Branch

Mr. Sean Hiraoka
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Hiraoka:

Thank you for the opportunity to review and comment on the Pre-Consultation for Draft Environmental Assessment Preparation for the Farrington Highway Drainage Improvements Project, Oahu (HWY-DD 2.8047). The following comments are provided in accordance with Corps of Engineers authorities to provide flood hazard information and to issue Department of the Army (DA) permits.

a. The information provided identifies two streams (Ulehawa and Nanakuli), a wetland at Nanakuli Stream, and several drainage solutions that may discharge into waters of the U.S. These activities may require a DA permit. However, additional design information is required to make a specific determination. Consultation should take place with our Regulatory Branch. For further information, please contact Mr. Farley Watanabe of our Regulatory Branch at (808) 438-7701 and refer to file number 200000186.

b. Any work in areas of the 100-year flood plain will need to adhere to the Federal Emergency Management Agency's regulations. Additional information is required to provide site specific evaluations.

Should you require additional information, please contact Ms. Jessie Dobinchick of my Civil Works Technical Branch staff at (808) 438-8876.

Sincerely,

James Pennaz

James Pennaz, P.E.
Chief, Civil Works
Technical Branch

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO
ATTENTION OF

October 29, 1999

Regulatory Branch

Mr. Fidel A Francisco
Francisco Architect
2379 Liloa Rise
Honolulu, Hawaii 96822

Dear Mr. Francisco:

This letter responds to your letter dated October 10, 1999, concerning the Corps' jurisdiction in the proposed addition to the St. Rita Catholic Church parking lot. Based on the additional information you provided and a site visit by a member of my staff, I have determined that a Department of the Army permit will not be required for this project.

If you have any questions concerning this determination, please contact William Lennan of my staff at 438-6986, and reference File No. 990000311.

Sincerely,

George P. Young, P.E.
Chief, Regulatory Branch

USDA

ited States
partment of
riculture

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rvice

O. Box 50004
nolulu, HI
850

Our People...Our Islands...In Harmony

May 25, 2000

Mr. Sean Hiraoka
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Hiraoka:

Subject: Reference No. HWY-DD 2.8046 – Pre-Consultation for Draft Environmental Assessment Preparation for Farrington Highway Drainage Improvements, Nanakuli Ranch to GTE Building (Phase I) and Ulehawa Beach Park to Ulehawa Stream (Phase III), Route 93, Districts of Nanakuli and Waianae, Island of Oahu

We have reviewed the above mentioned document and offer the following comment:

Phase III (Ulehawa Bridge at Ulehawa Beach Park) of the subject project is within the Lualualei Flood Study project area. The Lualualei Flood Study is a federal assistance effort undertaken by the U.S. Army Corps of Engineers and the USDA Natural Resources Conservation Service.

Please contact Mr. Tim Young, USACE, at (808) 438-7013 to coordinate the DOT's Farrington Highway project with the Lualualei Flood Study.

Thank you for the opportunity to review this document.

Sincerely,

KENNETH M. KANESHIRO
State Conservationist

Sean Hiraoka
05/19/2000 02:43 PM

To: Luanne Aburamen/HWY/HIDOT@HIDOT
cc: Duane Taniguchi/HWY/HIDOT@HIDOT
Subject: EA Pre-Consultation for Farr. Hwy. Drainage

Luanne,

U.S. Fish and Wildlife called today and said they have no comments at this time (no endangered life in the area), they will wait for the Draft EA. They will not send a written response to the pre-consultation letter.

Mahalo,

Sean

FARR. HWY DRAINAGE IMPS. 10/03/00

Telecon Daniel Ornellas 586-3837
Dept. of Hawaiian Home Lands

At this time, they have no comments on the report. They will wait for the formal DEA.

Asked him about other projects in the area. He only knew of the BLNR projects.

DIR 58

BENJAMIN J. CAYETANO
GOVERNOR

DIRECTOR'S OFFICE
DEPT. OF
TRANSPORTATION
MAY 19 2 55 PM '00

BRUCE S. ANDERSON, Ph.D., M.P.H.
DIRECTOR OF HEALTH

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

In reply, please refer to:
EMD/CWB
05030CEC.00

May 9, 2000

RECEIVED
MAY 22 1 01 PM '00
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

The Honorable Kazu Hayashida, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097

Dear Mr. Hayashida:

Subject: **Pre-Consultation for Preparation of Draft Environmental Assessment (DEA) for Farrington Highway Drainage Improvements, Nanakuli Ranch to GTE Building (Phase I) and Ulehawa Beach Park to Ulehawa Stream (Phase III) Route 93, Island of Oahu**

Thank you for the opportunity to comment on the preparation of the DEA for the subject drainage improvement project. The following are our comments provided for your DEA consideration . The Clean Water Branch (CWB) staff will work with your staff and provide additional comments when more information becomes available:

1. The DEA should discuss all potential impacts to the receiving State water quality resulting from the proposed construction activity.

   Based on the information received, it seems that the proposed construction will involve Nanakuli Stream, wetlands, Ulehawa Stream and open coastal waters at Pacific Ocean. For each alternative identified, potential water quality impact resulting from, either directly or indirectly, the construction activity should be discussed and evaluated. Mitigative measures should be established to minimize/eliminate any potentially adverse impacts to the receiving State waters. Applicable monitoring measures should be established to ensure that project related construction activities are in compliance with State water quality standards as adopted by the Department of Health (Department) on April 17, 2000.

2. The DEA should also discuss all potential impacts to the receiving State water quality from the constructed drainage systems.

The improved drainage systems should ensure that the receiving State water quality will not be adversely impacted. Permanent mitigative measures must be established to avoid any potential long term adverse impacts to the State waters.

3. The design and selection of alternatives should insure compliance with conditions of the MS4 storm water discharge permit issued to the Department of Transportation (DOT) under the authorization of National Pollutant Discharges Elimination System (NPDES) of the Federal Clean Water Act (CWA).

4. NPDES permit authorizing storm water or treated effluent discharges associated with the construction activities such as storm water discharges associated with construction activity, effluent discharge associated with construction dewatering activity ... etc. may be needed. Please have your staff contact the CWB staff for details.

5. The Honolulu Engineer District (HED) of the U.S. Army Corps of Engineers (COE) should be consulted for the potential Department of the Army (DA) permit requirements. A CWA Section 401 Certification is required for a DA permit.

Should you have any questions or need assistance, please contact Mr. Gary Gill, Deputy Director for Environmental Health, at extension 6-4424 or have your staff contact Mr. Edward Chen, Engineering Section of the CWB, at extension 6-4309.

Sincerely,

BRUCE S. ANDERSON, Ph.D., M.P.H.
Director of Health

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

May 19, 2000

LD-NAV

Ref.: DD28048.RCM2

Honorable Kazu Hayashida
Director of Transportation
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Hayashida:

SUBJECT: File No. DD28048 - Pre-Consultation for Draft Environmental Assessment for Farrington Highway Drainage Improvements, Oahu, Hawaii

This is a follow-up to our letter to you dated May 16, 2000 (Ref.: DD28048.RCM) regarding the subject matter.

Attached herewith is a copy of our Division of Aquatic Resources comments.

The Department has no other comment to offer on the proposed project. Should you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 587-0438.

Very truly yours,

DEAN Y. UCHIDA
Administrator

C: Oahu District Land Office

filed 6/19

SUSPENSE DATE: 5/10/00

STATE OF HAWAII
Department of Land and Natural Resources
DIVISION OF AQUATIC RESOURCES

MEMORANDUM

TO: William Devick, Administrator
FROM: Annette Tagawa, Aquatic Biologist
SUBJECT: Comments on Pre-Consultation for Preparation of Draft Environmental Assessment, Ref. No. HWY-DD28048
Comments Requested By: Dean Uchida, Administrator, Land Division
Date of Request: 4/27/00 Date Received: 5/1/00

Summary of Project

Title: Pre-Consultation for Preparation of Draft Environmental Assessment (Route 93) Preparation for Farrington Highway Drainage Improvements – Nanakuli Ranch to GTE Building (Phase I) and Uleiawa Beach Park to Uleiawa Stream (Phase III)

Project By: Hawaii Dept. of Transportation, Highways Division

Location: Districts of Nanakuli and Waianae, Oahu, Hawaii

Brief Description:

The applicant, Hawaii Department of Transportation, Highways Division, proposes to construct new drainage facilities on Farrington Highway to alleviate flooding along the roadside and within the sidewalk areas. The project is composed of two phases: The first, construct culvert and swale facilities from Nanakuli Stream to GTE building, and the second, install culvert systems along Uleiawa Beach Park to relieve flooding.

Comments:

The Division of Aquatic Resources has no major objections to this request since the proposed project is not expected to have significant adverse impact on aquatic resource values in this area. However, the Division is concerned because Uleiawa Stream and Nanakuli Stream are both on the project site. These streams probably harbor a number of exotic species and possibly a few native species as well. Construction activities could have short-term impacts on aquatic resources such as temporary turbidity, biota displacement and disturbance. We strongly recommend that mitigative measures should be taken during construction to prevent

excessive potential adverse impact to aquatic resources during construction activities. The applicant should take precautions as much as possible to prevent contaminants such as sediment, pollutants, and petroleum products from entering the aquatic environment. In addition, site work should be scheduled during periods of heavy rainfall, and lands denuded of vegetation should be covered as quickly as possible to control erosion.

not

Xc Akuna

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
LAND DIVISION
P.O. BOX 621
HONOLULU, HAWAII 96809

AQUACULTURE DEVELOPMENT PROGRAM
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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
STATE PARKS
WATER RESOURCE MANAGEMENT

May 16, 2000

LD-NAV

Ref.: DD28048.RCM

Honorable Kazu Hayashida
Director of Transportation
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Hayashida:

SUBJECT: File No. DD28048 - Pre-Consultation for Draft Environmental Assessment for Farrington Highway Drainage Improvements, Oahu, Hawaii

Thank you for the opportunity to review and comment on the subject matter.

The Department of Land and Natural Resources' Land Division has submitted the subject information material to our Commission on Water Resource Management, Division of: Aquatic Resources, State Parks and Forestry and Wildlife and Land Division's Planning and Technical Services, Engineering Branch and Oahu District Land Office for their review and comment on the proposed project.

Attached herewith is a copy of our Commission on Water Resource Management comments. We have no other comment to offer on the proposed project. Should you have any questions, please feel free to contact Nicholas A. Vaccaro of the Land Division Support Services Branch at 587-0438.

Very truly yours,

DEAN Y. UCHIDA
Administrator

C: Oahu District Land Office

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

MAY -5 2000

Doc REV.

MEMORANDUM

TO: Dean Y. Uchida, Administrator
Land Division

FROM: Linnel T. Nishioka, Deputy Director
Commission on Water Resource Management

SUBJECT: Pre-Consultation Draft Environmental Assessment Preparation for Farrington Highway Drainage Improvements - Nanakuli Ranch to Ulehawa Beach Park

If the project includes alteration of the bed or banks of streams, a stream channel alteration permit pursuant to HRS §174C-71 will be required.

Measures to minimize water pollution such as by providing appropriate landscaping should be considered early in the project design stages.

We look forward to working with the Department of Transportation in addressing permit requirements for this project as more specific plans are developed and proposed.

Thank you for allowing us to comment on the subject document. If you have any questions please call David Higa at extension 70249.

BENJAMIN J. CAYETANO
GOVERNOR

KAZU HAYASHIDA
DIRECTOR

DEPUTY DIRECTORS
BRIAN K. MINAAI
GLENN M. OKIMOTO

- ADMINISTRATOR
- ASS'T. ADMIN.
- DEV. BR.
- PLAN BR.
- RES. MGT. BR.
- PROJ. CONTROL
- SW. REC. PLAN.
- CLERICAL STAFF
- ADMIN. ASS'T.
- INTERP. BR.

FOR:

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- COMMENTS & REC.
- DRAFT REPLY
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869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813-5097

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MAY - 9 2000
DEPARTMENT OF TRANSPORTATION
HIGHWAY-DD

April 12, 2000

IN REPLY REFER TO:
HWY-DD
2.8049

TO: RALSTON NAGATA, ADMINISTRATOR
DIVISION OF STATE PARKS
DEPARTMENT OF LAND AND NATURAL RESOURCES

FROM: PERICLES MANTHOS, ADMINISTRATOR
HIGHWAYS DIVISION

SUBJECT: PRE CONSULTATION FOR DRAFT ENVIRONMENTAL ASSESSMENT PREPARATION FOR FARRINGTON HIGHWAY DRAINAGE IMPROVEMENTS, NANAKULI RANCH TO GTE BUILDING (PHASE I) AND ULEHAWA BEACH PARK TO ULEHAWA STREAM (PHASE III) ROUTE 93, DISTRICTS OF NANAKULI AND WAIANAE, ISLAND OF OAHU

The Design Project Report for the subject project is enclosed for your review and comment. The comments will be used to prepare an Environmental Exemption or Draft Environmental Assessment to satisfy Chapter 343, HRS, and the title 11-200 HAR, implementing regulations for the environmental assessment process.

Please indicate any studies or surveys (I.e. Archaeological, Flora and Fauna, Endangered Species, Gathering Rights Issues, etc.) you feel should be included and any special problem areas that should be addressed in the Draft Environmental Assessment.

If there are any questions regarding the proposed project or the type of comments requested, please notify Sean Hiraoka at 692-7581 and reference HWY-DD 2.8049 as noted above.

Enclosure

No comments.

RALSTON NAGATA, State Parks Administrator

Date: 5/3/00

5/10/00

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

TIMOTHY E. JOHNS, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES
JANET E. KAWELO

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BOATING AND OCEAN RECREATION
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STATE PARKS
WATER RESOURCE MANAGEMENT

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Jul 17 10 10 AM '00
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HIGHWAYS DIVISION

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION
Kakuhihewa Building, Room 555
601 Kamokila Boulevard
Kapolei, Hawaii 96707

July 7, 2000

MEMORANDUM

LOG NO: 25695
DOC NO: 0006EJ28

RECEIVED
00 JUL 19 AM 10:04
DEPT OF TRANSPORTATION
HIGHWAYS DIVISION

TO: Acting Administrator
DOT Highways Division

FROM: Don Hibbard, Administrator
Historic Preservation

SUBJECT: **Chapter 6E- Historic Preservation Review – Pre-Consultation for Draft Environmental Assessment Preparation for Farrington Highway Drainage Improvements, Nanakuli Ranch to GTE Building (Phase I) and Ulehawa Beach Park to Ulehawa Stream (Phase III) Route 93, districts of Nanakuli and Waianae, Island of O`ahu**
Nanakuli, Wai`anae, O`ahu
TMK: 8-7

Thank you for the opportunity to provide comment on the proposed Farrington Highway drainage improvements. The project proposes the construction of new drainage facilities to alleviate flooding along the roadside and sidewalk areas along the highway. Construction will consist of culvert and swale facilities from Nanakuli Stream to the GTE building and installation of culvert systems along Ulehawa Beach park. Our review is based on historic reports, maps, and aerial photographs maintained at the State Historic Preservation Division; no field inspection was made of the project areas. We received notification of this undertaking from your office on May 3, 2000, and apologize for the delay in our response.

A review of our records shows that there are several historic sites along the proposed work corridor. These sites include the OR&L Company Right-of-way (SIHP 50-80-12-9714), several military bunkers (SIHP 50-80-12-5761) and two subsurface archaeological deposits associated with prehistoric and/or early historic habitation (SIHP 50-80-12-5762, 5763). Although the boundaries of the two subsurface deposits do not extend to the highway, their presence indicates that other subsurface habitation deposits may be located along the

Filed 8/9

proposed corridor in sand areas. And burials could be associated with such habitation deposits.

Given the above, if such sites are present, they would be significant and could be impacted by ground disturbing activities within the project area. To handle such impacts, we believe that archaeological monitoring of the project areas within sand substrates should occur. This would identify and properly document any sites that might be present, and enable mitigation measures to be developed and applied as needed.

A written archeological monitoring plan (scope of work) must be submitted to this office for review and acceptance prior to any ground disturbance. This plan must contain the *following specifications:*

> (1) The kinds of sites that are anticipated and where in the construction area the sites are likely to be found; (2) How the sites will be documented; (3) How the expected types of sites will be treated; (4) The archaeologist conducting the monitoring has the authority to halt construction in the immediate area of a find in order to carry out the plan; (5) A coordination meeting between the archaeologist and construction crew is scheduled, so that the construction team is aware of the. plan; (6) What laboratory work will be done on remains that are collected; (7) A schedule for report preparation; and (8) Details concerning the archiving of any collections that are made.

If you have any questions please call Sara Collins at 692-8026 or Elaine Jourdane at 692-8027.

EJ:jk

BENJAMIN J. CAYETANO
GOVERNOR

GENEVIEVE SALMONSON
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

May 26, 2000

TO: Kazu Hayashida, Director
Department of Transportation

Attn: Sean Hiraoka

FROM: Genevieve Salmonson, Director

SUBJECT: Request for draft EA pre-consultation comments
Farrington Highway Drainage Improvements (Nanakuli), Phases I and III
HWY-DD 2.8048

HRS Chapter 343 requires full environmental disclosure and prohibits segmentation of projects. We strongly recommend that all 3 project phases be assessed in the forthcoming EA, including a discussion of cumulative impacts.

An assessment of cultural impacts is now required in EAs. In addition to your ongoing consultation with the State Historic Preservation Office, please also consult the Office of Hawaiian Affairs, which may advise you on the issues of access and impacts to traditional practices.

We would like to see a discussion included of the effects on the project during a catastrophic event, such as a hurricane or tsunami.

Impacts to traffic during construction will surely be raised during the public comment period. A thorough treatment of this in the EA would be beneficial to allay concerns.

If you have any questions call Nancy Heinrich at 586-4185.

BENJAMIN J. CAYETANO
GOVERNOR

ESTHER UEDA
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
P.O. Box 2359
Honolulu, HI 96804-2359
Telephone: 808-587-3822
Fax: 808-587-3827

May 5, 2000

MEMORANDUM

TO: Mr. Kazu Hayashida
Director
Department of Transportation

FROM: Esther Ueda
Executive Officer

SUBJECT: HWY-DD 2.8048
Pre Consultation for Draft Environmental Assessment
Preparation for Farrington Highway Drainage
Improvements, Nanakuli Ranch to GTE Building (Phase I)
And Ulehawa Beach Park to Ulehawa Stream (Phase III) Route 93,
Districts of Nanakuli and Waianae, Island of Oahu

We acknowledge receipt of the subject pre-consultation as transmitted by your memorandum. Based upon our review of the information provided, we have the following comments:

1) We suggest appropriate hydrogeologic studies for the project area in regards to percolation of potential contaminants through the use of dry wells for the drainage of low lying areas near Lualei Place. We recommend consulting with the Department of Health on the location and design of the dry wells.

2) We suggest studies of impacts to the Nanakuli and Ulehawa Streams from pipe culvert systems that may drain into the streams in regards to runoff, flood events, and non-point source contaminants.

3) We suggest studies of archaeological, cultural and historic resources that may be contained or transverse the project area. We also suggest studies to address any

cultural access and gathering issues in the project area and the Nanakuli and Ulehawa Streams.

4) We suggest summary descriptions of the affected environment should include suitable and adequate regional, location, and site maps such as but not limited to Flood Insurance Maps, Floodway Boundary Maps, or United States Geological Survey topographic maps.

5) We suggest including a listing of all permits and approvals (State, Federal, and County) that may be required.

We have no further comments to offer at this time. We appreciate the opportunity to comment on the subject application.

If you have any questions in regards to this matter, please feel free to contact me or Russell Kumabe of my staff at 7-3822.

EU:aa

PHONE (808) 594-1888

FAX (808) 594-1865

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813

May 4, 2000

Mr. Pericles Manthos
Highways Division Administrator
Department of Transportation
869 Punchbowl Street
Honolulu, Hawai'i 96813-5097
Attn: Sean Hiraoka

PC# 97

Subject: Pre-Consultation for Draft Environmental Assessment Preparation for Farrington Highway Drainage Improvements, Nanakuli Ranch to GTE Building (Phase I) and Ulehawa Beach Park to Ulehawa Stream (Phase III) Route 93, Districts of Nanakuli and Waianae, Island of Oahu

Dear Mr. Manthos,

Thank you for the opportunity to review and comment on the above-referenced document. Public complaints have been received regarding the existing roadway and sidewalk flooding problems during heavy rains and flooding and ponding problems associated with high waves from adjacent beaches into the highway. The proposed project consists of constructing new drainage facilities to alleviate flooding along the roadside and within the sidewalk areas.

At this time, the Office of Hawaiian Affairs has no immediate concerns with this project. We look forward to receiving your draft environmental assessment when it is completed to review the mitigation measures outlined to address construction overflow, potential burials and archaeological/cultural finds.

Please note for your records that Linda Colburn is no longer OHA's Administrator. The present Administrator is Randall K. Ogata. If you have any questions, please contact Ken R. Salva Cruz, Policy Analyst, at 594-1847.

Sincerely,

Colin C. Kippen, Jr.
Deputy Administrator

cc: Board of Trustees
OEQC

Luanne Segawa

10/04/2000 09:21 AM

To: Sean Hiraoka/HWY/HIDOT@HIDOT, Duane Taniguchi/HWY/HIDOT@HIDOT
cc:
Subject: Farr. Hwy. Drainage Improvements

I spoke to John Nakagawa (ph. 587-2878) of DBEDT, Office of Planning, Coastal Zone Management. He said that their Office does not have any comments on our project at this time. He also mentioned that their office no longer does routine reviews of EA;s and EIS's.

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET • HONOLULU, HAWAII 96813
PHONE: (808) 523-4414 • FAX: (808) 527-6743

JEREMY HARRIS
MAYOR

RANDALL K. FUJIKI, AIA
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

2000/CLOG-2574 (DT)

June 6, 2000

Mr. Kazu Hayashida, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Attn: Sean Hiraoka

Dear Mr. Hayashida:

Comments to Preliminary Assessment
Farrington Highway Drainage Improvements
Nanakuli Ranch to GTE Building (Phase I)
Ulehawa Beach Park to Ulehawa Stream (Phase III)

Thank you for the opportunity to review the above-referenced project. We have the following comments:

1. The Environmental Assessment (EA) should evaluate the existing hydrological condition and describe the improvements proposed. It should address any impacts to Ulehawa Stream due to the increase in runoff. It should also address measures to mitigate the quality of the stormwater runoff.

2. A drainage report to address any impacts of the drainage system will be required when the grading/construction plans are submitted to our Civil Engineering Branch.

3. The location and plans for the pipe culvert system, desiltation basin, ocean outfall, and other proposals should be included in the EA.

4. A Special Management Area Use Permit will not be required if the project is within the existing right-of-way.

5. A Shoreline Setback Variance (SV) will be required if any portion of the work will be within 40 feet of the vegetation line. A current certified shoreline survey may be required to determine whether a SV will be required.

6. Due to reorganization, three additional, project review branches (Wastewater, Traffic, and Civil Engineering) are now part of our department. In the future, please send four copies of the preliminary assessment and/or draft environmental assessments to our department.

If you have any questions regarding this letter, please call Dana Teramoto of our staff at 523-4648.

Sincerely yours,

Barbara A Myron

RANDALL K. FUJIKI, AIA
for Director of Planning
and Permitting

RKF:nt
Doc. No. 38789

DEPARTMENT OF PARKS AND RECREA

CITY AND COUNTY OF HONOLULU

DIRECTOR'S OFFICE
DEPT. OF TRANSPORTATION
May 24 8 52 AM '00

650 SOUTH KING STREET, 10TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4182 • FAX: 523-4064

RECEIVED
MAY 26 2000
DEPARTMENT OF TRANSPORTATION
HIGHWAY-DD

JEREMY HARRIS
MAYOR

WILLIAM D. BALFOUR, JR.
DIRECTOR

MICHAEL T. AMII
DEPUTY DIRECTOR

May 19, 2000

RECEIVED
MAY 24 4 57 PM '00
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

Mr. Kazu Hayashida, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Hayashida:

SUBJECT: Pre Consultation for Draft Environmental Assessment Preparation for Farrington Highway Drainage Improvements, Nanakuli Ranch to GTE Building (Phase I) and Ulehawa Beach Park to Ulehawa Stream (Phase III) Route 93, Districts of Nanakuli and Waianae, Island of Oahu (HWY-DD 2.8047)

Thank you for the opportunity to review and comment on the Design Project Report relating to the Farrington Highway Drainage Improvements.

The Department of Parks and Recreation supports drainage improvement projects along this section of Farrington Highway. However, alternate designs proposed in the report, such as the "desiltation basin" and "outlet to ocean," would impact existing City park properties.

The extent of any specific impact cannot be determined from this report. We will withhold further comments pending review of the Draft Environmental Assessment.

Should you have any questions, please contact Mr. John Reid, Planner, at 547-7396.

Sincerely,

W. D. Balfour

WILLIAM D. BALFOUR,
Director

RECEIVED
'00 MAY 25 A11:11
DEPT. OF TRANSPORTATION
HIGHWAYS DIVISION

WDB:cu
(00-1054JR)

cc: Mr. Don Griffin, Department of Design and Construction

filed w/ltr.

Hwy 490

FIRE DEPARTMENT

CITY AND COUNTY OF HONOLULU

3375 KOAPAKA STREET, SUITE H425
HONOLULU, HAWAII 96819-1869

JEREMY HARRIS
MAYOR

ATTILIO K. LEONARDI
FIRE CHIEF

JOHN CLARK
DEPUTY FIRE CHIEF

May 15, 2000

Mr. Pericles Manthos
Administrator
Highways Division
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Manthos:

We received your letter dated April 12, 2000, regarding the Draft Environmental Assessment for the Farrington Highway Drainage Improvements Project HWY-DD 2.8046.

The Honolulu Fire Department requests that you comply with the following:

1. Maintain fire apparatus access throughout the construction site for the duration of the project.

2. Notify the Fire Communication Center (523-4411) of any interruption in the existing fire hydrant system during the project.

Should you have any questions, please call Battalion Chief Kenneth Silva of our Fire Prevention Bureau at 831-7778.

Sincerely,

ATTILIO K. LEONARDI
Fire Chief

AKL/KS:jl

POLICE DEPARTMENT

CITY AND COUNTY OF HONOLULU

801 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96813 - AREA CODE (808) 529-3111
http://www.honolulupd.org
www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR

LEE D. DONOHUE
CHIEF

MICHAEL CARVALHO
ROBERT AU
DEPUTY CHIEFS

OUR REFERENCE CS-TL

May 15, 2000

Mr. Pericles Manthos
Administrator
Highways Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813-5097

Dear Mr. Manthos:

Thank you for the opportunity to review and comment on the subject document.

We are not in possession of any pertinent studies or surveys of the subject area. However, we will comment on the impact the proposal will have on the services provided by this department.

Construction-related dust, noise and traffic problems during the construction phase of the project will cause an increase in calls for police service in the area. We may have more comments to offer as plans for the proposed project are developed.

After the improvements are completed, there should be no additional impact on calls for service.

If there are any questions, please call me at 529-3255 or Captain George Yamamoto of District 8 at 674-8802.

LEE D. DONOHUE
Chief of Police

By
EUGENE UEMURA
Assistant Chief
Support Services Bureau

Pre-consultation
Farm Hwy -

HOUSE OF REPRESENTATIVES
STATE OF HAWAII
STATE CAPITOL
HONOLULU, HAWAII 96813

June 2, 2000

Mr. Kazu Hayashida, Director
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097

Dear Director Hayashida,

I am in receipt of your letter HWY-DD, 2.8047 regarding Phase I and Phase III of the Farrington Highway Drainage Improvement Project and wish to thank you and your staff for your assistance in facilitating this proposed project. I have read the referenced documents and would like to offer the following comments:

1) I oppose any type of direct ocean outlet drainage plan as is described in Design Alternative No. 2, Phase I and also cannot agree with Design Alternative No. 3, No Build, as your study indicates that this problem is a health and safety issue.

2) All relevant studies and surveys should be completed and included as part of the DES especially those that involve environmental, land and gathering rights issues. Furthermore, studies should be completed as to the effect if any that this project will have on existing and/or planned projects. For example, as part of Design Alternative No. I, for Phase I, the scope of work include areas around St. Rita's Church. St. Rita's is presently working with the City to expand their parking area. Included in your scope of work for Phase III are areas around Ulehawa Beach Park. At the present time rock walls are being erected as part of the Ulehawa Beach Park Master Plan.

3) Design Alternative No. 1, Phase III – it is my hope that the proposed drainage improvement will assist the residents on Lualei Place especially the house on the corner of Farrington and Lualei as the flooding is from both mauka and makai runoff.

4) In addition to the Waianae Coast Neighborhood Board, public meetings and/or presentations should be scheduled with the Nanakuli Hawaiian Homestead Association and members of St. Rita's Congregation for Phase I and the Princess

43rd District – Barbers Point, Honokai Hale, Nanakuli and Ma'ili
State Capitol, Room 328 Honolulu, HI 96813
Phone: (808)586-8465 FAX: (808)586-8469
E-MAIL: repkahikina@capitol.hawaii.gov
Website: www.capitol.hawaii.gov/site1/mkahikina.htm

Kahanu Estates Association and the Nanakuli Housing Association for Phase III. Like you, I believe that this will ensure that the public especially those in the immediate vicinity will have been notified and input can be made prior to the start of the project.

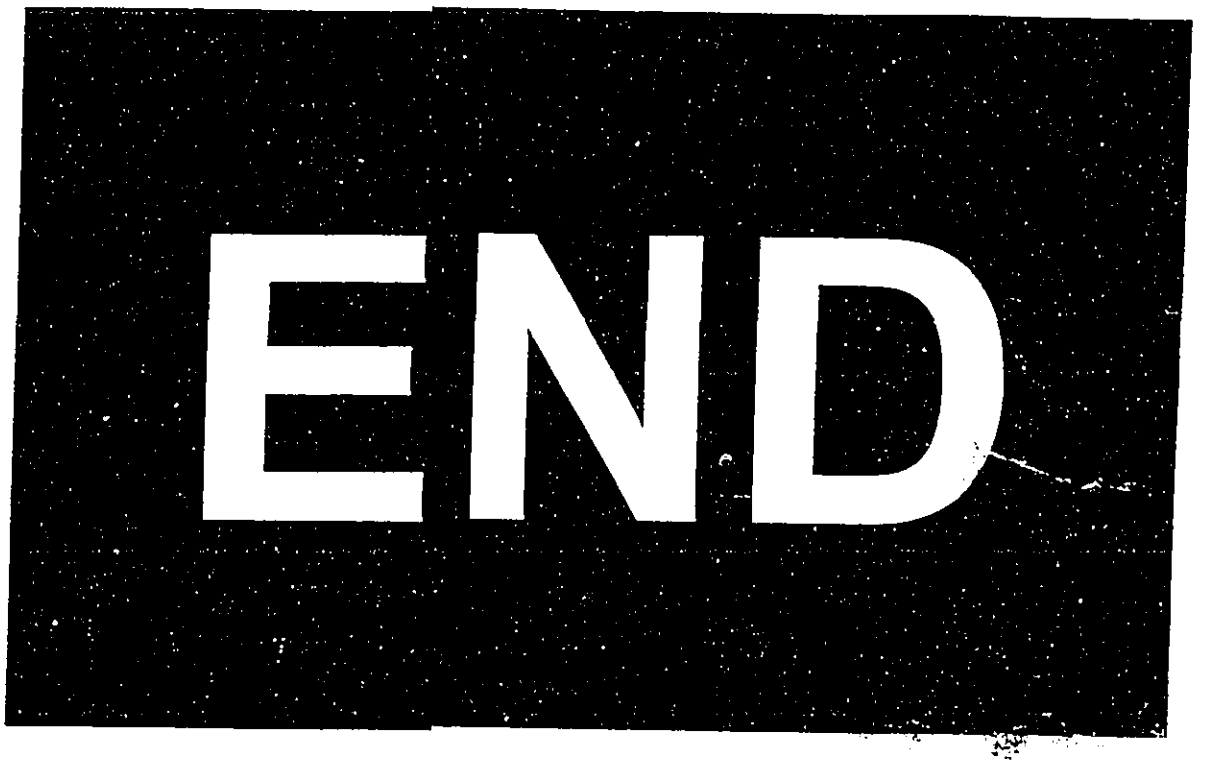
Again, I thank you for your assistance in facilitating this project. If I can be of any further assistance to you please do not hesitate to contact me.

Sincerely,

Michael P. Kahikina
State Representative

cc: Senator Colleen Hanabusa

43rd District – Barbers Point, Honokai Hale, Nanakuli and Ma'ili
State Capitol, Room 328 Honolulu, HI 96813
Phone: (808)586-8465 FAX: (808)586-8469
E-MAIL: mikahikina@capitol.hawaii.gov
Website: www.capitol.hawaii.gov/site1/mkahikina.htm

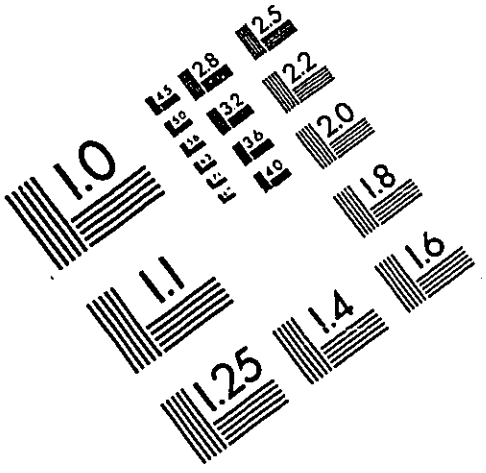


CERTIFICATION

I HEREBY CERTIFY THAT THE MICROPHOTOGRAPH APPEARING IN THIS REEL OF FILM ARE TRUE COPIES OF THE ORIGINAL DOCUMENTS.

2004
DATE

Joelle Kaai
SIGNATURE OF OPERATOR



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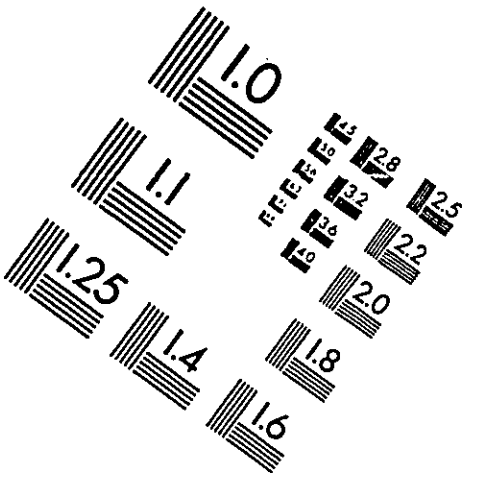

A & P International
612/854-0038 FAX 612/854-0482
8030 Old Cedar Ave. So., Ste. #215
Bloomington, MN 55425

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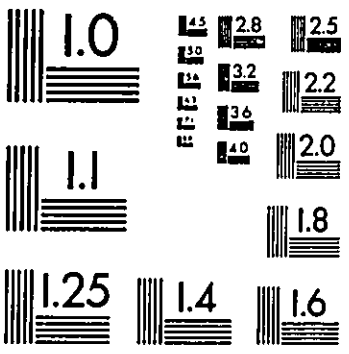

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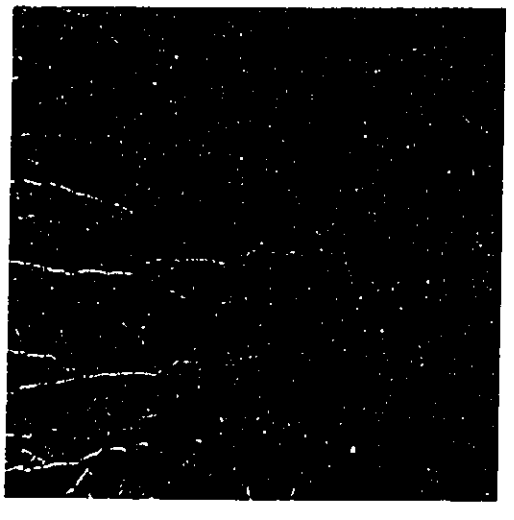

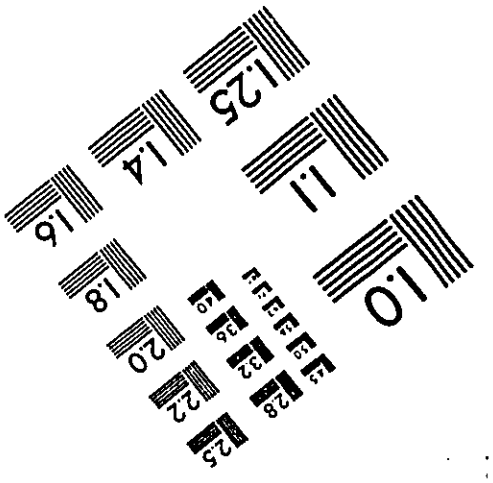

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