REPORT NUMBER: FHWA-HI-EIS-80-01-F

HALEIWA BYPASS
FINAL
Environmental Impact Statement

KAMEHAMEHA HIGHWAY REALIGNMENT
FROM
WEED JUNCTION TO HALEIWA BEACH PARK

FAP ROUTE 83
ISLAND OF OAHU, HAWAII

U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration

and

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION
Highways Division

EXECUTIVE CHAMBERS

HONOLULU

GEORGE R. ARIYOSHI
GOVERNOR

June 25, 1981

Mr. Donald A. Bremner, Chairman
Environmental Quality Commission
550 Halekauwila Street
Honolulu, Hawaii 96813

Dear Mr. Bremner:

Based upon the recommendation of the Office of Environmental Quality Control, I am pleased to accept the document, "Haleiwa Bypass Final Environmental Impact Statement," as satisfactory fulfillment of the requirements of Chapter 343, Hawaii Revised Statutes. This environmental impact statement will be a useful tool in the process of deciding whether or not the action described therein should or should not be allowed to proceed. My acceptance of the statement is an affirmation of the adequacy of that statement under the applicable laws, and does not constitute an endorsement of the proposed action.

When the decision is made regarding the proposed action itself, I expect the proposing agency to weigh carefully whether the societal benefits justify the environmental impacts which will likely occur. These impacts are adequately described in the statement, and, together with the comments made by the reviewers, provide a useful analysis of alternatives to the proposed action.

With warm personal regards, I remain,

Yours very truly,

George R. Ariyoshi

cc: Honorable R. Higashionna

FHWA-HI-EIS-80-01-F

HALEIWA BYPASS

Kamehameha Highway Realignment
FAP Route 83 Weed Junction to Haleiwa Beach Park
City and County of Honolulu, State of Hawaii
Project Number F-083-1(5)

FINAL

ENVIRONMENTAL IMPACT STATEMENT

Pursuant to Section 102(2)(C), PL 91-90
and Chapter 343, Hawaii Revised Statutes

US DEPARTMENT OF TRANSPORTATION
Federal Highway Administration
and
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION
Highways Division

This action complies with Executive Order 11988, Floodplain Management and Executive Order 11990, Protection of Wetlands

August 18, 1981
Date

Willis Kirkberg Jr.

Federal Highway Administration
Region 9

The following persons may be contacted for additional information concerning this document:

Mr. H. Kusumoto
Division Administrator,
Federal Highway Administration
US Department of Transportation
PO Box 50206
300 Ala Moana Boulevard
Honolulu, Hawaii 96850
(Telephone Number 546-5150)

Dr. Ryokichi Higashionna
Director,
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

(Telephone Number 548-3205)

The proposed Federal action is approval of a grant application to construct a new two-lane highway around the town of Haleiwa on the Island of Oahu, Hawaii, for the purpose of relieving traffic congestion.

SUMMARY

A. DESCRIPTION OF THE PROPOSED ACTION

The proposed project involves the construction of a new highway around the town of Haleiwa on the Island of Oahu, Hawaii. The Haleiwa Bypass will begin at the Weed Junction Traffic Circle and rejoin Kamehameha Highway (FAP Route 83) near the Haleiwa Beach Park, a distance of approximately 2.3 miles. Initial construction will provide two 12-foot traffic lanes and 10-foot paved shoulders. Right-of-way will be acquired to accomodate an additional two lanes, should the need arise. There is no definite schedule for construction of the additional two lanes. The bypass is expected to carry 60% of the traffic flow, while Kamehameha Highway will continue to be used by local traffic and some through traffic.

B. MAJOR ALTERNATIVES CONSIDERED

1. Alternative Alignments. Three alignments were proposed for evaluation. (See Figure 7, pg. II-2) They begin and end at the same point, but differ in their distance inland from Haleiwa and the point at which they cross the Anahulu River. Alternate A is over 1,000 feet from Kamehameha Highway at the central portion of town and crosses the Anahulu River below the bend. Alternate D comes closest to town (500 feet from the highway) but crosses the Anahulu River above the bend. Alternate C would require the least excavation of the bluff above the Anahulu River. Alternate C has been selected as the recommended alignment. (See Figure 7A)

2. No Project. The impact of not constructing a bypass around Haleiwa has been evaluated. The resulting congestion would cause long delays, high air pollution emissions, and a deterioration of the rural character of Haleiwa that is valued by its residents.

3. Other Alternatives. Widening Kamehameha Highway is not feasible, since it would require the removal of most of the businesses in Haleiwa. Increased mass transportation is desirable, but a new system is not warranted by the traffic volume to the North Shore. Expanding the existing bus service would increase the need for a bypass.

C. SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

1. The Haleiwa Bypass will significantly reduce congestion on Kamehameha Highway through Haleiwa.

2. Commuting times to and from Honolulu through the Haleiwa area will be reduced, but not enough for the new highway to have a significant growth-inducing impact throughout the North Shore. However, the bypass will create several remnant parcels of cane land, facilitating their conversion to other land uses. The bypass will most likely define the inland (east) boundary of future expansion for Haleiwa.

3. The selected Alternate C will remove forty five (45) acres of sugar cane lands. The gross value of this lost productivity is around $343,000 on a bi-annual basis.

4. Diversion of through traffic around Haleiwa may result in sales losses for traffic-oriented businesses, but reduced traffic congestion may encourage more shopping by North Shore residents.

5. The recommended alignment (Alternate C) will displace two residences. Equivalent (or better) replacement housing will be provided by the State.

6. By reducing congestion, automobile air pollutant emissions in Haleiwa will be reduced well below existing levels.

7. The bypass will cross three streams and the outlet of a marsh. Erosion from graded areas may cause a temporary increase in turbidity, but this will be minimized by planting slopes as soon as possible. The bridges will not aggravate flooding, interfere with the movement of fish, or alter the hydraulic characteristics of the marsh.

D. AREAS OF CONTROVERSY

The responses to the EIS Preparation Notice raised a number of concerns regarding the potential environmental effects of the proposed project. (This document, required by State environmental law, serves the same purpose as the "scoping process" outlined in the revised CEQ guidelines.) The primary issues are: 1) the effect of the highway on future population distribution through the creation of remnant agricultural lands, 2) impacts on properties and sites of historical or cultural significance, 3) impact on wetlands, aquatic life, and endangered waterbirds, 4) effects of the new stream crossings on flooding, 5) effects of the bypass on business activity in Haleiwa, and 6) aesthetic impact of a new bridge across the Anahulu River. Specific locations in the EIS where these issues are discussed are listed in the Index.

E. ORGANIZATIONS AND PERSONS CONSULTED

The Draft EIS has been reviewed at the State and Federal levels, and has been made available to community residents and organizations (see the Draft EIS Mailing List, page VI-34). Copies of the evaluation of comments have been submitted to all respective commentors.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF PLATES

LIST OF TABLES

CHAPTER I. PURPOSE AND NEED FOR THE PROJECT

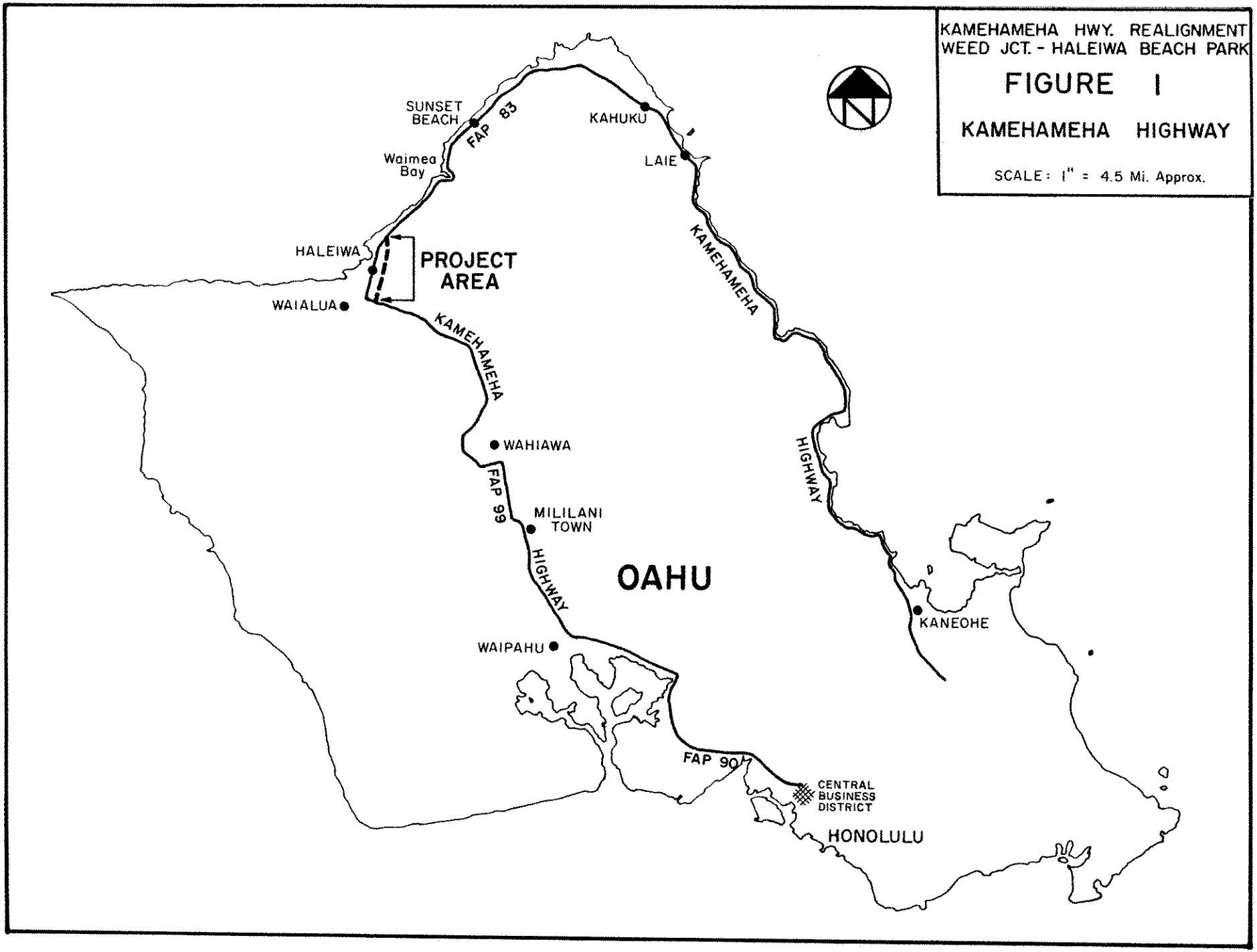
A. DEFICIENCIES OF THE EXISTING HIGHWAY

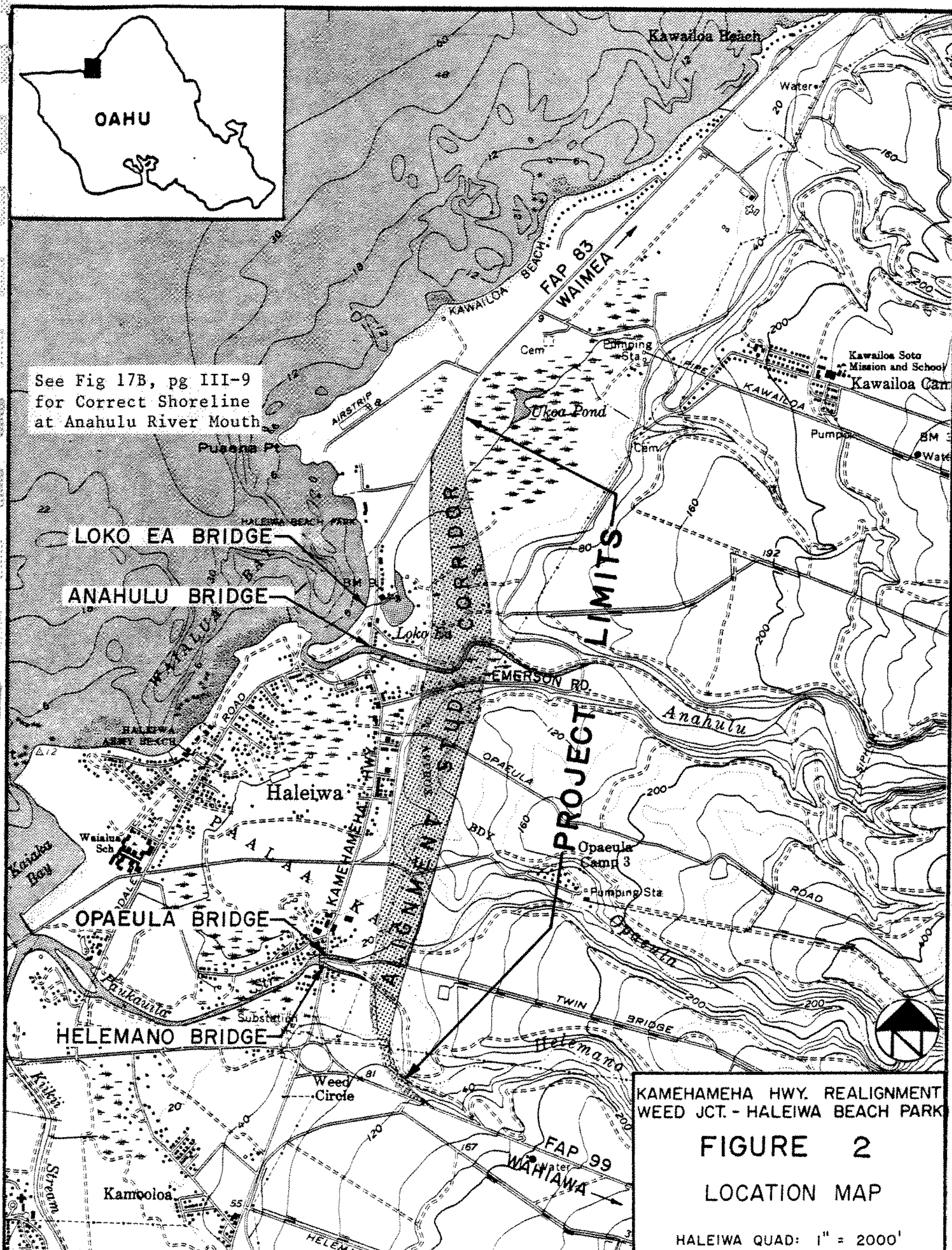
Kamehameha Highway is a two-lane Federal Aid Primary facility which serves as the major route to the North Shore of Oahu (Figures 1 and 2). The existing roadway through Haleiwa provides two 10-foot wide lanes with shoulders from 3 to 10 feet in width. It was constructed in 1949, with some improvements made near the Weed Junction traffic circle in 1965. There are four bridges in the project area: over Helemano and Opaeula Streams (the "twin bridges"), and over the Anahulu River, and over the Loko Ea outlet (Figure 2). They were constructed in the 1920's, but are still in good structural condition.

Kamehameha Highway is also a two-lane highway outside of Haleiwa Town. The vertical and horizontal roadway alignment is adequate, but the roadway width is substandard. The travel lanes vary between 10 to 11 feet with shoulders of 8 to 9 feet

The roadways outside of Haleiwa adequately accommodate present traffic conditions. However, the highway through town is not adequate for present traffic volumes. The present capacity of Kamehameha Highway through Haleiwa is approximately 1,265 vehicles per hour (vph) assuming free-flowing traffic, or 1,440 vph under stop-and-go conditions. However, the present peak hour traffic demand is 10% to 25% over the capacity of the highway (Tables 1 and 2). The result is traffic congestion. The capacity is limited by the width of the roadway, the narrow shoulders, and the cross-traffic and turning movements into the businesses in Haleiwa. The Anahulu River bridge is also a significant constraint to traffic flow, since it is barely wide enough (17 feet) for two autos, but not wide enough for an auto and a truck or a bus to pass. Therefore, traffic must stop when a truck or bus approaches. This is a hazardous situation, since the bridge is located on a curve in the highway, making it difficult to see approaching traffic.

A clear indication of the need for improving traffic flow through Haleiwa is the high rate of accidents that have occurred in town as opposed to adjacent highway segments. This is graphically portrayed on Figures 3 and 4. The first graph (Figure 3) shows the average accident rates for the years 1973 to 1977 by one-mile segments along Kamehameha Highway from Mililani to Laie (15 miles on either side of Haleiwa). There is a distinct pattern of higher accident rates in the towns(Wahiawa, Haleiwa, Sunset Beach), with the rate in Haleiwa being the highest on this 33 miles of highway. From Wahiawa to Weed Junction traffic circle, the average accident rate for the years 1973 through 1977 was only 1.72 accidents per million vehicle miles (mvm). From the


KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 1
KAMEHAMEHA HIGHWAY
SCALE: 1" = 4.5 Mi. Approx.
SUNSET BEACH
FAP 83
KAHUKU
Waimea Bay
LAIE
HALEIWA
PROJECT AREA
KAMEHAMEHA HIGHWAY
WAIALUA
KAMEHAMEHA
WAHIAWA
FAP 99
MILILANI TOWN
HIGHWAY
OAHU
KANEOHE
WAIPAHU
FAP 90
CENTRAL BUSINESS DISTRICT
HONOLULU


OAHU
See Fig 17B, pg III-9
for Correct Shoreline
at Anahulu River Mouth
LOKO EA BRIDGE
ANAHULU BRIDGE
OPAEULA BRIDGE
HELEMANO BRIDGE
ALIGNMENT STUDY CORRIDOR
PROJECT LIMITS
FAP 83
WAIMEA
FAP 99
WAHIAWA
Kawailoa Beach
KAWAILOA BEACH
Kawailoa Soto Mission and School
Kawailoa Camp
Ukoa Pond
Loko Ea
Puaena Pt
HALEIWA BEACH PARK
HALEIWA ARMY BEACH
EMERSON RD.
Anahulu
Haleiwa
Waialua Sch
Kaiaka Bay
KAMEHAMEHA HWY
OPAEULA
Opaeula Camp 3
Pumping Sta
TWIN BRIDGE
Helemano
Paukauila
Substation
Weed Circle
Kiikii Stream
Kamooloa
HELEMANO
AIRSTRIP
Cem
Water

KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 2

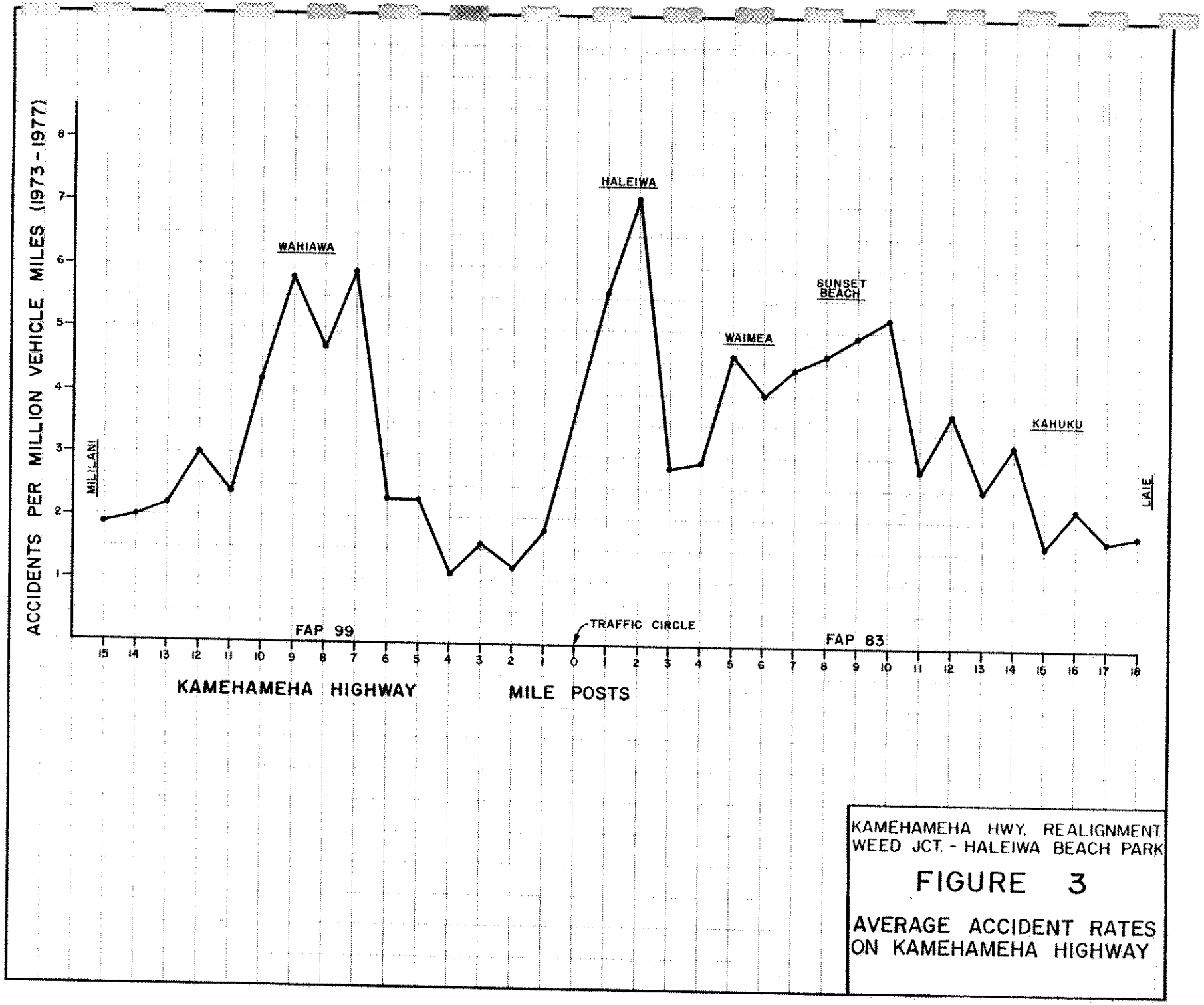
LOCATION MAP

HALEIWA QUAD: 1" = 2000'

traffic circle to Haleiwa Beach Park the average rate increased to 6.36 accidents per mvm, and from the park to Waimea Bay the rate dropped to 3.57 accidents per mvm. For comparison, the overall accident rate for primary highways on Oahu in 1977 was 2.72 per mvm, while the overall rate on Oahu's freeways was only 1.66 per mvm. In 1977 the accident rate on one segment in Haleiwa (mile 0.0 - 1.0) was the third highest rate on Oahu.

The reasons for the relatively high accident rates in Haleiwa are the mixture of through traffic with cross-traffic, turning movements, and other distractions that occur in town but are not as frequent on the open highway. The fact that traffic is generally moving faster between towns apparently does not result in more accidents (though the accidents that do occur may be more serious). Figure 4 illustrates the relationship between accidents and side streets by plotting the number of accidents recorded in 1976 and 1977 along one-tenth mile segments through Haleiwa. It can be seen that the highest number of accidents generally occur in the vicinity of side streets, especially where traffic is relatively free-flowing (e.g. Paalaa Road, Haleiwa Beach Park, Kahalewai Place). A notable exception is found near the center of town (Emerson Road to Haleiwa Road), where there were no accidents in 1976 or 1977; this is probably due to the fact that this segment is heavily congested and traffic moves very slowly.

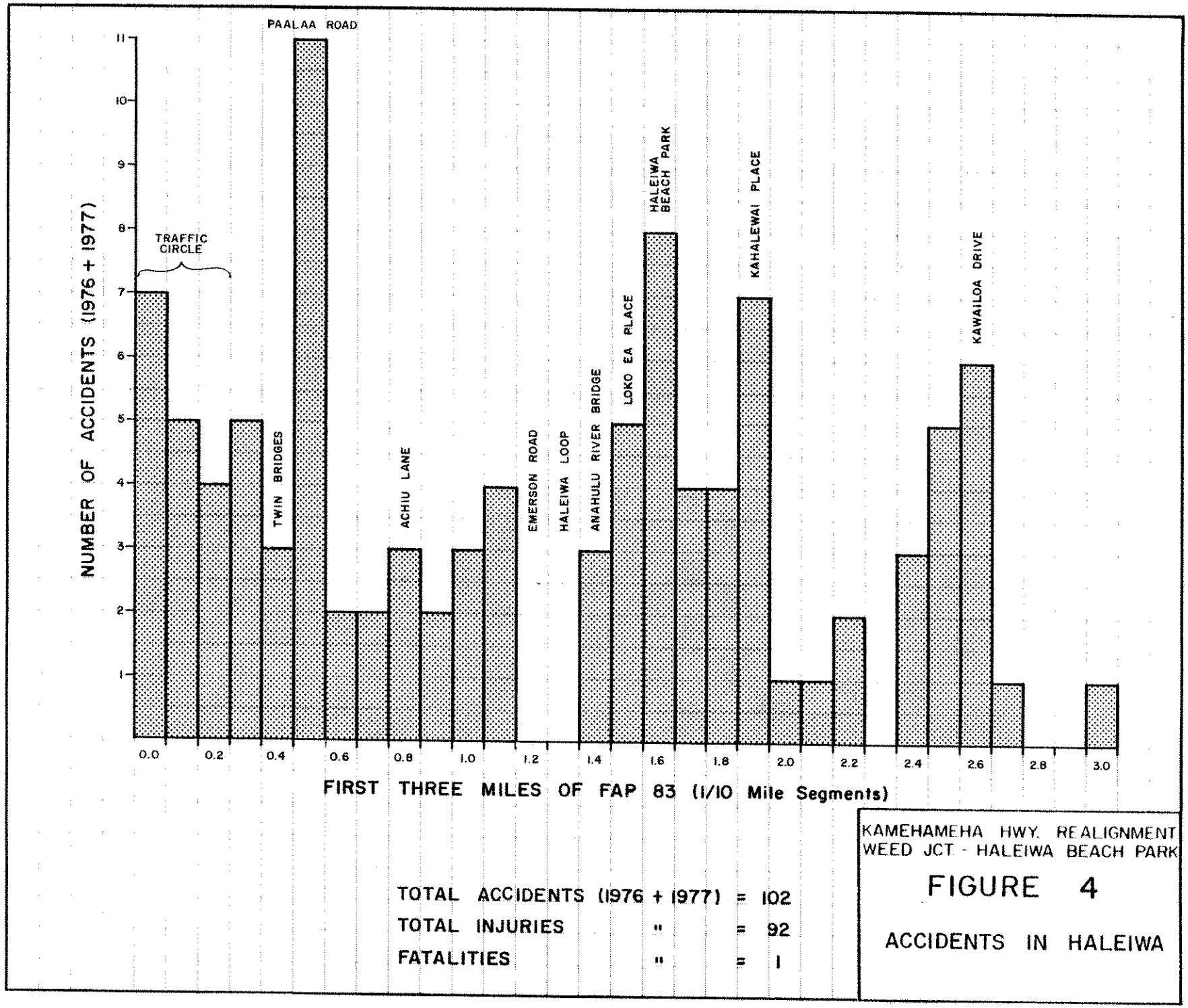
The fact that accident rates drop off significantly on the south and north sides of Haleiwa (taken as the Weed Junction traffic circle and Haleiwa Beach Park, respectively) indicates that these segments are adequate. The immediate need is to improve traffic circulation in and around Haleiwa. Therefore, the project only bypasses Haleiwa Town, leaving and rejoining the existing highway at the most practical points from the standpoint of topography and land use.



KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 3

AVERAGE ACCIDENT RATES
ON KAMEHAMEHA HIGHWAY


NUMBER OF ACCIDENTS (1976 + 1977)
FIRST THREE MILES OF FAP 83 (1/10 Mile Segments)
TRAFFIC CIRCLE
TWIN BRIDGES
PAALAA ROAD
ACHIU LANE
EMERSON ROAD
HALEIWA LOOP
ANAHULU RIVER BRIDGE
LOKO EA PLACE
HALEIWA BEACH PARK
KAHALEWAI PLACE
KAWAILOA DRIVE
TOTAL ACCIDENTS (1976 + 1977) = 102
TOTAL INJURIES " = 92
FATALITIES " = 1
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT - HALEIWA BEACH PARK
FIGURE 4
ACCIDENTS IN HALEIWA

B. ANTICIPATED BENEFITS OF THE PROJECT

The primary need for the proposed bypass around Haleiwa is to alleviate the congestion caused by the factors discussed above. At present, Haleiwa is the most critical segment on the North Shore due to the high volume of through traffic mixed with local traffic. The proposed bypass will greatly improve circulation in and around Haleiwa by removing approximately 60% of the traffic from the present alignment of Kamehameha Highway. By routing through traffic to a much safer highway, the number of accidents will be reduced. Even if the accident rate remains unchanged through town, the combined rate for the new and old alignments should be around 40% lower than the present accident rate (assuming 1.7 accidents per mvm for the new alignment). Reducing congestion will enable emergency vehicles to move more swiftly to and from the North Shore. This is particularly important for times when quick evacuation of the area is needed, as during extremely high surf or tsunamis. Another benefit of the project will be significantly reduced air pollution levels in town. In addition, a lower traffic volume through town will be more compatible with the historic/cultural district concept proposed for Haleiwa. However, the project will only improve this one bottleneck; other segments, such as Waimea Bay and Sunset Beach, will not be affected.

C. SUMMARY OF SUPPORTING STUDIES

1. Traffic. The base year (1978) and the projected (1985, 2001) traffic volumes developed for this project are presented in two forms. Average daily traffic (ADT) is given in Table 1 and Figures 5 and 6. Peak hour traffic (vph) is listed in Table 2. The values given for average daily traffic include both weekday and weekend traffic. In Haleiwa, the peak traffic occurs on the weekends in the late morning (11:00 to 12:00 AM) and the early afternoon (1:30 to 2:30 PM). The traffic projections in Tables 1 and 2 are averages for the section of Kamehameha Highway between the traffic circle and Haleiwa Beach Park; detailed values for the sub-segments are presented in Appendix C, Air Quality Study.

TABLE 1 AVERAGE DAILY TRAFFIC
(Vehicles per 24 Hours, Total of Both Directions)

Segment	1978	1985	2001
Kam Highway Without Bypass	14,500	17,000	23,000
Kam Highway With Bypass	------	6,800 (40%)	9,200 (40%)
Bypass Alignment	------	10,200 (60%)	13,800 (60%)

Note: 1. Average Weekday traffic = 0.952 x ADT
Average Weekend traffic = 1.120 x ADT

2. Average daily truck traffic is 5.0% of ADT.

3. Annual increase is 2.5%.

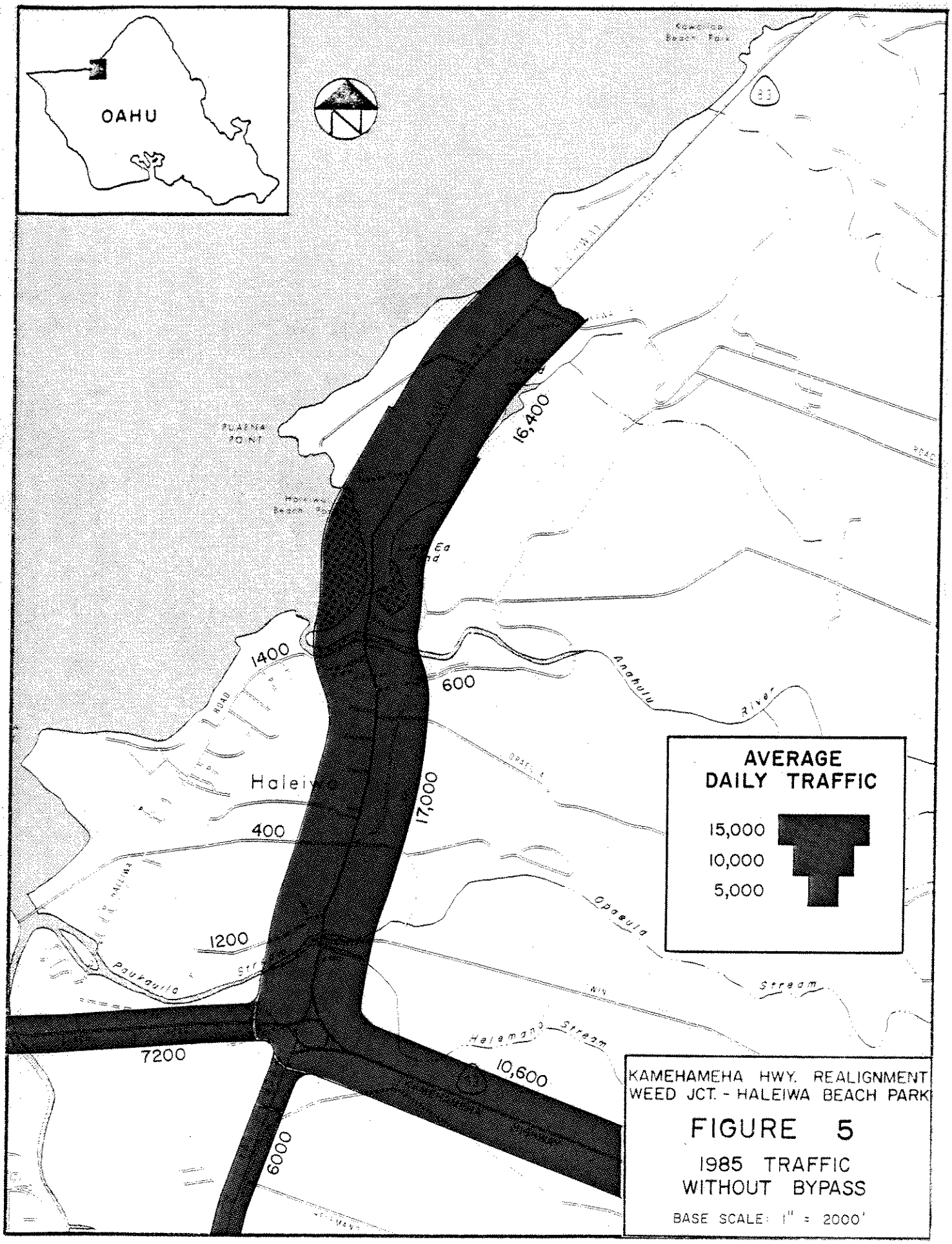
TABLE 2 PEAK HOUR TRAFFIC VOLUME VS CAPACITY
(Vehicles per Hour, Total of Both Directions)

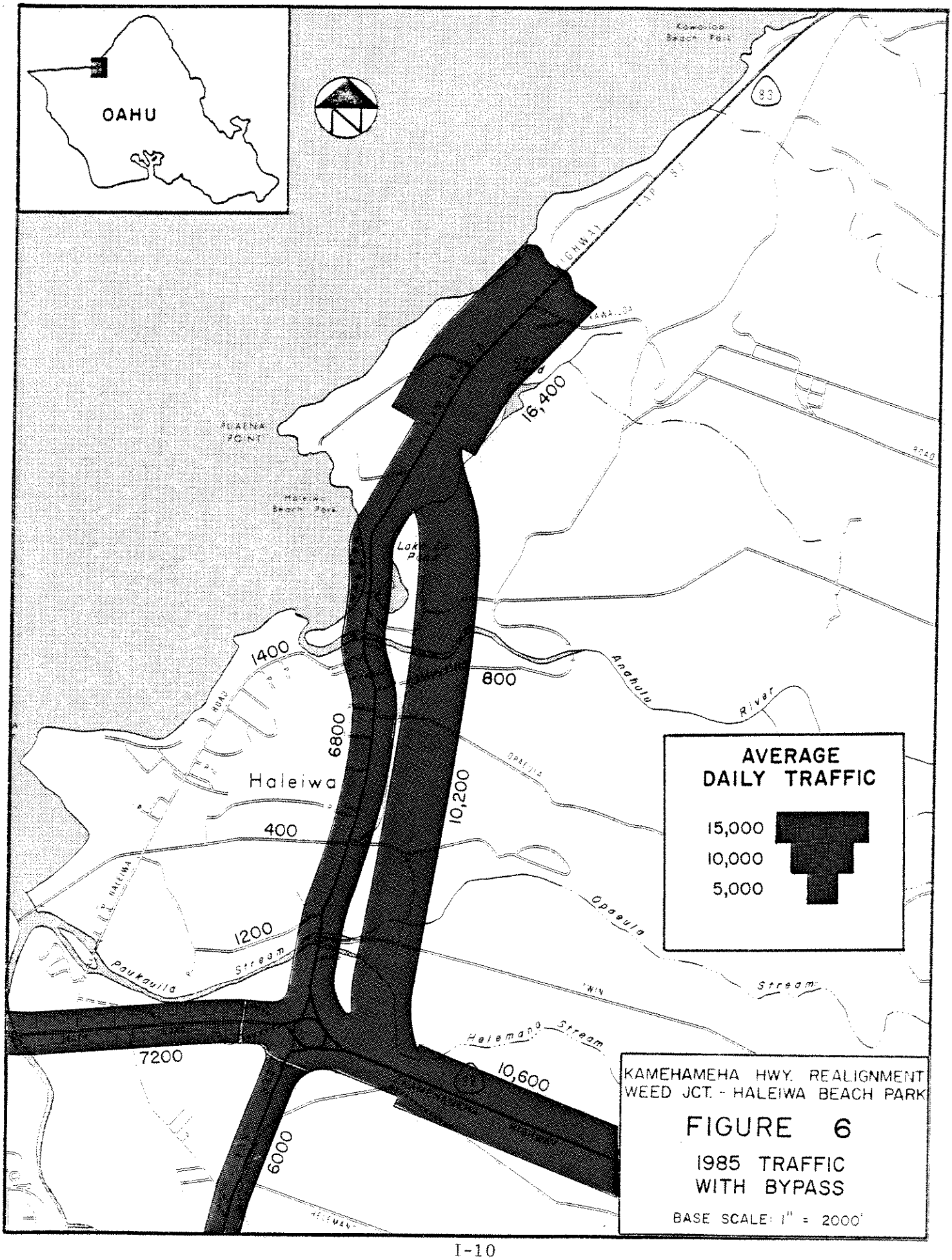
Segment	Capacity	1978		1985		2001	
		AM	PM	AM	PM	AM	PM
Kam Highway Without Bypass	1,265-1,440	1,310	1,580	1,535	1,870	2,080	2,535
Kam Highway With Bypass	1,265-1,440			610	745	830	1,010
Bypass Alignment	1,700			925	1,125	1,250	1,525

Note: 1. Morning peak hour is 9.0% of ADT, and afternoon peak hour is 11.0% of ADT.

2. Morning distribution is 60% toward Honolulu and 40% toward Waimea, while afternoon distribution is 45% toward Honolulu and 55% toward Waimea (Based on traffic counts).

3. Peak hour truck traffic is 3.0% of Design Hourly Volume.


OAHU
AVERAGE DAILY TRAFFIC
15,000
10,000
5,000
16,400
17,000
10,600
7200
6000
1400
600
400
1200
Anahulu River
Opaeula Stream
Helemano Stream
Paukauila
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 5
1985 TRAFFIC
WITHOUT BYPASS
BASE SCALE: 1" = 2000'


OAHU
AVERAGE DAILY TRAFFIC
15,000
10,000
5,000
16,400
1400
800
6800
10,200
400
1200
7200
10,600
6000
Haleiwa
ALAENA POINT
Anahulu River
Opaeula Stream
Paukauila Stream
Helemano Stream
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 6
1985 TRAFFIC
WITH BYPASS
BASE SCALE: 1" = 2000'

The average rate of traffic increase represented in Table 1 is approximately 2.5% per year, while the annual growth rate of Oahu for the same time span is 1.2%. It is typical for traffic to increase at a faster rate than population, though the use of current population growth forecasts for the traffic study might lessen the discrepancy slightly. It can be seen from Table 2 that the present peak hour traffic volume is significantly higher than the capacity of the highway, resulting in congestion. In future years, congestion will worsen if the capacity is not improved. (The traffic volume on Kamehameha Highway indicated for the year 2001 with or withut a bypass would probably never be attained, unless the adjacent highway segments are also improved.)

2. Other Studies. A number of detailed investigations were conducted for this project in order to provide data for the evaluation of the environmental impacts of the project. These included a survey of stream fauna, an air pollution study using the HIWAY dispersion model, a noise study based on short-term monitoring and predictions, and a cultural resources assessment (archaeology and history). The methods and results of these studies are presented in the appendices, and summarized in appropriate sections of the EIS text (e.g. Chapters III, and IV). In addition, a study of business activity in Haleiwa was conducted to determine the impacts of the bypass on the Haleiwa Business community. Data on the businesses was compiled through the Hawaii Business Directory, and merchants and shoppers were interviewed in order to evaluate the effects of reduced traffic volume through Haleiwa. The results of this study are discussed in Chapter IV.

D. THE BACKGROUND OF THE PROJECT, PRESENT STATUS, AND FUTURE PLANS

The increase in traffic to the North Shore and the subsequent need for a bypass around Haleiwa was anticipated by the State Department of Transportation in the early 1960's. In 1962, a corridor public hearing was held in Haleiwa to obtain public input on a possible future bypass alignment. There were no major objections

to the proposal, and the Bishop Estate, Waialua Businessmen's Association, and the Kawailoa Property Owners Association expressed their support. Although the necessary funds were not appropriated for construction as scheduled, the proposed corridor was incorporated into the 1964 Oahu General Plan and Detailed Land Use Maps.

In July of 1970, a design public hearing was held at the Haleiwa Elementary School, for an alignment within the corridor proposed in 1962. Although there was public support for the concept of the bypass, objections were raised with regard to the proximity of the alignment to the town and the location of the Anahulu River crossing. Further work on preparation of construction plans was suspended.

The project was reactivated in November, 1978. The objective of the present activity on the project is to re-evaluate the previous proposals and testimony to come up with a recommended alignment, submit an Environmental Impact Statement for that alignment, hold a second design public hearing, and prepare final construction plans. A series of community information meetings were held in February and March, 1979. The concerns expressed at these meetings were taken into account in the development of the proposed alternates described in the Draft Environmental Impact Statement circulated in May, 1980. Finally, agency and public comments on the EIS, and public testimony at a hearing held in June, 1980 have been incorporated into this Final EIS which describes the recommended alternative (modified Alternate C).

The current schedule projects planning to be completed by the second quarter of 1981. Preparation of the final right-of-way maps and construction plans will take another 18 months, placing the commencement of right-of-way acquisition about mid 1983 and construction sometime in 1984. The projected completion date for the two-lane highway is 1986. However, the proposed schedule is contingent upon appropriation of additional State and Federal funds.

Expansion of the Bypass to four lanes will be undertaken when it becomes necessary to widen the adjacent highway segments to four lanes. There is no definite schedule for the four lane expansion, however, the need is anticipated in the 1990's.

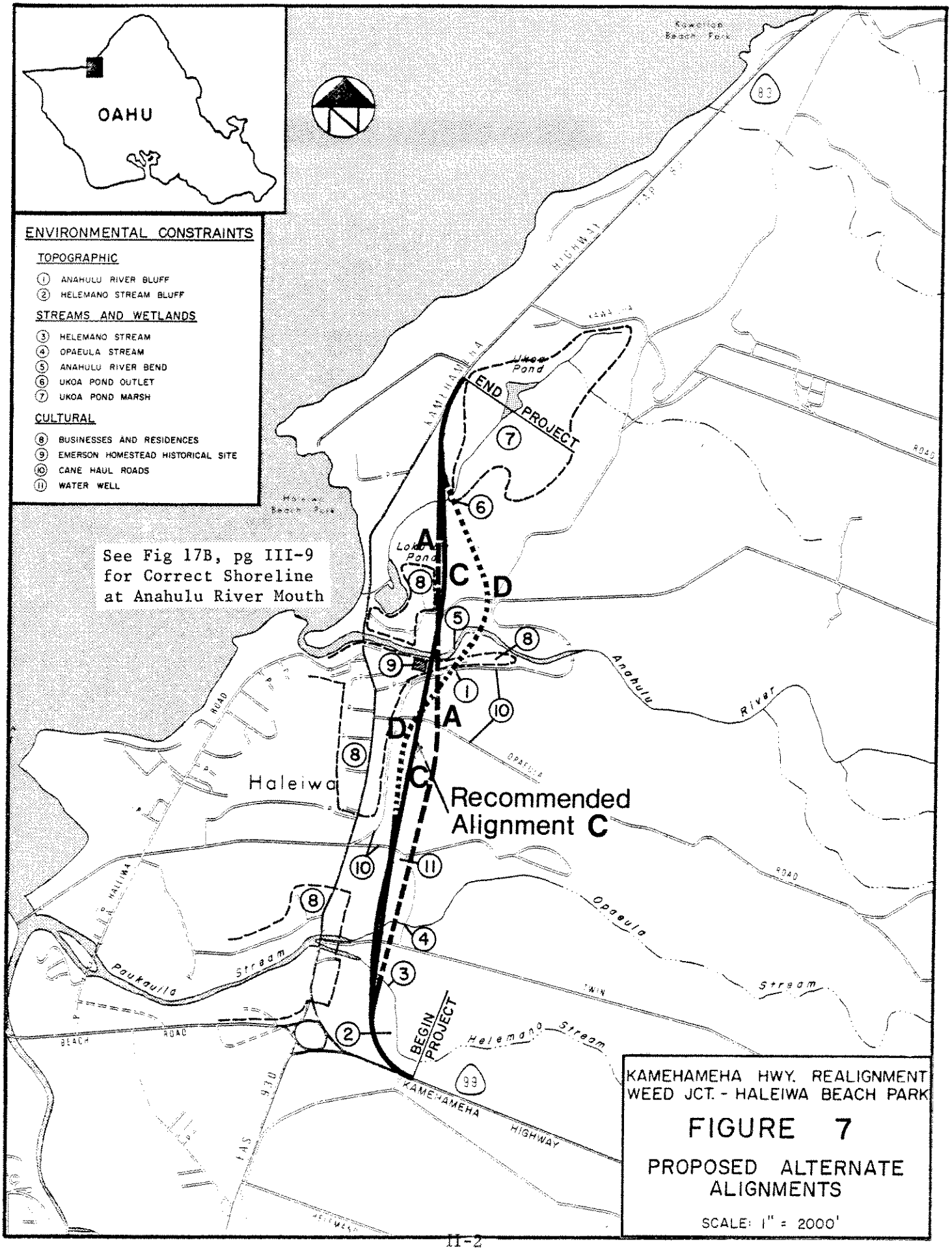
CHAPTER II. ALTERNATIVES INCLUDING THE PROPOSED ACTION

The proposed Federal action is approval of a grant application to construct a new 2-lane highway around the town of Haleiwa on the Island of Oahu, Hawaii. The purpose of the bypass route is to relieve congestion on the existing highway through town.

A. RECOMMENDED ALIGNMENT

1. Route. The proposed realignment of Kamehameha Highway is located on the North Shore (Waialua District) of the Island of Oahu, at the town of Haleiwa (Figures 1 and 2). Virtually all traffic from Honolulu to the North Shore passes through the central business district of Haleiwa, creating an undesirable situation in terms of safety and congestion. The proposed action is to rectify this situation by constructing a bypass around Haleiwa on the inland (east) side of town. The bypass will primarily carry through traffic which constitutes approximately 60% of the total traffic flow. The new section of Kamehameha Highway will begin approximately 1,600 feet (0.30 mile) from the Wahiawa side of the Weed Junction traffic circle, and will rejoin the existing highway approximately 1,800 feet (0.34 mile) north of Kahalewai Place (entrance to Haleiwa Beach Park). The length of the bypass will be approximately 2.3 miles (Figure 7).

The recommended alignment is Alternate C, which is approximately 600 feet from Kamehameha Highway at its closest point near the central business area. It crosses the Anahulu River below the bend, approximately 1,100 feet upstream from the existing bridge. The route cuts through several rocky waste areas to reduce the amount of productive cane land taken. Alternate C is 2.34 miles in length, requires 45 acres of right-of-way, and creates 16 acres of remnant cane land. As originally proposed, Alternate C would have resulted in the loss of six dwelling units. To avoid this, the alignment has been shifted 50 feet seaward and retaining walls will be used to reduce the right-of-way to 130 feet, so that only two homes will require relocation (one on Emerson Road and one on the north side of the Anahulu River). The recommended alignment is shown on Figure 7A, and its characteristics are compared in Table 3 with the two other alternates considered.



KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 7

PROPOSED ALTERNATE ALIGNMENTS

SCALE: 1" = 2000'

FIGURE 7A

PLAN OF MODIFIED ALTERNATE C
KAMEHAMEHA HIGHWAY REALIGNMENT
HALEIWA BYPASS

WEED JUNCTION TO HALEIWA BEACH PARK

PROJECT F-083-1(5)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

Weed Junction

KAMEHAMEHA HWY.

Cane Haul Road

KAMEHAMEHA

Cane Haul Road

CANE HAUL ROAD UNDERCROSSING #2

OPAEULA STREAM BRIDGE #2

HELEMANO STREAM VIADUCT

HELEMANO STREAM

Proposed Cane Haul Road

OPAEULA STREAM

TABLE 3 SUMMARY OF ALTERNATES (1980 Prices)

A. Alternate Alignments	Physical Characteristics: Length (Miles)	ROW (acres)	Excavation Yards^3	Embankment Yards^3	Costs (x $1,000): ROW	Bridges	All Other Construction	Engineering	Total
Alternate A	2.35	47.6	63,600	162,300	$1,075	$4,720	$5,399	$1,518	$12,712
Alternate C	2.34	45.2	37,800	150,600	$ 830	$4,748	$5,559	$1,546	$12,683
Alternate D	2.43	52.1	18,400	259,600	$1,269	$6,613	$6,695	$1,996	$16,573

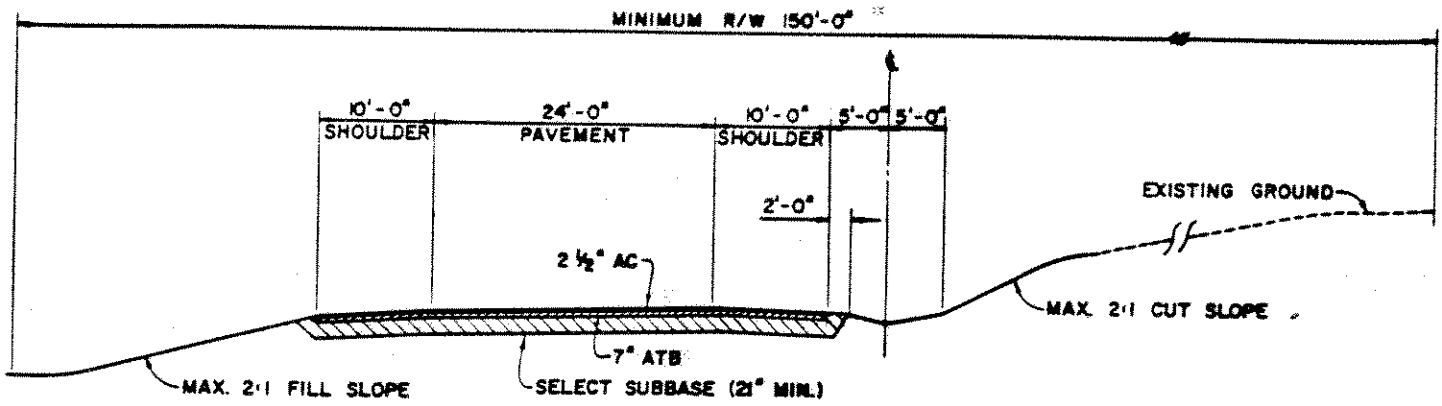
B. Bridges	(Alt's)	Length	Width	Av. Railing Elevation	Number and Spacing of Piers	Total Cost (x $1,000)
Helemano	(all)	970'	47'	32'	10 @ 90', on banks	$2,890
Opaeula	(all)	120'	47'	28'	none, abutments on banks	$ 568
Anahulu	(A & C)	210'	47'	27'	2 @ 60'-90'-60', partly in stream	$ 576
Anahulu	(D)	810'	47'	31'	8 @ 90', viaduct	$2,414
Ukoa Outlet	(all)	200'	47'	18'	4 @ 40', none in outlet	$ 549
Cane Haul	(A)	50'	47'	76'	None	$ 137
Cane Haul	(C)	60'	47'	61'	None	$ 165
Cane Haul	(D)	70'	47'	55'	None	$ 192

2. Design Criteria. Following are the general criteria which are being used in the design of the Haleiwa Bypass.

a.	Highway Classification:	Minor Arterial
b.	Access Control:	Partial
c.	Design Speed:	60 mph
d.	Posted Speed:	45 mph
e.	Number of Lanes:	2 (4 ultimate)
f.	Pavement Width:	24 feet
g.	Shoulder Width:	10 feet (paved)
h.	Minimum Right-of-Way:	130 feet
i.	Minimum Curve Radius:	1,043 feet
j.	Maximum Degree of Curve:	5.5 degrees
k.	Maximum Superelevation Rate:	10%
l.	Maximum Cross Slope:	2%
m.	Maximum Grade:	6%
n.	Minimum Grade:	0.5%

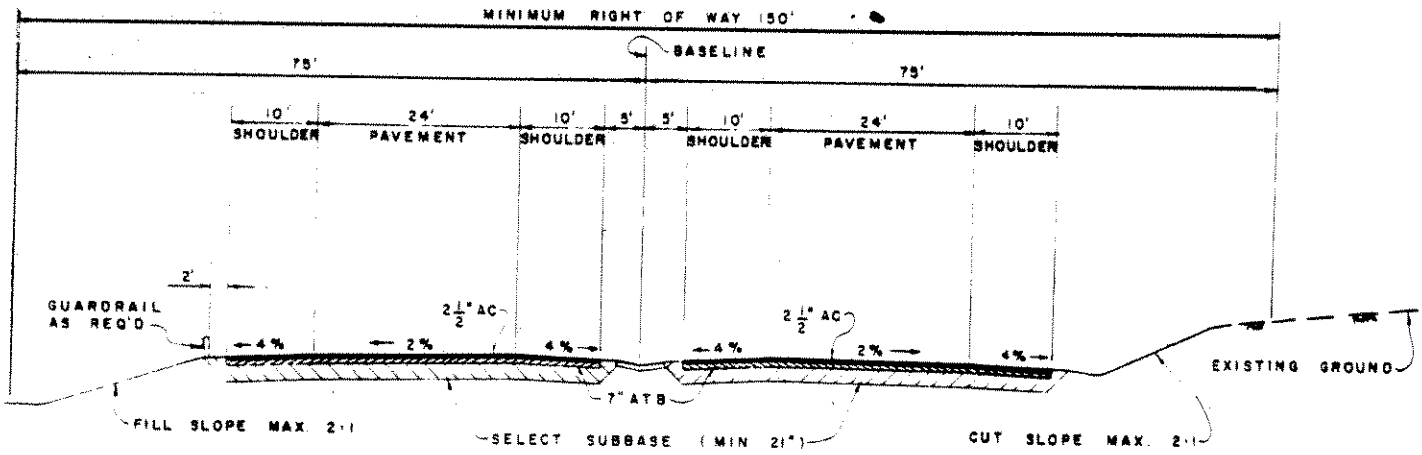
3. Typical Section. The proposed bypass will provide two lanes when it is opened. The typical highway section is shown on Figure 8. The two traffic lanes will be 12 feet wide, and the paved shoulders will be 10 feet wide. Bicycles will be allowed to use the shoulders. Long range traffic projections indicate that four lanes may ultimately be required, so a right-of-way for four lanes (130 feet minimum) will be acquired, though grading and bridges will only be completed for two lanes. There is no timetable for expansion to four lanes, but the impacts of the project have been evaluated with respect to a four-lane configuration (except for air quality - see page C-17).

4. Cuts and Fills. In order to keep costs down and to minimize the visual impact of the highway, an effort has been made to avoid the need for large cuts and fills. The recommended alternate requires a cut approximately 10 feet deep at the beginning of the project where the highway descends a bluff along Helemano Stream. From this point it will descend on a viaduct across Helemano Stream. A large fill is needed to accommodate the cane haul road under-crossing located in a draw between Twin Bridge Road and Opaeula Road. The maximum depth of fill at this point is 25 feet for Alternate C, which is the least of the three alternates considered. Similarly, Alternate C requires the least cut (5 feet) at the Anahulu River bluff. The highway will be on piers across the Anahulu River, to minimize encroachment into the flood plain. Alternate C will require up to 12 feet of fill from the river to the end of the project. No fill will be placed

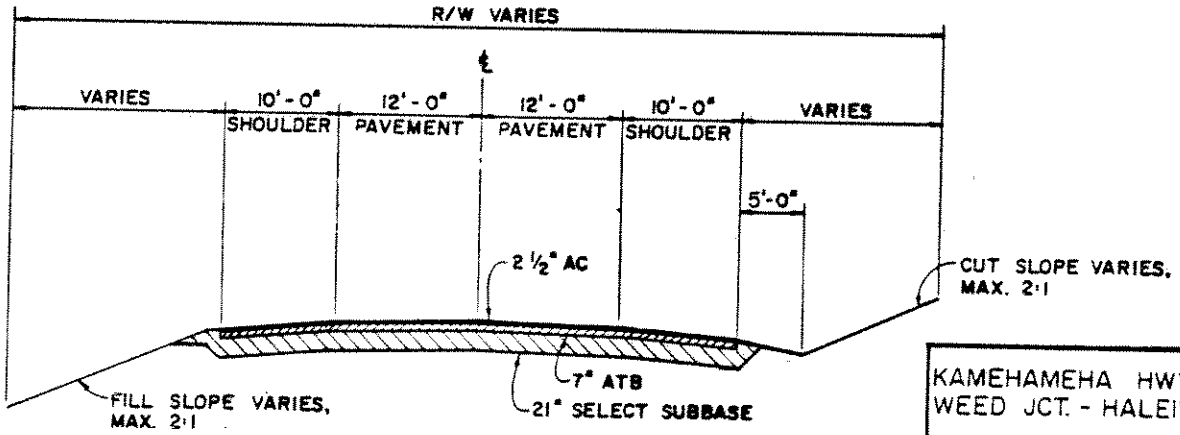


*130' minimum at retaining walls

TYPICAL BYPASS SECTION



TYPICAL ULTIMATE SECTION



TYPICAL CONNECTOR ROAD SECTION

KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 8

TYPICAL HIGHWAY SECTIONS

SCALE VARIES

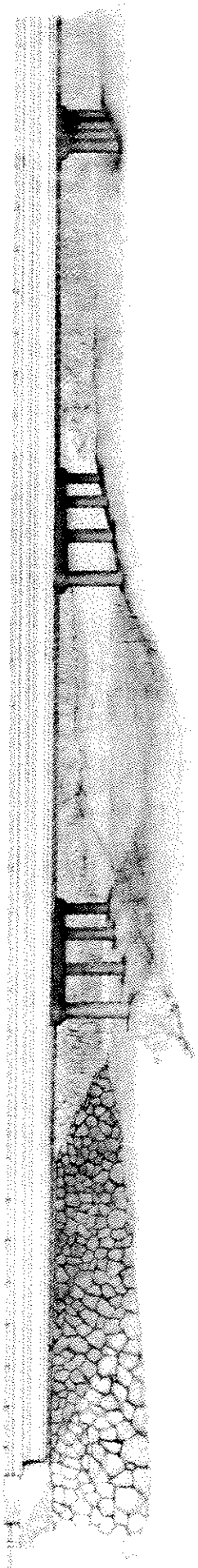
The earthmoving requirements for the three alternates are presented in Table 4. Alternate D requires the most cut and fill with a total of 464,300 cubic yards, followed by Alternates A and C, which require 307,800 and 354,200 cubic yards of earthmoving, respectively. The cut and fill is not balanced on any of the alignments, but Alternate A requires the smallest amount of borrow material. Imported borrow material will be obtained from private sources,the locations of which can not be determined at this time.

TABLE 4. EARTHMOVING REQUIREMENTS (cubic yards)
(Excluding Surcharge Fill and Removal)

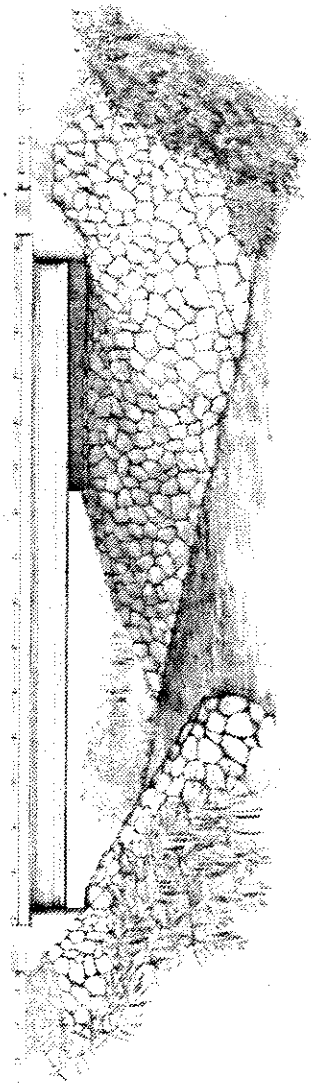
	Cut	Fill	Net Total	Imported Borrow	Max Cut	Max. Fill
Alternate A	63,600	162,300	98,700	98,700	20'	35'
Alternate C*	37,800	150,600	112,800	112,800	15'	35'
Alternate D	18,400	259,600	241,200	241,200	15'	35'

(Figures rounded-off)
* Recommended Alternate with Helemano viaduct

5. Bridges. Bridges will be required over Helemano Stream, Opaeula Stream, the Anahulu River, the outlet of the Ukoa Pond, and over the cane haul road (Figure 7 and Table 3). The Helemano crossing will be on a viaduct approximately 970 feet long (Figure 9). The Opaeula bridge will be approximately 120 feet long, constructed with prestressed concrete girders in a single span (Figure 9). The Anahulu River crossing for the recommended Alternate will have a straight 210-foot bridge constructed of prestressed concrete girders in three spans with two sets of piers in the river near the banks (Figure 10). The bridge over the Ukoa Pond outlet will be approximately 200 feet long, with five spans supported by four sets of piers (Figure 10). This bridge will be made of concrete slabs, and will not require construction in swampy ground, nor will the outlet be altered. The bridge over the cane haul road will be a single span approximately 200 feet in length (Figure 11).



HELEMANO STREAM VIADUCT



OPAEULA STREAM BRIDGE

KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 9

HELEMANO AND OPAEULA BRIDGES

0 10 20 30 40 50
SCALE IN FEET

ANAHULU RIVER BRIDGE
(ALTERNATE A OR C)

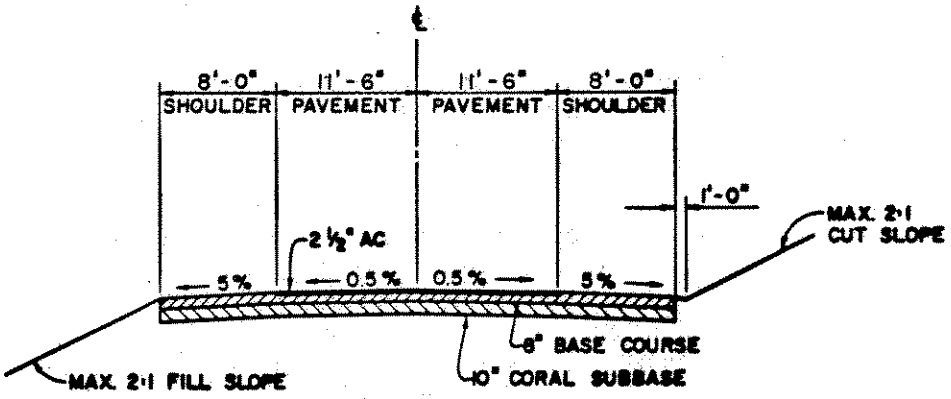
UKOA POND OUTLET BRIDGE

KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 10

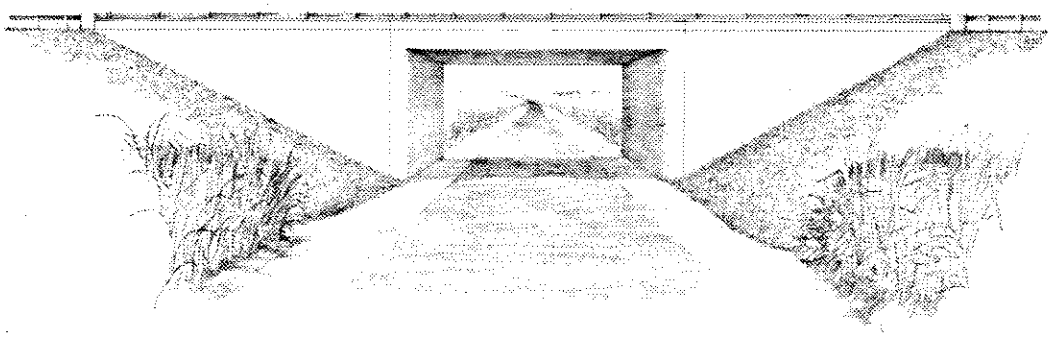
ANAHULU AND UKOA BRIDGES

0 10 20 30 40 50
SCALE IN FEET



TYPICAL CANE HAUL ROAD SECTION

2 6 10 14
SCALE IN FEET



CANE HAUL ROAD UNDERCROSSING AT BYPASS

10 20 30
SCALE IN FEET

KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

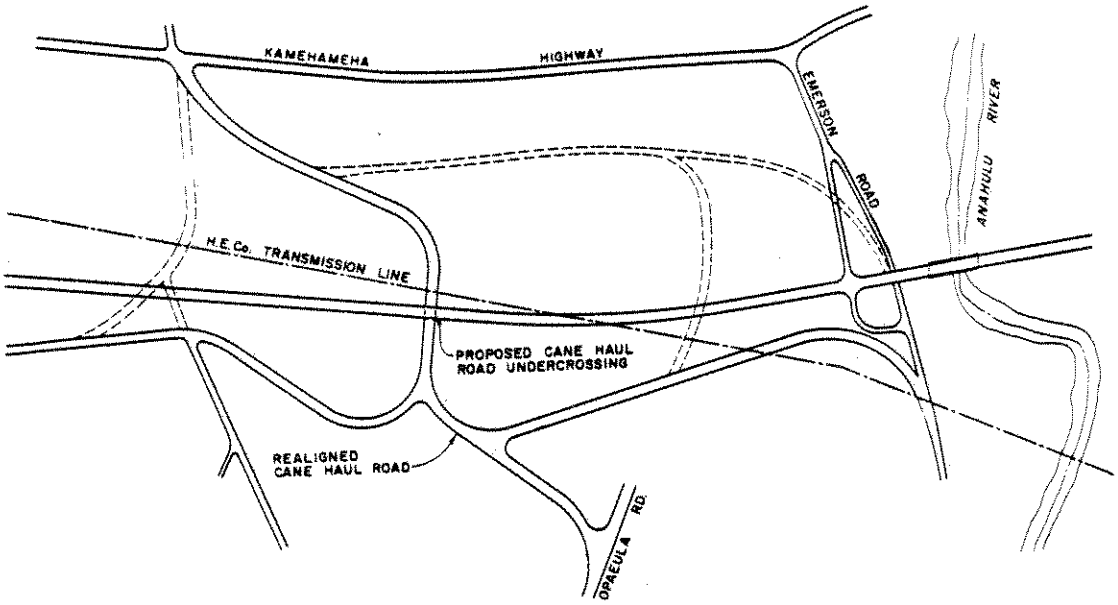
FIGURE II

CANE HAUL ROAD
SECTION AND BRIDGE

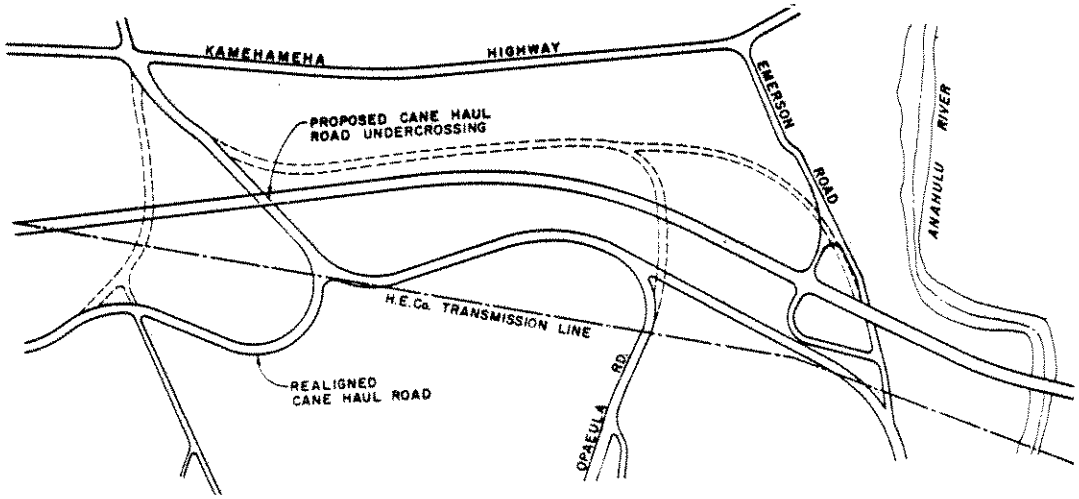
6. Cane Haul Roads. The bypass will cross three major roads owned by the Waialua Sugar Company and used to transport harvested sugar cane to the mill. Because of the hazards involved in mixing vehicular and cane haul traffic, the cane haul roads will be realigned and provided with a single underpass crossing. The typical section for the new cane haul roads is shown on Figure 11, which also shows a perspective drawing of the underpass. The proposed cane haul road relocation for the recommended alternate is given on Figure 7A (Figure 12 shows the rejected alternates). The major change in the cane haul road system will be to bring the primary collector road to the inland (east) side of the bypass, abandoning the road that presently passes immediately behind Haleiwa. Alternate C has been shifted slightly seaward from the original alignment, which improves the alignment on the cane haul road up the Anahulu River bluff. The maximum uphill grade for loaded trucks will be 6% and the maximum downhill grade will be 8%. The cost of relocating the cane haul roads is included in the construction budget.

7. Connector Roads. The intersections with Kamehameha Highway at the beginning and end of the project will be designed to give preference to through traffic using the bypass. They will not be signalized, but acceleration, deceleration, and left-turn lanes will be provided. The intersections will be clearly signed to identify Haleiwa. The typical section (Figure 8) and preliminary plans (Figure 13) for the two intersections are the same for all three alternates.

To provide for efficient traffic circulation, a connection between the bypass and Kamehameha Highway will be provided at Emerson Road. This will also provide convenient access without having to use the cane haul road, as at present, for the residents in Anahulu Valley. The typical section of the connector road from the bypass to Emerson Road is shown on Figure 8. The at-grade intersection will be controlled by stop signs on Emerson Road, and caution lights and signs will be placed on the bypass to warn drivers of an intersction and pedestrian crossing. The preliminary plans for this connector road on the recommended alternate is shown on Figure 14A (the rejected alternates are shown on Figure 14B). These plans will be referred to in the discussion of impacts (Chapter V), since they show in detail the relationship of the alternate alignments to the Emerson Homestead and the residences between Emerson Road and the Anahulu River.



BYPASS ALTERNATE A



BYPASS ALTERNATE D

LEGEND:

——————— REMAINING ROADS

– – – – – – – – – ABANDONED ROADS

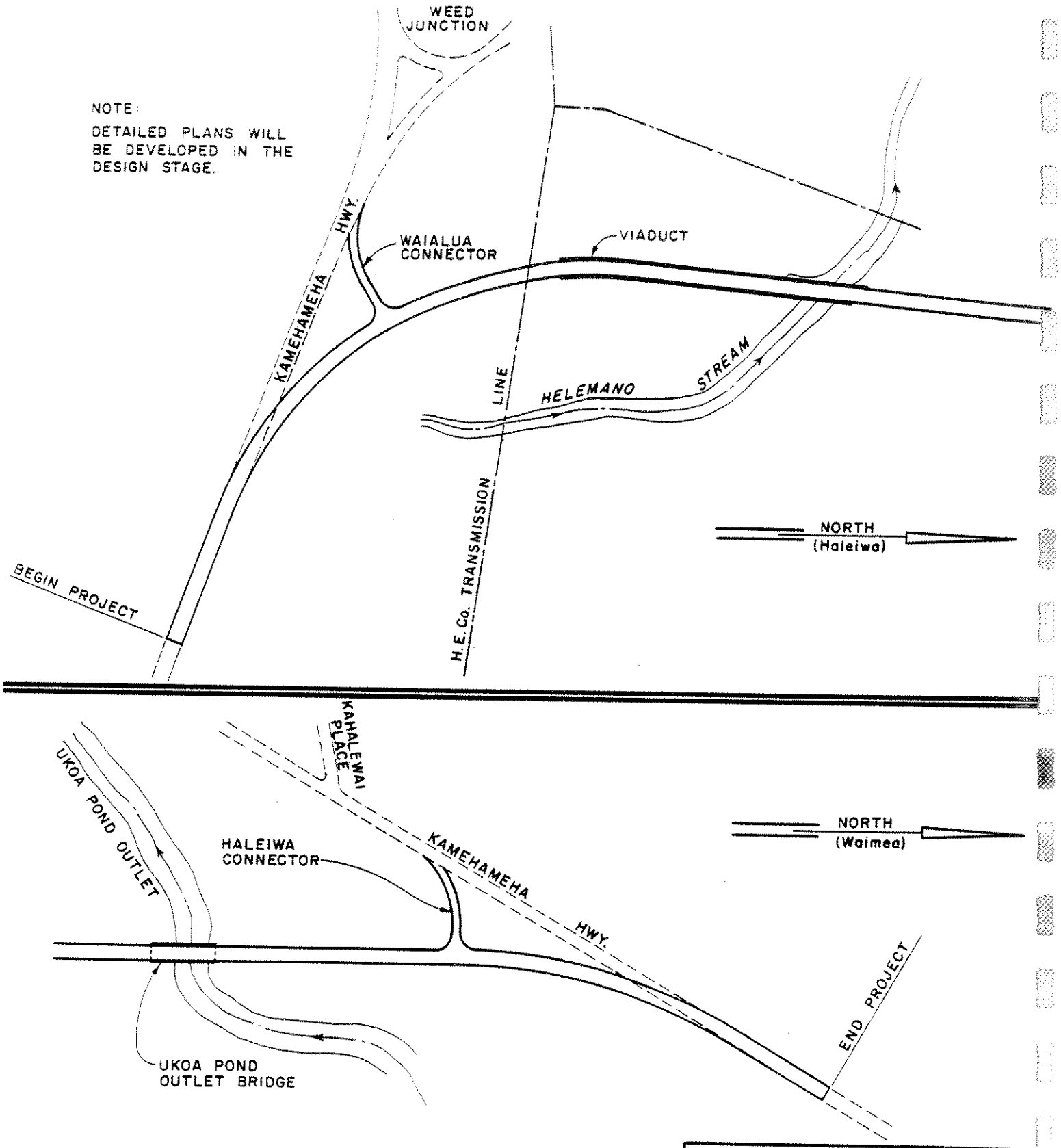
——— · ——— · ——— ELECTRIC LINES

KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 12

CANE HAUL ROADS
ALTERNATES A and D

SCALE: 1" = 800'

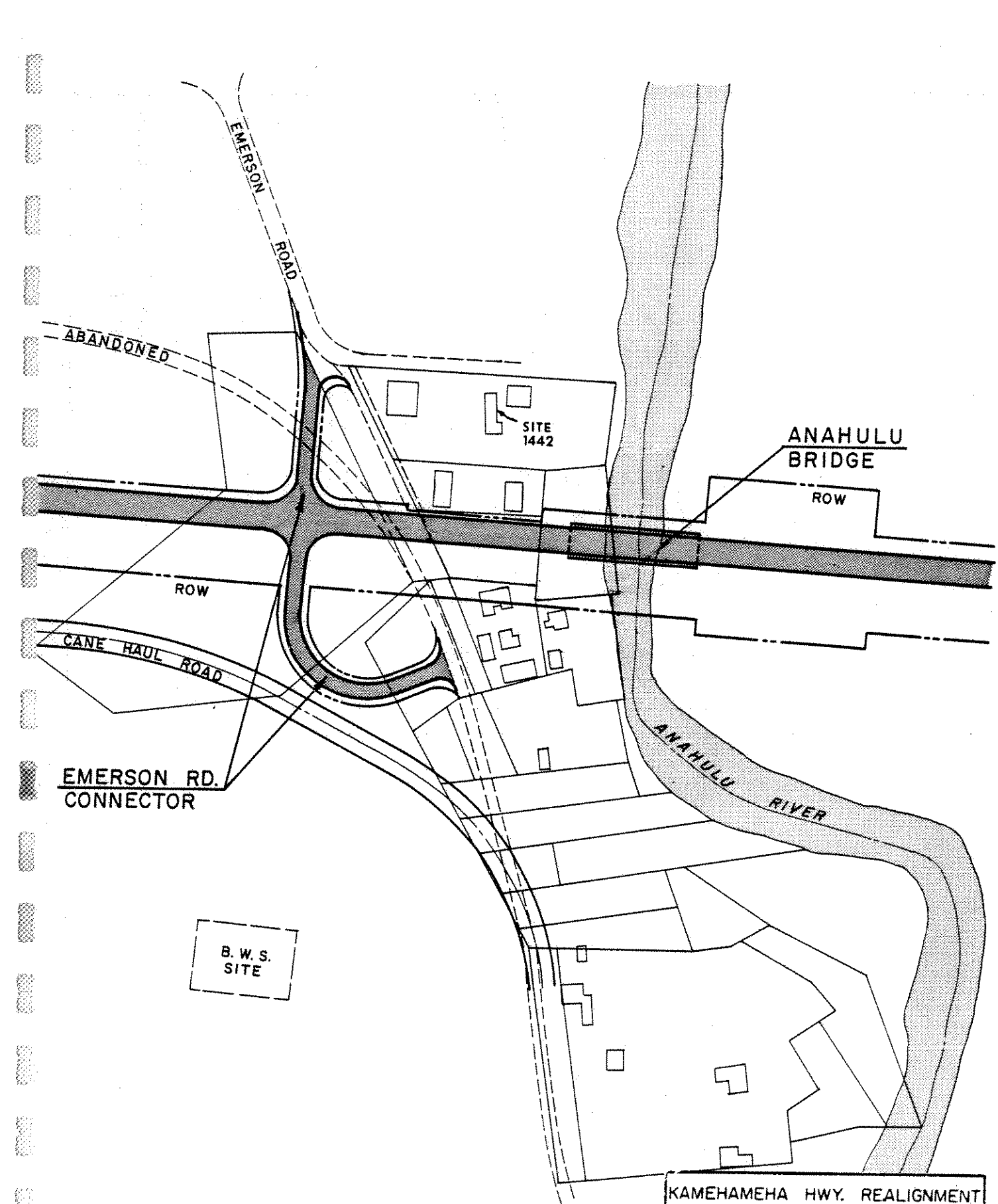


KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 13

KAMEHAMEHA HIGHWAY INTERSECTIONS

SCALE: 1" = 400'

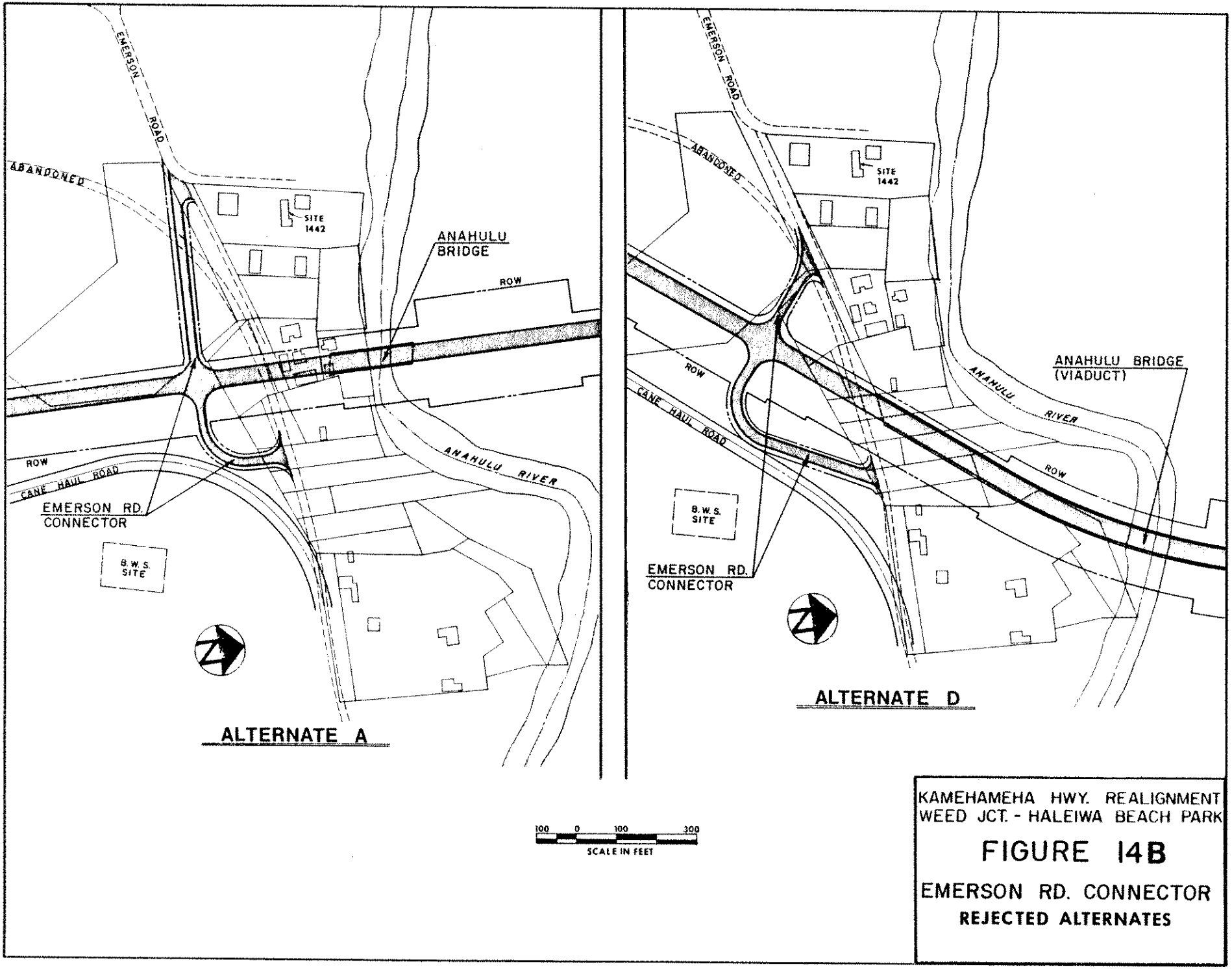


KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 14A

EMERSON RD. CONNECTOR
ALTERNATE C

SCALE: 1" = 200'



KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 14B

EMERSON RD. CONNECTOR
REJECTED ALTERNATES

8. Environmental Constraints. The major environmentl constraints identified for the Haleiwa area are liste below. The specific constraints that restrict possible bypass alignments are identified on Figure 7.

a. Prime Agricultural Lands. The use of prime agricultural lands has been minimized.

b. Taro Lands. A 177 State Senate Concurrent Resolution urges preservation of agricultural lands where taro can be grown. Such lands have been avoided.

c. Homes. Care has been taken to minimize the need to remove housing and to avoid impacting nearby housing with highway noise.

d. Businesses. Removal of existing businesses, or disruption of access, has been avoided.

e. Cane Haul Roads. Provisions have been made to accommodate cane haul traffic.

f. Wells, Irrigation Systems, and Utilities. Public services will not be disrupted and convenient relocation of affeacted facilities will be provided.

g. Parks. Parks or proposed park sites have been avoided (see Figure 23).

h. Noise Sensitive Areas. In order to minimize the impact of noise, the new highway has been placed at an adequate distance from businesses and housing where possible.

i. Aesthetic Impact. Care has been taken to choose a route which will minimize the highway's visual intrusion into the natural environment. Stream crossings have been chosen so as to minimize the visual impact of bridge structures.

j. Historic Sites. The route avoids registered and potential historic or archaeologic sites.

k. Wildlife Habitat. The removal of wildlife habitat has been minimized, and any disturbance of endangered species will be strictly avoided.

l. Natural Hazards. Structures in flood plains or tsunami inundation areas will be designed to withstand maximum forces, and will not aggravate flooding.

A major physical constraint that has restricted the development of the alternate alignments is the bluff on the south side of the Anahulu River (Figure 7 and Plate 1). The base of the bluff is approximately 700 feet inland from Kamehameha Highway, and rises steeply to a height of 70 feet at a distance of 1,000 feet from the highway. As a result, the farther inland the alignment is placed, the more excavation is required. The recommended alternate strikes a favorable balance between cutting into the bluff and maintaining a suitable distance from town.

9. Community Concerns. A number of important criteria that have guided the design study were derived from public input at meetings held in 1962, 1970, 1979, and 1980. At the earlier meetings it was expressed that the alignment should be as far inland as possible and should cross the Anahulu River above the bend. This first criteria has been met in so far as possible while keeping landform modification to a minimum. It is not practical to cross above the bend since the cut in Anahulu River bluff would be excessive and a long viaduct would be required. These points have apparently been addressed to the satisfaction of the community, since they have not been raised at the more recent hearings. However, the proposed crossing below the bend has brought up the concern of relocating the families located in that area. This problem has been mitigated by using retaining walls to reduce the right-of-way required, so that only two residences will be removed. Full relocation assistance will be provided to these families. A concern frequently raised regards maintaining access to as much cane land as possible. The preferred alignment takes the least cane land of the three alternates. Furthermore, the relocated cane haul roads will be provided with grades and surfacing compatible with the requirements of the cane trucks.

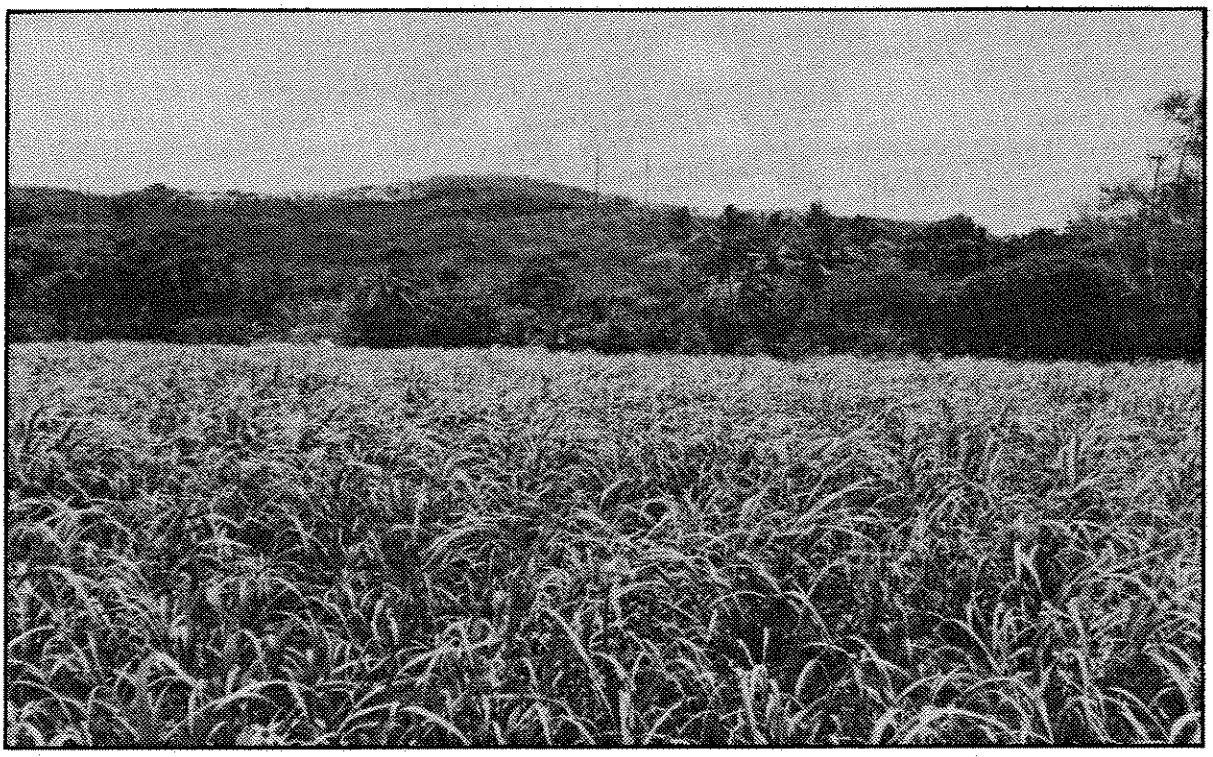


Plate 1. View of the Anahulu River bluff looking south. The river flows from left to right between the sugar cane (foreground) and the row of trees (middle).

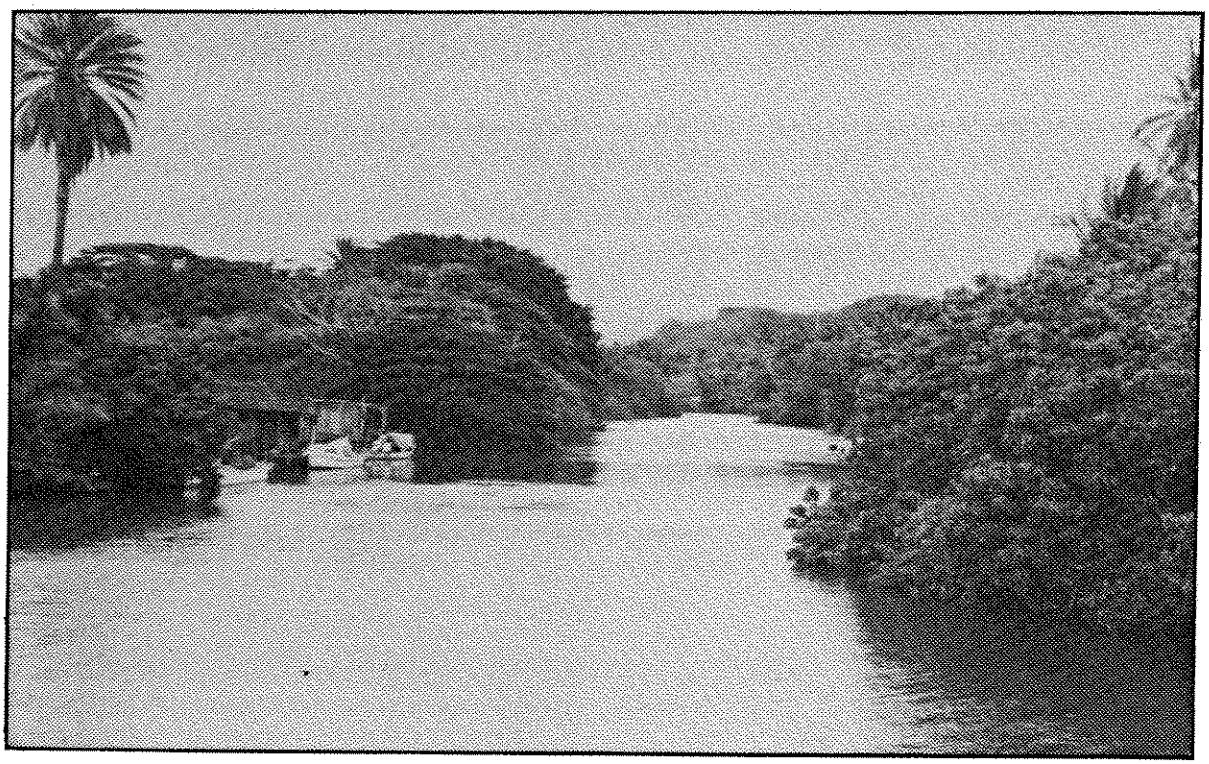


Plate 2. View up the Anahulu River from the existing bridge (compare with Plate 5).

B. PROJECT COST AND BENEFIT/COST RATIO

The characteristics and costs of the three proposed alternates are summarized in Table 3. The total cost (at 1980 prices) of the two lanes of the recommmended Alternate C would be $12.683 million. Cost estimates to bring the highway up to four lanes have not been derived, since this ultimate development would be well into the future, if at all. It is anticipated that the cost of the project will be shared between the Federal Government (approximately 75%) and the State of Hawaii (approximately 25%)

The benefit/cost ratios of the recommended alternate is shown in Table 5. This was calculated according to the methodology prescribed in the American Association of State Highway Officials publication, "Road User Benefit/Cost Analyses for Highway Improvements". On the basis of annual user benefits versus annually pro-rated right-of-way and constuction costs, Alternate C shows significant benefits. The user benefits are primarily an expression of savings through reduced driving time and a decrease in the number of accidents. The benefit/cost ratio only evaluates user benefits and highway-related costs. Other costs and benefits such as environmental impacts, economic impacts, and non-user benefits are evaluated throughout the EIS. The purpose of the benefit/cost ratio is to determine the cost effectiveness of a particular project for comparison purposes. The purpose of the EIS is to present all of the costs and benefits of a project, without attempting to reduce them to dollar terms.

TABLE 5 BENEFIT/COST RATIOS

	User Benefits*	Highway Costs	Ratio
Alternate C	$32,181,000	$12,683,000	2.54

* Annual savings relative to the "Do Nothing" alternative amounting to a 28% decrease in user costs (eg. time and fuel).

C. REJECTED ALTERNATE ALIGNMENTS

On the basis of the design criteria and constraints discussed above, three feasible alternates were developed. The three proposed alternates share a common alignment for several thousand feet at the beginning and at the end of the project. The major differences between them arise in relationship to their distance inland from Kamehameha Highway and the point at which they cross the Anahulu River. None of the alternates satisfies all of the different environmental and community concerns, since some are conflicting. The characteristics of the alternates are summarized in Table 3, and their impacts are compared in Chapter IV. The two alternates that were rejected following review of the Draft EIS are described below.

1. Alternate A. Alternate A was developed to examine an alignment as far inland from Kamehameha Highway as possible. This alternate is approximately 1,000 feet from Kamehameha Highway at its closest point to the central busines area. Alternate A crosses the Anahulu River below the bend, approximately 1,300 feet upstream from the existing Anahulu Bridge. Alternate A is 2.35 miles in length, requires 52 acres for right-of-way, and creates 29 acres of remnant cane land. The cost of Alternate A is $12.71 million.

Alternate A was rejected primarily because of the adverse impact it would have on homes between Emerson Road and the Anahulu River. (Alternate B, a variation of Alternate A, was discarded prior to circulation of the Draft EIS.)

2. Alternate D. Alternate D is a modification of Alternate C to provide a crossing above the bend in the Anahulu River. To accomplish this, and negotiate the river bluff, the section south of the river has to be much closer to town (450 feet), and a long viaduct is required across the Anahulu River. Alternate D is 2.43 miles in length, requires 57 acres of right-of-way, and creates 20 acres of remnant cane land. The cost of Alternate D is $16.57 million.

Alternate D was rejected because it would adversely affect a marsh and historic taro complex at the bend in the Anahulu River. Both the U.S. Fish and Wildlife Service and the State Historic Preservation Officer recommended against this alignment.

D. NO BUILD ALTERNATIVE

The existing Kamehameha Highway through Haleiwa now acts as a traffic bottleneck causing congestion during weekend peak hours. If the bypass road is not constructed, traffic congestion will worsen. Increased traffic congestion will result in greater air pollution, pedestrian-vehicle conflicts, and longer travel times. The traffic-related impacts of the no-build alternative would frustrate efforts to preserve the rural atmosphere of Haleiwa (see Appendix F).

Traffic jams in Haleiwa Town resulting from the no-build alternative would spread traffic-related impacts into areas outside of Haleiwa. Drivers seeking to drive around the traffic tie-up on Kamehameha Highway would take alternative routes through Waialua or on Haleiwa Road, impacting these quiet residential neighborhoods. Some Honolulu drivers, wanting to visit the North Shore on weekends, would utilize the Windward route to the North Shore, increasing traffic volumes on that side of the island.

Traffic tie-ups in Haleiwa Town during peak periods would restrict the mobility of North Shore residents. Residents wishing to travel into Haleiwa Town or to points south, such as Wahiawa and Honolulu, would have three choices: 1) endure the traffic jam in Haleiwa; 2) take the Windward Route; or 3) stay home.

The no-build alternative would reduce the travel options of Honolulu residents as well. Unpleasant traffic conditions in Haleiwa would discourage many weekend travelers who would otherwise have visited the North Shore. However, this negative impact on Honolulu residents could be a benefit for North Shore residents, since the no-build alternative could eventually make for less crowded conditions at North Shore beaches and parks. But these benefits would be at the expense of other areas on Oahu.

The no-build alternative would avoid the loss of the agricultural land required for the bypass. This would be one of the most important benefits of the no-build alternative, as the loss of valuable agricultural land is an important concern in the State of Hawaii.

If the highway realignmet is not constructed, the State of Hawaii would save up to $12 million, and the economic impact of the bypass on Haleiwa businesses would be avoided. Congested traffic conditions in Haleiwa could increase the level of "off-the-road" purchases, as weary drivers seek temporary respit in local businesses. However, higher levels of weekend traffic will impact non-roadway oriented business,

as North Shore residents avoid Haleiwa during times of high traffic volumes. On the other hand, user costs, in terms of time and fuel consumption, would be 28% higher than with the bypass (Table 5).

As with the evaluation of project-related impacts, the evaluation of the impacts of the no-project alternative assumes that existing patterns persist and that present North Shore economic conditions remain unchanged. Should rising gasoline prices or restricted availability of fuel cause Oahu residents to drive less, the impacts of the no-project alternative will not be as pronounced. If consumers are forced to reduce fuel consumption due to high prices or rationing, weekend recreational driving will be cut back. Should this occur, weekend traffic in Haleiwa would not necessarily improve, but would probably increase at a slower pace than projected.

Since there is a clear present need for relief of congestion in Haleiwa, and there is no indication that the situation will change unaided, the no-action alternative has been rejected.

E. WIDEN KAMEHAMEHA HIGHWAY ALTERNATIVE

The existing Kamehameha Highway through Haleiwa is only 20 feet wide, with narrow shoulders and no sidewalks, curbs, or gutters. The right of way varies from 50 to 60 feet in width, though many buildings have almost no set-back from the highway (Plate 3, Chapter III). The present traffic volume through Haleiwa requires four traffic lanes, and projections indicate that this need will increase. The proposed bypass will provide the needed four lanes (2 on the bypass and 2 on Kamehameha Highway), or Kamehameha Highway could be widened. Four 12-foot lanes, two 10-foot shoulders, and two 8-foot sidewalks would require an 84-foot right of way. This alternative would take a 24 to 34-foot strip on either side of the highway (7.4 acres).

To implement this alternative, nearly all of the buildings (approximately 30) along one side of Kamehameha Highway would have to be removed. Also, the Anahulu River bridge would have to be replaced, or a second bridge built adjacent to it; either choice would destroy the bridge's scenic value. This alternative would eliminate the rural character of Haleiwa, so it has not been given serious consideration.

F. ALTERNATIVE MODES OF TRANSPORTATION

1. Bus Service. An alternative to the construction of the proposed Kamehaeha Highway realignment is the provision of additional bus service to the North Shore. In order to be successful as an alternative, expanded bus service would have to attract enough riders to prevent traffic congestion from increasing. To accomplish this, travelers' attitudes toward bus travel would have to be drastically altered, since drivers have proven very resistant to giving up their automobiles.

The bus service alternative would have its best chance of success in attracting weekday commuters who travel from the North Shore into Wahiawa and Honolulu. If bus service were expanded to the point where wait times were greatly shortened, some commuters might be wooed out of their autos. But even if this alternative were to be successful in preventing increases in weekday traffic, it would not solve all of the problems to which the bypass road is addressed. The greatest traffic problems occur on weekends when visitors from urban areas flock to the North Shore. Recreational drivers are especially resistant to alteration of their method of travel. Based on the past behavior of weekend travelers it appears unlikely that significant numbers would give up the private automobile for the bus. Without a significant change in recreational travel preferences, the expanded bus service alternative would be unable to prevent weekend traffic from growing to undesirable proportions.

However, drivers' past unwillingness to switch from their automobiles into buses may not hold true in the future. Continuing increases in fuel prices or gas rationing could change travel preferences sufficiently to make expanded bus service a more feasible alternative.

If successful, the bus alternative would result in energy savings, as buses are more efficient than automobiles. But the bus alternative would not solve the problems inherent in maintaining a busy highway through a small rural community. Haleiwa would still be impacted by traffic noise, air pollution, and pedestrian/vehicle conflicts. Furthermore, the inadequate roadway and shoulder widths, poor geometry, and conflicts at side streets, would continue to cause problems.

While expanded bus service is desireable, it is not a viable substitution for a new highway around Haleiwa.

2. Fixed Rail. A fixed guideway rapid transit system would be faster than existing automobile or bus transportation and would not be subject to adverse traffic conditions. Because of its speed, and the possible reduction in travel time, this type of transit would have the greatest chance of superseding the automobile. However, a fixed guideway system would be much more expensive than any other alternative and is dependent on the previous establishment of such a system in Honolulu. Though a fixed guideway system is being considered for Honolulu, its eventual implementation is far from certain. Such a system would have to be constructed and proven over a period of time in Honolulu before extension of rail service to the North Shore could be considered. Even with the existence of a Honolulu system, the low population of the North Shore might not justify the large capital expense. A fixed guideway system, due to its speed and comfort, would have a very large growth inducing impact on the North Shore. At this time, it appears that a fixed guideway system is too far off in the future to resolve the existing traffic problems on Kamehameha Highway through Haleiwa.

3. Small Scale Programs. Nationally, small-scale programs to encourage van pooling and car pooling have been attempted in order to conserve energy and reduce traffic congestion. However, these programs have faced strong commuter resistance to abandoning the individual use of private automobiles. Van pools and car pools primarily appeal to commuters and could help to reduce weekday traffic, but would be of little help in reducing weekend traffic. Due to the distance between the North Shore and urban job centers, walking and bicycling are not viable alternatives. Should the bypass road not be constructed, van pools or car pools would not, by themselves, be an adequate alternative. It is possible that van pooling and car pooling, combined with other "non-structural" alternatives such as expanded bus service, could help to prevent traffic congestion from worsening. However, the inadequacies of the existing highway would continue to cause problems.

CHAPTER III. SOCIAL, ECONOMIC, AND ENVIRONMENTAL CONTEXT OF THE AREA

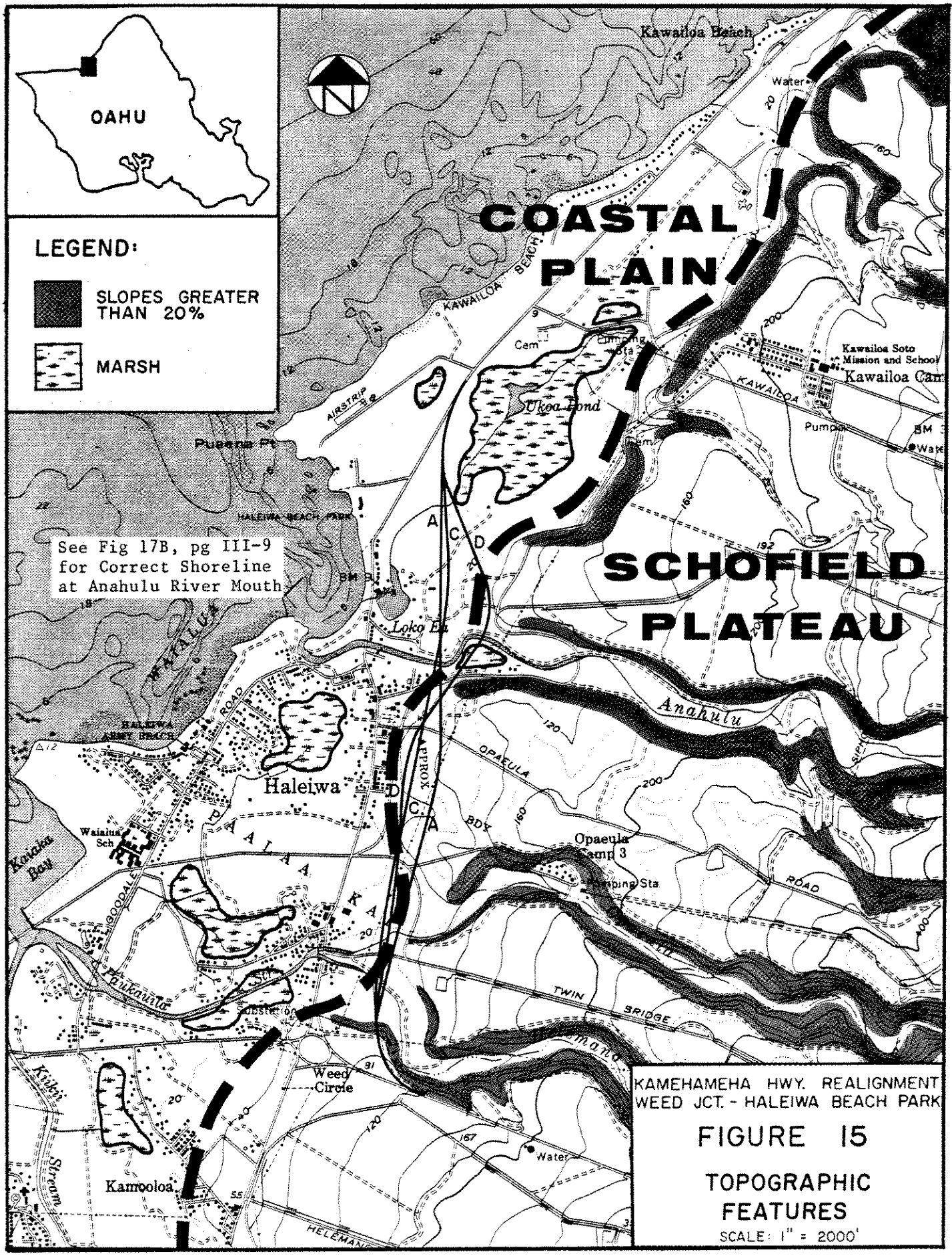
A. TERRAIN

1. Topography. The proposed bypass around Haleiwa is located on the gradual transitional area between the Schofield Plateau and the coastal plain (Figure 15). The plateau is cut by the steep-sided valleys of Helemano Stream, Opaeula Stream and the Anahulu River. The ridges between these streams are broad and slope at a rate of 5%-10% toward the base of the Koolau Range. The coastal plain on which Haleiwa Town is situated is relatively level, and only 10-20 feet above sea level. Significant topographic features of the coastal plain include the tidal portions of the three above-mentioned streams, several marshes, and the Loko Ea fishpond. The transition from the plateau to the coastal plain is a gentle slope in the project area behind Haleiwa, but is marked by steep bluffs north of the Anahulu River.

The alternate alignments begin at an elevation of 130 feet, and descend to an average elevation of 30 feet in the vicinity of Helemano and Opaeula Streams. Alternate A crosses the Anahulu River bluff at an elevation of 80 feet, while Alternates C and D reach elevations of 70 feet and 40 feet, respectively, at this point. From the north side of the river to Kamehameha Highway, Alternates A and C have an average elevation of 20 feet, while Alternate D is farther inland at an elevation of 40 feet. The three alternates rejoin Kamehameha Highway at an elevation of approximately 8 feet above sea level.

2. Geology and Soils. The landform described above is a result of erosional forces (stream, ocean, landslide, and wind) acting on the Koolau Volcanoe. The Schofield Plateau was formed by coalescing lava flows from the Koolau and Waianae Volcanoes, although the portion of the plateau in the project area is made up entirely of Koolau flows (1, 2)*. The coastal plain was created during the Pleistocene age, when the sea was at a higher level than at present. A broad coral reef was developed, waves cut low sea cliffs in the plateau, and the river valleys were submerged (3). Then, the sea receeded to its present level, exposing the reef and the level

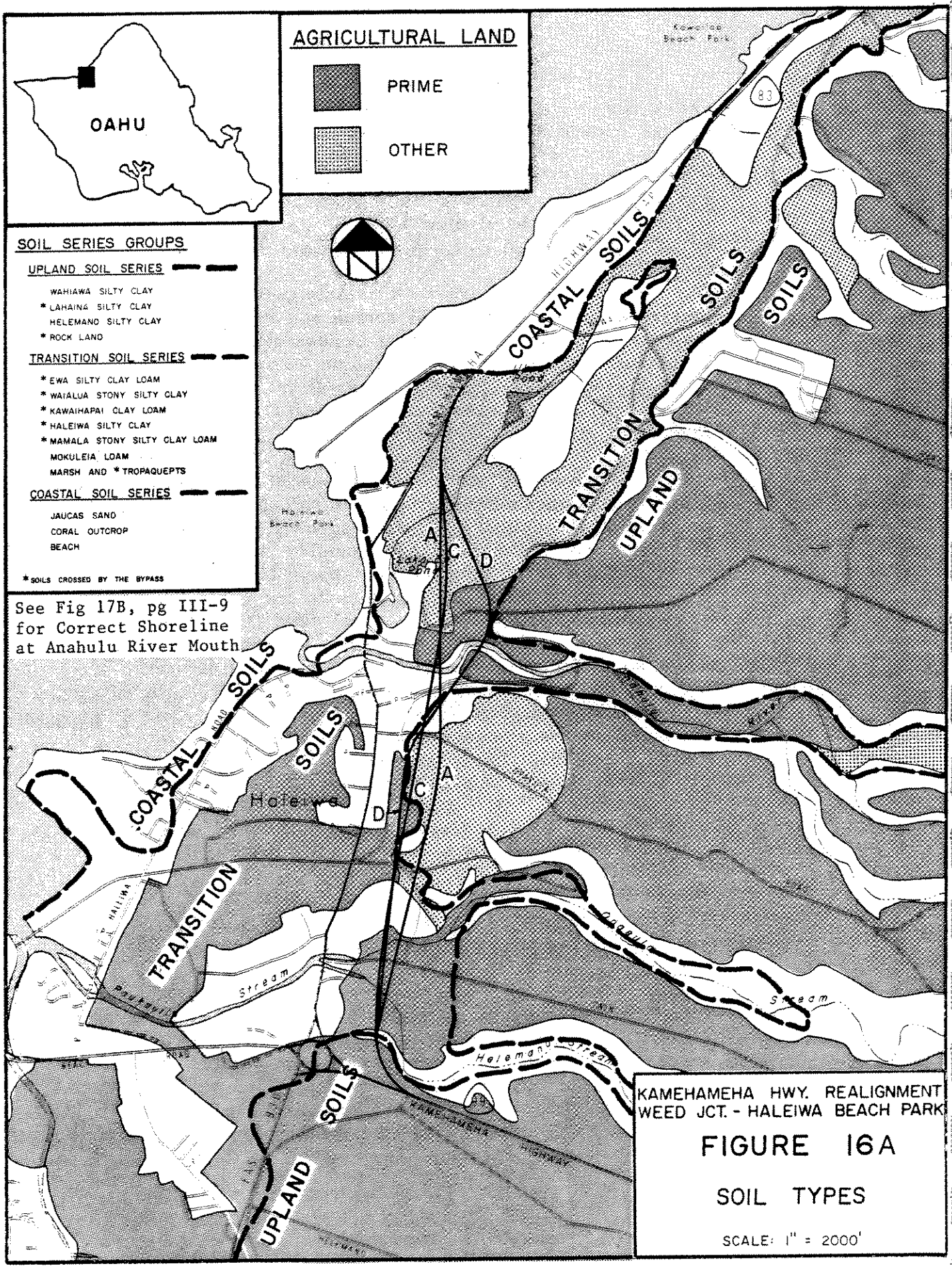
* References are listed at the end of this Chapter.

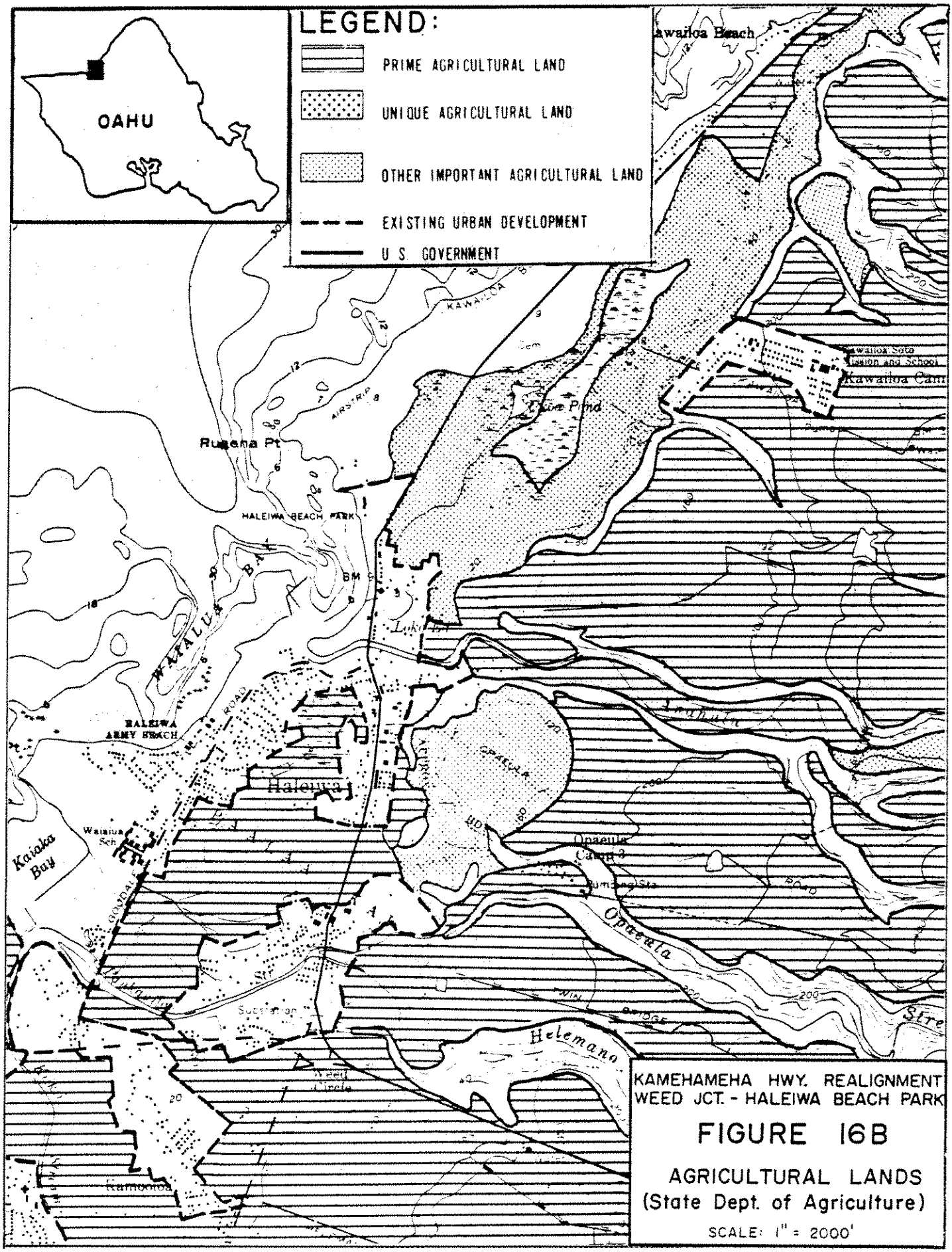

OAHU
LEGEND:
SLOPES GREATER THAN 20%
MARSH
COASTAL PLAIN
SCHOFIELD PLATEAU
See Fig 17B, pg III-9 for Correct Shoreline at Anahulu River Mouth
Kawailoa Beach
Water
KAWAILOA BEACH
Cem
Camping Sta
Kawailoa Soto Mission and School
Kawailoa Cam
KAWAILOA
Ukoa Pond
AIRSTRIP
Pumping Sta
Pupukea Pt
HALEIWA BEACH PARK
Loko Ea
A
C
D
APPROX
Anahulu
OPAEULA
BDY
Opaeula Camp 3
Camping Sta
ROAD
Haleiwa
HALEIWA ARMY BEACH
Waialua Sch
Kaiaka Bay
PAALAAKA
Pukaana
TWIN BRIDGE
Weed Circle
Kawaihapai
Kaiaka Stream
Kamooloa
Water
HELEMANO
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 15
TOPOGRAPHIC FEATURES
SCALE: 1" = 2000'

valley floors filled with sediment. Further erosion of the plateau caused sediment to be deposited on the coastal plain, covering the reef with a thick layer in the vicinity of the stream mouths and a fairly thin layer elsewhere. A portion of the former reef is exposed at Haleiwa Beach Park. Depressions in the reef became shallow lakes or estuaries, which gradually filled with sediment to form the present marshes.

The soils of the Haleiwa area clearly reflect this geologic history. The fourteen soil series and miscellaneous types mapped in the area by the Soil Conservation Service (4) can be placed into three groups; upland, coastal, and transition (Figure 16A). The upland soil series include Wahiawa, Lahaina, and Helemano silty clays. Lahaina and Wahiawa soils were formed in place on the relatively gentle slopes of weathered basaltic lava flows and ancient alluvium, while the Helemano series developed on the steep valley walls. Rocky slopes in the valleys, where little or no soil has developed, are also included in the upland soil grouping delineated on Figure 15. (Helemano soils and rock lands roughly correspond to the areas of slopes over 20% mapped on Figure 15.) The coastal soils are represented by a single series in the project area, Jaucas sand, which developed on the coral sand left behind when the sea receeded. Present beach sand and the coral outcrops are also included in this group. The transition soils are found between the upland and coastal soils, having developed on the sediments that were eroded from the upland areas and deposited on the coastal plain at the base of the sea cliffs and at the stream mouths. The soils that are placed in this group include Ewa, Waialua, Kawaihapai, Haleiwa, and Mamala; most are silty clays, with some having loam or stony components. The transition area also includes marshy soils and soils (termed tropaquepts) that are periodically flooded for crops such as taro, rice, or lotus.

The proposed bypass crosses six soil types, plus rock land and a small area mapped as tropaquept soils, as indicated on Figure 16. With the exception of Lahaina silty clay, these are all soils of the transition area. The soils encountered from the beginning of the project to the Anahulu River have properties that are well-suited for highway construction (5). However, the soils north of the Anahulu River (Waialua, Mamala and tropaquept) are less desirable, so the bypass will require imported fill for a suitable base. The erosion potential of the soils crossed by the proposed highway falls


OAHU
AGRICULTURAL LAND
PRIME
OTHER
SOIL SERIES GROUPS
UPLAND SOIL SERIES
WAHIAWA SILTY CLAY
* LAHAINA SILTY CLAY
HELEMANO SILTY CLAY
* ROCK LAND
TRANSITION SOIL SERIES
* EWA SILTY CLAY LOAM
* WAIALUA STONY SILTY CLAY
* KAWAIHAPAI CLAY LOAM
* HALEIWA SILTY CLAY
* MAMALA STONY SILTY CLAY LOAM
MOKULEIA LOAM
MARSH AND * TROPAQUEPTS
COASTAL SOIL SERIES
JAUCAS SAND
CORAL OUTCROP
BEACH
* SOILS CROSSED BY THE BYPASS
See Fig 17B, pg III-9 for Correct Shoreline at Anahulu River Mouth
COASTAL SOILS
TRANSITION SOILS
UPLAND SOILS
A
C
D
Haleiwa
Stream
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 16A
SOIL TYPES
SCALE: 1" = 2000'


LEGEND:
PRIME AGRICULTURAL LAND
UNIQUE AGRICULTURAL LAND
OTHER IMPORTANT AGRICULTURAL LAND
EXISTING URBAN DEVELOPMENT
U S GOVERNMENT
OAHU
Kawailoa Beach
Kawailoa Camp
Rugena Pt
HALEIWA BEACH PARK
HALEIWA ARMY BEACH
Haleiwa
Waialua Sch
Kaiaka Bay
Opaeula
Helemano
Kamananui
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 16B
AGRICULTURAL LANDS
(State Dept. of Agriculture)
SCALE: 1" = 2000'

in the moderate to high range. The normal annual rate of soil loss on the cane lands in the project area ranges from 2 to 6 tons per acre, as calculated using the universal soil loss equation (6)

The bypass highway will cross soils that are classified by the State Department of Agriculture as being "Prime Agricultural Land" (7). These are lands which have a combination of soil quality, growing season, and moisture supply which is capable of sustained high yields of crops. The Prime Land is found on the broad ridges of the Schofield Plateau and on the coastal plain around Haleiwa (Figure 16). The bypass will also encounter "Other Important Agricultural Land", which is considered to be of state-wide or local importance. This class includes the pasture land around Ukoa Pond and a portion of the cane field behind Haleiwa. The project area has no agricultural land classified as "Unique". The impact of the alternate alignments on agricultural land is discussed in Chapter IV.

3. Meteorology. Haleiwa, being located on the North Shore of Oahu, is exposed to the northeasterly trade winds, which are one of the primary determinants of Hawaii's weather. According to wind records from stations at Mokuleia Field and at Waialua (8, 9), the dominant winds are from the east and east southeast, respectively, indicating deflection of the trade winds by the Koolau and Waianae mountain ranges. These modified trade winds occur more than 75% of the time, and have a velocity of 10-25 mph. The temperature at Haleiwa, like other coastal stations in Hawaii, is fairly uniform, with average monthly minimum temperatures ranging between 60° and 65° (Farenheit) and average monthly maximums around 75° - 85°; relative humidity varies between 65% and 90% (10). The average rainfall in the project area is 30 inches per year, while the headwaters of the Anahulu River watershed at the crest of the Koolau range may receive as much as 300 inches per year (11). Rainfall occurs most frequently from trade wind showers, although "Kona Storms" (persistent low-pressure storms with southerly winds) contribute large amounts of rain in the winter months. The wettest months are January and February, and the driest months are July and September (12), when the trades are not as strong.

4. Hydrology. As previously noted, the major surface waters in the project area are Helemano Stream, Opaeula Stream, the Anahulu River, Loko Ea fishpond, and the Ukoa Pond marsh. All three streams are diverted, in their upper reaches, for sugar cane irrigation. Helemano and Opaeula Streams are periodically dry above the proposed bypass crossings, as is the Anahulu River, though less frequently. Where crossed by the bypass, the Helemano Stream bed is approximately 80 feet wide, Opaeula Stream is 30 feet wide, and the Anahulu River is 120 feet wide. The Ukoa Pond outlet is approximately 80 feet wide at the proposed crossing, but it is marshy and only appears to flow from storm runoff. At the bypass crossings, the three streams are at or near sea level, so are subject to the upper edge of tidal action. As a result, the water at the crossings is occasionally brackish when stream flow is minimal. The Ukoa Pond outlet is separated from Loko Ea fishpond and the ocean by a system of dikes, so it is not directly subject to tidal action.

The Ukoa Pond marsh is roughly 115 acres in extent (Figures 15 and 18). Ukoa Pond itself covers less than 3 acres and has a maximum depth of roughly 10 feet. The several water sources for the marsh have been diverted for sugar cane irrigation, and wells have reduced the flow of the springs which feed the marsh (13). As a result of water diversion and cultivation, the area of the marsh has been reduced, and the remaining permanent marsh is surrounded by former marsh land that is dry during a portion of the year. In this condition, the marsh is very sensitive to changes in water level. The relationship of the alternate alignments to the marsh is shown on Figure 18.

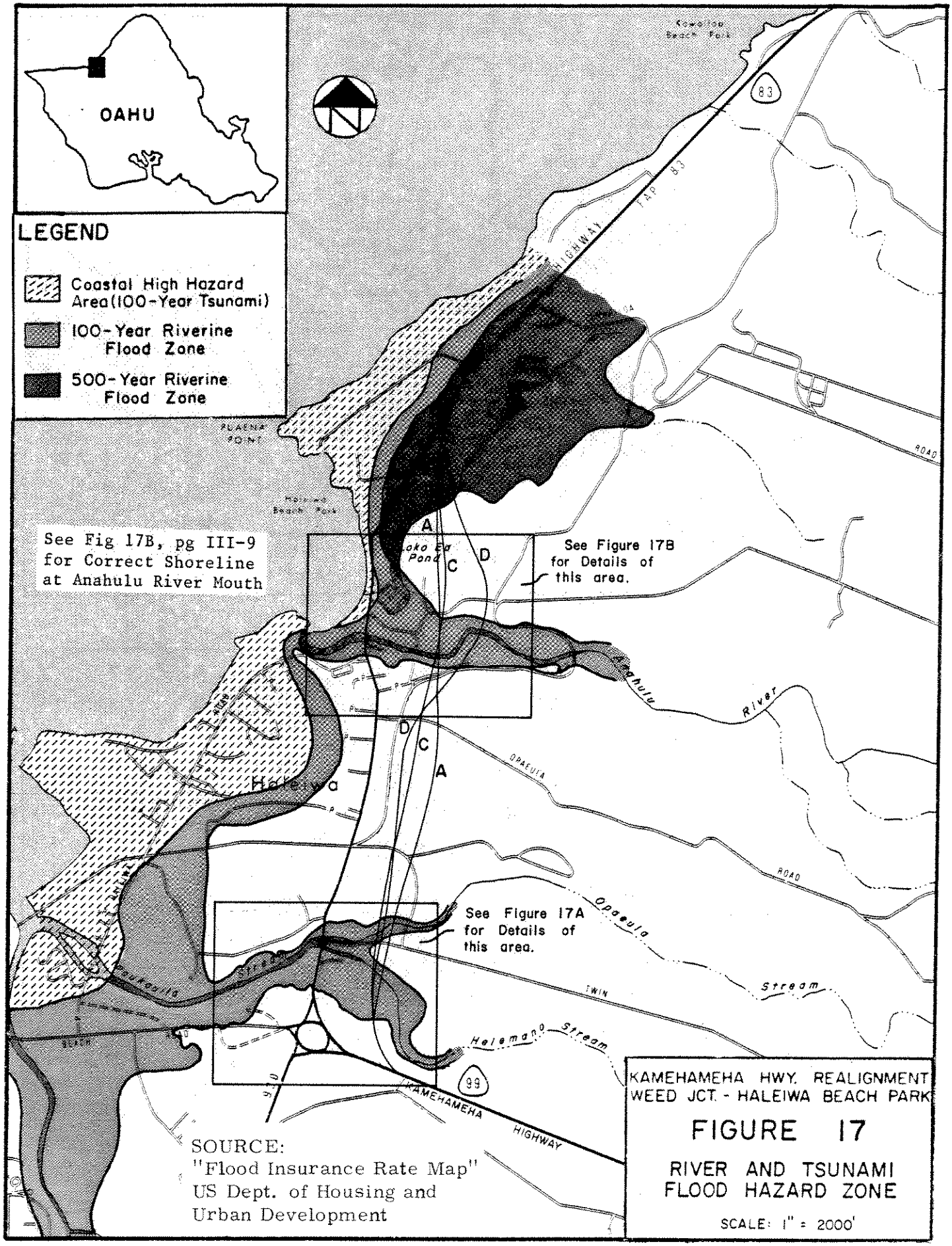
Loko Ea is an historic fishpond and it is still in use. It is fed by freshwater springs and Ukoa Pond. Dikes and water gates are used to control flow between the Ukoa Pond out and the fishpond, so that Ukoa Pond does not normally discharge through the fishpond. The fish raised in Loko Ea are listed in Appendix B.

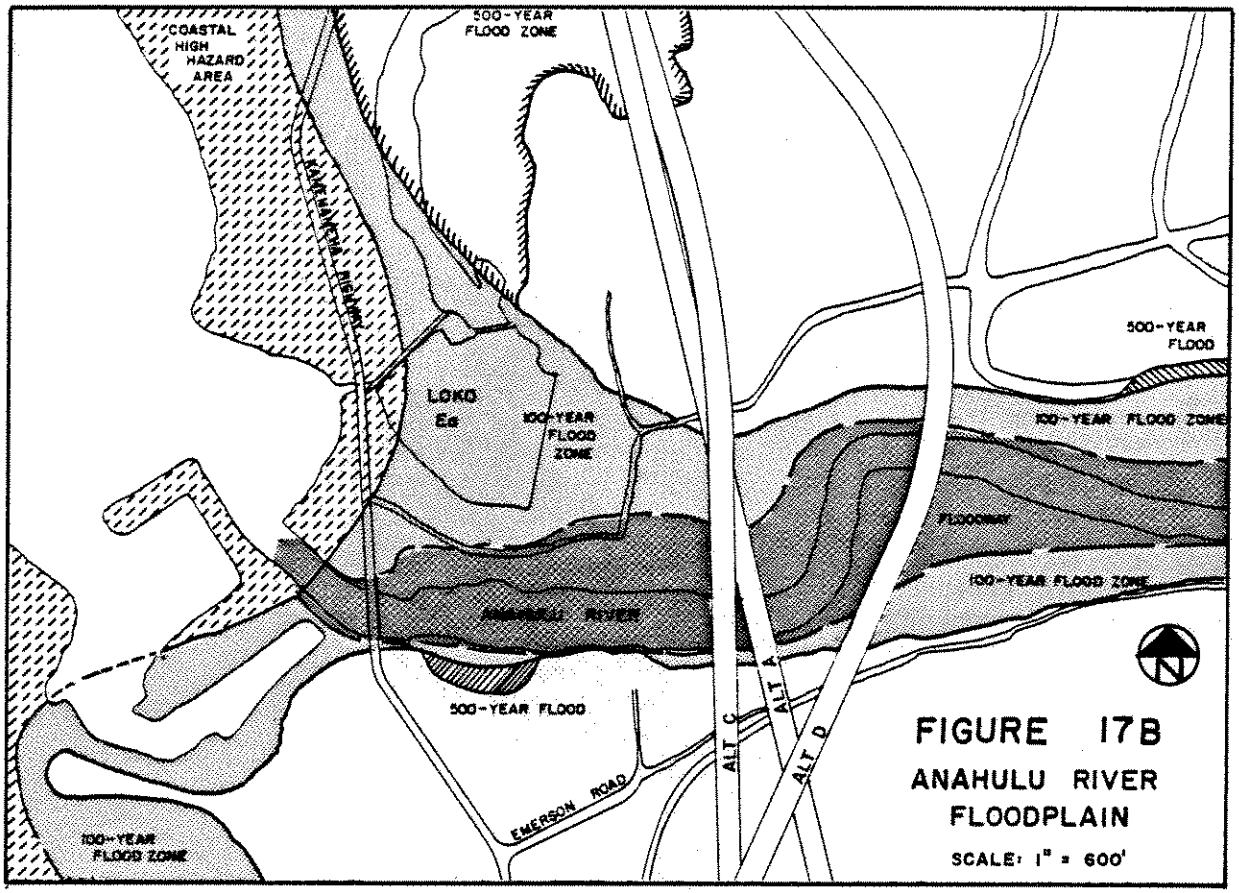
The principal flood hazard in the area is from peak flows overtopping the banks at Kamehameha Highway near the

confluence of Helemano and Opaeula Streams and further downstream (Paukauila Stream). The most recent serious flood in the Waialua-Haleiwa area, which occurred in April 1974, resulted in three deaths and caused considerable damage. A record discharge of 18,200 cubic feet per second (cfs) was estimated for Helemano Stream, Opaeula Stream reached 6,670 cfs, and the Anahulu River had a record discharge of 16,300 cfs (14). The 100-year flood plains of these streams are delineated on Figure 17, which also delineates the 100-year tsunami zone. Approximate maximum flood elevations at the proposed highway crossings are 15 feet on Helemano and Opaeula Streams and 11 feet on the Anahulu River (15). The 100-year flood discharges of Helemano, Opaeula and Anahulu Streams are 16,000 cfs, 10,000 cfs, and 16,400 cfs, respectively.

The southerly portion of the bypass corridor is underlain by the Waialua basal water body and the northerly portion is underlain by the Kawailoa basal water body: the dividing line between these two ground water zones is the deep valley fill of the Anahulu River (37). The caprock over the Waialua basal water body is thicker and more efficient at confining the ground water than that over the Kawailoa basal water body, so the former has artesian water while the latter has little or no artesian pressure (38). The basal water head in the Wailua body is 11-12 feet above sea level (39). The upper edge (contact) of the caprock approximately corresponds to the dashed line on Figure 16 separating the "transition" and "upland" soil series. It can be seen that over much of its length, the bypass lies near the upper edge of the caprock. All three streams crossed by the bypass gain flow by basal water leaking through the caprock. This leakage occurs at the proposed Helemano Stream crossing, but ceases slightly upstream from the other proposed crossings. Basal water also leaks out at the marshes on the coastal plain (Figure 15). Alternate D crosses a small, cultivated spring-fed marsh on the south bank of the Anahulu River, and all three alternates span the outlet of Ukoa Marsh.

5. Vegetation. The natural vegetation of the project area is dry scrub and mixed lowland forest (16). However, virtually all suitable sites are now cultivated in sugar cane. Approximately one-half (47%) of the bypass corridor crosses sugar cane fields. The remainder encounters kiawe "forest" (28%), koa haole scrub (17%), riparian (streamside) forest


OAHU
LEGEND
Coastal High Hazard Area(100-Year Tsunami)
100-Year Riverine Flood Zone
500-Year Riverine Flood Zone
See Fig 17B, pg III-9 for Correct Shoreline at Anahulu River Mouth
See Figure 17B for Details of this area.
See Figure 17A for Details of this area.
Haleiwa
Anahulu River
Opaeula Stream
Helemano Stream
KAMEHAMEHA HIGHWAY
83
99
A
C
D
SOURCE:
"Flood Insurance Rate Map"
US Dept. of Housing and
Urban Development
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 17
RIVER AND TSUNAMI FLOOD HAZARD ZONE
SCALE: 1" = 2000'


COASTAL HIGH HAZARD AREA
500-YEAR FLOOD ZONE
KAMEHAMEHA HIGHWAY
LOKO Ea
100-YEAR FLOOD ZONE
500-YEAR FLOOD
100-YEAR FLOOD ZONE
FLOODWAY
100-YEAR FLOOD ZONE
ANAHULU RIVER
500-YEAR FLOOD
EMERSON ROAD
ALT C
ALT A
ALT D
100-YEAR FLOOD ZONE
FIGURE 17B
ANAHULU RIVER
FLOODPLAIN
SCALE: 1" = 600'

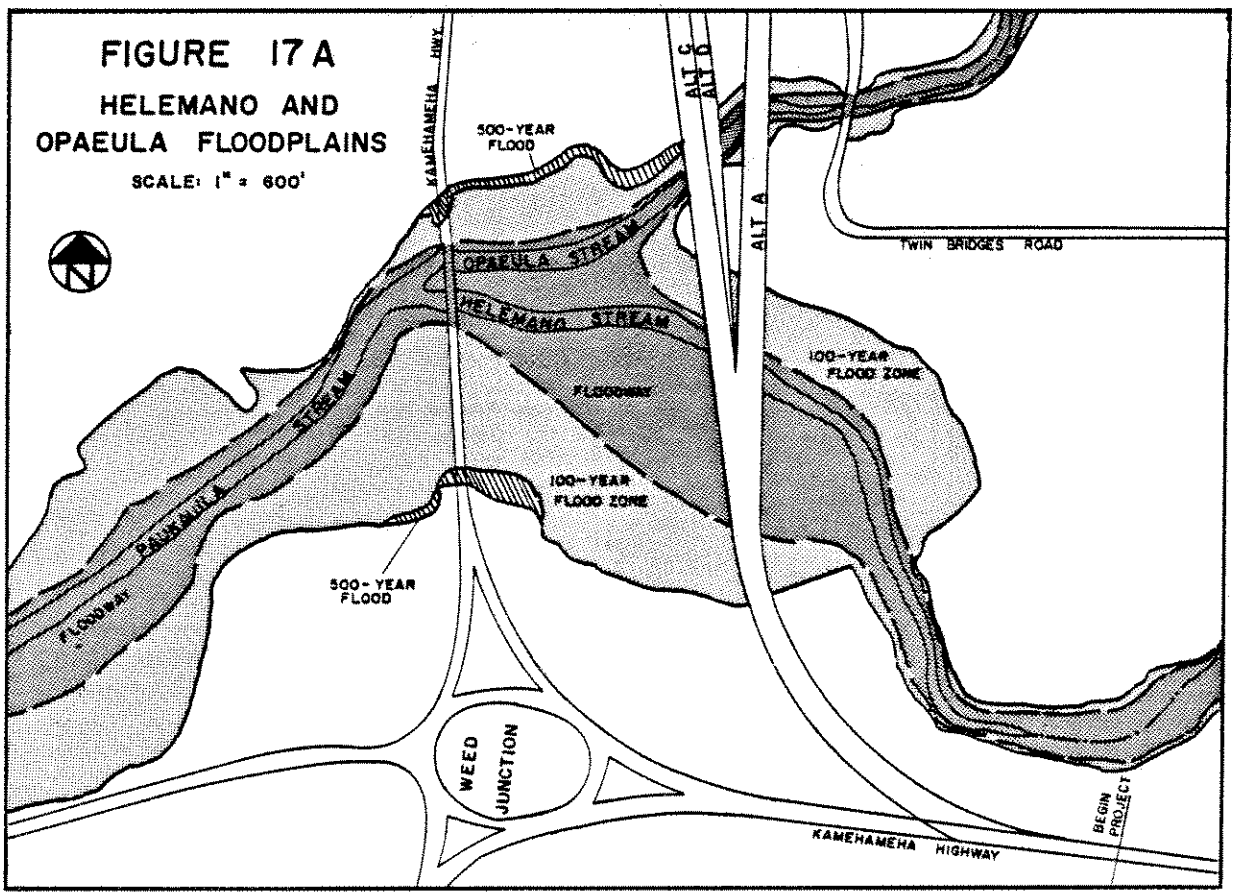


FIGURE 17A
HELEMANO AND
OPAEULA FLOODPLAINS
SCALE: 1" = 600'
KAMEHAMEHA HWY.
500-YEAR FLOOD
ALT C
ALT D
ALT A
TWIN BRIDGES ROAD
OPAEULA STREAM
HELEMANO STREAM
100-YEAR FLOOD ZONE
FLOODWAY
100-YEAR FLOOD ZONE
500-YEAR FLOOD
WEED JUNCTION
KAMEHAMEHA HIGHWAY
BEGIN PROJECT

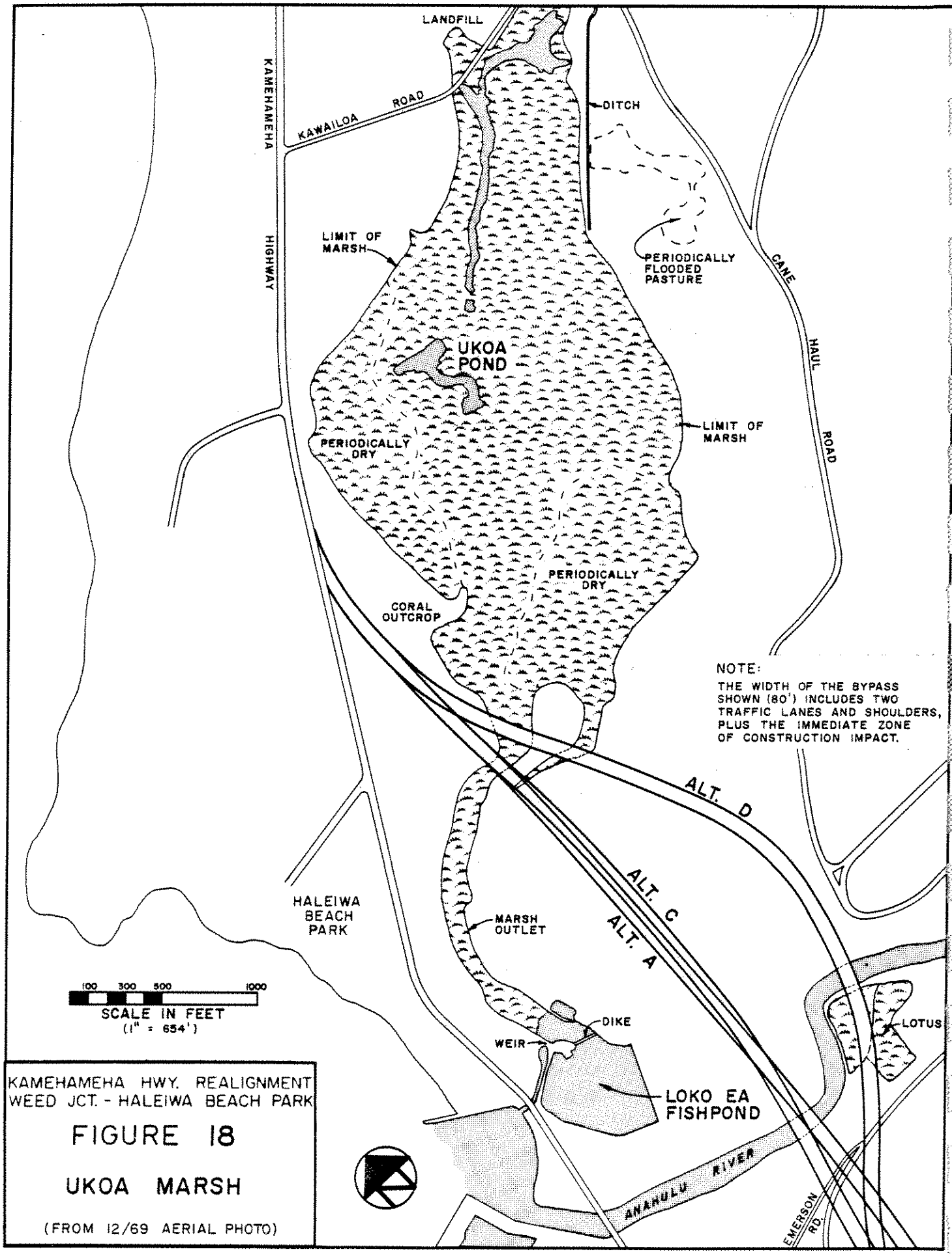
(4%), developed lands (3%), and the marshy outlet of Ukoa Pond (1%). With the exception of some of the marsh plants, virtually none of the vegetation encountered by the bypass is native to Hawaii. Likewise, rare or endangered plants are not found in the project area due to the long history of cultivation. The different vegetation types that would be crossed by the highway are briefly described below.

Kiawe (Prosopsis pallida) occurs on the coral outcrops north of the Anahulu River where it forms fairly dense stands with an undergrowth of grasses. Other trees growing in this area include koa haole (Leucaena leucocephala), Java plum (Eugenia cumini) and date palm (Phoenix dactylifera). The date palms are well established around the perimeter of Ukoa Marsh. The kiawe forest is thickest on either side of the marsh, and opens up into cleared pasture with scattered trees and koa haole thickets toward the inland edge of the coastal plain. The forest and open area is subdivided into several pastures where cattle are grazed.

The koa haole scrub vegetation type is found on the steep slopes of the stream valleys, and on disturbed areas such as rock piles in the cane fields and pastures. Some areas are exclusively koa haole, while other sites also have some Java plum, kiawe, and guava (Psidium guajava). A population of sisal (Agave sp.) has become established on the Anahulu River bluff.

The upper banks of the streams in the project area support a dense growth of koa haole and pluchea (Pluchea spp.). Closer to the water, the banks are lined with hau (Hibiscus tiliaceus). The banks of the Anahulu River also have mango trees (Mangifera indica) coconut (Cocos nucifera), a few monkeypod trees (Samanea saman), and numerous ornamentals (Plate 2). A small marsh, now cultivated in lotus is located on the south bank of the Anahulu River at the bend (Figure 18).

Ukoa Pond and its surrounding marsh comprise one of the larger freshwater wetlands on Oahu. The maximum extent of the marsh is approximately 115 acres, including the outlet, as shown on Figure 18 which was drawn from a December, 1969 aerial photograph. The marsh is described by Elliott and Hall (17) as being dominated by a sedge (Cladium leptostachyum), two species of bulrush (Scirpus californicus, and S. validus), and California grass (Brachiaria mutica). Roughly 10-15 acres in the southeastern portion of the marsh were formerly



KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 18

UKOA MARSH

(FROM 12/69 AERIAL PHOTO)

cultivated in taro and lotus (neither of which remain), and large areas of the southerly and westerly portion are accessible to cattle (Figure 18). As a result of these disturbances, plus irrigation water diversion, the southerly and westerly portions of the marsh are periodically dry (at least to several inches below the soil surface), and "facultative" wetland plants (i.e. not requiring constantly waterlogged soil) are important constituents. Two shrubby species, (Pluchea indica and P. odorata), give these marginal areas a very non-marshy appearance, but the presence of water hyssop (Bacopa monnieria) confirms that the areas are frequently inundated. The outlet of the marsh, where the bypass corridor crosses, is approximately 80 feet wide, and clearly demarcated by coral outcrops forming banks on both sides. The outlet is completely filled with large bulrushes and California grass floating in a tight mat of roots and old stems. The water in the channel is at least several feet deep, with the level being controlled by a dike and weir at the Loko Ea fishpond.

6. Fish and Wildlife. As previously noted, the alternate bypass routes cross Helemano and Opaeula Streams (tributaries of Paukauila Stream), the Anahulu River, and the outlet of Ukoa Pond. The two streams and the river are crossed in their estuarine zones, that is, where stream flow and tidal action mix to produce a fluctuation between fresh and brackish conditions. The fish and other aquatic species occurring in these streams and in the marsh were inventoried, the results of which are reported in Appendix B. A total of nineteen species were found, including four species of prawns and shrimps, three species of crabs, and twelve species of fish. Of these, nine species are native to Hawaii, and two of the fish are endemic (occurring naturally in Hawaii only). The streams are characterized by the presence of one native prawn (Opae oeha'a), one native swimming crab (papa'i maku'e), and three native fishes (ama'ama, o'opu oku'e, ahole'ole). The dominant species in Ukoa marsh are introduced guppys, mollys, and swordtails (family poeciliidae), and crayfish. Only one goby fish (o'opu naniha) was found in the areas sampled. However, it is expected that another goby (o'opu nakea), which lives in the mid and upper reaches of streams, is present at least during its juvenile stage. A third goby (o'opu nopili) that requires strongly flowing, clear, cool water, is most likely absent. (See Appendix B, page 11, for a complete listing of species by local and scientific name.) None of the fish found in the project area are listed as endangered, rare or threatened.

The canefields and dry scrub vegetation types primarily support common, introduced species of wildlife (eg rat, mongoose, feral dogs and cats, Common Mynah, Cardinal, Barred Dove, House Finch), although Hawaiian Owls (Pueo) have been sighted flying over Ukoa Marsh (18), and probably forage in the pastures and other open areas. Ukoa Marsh is one of the more important wildlife habitats on the island, as it is frequented by three species of endangered waterbirds; the marsh supports a breeding population of around 30 Hawaiian Gallinule, and is utilized as feeding habitat by Hawaiian Coots (which may also nest there) and Hawaiian Stilts. The primary feeding and nesting area for the gallinule is centered around the open water of Ukoa Pond at the northerly end of the marsh, but the entire marsh is undoubtably utilized. During high water, a flooded pasture to the east of the marsh has provided temporary feeding habitat for large numbers of stilts. Hawaiian Ducks (Koloa), which are also endangered, may occasionally visit the marsh.

Ukoa Marsh is also regularly frequented by Black-crowned Night Herons. Although not considered to be endangered or threatened, these birds may be adversely affected by diminishing wetland feeding habitat. They roost and nest in trees at secluded locations. A fourth resident "wetland" bird found in the area is the introduced Cattle Egret, though it is as much attracted to the area by the cattle and by the landfill at the north end of the marsh, as it is attracted to the marsh itself. Ukoa Marsh and the associated mudflats and flooded pasture are also reported to be utilized by migratory waterfowl and shorebirds, including Pintails, Green-winged Teal, Northern Shovelers, Golden Plovers, Sanderlings, and Ruddy Turnstones.

Although Ukoa Marsh has been adversely affected by past land and water management practices, the draft "Hawaiian Waterbirds Recovery Plan" (U.S. Fish and Wildlife Service) has suggested it for acquisition and development as a wildlife refuge, since there is a good potential for habitat improvement under proper management. (Ukoa Marsh was surveyed as part of a statewide investigation of wetlands for the Corps of Engineers; the resulting report (19) forms the basis of the above discussion.)

B. AESTHETIC AND RECREATIONAL VALUES

Central Oahu, between the Koolau and Waianae Mountain Ranges, is a broad plateau known as the Schofield Saddle. The road from Honolulu to Haleiwa and the rest of the North Shore traverses this saddle and, with the exception of Wahiawa, the drive is almost entirely through unused open space and agricultural land. The lack of urbanization affords an unbroken view of the broad plain and the mountains beyond. The saddle is the only place on Oahu where one can view a large expanse of open land. Past Wahiawa, where the saddle descends to the Waialua Plain, the landscape opens to a dramatic view of the North Shore and the ocean. From the high saddle one can look down on the coastal communities and the white wash of waves breaking along the fringing reef on either side of Waialua Bay.

Upon entering Haleiwa Town, the open landscape is exchanged for the environment of a small rural town. Though the densely populated City of Honolulu is just 20 miles distant, Haleiwa retains a pleasant atmosphere. Weatherbeaten false front stores make up the bulk of the town along Kamehameha Highway (Plate 3). Aside from a small shopping center (Plate 4), there has been little recent development in Haleiwa. Of all the rural communities on Oahu, Haleiwa bears the closest resemblence to the sleepy plantation towns of the early part of this century. Only 20% of the structures in the town of Haleiwa (census tract 99.02) have been constructed since 1960, while 55% of all structures on Oahu were constructed since 1960. In fact, 40% of Haleiwa's structures are over 40 years old, while only 16% of all structures on Oahu have reached this age (20).

Haleiwa residents value the quiet, rural flavor of old Hawaii and have worked to retain it. New development has been encouraged to adapt the architectural style of older buildings, and some existing buildings have been renovated to better fit the architectural style of Haleiwa (Appendix F). The City and County of Honolulu Department of Land Utilization is currently working to establish an Historic Design District for Haleiwa which would protect the town's architectural integrity (see Page III-39).

Occasionally visible above and between the buildings, are the higher elevation canefields and the Koolau and Waianae Mountain Ranges. Exiting town on Kamehameha Highway, the ocean returns to sight and a view of the Haleiwa Small Boat Harbor is offered. The harbor is located near the mouth of the Anahulu

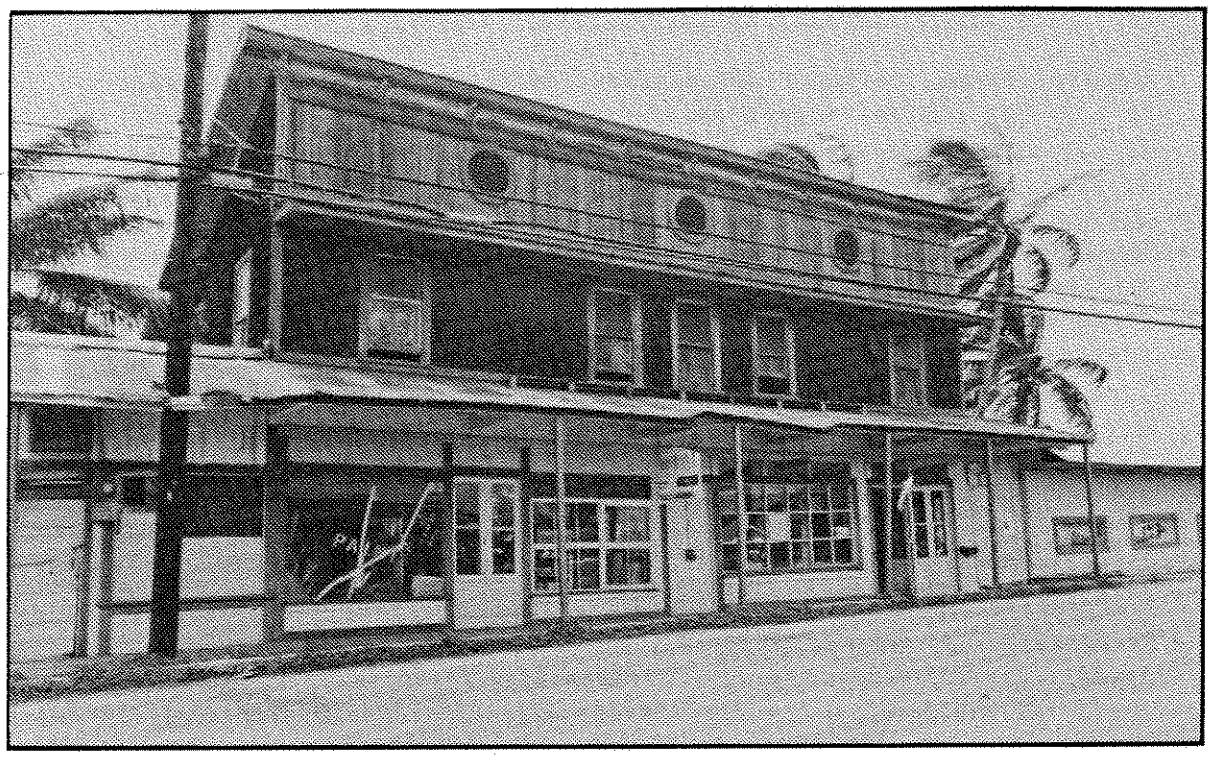


Plate 3. Typical Haleiwa storefront. Note proximity of the building to Kamehameha Highway.

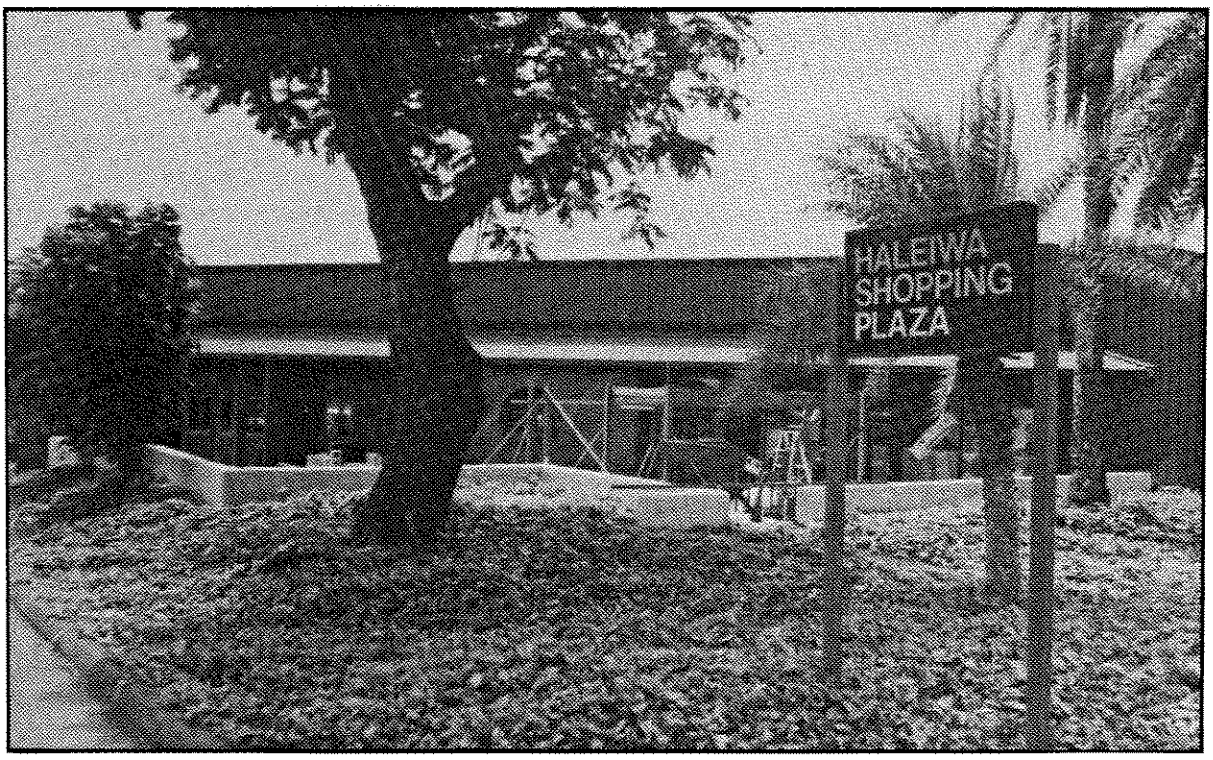


Plate 4. New shopping center with compatible architectural style.

River, and is administered by the State. Facilities include a bathhouse, restrooms, drinking water, parking, marina, and boat ramp.

Upon leaving town, one crosses the Anahulu River Bridge, a concrete arch constructed in the 1930's. This bridge is an important visual resource. The view upstream from the bridge is one of the most beautiful scenes on Oahu, with small shelters along the bank at which small fishing boats are moored in the still waters (Plate 2).

Several small streams running through the area add to the rural atmosphere as do the two ponds, Loko Ea and Ukoa Pond. Hawaiian legends say that the menehune caught fish in the ponds of Ukoa and in the bays of Haleiwa and Waialua. It is also said that on certain dark nights one can hear the voices of the menehune and see the flickering lights of their torches on the sea waters (21).

The drive along the North Shore affords views of the many fine beaches and Kaena Point in the distance. Haleiwa's greatest recreational assets are its beautiful beaches. Pu'uiki Beach Park, Kaiaka Bay Beach, Ali'i Beach Park, and Haleiwa Beach Park are all close by. Swimming, diving, surfing, fishing, picnicking, and sunbathing are all popular activities at these beaches. Further up the coast are internationally-famous Waimea Bay and Sunset Beach, renown for their winter waves reputed to be the largest surfing waves in the world. When a big swell appears, surfers and spectators from all over Oahu gather on the beaches to watch some of the world's best surfers challenge the waves. These North Shore beaches have been featured in many surfing films, and surfers from all over the world have been attracted to the area. Some have come as transients while others have remained as permanent residents.

The beautiful beaches and quiet country atmosphere of Haleiwa are an important recreational resource for all of Oahu. This is evidenced by the weekend traffic jams of Honolulu residents seeking to escape the city for a day. This country atmosphere also provides an important alternative for those who dislike the more urban life style of Honolulu. The need for this alternative is felt by those North Shore residents who are willing to commute over the long drive to Honolulu in order to live the "country" life style.

C. CULTURAL AND HISTORIC FEATURES

The Waialua / Haleiwa area has been continuously occupied since prehistoric times, as evidenced by the numerous heiau (pre-Christian places of worship), burial sites, and traditional sites throughout the region. The archaeological report prepared for this project (Appendix E) presents a map and description of the previously-recorded sites in the area; unfortunately, most have been destroyed. The Haleiwa area is believed to have been a favorite spot of the Hawaiian royalty. The fish from Loko Ea are reported to have been reserved for Queen Liliuokalani, whose house site and private swimming pond were located on the edge of the fishpond. This small pond has been filled in, and a residence is now located on the site. However, the fishpond is still in use. The archaeological survey located several previously-unrecorded sites in the vicinity of the proposed bypass alternates. These consist of a shallow deposit of bottles and other historic materials, a wall remnant, and a large complex of wet agricultural terraces. These terraces are located in a marshy area on the south bank of the Anahulu River, and are presently cultivated in lotus (hasu) and taro. They were previously cultivated in taro and rice, and it is possible that they are the remnant of a much older taro terrace system that has been modified in recent times.

During the 1830's, American Protestant missionaries extended their influence to the rural areas of Oahu, including the Waialua District. In 1834, John S. Emerson and his wife completed construction of their mission home on the south bank of Anahulu River. Later, the Waialua Female Seminary was established on the other side of the river. The school's two-story dormitory was named Haleiwa, "house of the frigate bird". It closed in 1882, but seventeen years later, in 1899, a new hotel constructed near the ruins of the old school adopted its name and was known as the Haleiwa Hotel. Local Hawaiians thought that the hotel would bring bad luck, because it was constructed over the ruins of Kaimani heiau. However, the hotel became so prosperous and well known that the community around it was eventually known as Haleiwa. The hotel is long gone and the site is now occupied by the Sea View Inn (22).

The original Emerson homestead was demolished in 1904, but another structure, apparently made of coral block in the same fashion as the homestead, remains and is still occupied. This building, which may have been contemporaneous with the homestead, is located across from the City and County maintenance yard on Emerson Road (see Appendix E for further details). The State has acquired

some of the property east of this structure, but the building itself is on private property. It is not listed as a State or National Historic Site, but a preliminary opinion by the State Historic Preservation Officer indicates that the structure might meet the criteria for inclusion on the National Register (23). The project area also contains a wood structure reputed to be an old church. Its style of construction dates from the turn of the century, but the building does not contain enough architectural significance to warrant National Register designation for architectural reasons alone (see Appendix E).

D. ECONOMIC FACTORS

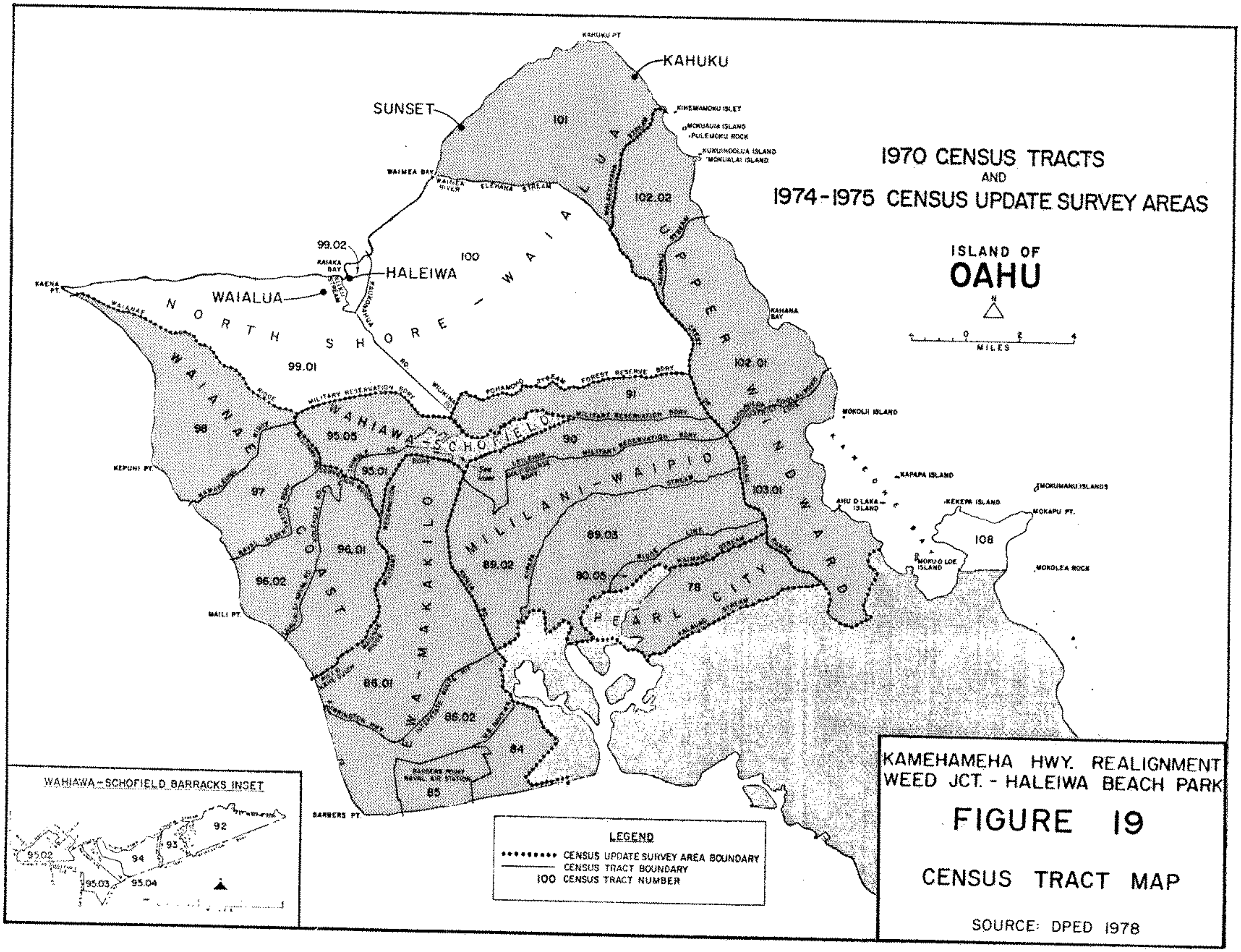
The Waialua District (census tracts 99-100, Figure 19) is a sparsely-populated rural area lacking in employment opportunities. The area suffers from a high unemployment rate, and most workers commute to other areas of Oahu for employment. Less than 40% of the Waialua District's resident job holders are locally employed (Table 6). Fully 29% of the labor force commutes an average of 10 miles to Wahiawa, while the rest travel distances greater than 20 miles to other parts of Oahu. The 1970 census reveals that, while 2,798 workers live in the Waialua District, only 1,391 persons were employed within the area.

Growth of employment within the Waialua District has been slightly better than Oahu as a whole (53.8% versus 48.1% for 1964-1975). Much of this increase is due to growth in the manufacturing sector, which is primarily food processing (24). Manufacturing is the largest employer in the Waialua District, followed by agriculture and retail trade (Table 7). Government and services are also significant areas of employment. The Waialua Sugar Company is the largest single employer in the Waialua District, while Waimea Falls Park is the second largest.

The make-up of the labor force is not restricted by the local job market, since large numbers of workers commute to jobs outside of the Waialua District. Craftsmen and professionals are the largest occupational groups (Table 8), while only 9.6% of the Waialua District's residents are employed as farm workers.

The lack of local employment opportunities, and the remoteness of the large employment centers in Honolulu, have resulted in persistent high levels of unemployment in the Waialua District. During the second quarter of 1978, the unemployment rate was 13.5% in the Waialua District, almost twice Oahu's overall rate of 6.2%.

Most of the nonagricultural businesses in Haleiwa are located along the existing Kamehameha Highway. A guava orchard and an egg farm are located within the alignment study corridor but most land within the corridor is used for growing sugar cane.


1970 CENSUS TRACTS
AND
1974-1975 CENSUS UPDATE SURVEY AREAS
ISLAND OF
OAHU
N
0
2
4
MILES
KAHUKU PT.
KAHUKU
SUNSET
HALEIWA
WAIALUA
WAIMEA BAY
KAIAKA BAY
KAENA PT.
KEPUHI PT.
MAILI PT.
BARBERS PT.
KAHANA BAY
MOKOLII ISLAND
KAPAPA ISLAND
AHU O LAKA ISLAND
KEKEPA ISLAND
MOKU O LOE ISLAND
MOKUMANU ISLANDS
MOKAPU PT.
MOKOLEA ROCK
KIHEWAMOKU ISLET
MOKUAUIA ISLAND
PULEMOKU ROCK
KUKUIHOOLUA ISLAND
MOKUALAI ISLAND
ELEHAHA STREAM
FOREST RESERVE BDRY
MILITARY RESERVATION BDRY
NORTH SHORE - WAIALUA
UPPER WINDWARD
WAIANAE
WAHIAWA - SCHOFIELD
MILILANI - WAIPIO
EWA - MAKAKILO
COAST
PEARL CITY
KANEOHE BAY
101
102.02
102.01
100
99.02
99.01
98
97
96.02
96.01
95.05
95.01
91
90
89.02
89.03
89.05
78
103.01
108
86.01
86.02
84
85
BARBERS POINT NAVAL AIR STATION
WAHIAWA-SCHOFIELD BARRACKS INSET
92
93
94
95.02
95.03
95.04
LEGEND
CENSUS UPDATE SURVEY AREA BOUNDARY
CENSUS TRACT BOUNDARY
100 CENSUS TRACT NUMBER

KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 19

CENSUS TRACT MAP

SOURCE: DPED 1978

TABLE 6

AREA OF EMPLOYMENT FOR THE WAIALUA DISTRICT RESIDENTS[1]

Waialua Division	38.4%
Honolulu-Central Business District	.5%
Remainder of Honolulu	18.3%
Koolaupoko Division (Windward)	1.4%
Ewa Division	11.3%
Wahiawa Division	29.0%
Waianae Division	.5%
Koolauloa Division (Kahuku-Kaaawa)	.6%
	100.0%

Source: 1970 census

1 Census Tracts 99-100

TABLE 7

EMPLOYMENT WITHIN THE WAIALUA DISTRICT BY INDUSTRY [1]

Manufacturing	39.4%
Agriculture	19.9%
Retail Trade	13.8%
Government	9.6%
Services	4.9%
Finance, Insurance & Real Estate	1.3%
Transportation, Communications, Gas, Electric, and Sanitary Services	.9%
Other	10.2%
	100.0%

Source: DLIR, 1977

1 Census Tracts 99-100

TABLE 8

OCCUPATIONS OF WAIALUA DISTRICT RESIDENTS[1]

OCCUPATION CATEGORY	
Professional	12.8%
Managers and Administrators	5.8%
Sales Workers	3.4%
Clerical	11.9%
Craftsmen	19.7%
Operatives	11.1%
Transport Operatives	5.1%
Non-Farm Laborers	6.2%
Farm Workers	9.6%
Service Workers	13.6%
Private Household Workers	.8%
	100.0%

Source: U.S. Bureau of the Census, 1970 Census of Population

1 census tract 99-100

E. SURROUNDING SETTLEMENT PATTERNS

The lands of the Waialua District of Oahu are primarly in agriculture use or preserved as open space for conservation purposes. The few existing residential areas are located in the towns of Waialua and Haleiwa and scattered along the coastline (see Section H for further information on land use). Nonagricultural land uses have spread only one-half mile beyond the commercial centers of Haleiwa and Waialua. North Shore development patterns are typical of small rural towns with housing centrally located around a small business district. Haleiwa, having grown around Kamehameha Highway and Goodale Road, has taken a linear land development pattern. Development in Waialua has concentrated around the sugar mill.

Land ownership in the Waialua District is similar to other rural areas of Hawaii, with most land in the hands of government or a few large estates. Most of the agricultural land is under the control of Bishop Estate or Castle and Cook. Much of the land in urban use is leasehold with Bishop Estate holding title.

The 1977 population of the Waialua District (census tracts 99-100) was 10,131 and has grown from a 1960 population of 8,043 (25). During the 1960's and early 1970's, the Haleiwa District grew at a slower rate than Oahu as a whole, and its relative proportion of the islands population has declined (Table 9). The present population of the Waialua District makes up 1.4% of total population for Oahu. The year 2000 population figures for the Waialua District given in Table 9, are not extrapolations of current trends, but are desired population levels based on land use and population distribution policy. The 1977 General Plan set a population distribution goal for the Waialua District of 1.4% of Oahu's population for the year 2000. This population share would give the Waialua District a population of 12,800 for the year 2000 (Table 20, Chapter IV). Preliminary population distribution figures developed from the preliminary Development Plans (see Chapter IV for explanation of Development Plans) assign the Waialua District 2.2% of Oahu's population with a total population of 20,200 by the year 2000. The Development Plan figures are preliminary and subject to change.

The population of the North Shore-Waialua area (census tracts 99-101, Figure 19) is younger, less educated, and has a lower income than the Oahu population as a whole (Table 10). The median age

TABLE 9

POPULATION GROWTH (Census Tracts 99-100)

Year	Oahu	Annual Δ%	Waialua	Annual Δ%	% of Oahu
1960	500,409		8,043		1.6
		2.6		1.4	
1970	630,528		9,171		1.5
		2.4		1.4	
1975	705,400		9,800		1.4
		1.3		1.7	
1977	723,422		10,131		1.4
		1.2		1.1	
2000 Preliminary Development Plan	917,400		20,200		2.2

Sources: DPED and Department of General Planning

Annual Δ% = Average Annual Growth Rate

TABLE 10

POPULATION CHARACTERISTICS 1975

	North Shore-Waialua	Oahu
Median Age	24.3	25.9
Percent High School Graduates	58.2	73.7
1975 Median Houshold Income	11,732.00	14,139.00
Percent Born Out of State	41.7	41.2

Source: DPED 1978

of North Shore-Waialua residents is 24.3, younger than the Oahu average of 25.9. High School graduates make up only 58.2% of the areas population, considerably lower than the Oahu total of 73.7%. As discussed earlier (see D; Economic Factors), unemployment is high and job opportunities are not numerous in the North Shore area. With these economic conditions, combined with the low level of educational achievement, it is not surprising that the median annual household income is lower than for Oahu as a whole ($11,732 versus $14,139 in 1975). However, these basic economic problems have not resulted in a large number of persons receiving welfare assistance. In 1974, welfare recipients made up 12% of the Waialua District population while the island-wide average was 9%. The welfare rate in Waialua District is less then half that of other areas with similar economic problems, such as the Waianae and Koolauloa Districts (26). The ethnic composition of the area is primarily Filipino, Caucasian, and Japanese (Table 11).

There does not appear to be a housing shortage in the North Shore-Waialua area (census tracts 99-101). The vacancy rate was 2.7% in 1978, almost twice the rate of 1.4% for Oahu as a whole. Housing costs are also lower than the average for Oahu (Table 12). The high vacancy rate and low housing costs are due, in part, to the distance of the area from major employment centers. Centrally-located housing in Honolulu is more expensive and scarce. Despite the high vacancy rates, the number of housing units in the North Shore-Waialua area has increased at a rate slightly higher than the island as a whole (Table 12). A larger proportion of area residents are renters than for Oahu as a whole. Though the cost of housing is low for Oahu, North Shore residents have expressed concern about the need for low cost housing and the dilapidated condition of existing housing stocks. Single family residences are the predominant type of housing; only a small number of apartments and no low density multi-family units exist in the Waialua District (Table 13).

TABLE 11

ETHNIC COMPOSITION

Ethnic Group	Male	Female	Total
Black	22	14	36 (0.4%)
Caucasian	1,563	1,352	2,915 (31.8%)
Chinese	90	91	181 (2.0%)
Filipino	1,664	1,270	2,934 (32.0%)
Hawaiian/Part Hawaiian	327	290	617 (6.7%)
Japanese	1,077	1,134	2,211 (24.1%)
Korean	16	28	44 (0.5%)
Other	102	131	233 (2.5%)
TOTAL	4,861	4,310	9,171 (100.0%)

Source: U.S. Bureau of the Census, 1970 Census of Population

TABLE 12

HOUSING CHARACTERISTICS

	North Shore-Waialua (Census Tracts 99-101)	Oahu
Housing Units 1970[1]	3,677	174,742
Housing Units 1977[2]	4,477	217,476
% Increase	82%	80%
Vacancy Rates (1978)[3]	2.7%	1.4%
Occupied Housing Units (1975)[4]		
% Owner Occupied	39.8%	48.8%
Monthly Cost		
Owned	$157.00	$256.00
Rented	$183.00	$197.00

1,2,4 Source: DPED 1978

3 Source: Department of Housing and Community Development 1977

TABLE 13

1975 DWELLING UNITS BY UNIT TYPES IN WAIALUA DISTRICT
(Census Tracts 99-100)

Item	Neighborhood Area		Oahu	
	No. of Units	%	No. of Units	%
Single Family Units*	3,821	87.6	120,790	55.7
Low Density Multi-Family**	----	----	9,613	4.4
High Density Multi-Family	543	12.4	86,382	39.8
Total Dwelling Units	4,364	100.0	216,785	100.0
Net Residential Density (Dwelling Units per Urban Zoned Acre)	2.3		2.6	

* Single family & duplex
** Townhouse units

Source: Department of General Planning 1977

F. PUBLIC FACILITIES AND SERVICES

There are three public schools in the combined Waialua-Haleiwa Districts ; Two grade schools, Haleiwa School (K-6) and Waialua School (K-6), and Waialua High School (7-12). There are also two licensed private schools which accept students from Kindergarten to eighth grade. No private schools for special education exist within the Waialua-Haleiwa area, but two such centers are located in Wahiawa (27).

Medical facilities in the area include the Waialua Hospital operated by Castle and Cooke Inc. and the Haleiwa Family Medical Center at 66-125 Kamehameha Highway. Twenty-four hour emergency service is available at Wahiawa General Hospital and Kahuku Community Hospital. Dental services are provided by several private practices in the area.

Fire and police protection for Haleiwa are provided by the Honolulu Fire Department and the Honolulu Police Department. The fire station for the area is the Waialua Fire Station No. 14 at 66-420 Haleiwa Road.

Haleiwa has a post office, located near the center of town (zip code 96712). The Waialua Community Association Building, located in Haleiwa, provides facilities for public meetings. Plans are being considered for a new civic center building in town, though a site has not been selected.

Haleiwa is within the Honolulu City and County Board of Water Supply's (BWS) Waialua-Kahuku Water Use District (Census Tracts 99-101). BWS facilities service the town of Waialua, Haleiwa, and coastal communities as far as Waialee. 68% of the district's residents receive water from the BWS, the rest being served by private systems including the former Kahuku Plantation, Campbell Estate, Waialua Sugar Company, and other small ranch systems. All BWS water sources are wells within the district and ground water resources are more than sufficient to meet existing and projected demand (28).

There are no municipal sewer facilities in the Waialua-Haleiwa area. Sewage disposal is in the form of cesspools and small package treatment plants in high density areas. Presently, cesspools in the area have a 63% failure rate. Separate sewage treatment plants for Waialua and Haleiwa are planned and cesspools will only be retained for isolated areas (29). Hawaiian Electric provides electricity for Haleiwa.

G. DESCRIPTION OF THE AREA'S PLANNING PROCESS

Government in the State of Hawaii is unique that it has only two tiers, the State Government and the County Government. In Hawaii, the State government has assumed many responsibilities that are carried out by the County or City governments in other states. One of these responsibilities is land use planning and regulation. While the counties do have some planning and regulatory authority, the responsibility for state-wide land use planning in Hawaii rests with the State Land Use Commission.

The Land Use Commission has classified the lands of Hawaii into four major districts. These are; Conservation, Rural, Agricultural, and Urban. The distribution of these districts on Oahu is shown on Figure 20.

Conservation districts are administered by the State Department of Land and Natural Resources and include forest reserve and watershed reserve zones along with other protected lands. The Rural districts are regulated by the State Land Use Commission, but are administered by the Counties. These districts are composed of small farms and low density residential areas. There are no Rural districts on Oahu. Agricultural districts are also regulated by the State Land Use Commission but administered by the counties. These districts include lands with the capacity for intensive cultivation. Urban districts are regulated and administered by the counties and are defined as lands in urban use with reserve areas to accommodate an estimated 10-year growth.

In 1964 the City and County of Honolulu adopted a General Plan to guide the long range development of all lands designated as urban and agriculture on Oahu. This General Plan is presented in graphic form in the Detailed Land Use Maps adopted by the City Council which indicate the locations of planned land uses, public facilities, and major streets and highways.

A new General Plan adopted by the City Council in 1977 set forth broad objectives and policies in nine areas of concern. The

LEGEND:

- URBAN
- NONE — RURAL
- AGRICULTURE
- CONSERVATION

NORTH

0 2 4 6
MILES

KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 20

STATE LAND USE
DISTRICTS (OAHU)

1977 General Plan did not contain land use maps indicating allowable planned land uses in the different parts of Oahu. Part of the planning process established in the 1977 General Plan is the preparation of individual development plans for Oahu's neighborhoods. These development plans are presently in preparation, with some preliminary proposals completed, but subject to change. In the interim, until the development plans are adopted by the City Council, the existing Detailed Land Use Maps (DLUM) are being used to guide the City in evaluating land use changes.

The Comprehensive Zoning Code of the City and County of Honolulu is Oahu's basic zoning law, the intent of which is to implement the General Plan by regulating land uses, densities, building location, heights, and activities.

The Hawaii Shoreline Protection Act of 1975 established a Special Management Area (SMA) extending at least 100 yards inland from the shoreline vegetation. Developments within the SMA which exceed $25,000, or would significantly affect the shoreline, now require County approval.

Transportation planning in the State of Hawaii is coordinated by the Oahu Metropolitan Planning Organization (OMPO). The OMPO Policy Committee is made up of members of the Honolulu City Council and 10 members of the State Legislature. The Technical Advisory Committee includes the heads of planning and transportation for the State and the City and County of Honolulu. Through the vehicle of OMPO, transportation planning is coordinated, and is compatible with the policies of the Hawaii State Plan and the General Plan of the City and County of Honolulu. The Long Range Plan for Oahu, which identifies transportation needs for Oahu through 1985, was prepared by the Oahu Transportation Planning Program in 1967. The OMPO reaffirms the Long Range Plan each year until the plan is revised, or a new plan is prepared. The proposed Kamehameha Highway Realignment is part of the Long Range Plan and is listed as a proposed arterial.

H. EXISTING AND PLANNED LAND USE

The Waialua District is primarily rural in character. The existing and planned land uses are principally agriculture and conservation. The State Land Use Commission has classified over sixty percent of the land within the Waialua District as Agricultural (Table 14). Agricultural lands are located on the broad Schofield Saddle and Waialua Plain, sugar cane and pineapple being the main crops (Figure 21). Thirty-seven percent of the district is classified as Conservation land and less than two percent of the area is classified Urban (Table 14). Less than two percent of the land area is currently devoted to residential uses, and less than one percent is devoted to commercial and industrial uses (Table 15).

TABLE 14

ACREAGES OF 1975 STATE LAND USE DISTRICTS IN THE WAIALUA DISTRICT (in acres)

State Land Use District	Waialua Acres	%	Oahu Acres	%
Urban	1,471.754	1.9	79,690.665	21.3
Agriculture	46,074.026	60.8	139,165.633	37.3
Conservation	28,236.668	37.3	154,736.777	41.4
TOTAL	75,782.448	100.0	373,593.075	100.0

Source: Department of General Planning 1977

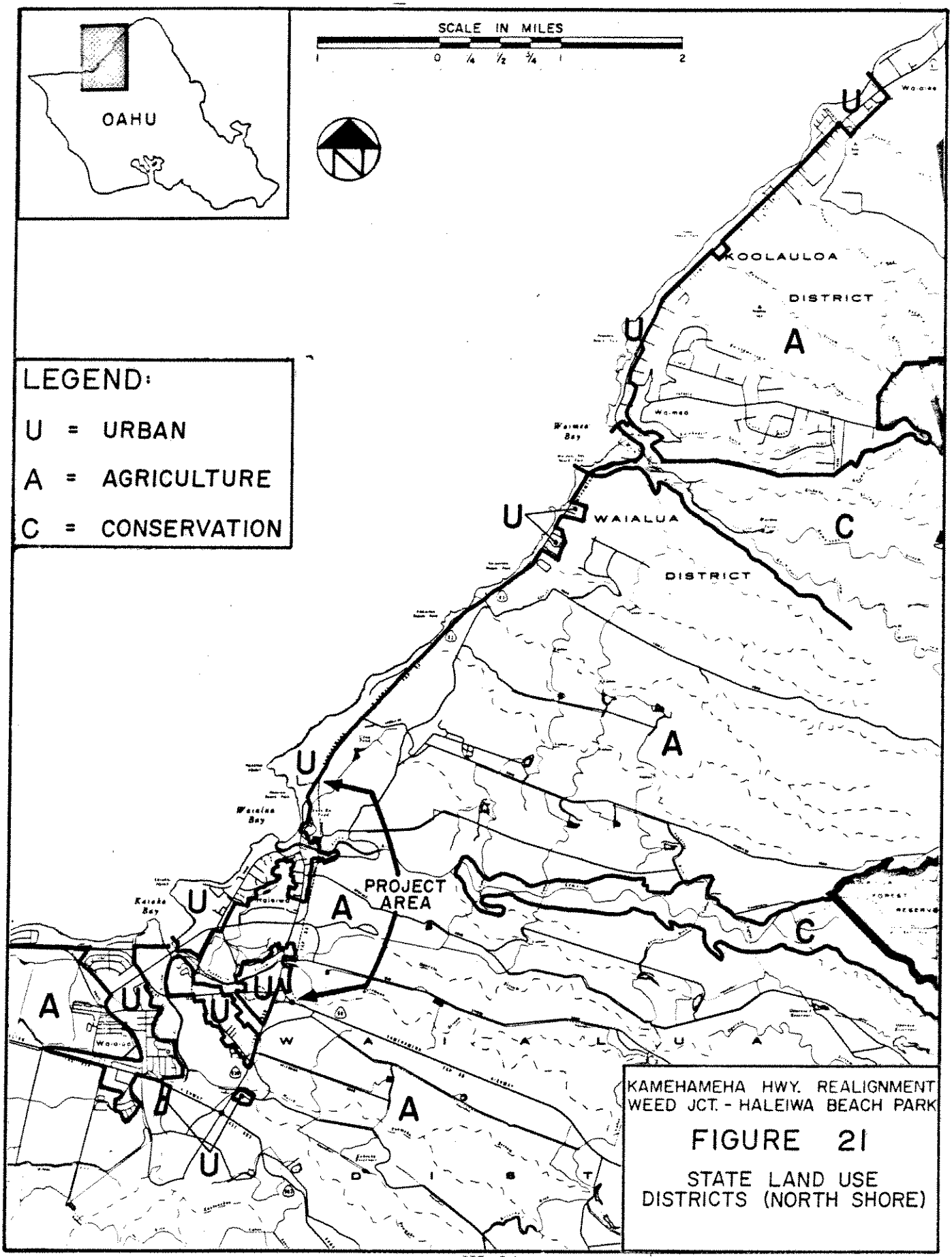
TABLE 15

1975 EXISTING LAND USES WITHIN STATE LAND USE DISTRICTS
WITHIN THE WAIALUA DISTRICT (Census Tract: 99-100)

Existing Land Use	State Land Use District						District Total	
	Urban	%	Agriculture	%	Conservation	%		
Single Family	561.639	38.2	683.713	1.5	15.743	0.1	1,261.095	1.7
Multi-Family	14.654	1.0	-------	0.0	------	---	14.654	*
Industrial	27.684	1.9	279.866	0.5	2.860	*	310.410	0.4
Commercial	55.370	3.7	11.349	0.1	.009	*	66.728	0.1
Agriculture	222.320	15.1	25,567.682	55.5	154.480	0.5	25,944.482	34.2
Vacant Usable	338.382	23.0	4,594.402	10.0	194.410	0.7	5,127.194	6.8
Other	251.705	17.1	14,937.014	32.4	27,869.166	98.7	43,057.885	56.8
TOTAL	1,471.754	100.0	46,074.026	100.0	28,236.668	100.0	75,782.448	100.0

Source: Department of General Planning 1977

* Less than 0.1%


OAHU
SCALE IN MILES
1 0 ¼ ½ ¾ 1 2
LEGEND:
U = URBAN
A = AGRICULTURE
C = CONSERVATION
KOOLAULOA DISTRICT
WAIALUA DISTRICT
PROJECT AREA
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 21
STATE LAND USE DISTRICTS (NORTH SHORE)

The Conservation districts are located in the uplands of the Waialua District while the Urban districts are located at Haleiwa, Waialua, and in a narrow strip along the North Shore Coastline. As would be expected, agriculture is the primary existing land use within the Agricultural district, and open space is the primary existing land use within the Conservation district. Urban uses are minimal within the Waialua District (Table 15). Single family residential use is the greatest existing land use within the Urban districts, accounting for about thirty-eight percent of total acreage. Multiple family dwellings make up only one percent of urban district land use and industrial and commercial uses make up less than six percent of land uses within the Urban districts. Fifteen percent of the land in Urban districts is still in agricultural use and twenty-three percent is vacant usable land.

The Waialua District has been zoned to preserve its rural atmosphere. Most of the Waialua District has been zoned agriculture or preservation by the City and County of Oahu. Less than five percent of the acreage is zoned for urban uses, and the urban zonings are for low intensity uses in contrast to the high intensity of land use typical of Honolulu. Within the Urban districts, over ninety-one percent of the acreage is zoned for residential use, while relatively little land (1.2%) is zoned for apartment use. Almost five percent of the land in Urban districts is zoned for agricultural use. Most of this land is in Haleiwa Town (census tract 99.2) where fifty-two percent of the land area is zoned for agricultural use (Figure 22).

Possibly in anticipation of future growth, over two thousand acres of land in Agricultural districts has been zoned for residential use. The city has chosen to give a higher level of protection to some land within the Agricultural district by zoning 5,398 acres of this land for preservation status. Within the Conservation district, almost all (99.7%) of the land area is zoned for preservation (Table 16).

As expected, planned land uses in the Waialua District are quite similar to existing zoning (Table 17). Over 95% of the district is planned for agricultural or open space use, while two percent of the area planned for residential use. In the Urban districts, approximately 50% of the land area is planned for residential and over 21.9% of the area is planned for open space. The planned open space allocation is much greater than present zoning shows.

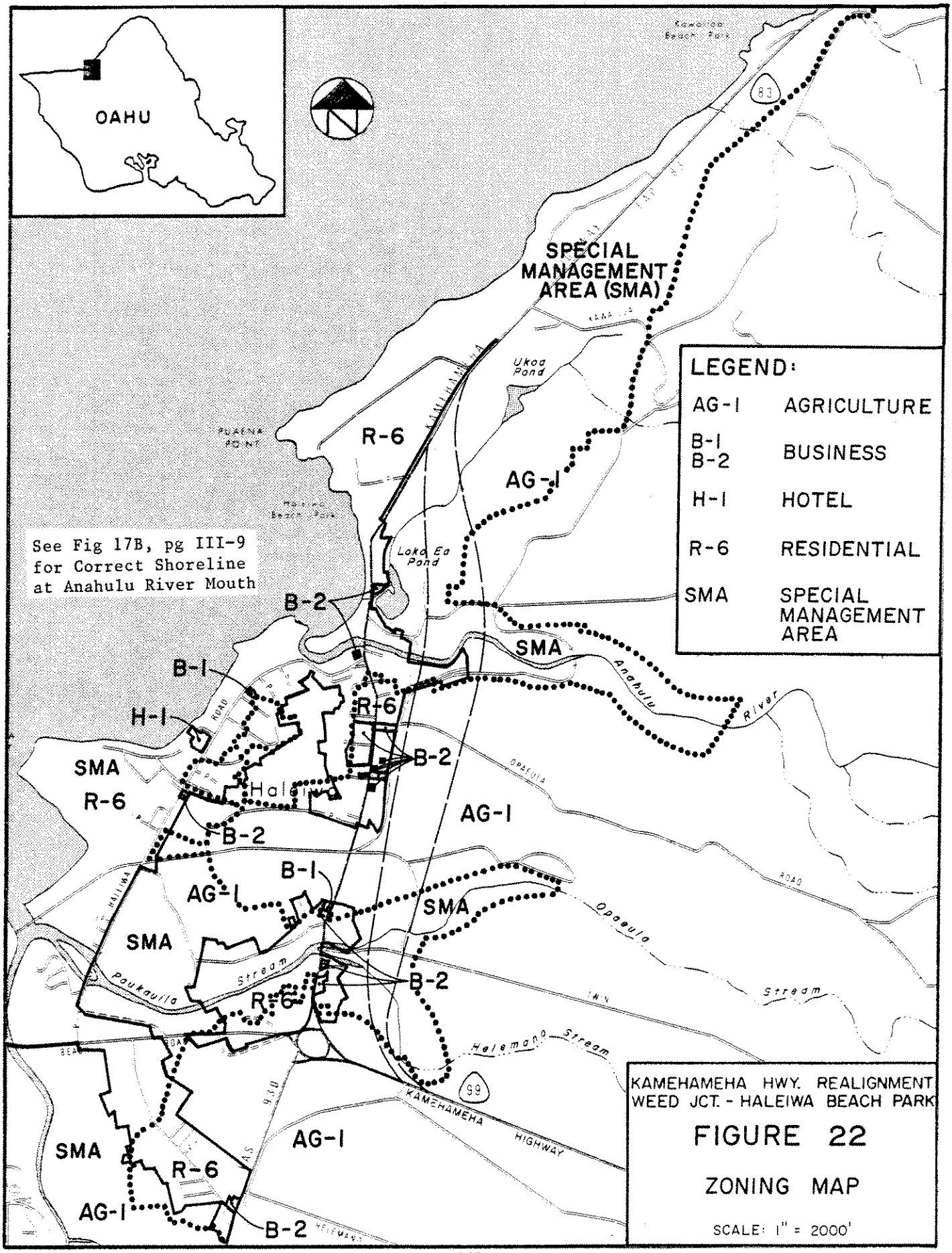

OAHU
SPECIAL MANAGEMENT AREA (SMA)
LEGEND:
AG-1 AGRICULTURE
B-1 B-2 BUSINESS
H-1 HOTEL
R-6 RESIDENTIAL
SMA SPECIAL MANAGEMENT AREA
See Fig 17B, pg III-9 for Correct Shoreline at Anahulu River Mouth
Ukoa Pond
Loko Ea Pond
Anahulu River
Opaeula Stream
Paukauila Stream
Helemano Stream
KAMEHAMEHA HIGHWAY
R-6
AG-1
B-2
SMA
B-1
H-1
KAMEHAMEHA HWY. REALIGNMENT WEED JCT. - HALEIWA BEACH PARK
FIGURE 22
ZONING MAP
SCALE: 1" = 2000'

TABLE 16

1975 ACREAGES OF COMPREHENSIVE ZONING CODE (CZC) DISTRICTS IN THE WAIALUA DISTRICT+

CZC District	Waialua District Total	%	By State Land Use District: Urban	%	Agriculture	%	Conservation	%
Residential	3,614.339	4.8	1,350.892	91.8	2,263.447	4.9	.000	----
Apartment	17.815	*	17.815	1.2	.000	----	.000	----
Hotel	2.131	*	2.131	.1	.000	----	.000	----
Business	21.091	*	19.930	1.4	1.161	*	.000	----
Industrial	------	----	------	----	------	----	----	----
Agricultural	38,567.860	50.9	71.996	4.9	38,410.611	83.4	85.253	.3
Preservation	33,550.222	44.3	.000	-----	5,398.807	11.7	28,151.415	99.7
Planned Devel.	8.990	*	8.990	.6	.000	----	.000	----
TOTAL	75,782.448	100.0	1,471.754	100.0	46,074.026	100.0	28,236.668	100.0

+ Census tracts 99-100

* Less than .1%

Source: Department of General Planning 1977

TABLE 17

1975 ACREAGES OF PLANNED USES IN THE WAIALUA DISTRICT+ (In acres)

Planned Use	Waialua District Total	%	By State Land Use District: Urban	%	Agriculture	%	Conservation	%
Residential	1,420.582	1.9	743.606	50.5	589.325	1.3	87.651	.3
Multi-Family	49.567	.1	42.149	2.9	7.418	*	------	----
Resort	93.460	.1	93.460	6.4	-----	----	------	----
Commercial	45.781	.1	39.634	2.7	6.147	*	------	----
Industrial	35.603	*	35.603	2.4	-----	----	------	----
Agriculture	34,311.767	45.3	117.453	7.9	33,842.744	73.5	351.570	1.2
Open Space	37,669.694	49.7	322.345	21.9	9,668.352	21.0	27,678.997	98.1
Public Facility	103.464	.1	77.504	5.3	25.020	*	.940	*
Military	2,052.530	2.7	------	----	1,935.020	4.2	117.510	.4
TOTAL	75,782.448	100.0	1,471.754	100.0	46,074.026	100.0	28,236.668	100.0

* Less than .1%

\+ Census tracts 99-100

Source: Department of General Planning 1977

The highway alignment intersects the Special Management Area (SMA) along the North Shore. The SMA boundaries are indicated on Figure 22. The Department of Land Utilization administers zoning ordinances for Oahu and is presently working on the establishment of a Historic Design District for the Town of Haleiwa (see Appendix F, Newspaper articles). This special district would establish architectural controls to preserve and enhance the rustic flavor of Haleiwa Town. The purpose of the Historic Design District is to prevent uncontrolled development of Haleiwa Town which, without architectural controls, could eventually result in the loss of the town's rural character.

As part of the ongoing development plan process, the Department of General Planning has developed a preliminary Development Plan Ordinance and a Development Plan Map for the North Shore Neighborhood (Waialua District). These documents were developed after neighborhood boards were consulted and opinion surveys on local concerns were conducted. On the subject of residential land use, the opinion survey revealed that North Shore residents strongly preferred single family residences and had negative feelings toward town houses, low rise apartments, and high rises (30). The Neighborhood Board felt that more low cost housing was needed on the North Shore. Residents also felt that the area is growing too fast and development needs to be controlled. Few residents saw the need for more stores. It is not surprising, considering the large number of North Shore residents who commute long distances to work, that residents felt jobs were too far away. On the subject of agriculture, residents considered the preservation and perpetuation of agricultural lands a high priority.

Major urban design issues identified were:

1. Preservation of historic sites.
2. Development controls and design standards to maintain the area's rural characteristics.
3. Preservation of the rural lifestyle by maintaining a low population density.
4. Protecting views and scenic areas.
5. A Special Design District for Haleiwa.

Transportation priority issues indicated by surveys were; too much traffic, the need for more bus service, and street paving and repair. The neighborhood association outlined the following traffic problems and remedies:

1. Kamehameha Highway traffic congestion.
2. The need for a bypass road around Haleiwa.
3. Widening and improving road shoulders.
4. Improving sidewalks.
5. Improve bus service - present service is inadequate to reach job and education centers.

Several tracts of land which had been planned as residential land on the Detailed Land Use Map are re-assigned to agricultural use on the Development Plan Map. The Development Plan Map has removed urban uses such as residential and commercial from State Preservation and Agricultural Districts. The Development Plan Map is more consistent with State land use designations than existing zoning and DLU maps, which sometimes designate urban uses for Agricultural and Conservation districts (Table 17).

Should the Development Plan for the North Shore be adopted by the City Council in its present form, it will result in extensive re-zoning to lower intensity uses. Despite the lower intensity land use forseen by the Development Plan, preliminary population projections are higher than 1977 General Plan population goals (Table 18). As part of their work program for the Development Plans, the Department of General Planning prepared a resort options report (31). The report recommends 8,400 new hotel units for Oahu by the year 2000. The Kahuku area is assigned 2,700 of these units. This is considerably lower than the Prudential proposal of 4,700 additional hotel rooms at Kuilima. The Development Plan Map does not indicate any additional resort development for the Waialua District. The Detailed Land Use Map assigns the Puaena Point area to future resort development, while the New Development Plan Map retains the area for agricultural use (Figures 23 and 24). The Development Plan states "the area designated for hotel in Haleiwa is considered fully developed. Increased development within the designated area should not be permitted" (32). The Detailed Land Use Map shows a large park inland along the Anahulu River, but this has been substantially reduced in the proposed Development Plan.

The 1977 General Plan established a year 2000 population distribution goal for the North Shore of 12,800 or 1.4% of the Oahu population. The Development Plan projects a population of 20,000 or 2.2% of Oahu's population, by the year 2000. The 1977 General Plan population projections were based on a desired population distribution rather than on planned land use. The General Plan policy regarding rural areas such as the Waialua District is to "reduce, or at most maintain, the 1975 proportions of the Island's rural and urban-fringe populations" (1977 General Plan Objective C - Policy 3). The Development Plan population objective is

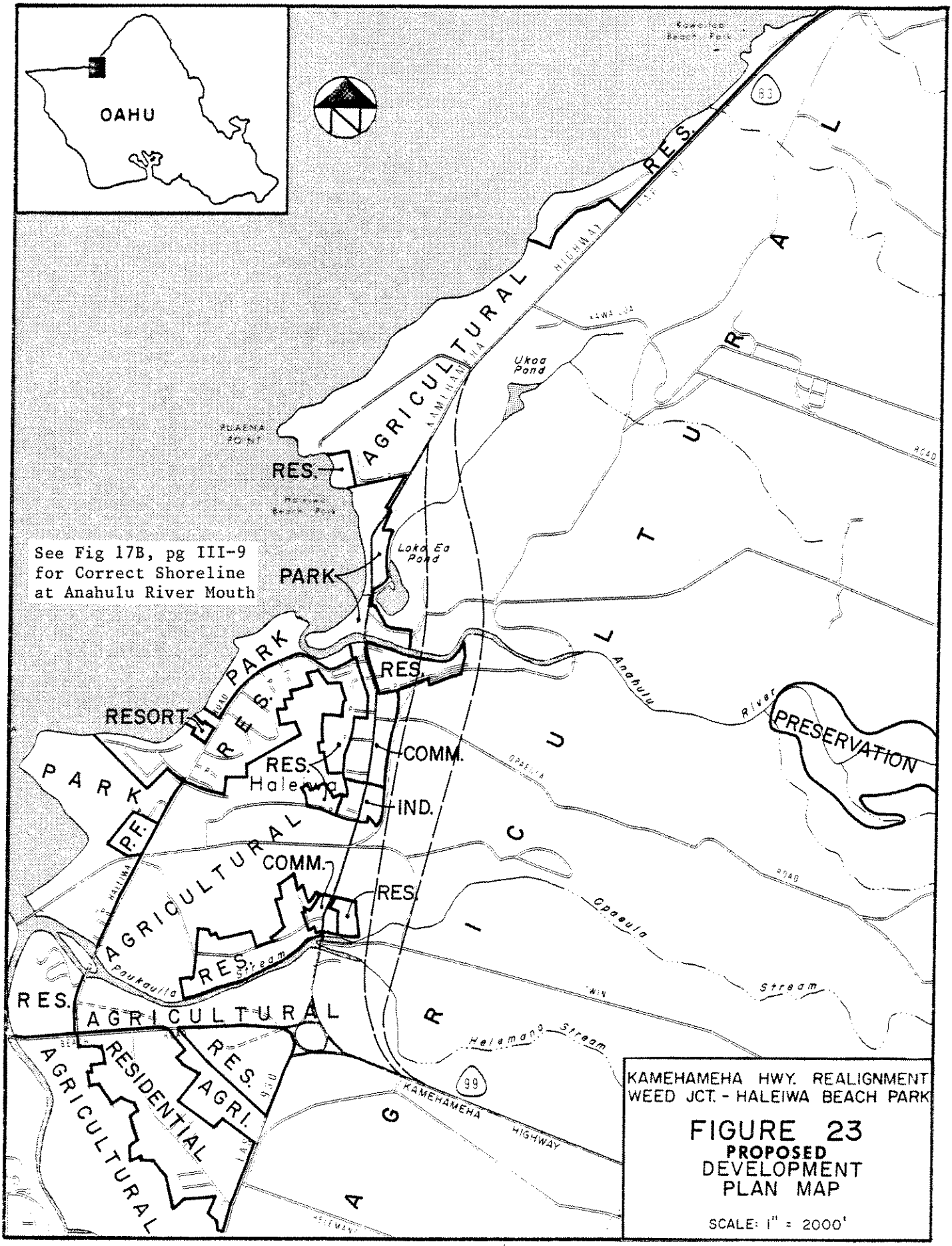
PRELIMINARY
SUBJECT TO CHANGE

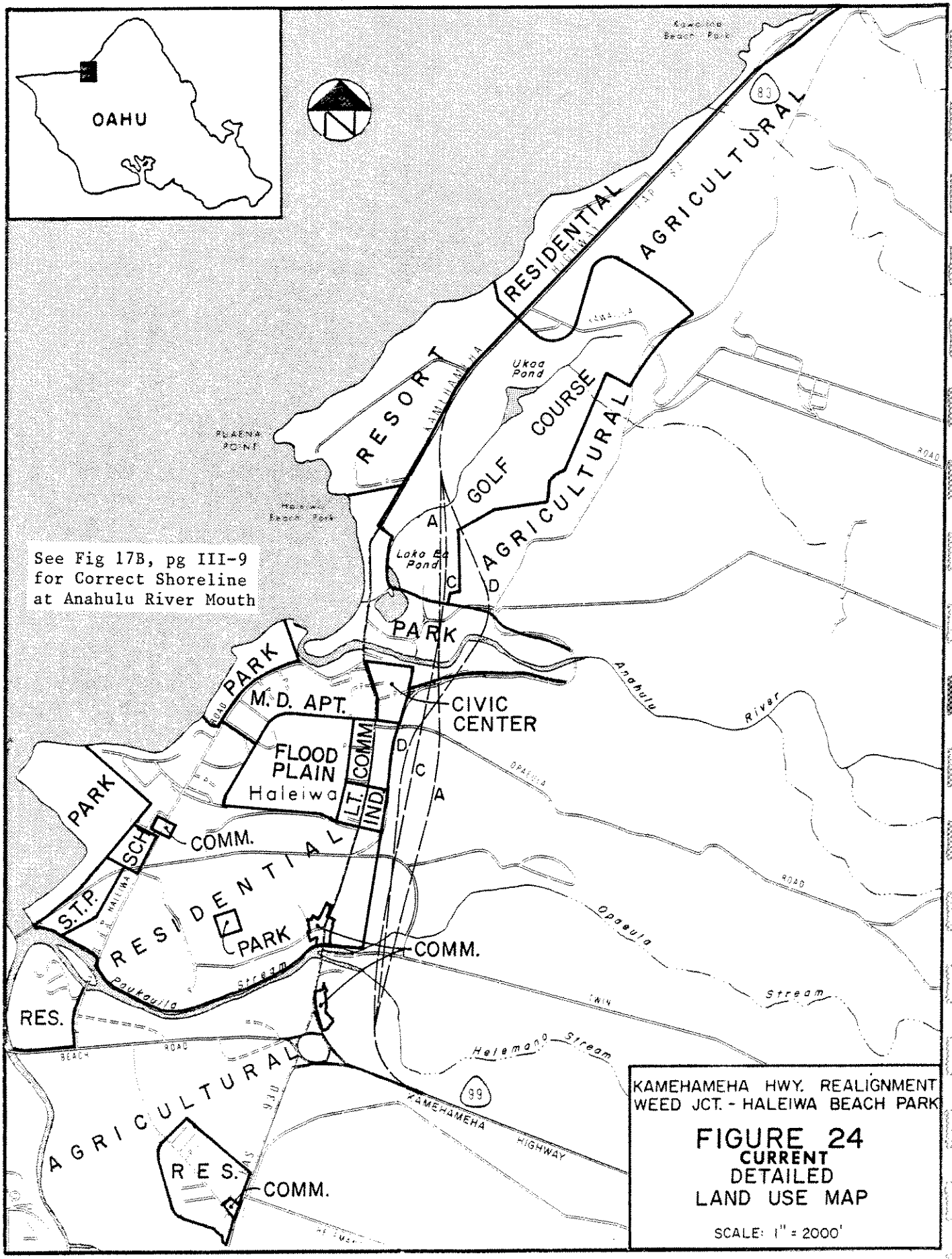
TABLE 18

COMPARISON OF YEAR 2000 POPULATION

DP Area	General Plan		Development Plan	
	Population	%	Population	%
PUC	458,700	50.0	457,300	49.8
Ewa	100,900	11.0	37,400	4.1
Central Oahu	122,900	13.4	136,800	14.9
East Honolulu	57,800	6.3	59,500	6.5
Koolaupoko	119,300	13.0	134,600	14.7
Koolauloa	10,100	1.1	22,800	2.5
North Shore	12,800	1.4	20,200	2.2
Waianae	34,900	3.8	49,300	5.4
Total	917,400	100.0	917,900	100.0

Source: Department of General Planning, 1979


OAHU
See Fig 17B, pg III-9 for Correct Shoreline at Anahulu River Mouth
AGRICULTURAL
RES.
PARK
RESORT
COMM.
IND.
Ukoa Pond
Loko Ea Pond
Anahulu River
PRESERVATION
Opaeula Stream
Paukauila Stream
Helemano Stream
KAMEHAMEHA HIGHWAY
RESIDENTIAL
AGRI.
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 23
PROPOSED
DEVELOPMENT
PLAN MAP
SCALE: 1" = 2000'


OAHU
See Fig 17B, pg III-9
for Correct Shoreline
at Anahulu River Mouth
RESIDENTIAL
AGRICULTURAL
RESORT
GOLF COURSE
AGRICULTURAL
PARK
PARK
M. D. APT.
CIVIC CENTER
FLOOD PLAIN
Haleiwa
COMM.
L.T. IND.
PARK
SCH
COMM.
S.T.P.
RESIDENTIAL
PARK
COMM.
RES.
AGRICULTURAL
RES.
COMM.
Ukoa Pond
Loko Ea Pond
Anahulu River
Opaeula Stream
Paukauila Stream
Helemano Stream
KAMEHAMEHA HIGHWAY
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 24
CURRENT
DETAILED
LAND USE MAP
SCALE: 1" = 2000'

based on the full development of the land uses presented in the Development Plans. These population goals do not include induced growth from resort developments such as the proposed development at Kuilima. The General Plan states that population distribution goals may be further adjusted to accommodate housing necessary to support the resort industry in the various sections of Oahu (33).

I. FUTURE RESORT DEVELOPMENT

A large expansion of the resort industry on the North Shore could significantly change the existing environment as outlined in this chapter. Though no large resort developments are proposed for the Waialua District, resort development in nearby Kahuku would impact Haleiwa and the rest of the Waialua District. The Prudential Insurance Company has proposed an expansion of the Kuilima Resort Community (KRC) in Kahuku which would affect traffic, employment, population growth, and housing along the entire North Shore. As Prudential's plans have not yet obtained all necessary government approvals, the project is still tentative. Therefore, the impacts of the development are not included in our estimates of future population growth traffic, and other conditions in the Waialua District. A summary of the probable impacts of the proposed KRC expansion are presented here. Comprehensive assessments of the KRC expansion impacts are available in several reports on Waikiki Resort Development by the Department of General Planning (34) and in the developer's Environmental Impact Statement (35).

Prudential has proposed an additional 4,700 hotel rooms, 100,000 square feet of commercial space, 1,700 resort condominiums, 50 single family resort residential units, a second 18 hole golf course, and 9 additional tennis courts by the year 2000.

The Kuilima EIS predicts that the proposed Kuilima Resort Community expansion will have significant impacts on North Shore traffic. Projected peak volumes on Kamehameha Highway for the year 2000 would exceed the highway's capacity. Kuilima Resort Community-related traffic would make up 57% of peak hour volumes. The Department of General Planning predicts that peak hour traffic volumes for the year 2000 on the Kamehameha Highway Realignment will almost double, from 1,264 to 2,375 if

the Kuilima Resort Community is constructed (Table 19). Construction of the KRC will require extensive highway improvements estimated by the Department of General Planning at over 50 million dollars. This estimate does not include the cost of the Kamehameha Highway Realignment at Haleiwa.

The Kuilima EIS estimates that the KRC expansion will result in the creation of 5,600 direct, indirect, and induced jobs in the North Shore area by the year 2000. The creation of additional employment opportunities would help to ease the persistent job shortage on the North Shore. The KRC would provide a needed "local" source of opportunities and would be a shorter commute for Haleiwa residents. Increased job opportunities would result in additional population growth. High and low estimates of the additional population impact of the KRC expansion by the Department of General Planning are given in Table 20. Some of this resort-induced population growth would occur in Haleiwa. Increased population growth would result in lower vacancy rates and higher rents.

If the KRC expansion is eventually implemented, which is by no means a certainty, development at levels indicated might not occur. The Department of General Planning's "Resort Options Report" (36) recommends 2,700 additional units for Kuilima, less than 60% of Prudential's proposal. Political tradeoff could result in a greater or smaller number of units than recommended by General Planning. The impact of the KRC development on growth and traffic volumes on the North Shore will ultimately depend on the number of units constructed.

TABLE 19

TRAFFIC IMPACTS RESULTING FROM THE KUILIMA RESORT COMMUNITY

Resort/Highway	Section	Existing Service Vol. (Level)	PEAK HOUR VOLUME 1975	2000w/o Resort	2000w/ Resort	2000 Serv. Vol. w/o Resort (Level D)[1]
KAHUKU						
Kamehameha Hwy.	Kaawa to Kahuku	1360 (C)	526	594	1247	1500
Kamehameha Hwy.	Kahuku to Kuilima	1360 (C)	587	664	1809	1500
Kamehameha Hwy.	Kuilima to Pupukea	1360 (C)	483	547	1987	1500
Kamehameha Hwy.	Pupukea to Haleiwa	1360 (C)	1001	1133	2357	1500
Kamehameha & Bypass	Haleiwa to Weed Jct.	1500 (D)	1117	1264	2373	3000
Kamehameha Hwy.	Weed Jct. to Wahiawa	1224 (C)	951	1075	1730	1350
Kamananui Road	Wahiawa to Around Wahiawa	2860 (C)	2632	3187	4296	4700

[1] Phase III development for West Beach & Queen's Beach assumed for traffic volumes.

Source: Department of General Planning

TABLE 20.

POPULATION IMPACT OF THE KUILIMA RESORT COMMUNITY

1. Maximum potential additional population impact. 1/

Year	Onsite Visitor Population		Additional Resident Population	
	Low	High	Low	High
1985	1,600	1,900	2,800	4,000
1990	3,300	3,800	5,500	8,600
1995	5,100	5,900	8,900	12,800
2000	6,400	7,300	11,200	16,300

1/ This data does not include an additional 200 condominium units planned for the Kahuku Resort, since the study was undertaken nor does it account for 475 housing units to be provided for the employees on the site.

Source: Department of General Planning

J. COMPATIBILITY OF THE PROJECT WITH LAND USE PLANS AND POLICIES

The Kamehameha Highway Realignment is part of the OMPO Long Range Plan which is a product of a joint County-State transportation planning process. As a product of this process, the proposed project is part of, and compatible with, City and County of Honolulu and State of Hawaii land use plans and policies. The bypass road is delineated on the existing Detailed Land Use Map. At present, the preliminary Development Plan Map does not show proposed roadways. However, the proposed project is compatible with, and addresses some of, the needs of North Shore residents as expressed through the Development Plan. The local neighborhood board supported the concept of the highway realignment, and the poll conducted for the Development Plan found that residents considered the traffic through Haleiwa to be a problem. The proposed realignment will protect the quiet rural atmosphere by reducing traffic through Haleiwa Town. However, the proposed highway will remove some prime agricultural land (Figure 16). The consistency of the proposed project with Hawaii's Coastal Zone Management Program is discussed on page IV-45

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CHAPTER IV. PROBABLE IMPACTS OF THE PROPOSED ACTION ON THE ENVIRONMENT, AND MITIGATING MEASURES

A. SECONDARY IMPACTS

Secondary impacts are changes which will indirectly result from the proposed highway realignment. Secondary impacts may not be apparent during or immediately after the highway construction, but are changes which take place as a result of the highway's long term use. Highway construction can generate secondary impacts affecting community growth, land use, and development patterns.

1. Growth. By reducing the commute time from the North Shore to Honolulu, the new bypass route will have a small growth inducing impact. Transportation facilities are a major determinant of the location and density of urban development. In urban areas, population densities are high close to employment centers where commuting costs, in terms of time and fuel costs, are low. At greater distances from city centers, where commuting costs are higher, population densities are lower. Historically, many new highways have induced growth in outlying areas by reducing commuting costs, making those areas more desireable for residential development.

Population density in the Waialua District is low, partly because of the lack of local job opportunities and the distance from job centers in Honolulu. Low rents and high vacancy rates (see Page III-25) indicate that demand for housing is lower in the Waialua District than in Honolulu and suburban residential areas. The Waialua District is a very beautiful area, and the population would be much higher were it not for the long commute (at least 45 minutes) to job centers in Honolulu.

The proposed bypass road will remove one of the many traffic bottlenecks along the North Shore. This will reduce commuting times, but the time savings, and the growth inducing impact, will be small. The average weekday time savings resulting from highway realignment will be approximately 3 minutes. The average commuting time to Honolulu from Haleiwa is over 45 minutes, so the project will only produce a 7% reduction in travel time when compared to existing commute times. The percent reduction in travel time will be even lower for communities north of Haleiwa, since the capacity of the roadway will still be limited by the two-lane highway segments adjacent to the bypass.

A slight reduction in commute time might encourage a few Honolulu residents to relocate to the North Shore, but such a small reduction is unlikely to cause a significant population increase.

With or without highway construction, population on the North Shore will continue to grow. However, if the bypass is not constructed, traffic congestion through Haleiwa will continue to worsen, making the North Shore a less desirable place in which to live. Unpleasant traffic conditions could discourage potential residents, so by reducing traffic congestion, the bypass removes a hinderance to growth.

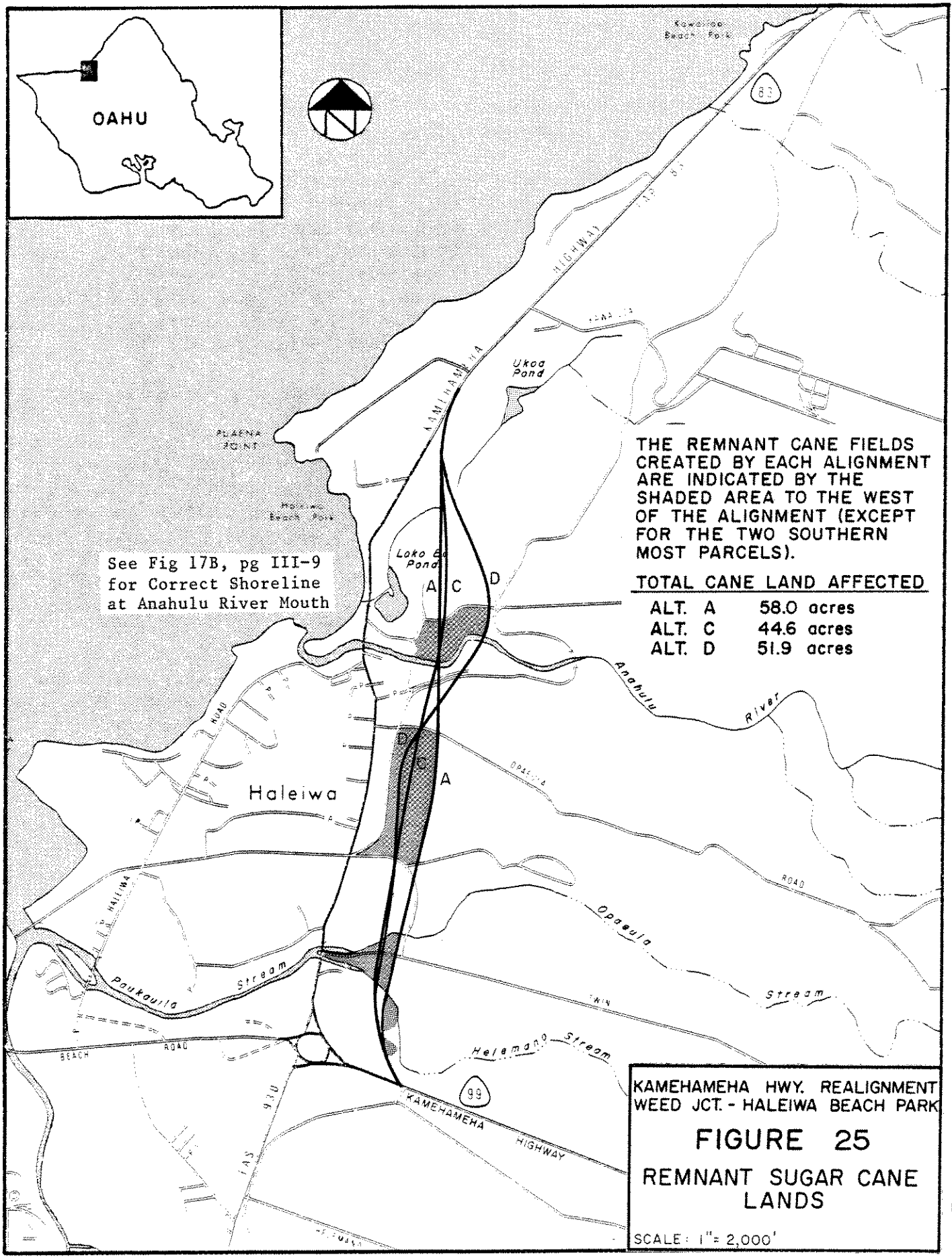
All of the growth inducing impacts discussed above assume that existing conditions remain the same. However, there are several factors which could negate the growth inducing impacts of the project. In particular, increasing gasoline and automobile prices could offset the fuel savings produced by the cutoff. Very high gasoline prices or gas rationing could reduce commuting from the North Shore to job centers in Honolulu and Wahiawa. To date, consumers have shown little response to gasoline price increase. However, this may change as gasoline prices continue to rise.

2. Development Patterns. A major highway can affect the development patterns of a community by acting as a catalyst for development or as a physical and psychological barrier. Many new highways have stimulated development along their corridors, producing linear development patterns. However, the Kamehameha Highway, in its present design, will not stimulate growth along its corridor, since the roadway will have partially controlled access. Without unlimited access, property along the highway corridor will not gain any significant transportation benefits. However, if access is constructed at some point in the future, the proposed realignment could act as a catalyst to development along its corridor. The State Department of Transportation has no plans to allow additional future access.

Although businesses can not be located on the bypass, the section of Kamehameha Highway beyond the Haleiwa Beach Park end of the project could become more attractive to highway-oriented businesses. For example, sites along Kawailoa Beach could attract service stations, curio stands, fast food franchises, and other enterprises catering to drivers who have bypassed Haleiwa. The area is presently zoned for agriculture and residential use, so rezoning would be necessary for commercial development to occur. The highway between Haleiwa Beach Park and Kawailoa Beach has partially controlled access, which would also limit such development.

Construction of the bypass road, connecting roads, and new cane haul roads will create remnant parcels of sugar cane land on which cultivation will not be practical (see discussion of agricultural impacts in Social Impacts below). These remnant parcels are located between the proposed highway alignment and Haleiwa Town (Figure 25). Though the remnant parcels are classified by the State and County as agricultural lands, the cessation of sugar cane production on these parcels could lead to their eventual conversion to urban use. The long term result could be the urbanization of all of the lands between Haleiwa Town and the bypass.

New highways have been known to form outer barriers to development. The bypass road could, if land use policy permitted, become the outer boundary to urban encroachment of agricultural land in Haleiwa. The current Detailed Land Use Maps show residential development in the southern portion of Haleiwa extending inland to a previously-considered bypass alignment; the current bypass alignments are 300-600 feet farther inland (Figure 24). The new Development Plan Maps, which have not yet been adopted, show this area as agriculture (Figure 23).


OAHU
Kawailoa Beach Park
83
HIGHWAY
Ukoa Pond
KAMEHAMEHA
PLAENA POINT
Mokuleia Beach Park
Loko Ea Pond
A
C
D
See Fig 17B, pg III-9 for Correct Shoreline at Anahulu River Mouth
THE REMNANT CANE FIELDS CREATED BY EACH ALIGNMENT ARE INDICATED BY THE SHADED AREA TO THE WEST OF THE ALIGNMENT (EXCEPT FOR THE TWO SOUTHERN MOST PARCELS).
TOTAL CANE LAND AFFECTED
ALT. A 58.0 acres
ALT. C 44.6 acres
ALT. D 51.9 acres
Anahulu River
Haleiwa
ROAD
Opaeula Stream
Paukauila Stream
Helemano Stream
BEACH ROAD
99
KAMEHAMEHA HIGHWAY
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 25
REMNANT SUGAR CANE LANDS
SCALE: 1"= 2,000'

3. Public Facilities. When highway construction induces growth, communities must provide new public facilities to serve the additional population. However, as the growth inducing impacts of the proposed realignment are small, no major expansion of public facilities will be required as a result of the project. Reduction of traffic on the existing realignment through Haleiwa should reduce the frequency of repairs needed on that roadway.

4. Mitigation Measures. The Kamehameha Highway Realignment could, but need not, influence the spatial development of Haleiwa. None of the bypass alignments will affect the growth of Haleiwa if development is confined to areas designated for urban use on the development plan map, the Detailed Land Use Map, and the Zoning Map. Any development of remnant agricultural parcels or of lands near the termini of the bypass road will require a zoning change. Existing land use controls can be sufficient mitigation measures for any highway-induced land use impacts.

B. PRIMARY IMPACTS

1. Ecological Impacts. The majority of the bypass route passes through lands which have been highly disturbed by agriculture for many years. Converting this land to highway use will therefore have no direct effect on natural ecosystems. The only significant natural ecosystem encountered by the bypass is Ukoa Marsh, which provides habitat for three endangered species of waterbirds.

2. Wetlands. Several wetlands are encountered in the project area, as previously noted. All three alternates span the outlet of Ukoa Marsh, and Alternate D crosses a small marsh on the bank of the Anahulu River (Figures 15 and 18). Environmental analysis of these wetlands has included field investigations, review of current literature, and consultation with the U.S. Fish and Wildlife Service and State Division of Fish and Game. The objectives of Executive Order 11990, "Protection of Wetlands", have been pursued in this evaluation.

Because of the importance of Ukoa Marsh, and its sensitivity to changes in water level, the recommended alignment, Alternate C, has been designed to cross the marsh at its outlet channel, which, with a width of 80-100 feet, is the marsh's narrowest point (Figure 18). This channel is presently clogged with aquatic vegetation. Flow out of the marsh is controlled by a weir at the Loko Ea fishpond. The highway will be slightly elevated on piers (instead of fill) on both sides of the channel, and the channel itself will not be altered. With some types of soils, the weight of a new highway can cause a slight uplift ("bulge") of the adjacent ground surface on the order of several inches or even several feet, which would be enough to affect the water balance of a nearby marsh. Fortunately the Waialua Stony Clay on the southerly side of Ukoa Marsh and the coral outcrop on the northerly side will provide a rigid base for the highway so that no uplift is expected. Furthermore, the bypass is downstream from the main body of the marsh, so it will not cut off any sources of water to the marsh.

Since the bypass will not involve any dredging or filling in the marsh, and the water balance will not be affected, it can be concluded that there will be no direct adverse impact to the size or water level of the marsh. Therefore, the project will not reduce the habitat of the three species of endangered

waterbirds (Hawaiian Stilt, Hawaiian Coot, and Hawaiian Gallinule). An indirect impact to the marsh would be water pollution from highway litter and roadway chemicals (e.g. hydrocarbons, lead, rubber, asbestos). Since the marsh is already receiving wind blown litter (and probably leachate) from the Kawailoa Landfill, any additional stress is undesirable. However, because the highway will be downstream from the main body of the marsh, this impact will not affect the primary waterbird habitat. The same is true for silt and other potential water pollutants generated during the construction phase.

An indirect impact to the endangered waterbirds could occur from making the marsh more visible. The marsh is presently screened from Kamehameha Highway by a row of trees, so the majority of motorists are unaware of it, and this provides a measure of security for the waterbirds. The marsh will be partially screened from view along the bypass by the remaining kiawe forest, but not where it crosses the outlet, at which point the entire marsh will be briefly visible. Although the bypass will not make the marsh any more accessible than it now is, an increased awareness could lead to more people visiting it and disturbing the waterbirds. This impact can not be avoided, since the marsh is easily accessible from many points. The air and noise impacts from the highway will not be severe enough to have any effect on wildlife.

Alternate D crosses through a small (approximately 3.5 acre), spring-fed marsh on the south bank of the Anahulu River (Figure 18). Roughly half of this marsh is cultivated in lotus (hasu) and ʻaro. The remainder is presently overgrown with grass, but was probably cultivated in the past (see Appendix E). Constructing a viaduct across this area would unavoidably eliminate some, but not necessarily all, of the cultivated terraces. The viaduct will be located downslope from the springs that feed this marsh, but there is a possibility that highway construction could decrease their flow. It is difficult to predict the nature of this potential impact without test borings and detailed plans for the viaduct footings (see Ground Water, below). This marsh is considered by the USFWS to be important feeding and nesting habitat for the Hawaiian gallinule.

By aligning the alternates to avoid major impact to Ukoa Marsh, the project is consistent with the U.S. Fish and Wildlife Services desire to possibly maintain it in the future as a waterbird habitat.

The USFWS has concluded that neither Alternate A nor C would jeopardize the continued existence of the listed species (see their formal Biological Opinion, page V-5).

3. Stream Modification. Where the alternate alignments cross the three streams, bridge construction will modify the stream bed and banks. No piers will be placed in Helemano or Opaeula Streams, but two sets of piers will be constructed in the Anahulu River. Rock or cement facing will be placed on the banks to protect the bridge abutments from erosion, but no obstructions will be placed in the stream which would inhibit the movement of fish.

Construction in and near the three streams will produce silt which will increase the turbidity of the streams. Since soil loss from sugar cane fields is high, the streams are already turbid; so any increase is undesirable. One of the effects of the silt would be to discourage young gobies (o'opu nakea) from reaching their adult habitat in the mid and upper reaches of the streams. However, this is a speculative impact, since this species was not confirmed to be present in the project area. If the silt reaches a high enough level, the respiration of some organisms could be hampered. This impact will be effectively controlled through the application of erosion control measures such as immediately seeding cut and fill slopes and protecting them with straw or burlap mat, constructing siltation ponds, temporarily directing runoff with hay bales, and other practices suited to the site.

The bypass does not enter the immediate coastal zone or directly affect any associated features such as sand dunes. The highway does encounter the Special Management Area (SMA) in the vicinity of Helemano and Opaeula Streams and north of the Anahulu River. The relationship between the highway and tsunamis is discussed in the following paragraph.

4. Flood Hazard Evaluation. As described in Chapter III, the bypass alignments pass through the floodplain of Helemano and Opaeula Streams and the flood plain of the Anahulu River (Figure 17). The coastline is subject to tsunami inundation

but the bypass will not be located in the designated "coastal high hazard area". The goals of Executive Order 11988, "Floodplain Management", have guided the planning and preliminary design of these stream crossings. A written finding in accordance with this Executive Order is provided on page V-10, and a summary of coordination with involved agencies is given on page V-16. Since these streams are perpendicular to the bypass route, it is not physically possible to construct a bypass around Haleiwa without encroachment on their floodplains. Therefore, every effort has been made to minimize inpact to the base (100 year) floodplain. At each stream, either fill or structures will be placed within the base floodplain, and at the Anahulu River, fill will be placed within the floodway (Figure 17B). Helemano Stream will be crossed on a viaduct. The anticipated backwater effect at the Anahulu River is less than 4 inches (0.31 feet). The Helemano and Opaeula crossings would have negligible effect on flood elevations.

On Helemano and Opaeula Streams, the proposed bypass alternates do not pose any risk to health or safety, since there are no homes or regular activity (other than occasional agricultural access) upstream from the crossings, nor are these narrow valleys suitable for future development. There are seven residences and a number of outbuildings upstream from the Anahulu River crossing which are presently within the 100-year floodplain (Figures 14 and 17B). The ground elevation at these residences is approximately 9-10 feet, and the 100-year flood elevation is 12-13 feet (from the Flood Insurance Rate Map). Therefore, the potential inundation depth is 2-4 feet. Most of the buildings are of light wood frame construction, so a flood of this magnitude would probably result in total loss. Constructing the bypass will slightly increase this risk by raising the potential inundation depth by less than 4 inches. A 100-year flood would isolate Haleiwa by cutting off Kamehameha Highway at the Twin Bridges and at the Anahulu River. However, the bypass would not be affected, and the connection at Emerson Road would provide an evacuation route.

The proposed project will have no effect on natural and beneficial floodplain values such as moderation of floods, water quality, groundwater recharge, fish, wildlife, plants, scientific

study, outdoor recreation, aquaculture, or forestry. The bypass will, however, intrude into a region of open space, and may affect the natural beauty of the view upstream on the Anahulu River (see Scenic Impacts, below). The bypass will also affect agricultural land through direct taking and by the creation of remnant parcels. These impacts to floodplain values will be minimized by selecting a route that has a low profile and that preserves as much agricultural land as possible.

The proposed project will not encourage future development in the base floodplains of the three streams. Access will be partially controlled, preventing "strip" development, and no new access will be created into the floodplains. Furthermore, existing zoning does not allow development in the floodplains upstream from the bypass.

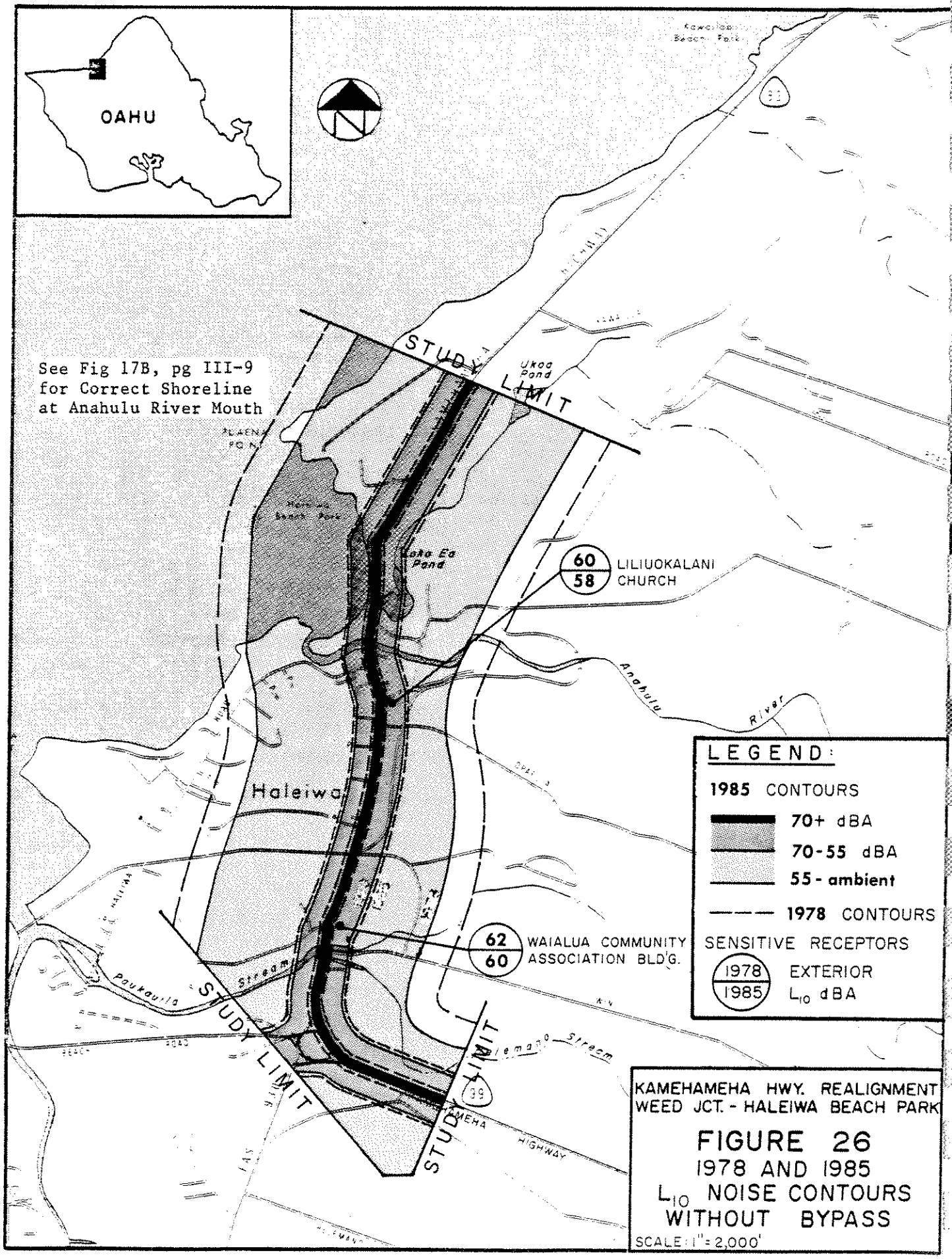
5. Ground Water. The proposed bypass alternates lie along the upper edge of the caprock confining the basal water body. Therefore, there is a possibility that excavations or pilings for deep bridge footings could penetrate into the basal aquifer and encounter artesian water. This could occur in the Kawailoa basal water body north of the Anahulu River, where the caprock is much thinner than over the Wailua body. Also, footings for the viaduct required on Alternate D would almost certainly encounter artesian water in crossing the small cultivated marsh on the south bank of the Anahulu River (Figures 15 and 18). At this location, the basal water head is higher than on the other side of the valley alluvium. If artesian water was encountered during construction, there would be the possibility of leakage from the aquifer, or even contamination. Although the current Board of Water Supply wells are located upslope from the area of concern (at Opaeula Camp, see Figure 2), it is important not to waste or jeopardize the quality of this water source. Furthermore, if artesian water was encountered during construction, it could create serious engineering difficulties. To avoid these impacts, footings and pilings will be kept within the caprock in areas where the State Division of Land and Water Development and the U.S. Geological Survey recommend caution. Where there is uncertainty, test borings will be made. Preliminary plans will be coordinated with these agencies.

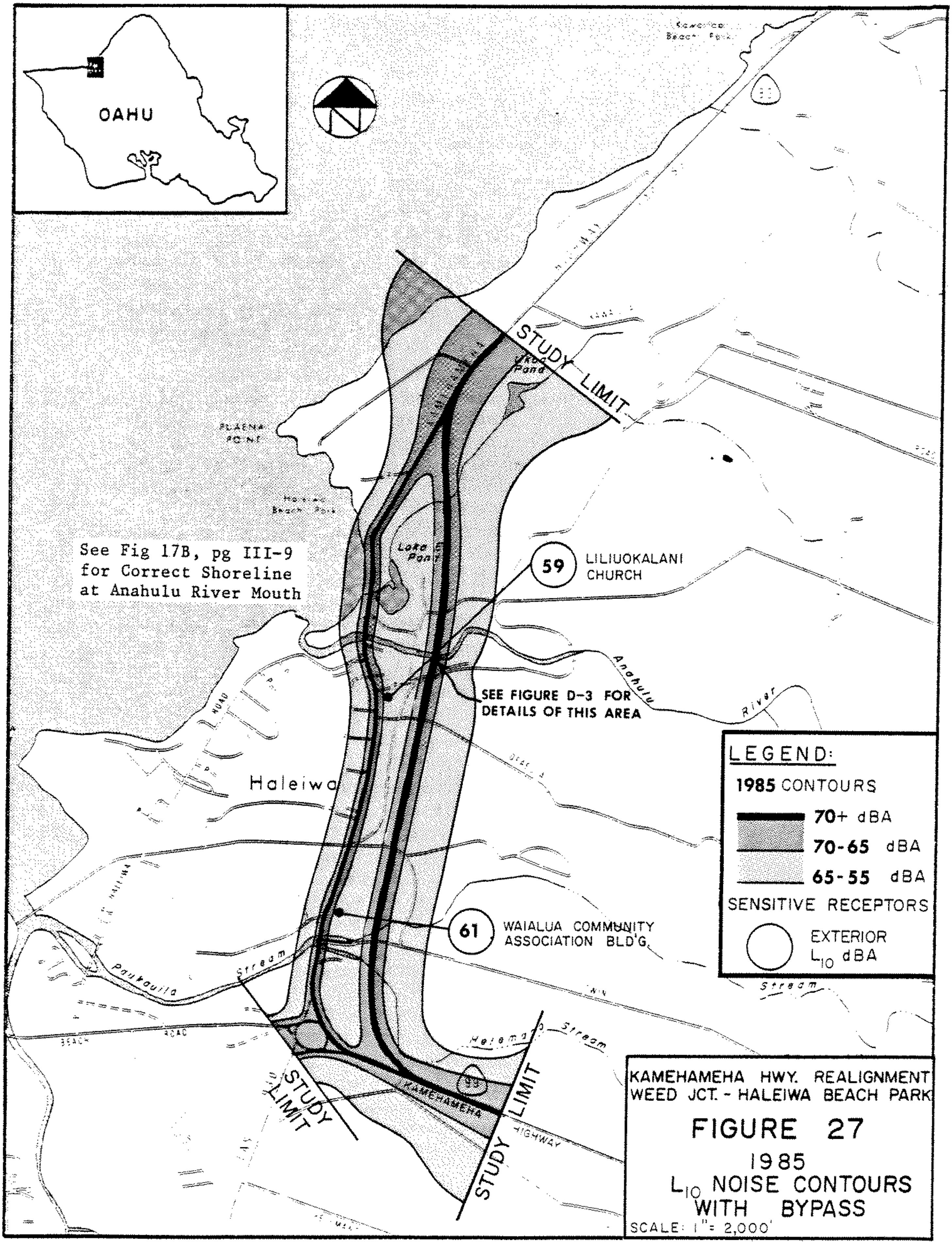
6. Air Quality. The effect of the proposed project on the air quality of Haleiwa was investigated using the HIWAY computer model (Appendix C). The results show that the critical year for Carbon Monoxide air pollution is 1985. If the bypass is not constructed, "worst case" traffic and meteorological conditions could result in the State 1-hour and 8-hour CO standards being exceeded with 300 feet of Kamehameha Highway, and the Federal standard being exceeded within 25 feet of the highway. If the bypass is operational in 1985, the CO concentration will be approximately 1/7 of what it would be without the bypass, with no danger of the standards being exceeded.

7. Noise Impacts. The present noise environment of Haleiwa is typical of a rural community. The daytime background noise level is around 45-50 dBA. Away from the highway, the dominant noise source is normal neighborhood activity. However, traffic on Kamehameha Highway presently has a significant effect on the community noise level for 300-400 feet on either side (L_{eq} at least 5 dB over ambient), and is noticeable (L_{10} at least 5 dB over ambient) for as much as a mile away under optimum conditions. (Refer to the noise assessment in Appendix D for a detailed discussion and noise contours.)

The present and predicted "peak" (L_{10}) highway noise levels in the community are graphically shown on Figure 26 for 1978 and 1985 without the bypass, and on Figure 27 for 1985 with the bypass. Key points for comparison are two "sensitive receptors" near the highway, the Liliuokalani Church and the Waialua Community Association building. The Church is 150 feet from the edge of the highway, and the Community building is 100 feet from the highway. At present, the exterior L_{10} sound levels are 60 dBA and 62 dBA, respectively at the front of the buildings. The FHWA standard in this case is 70 dBA (Table D-3). If all of the anticipated 1985 traffic is carried by Kamehameha Highway (i.e. no bypass), the noise levels will actually decrease by several decibels, since the traffic will move more slowly, and engine and tire noise will be lower.

It is estimated that the interior noise level in the Church is reduced by around 15 decibels below the exterior level, and the Community building experiences an attenuation of around 10 decibels (according to the type of construction of the buildings and assuming that windows and doors are open).


OAHU
See Fig 17B, pg III-9 for Correct Shoreline at Anahulu River Mouth
STUDY LIMIT
Ukoa Pond
Loko Ea Pond
60/58 LILIUOKALANI CHURCH
Anahulu River
Haleiwa
62/60 WAIALUA COMMUNITY ASSOCIATION BLD'G.
Paukauila Stream
STUDY LIMIT
Waialeamo Stream
STUDY LIMIT
KAMEHAMEHA HIGHWAY
LEGEND:
1985 CONTOURS
70+ dBA
70-55 dBA
55 - ambient
1978 CONTOURS
SENSITIVE RECEPTORS
1978/1985 EXTERIOR L_{10} dBA
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 26
1978 AND 1985
L_{10} NOISE CONTOURS
WITHOUT BYPASS
SCALE: 1" = 2,000'


OAHU
See Fig 17B, pg III-9
for Correct Shoreline
at Anahulu River Mouth
STUDY LIMIT
59
LILIUOKALANI
CHURCH
SEE FIGURE D-3 FOR
DETAILS OF THIS AREA
Anahulu
River
Haleiwa
61
WAIALUA COMMUNITY
ASSOCIATION BLD'G.
Paukauila
Stream
Helemano Stream
KAMEHAMEHA
HIGHWAY
STUDY LIMIT
STUDY LIMIT
LEGEND:
1985 CONTOURS
70+ dBA
70-65 dBA
65-55 dBA
SENSITIVE RECEPTORS
EXTERIOR
L_{10} dBA
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE 27
1985
L_{10} NOISE CONTOURS
WITH BYPASS
SCALE: 1" = 2,000'

On this basis, the peak (L_{10}) interior noise levels in 1985, attributable to traffic on Kamehameha Highway without a bypass, should be around 45 dBA in the Church, and 50 dBA in the Community building. Both of these noise levels are acceptable under both Federal and State standards. Technically, the State standard applies only to new highway construction, but it is a useful guideline to illustrate the consequence of allowing traffic to increase on Kamehameha Highway.

The Draft EIS reported that reducing traffic on Kamehameha Highway by constructing the bypass would reduce noiselevels through town by as much as 10 decibels. However, this earlier analysis did not take into account the increased speeds that will be possible when congestion in town is reduced. In reality, the increased speeds (from less than 10 to 25 mph) cancel any noise benefit from reduced traffic flow, so that only a 1-2 decibel change can be expected with the bypass (Figure D-2).

There will be significant noise impact along the bypass itself. Peak traffic noise will exceed 70 dBA (the Federal Design Noise Level) within 75 feet of either side of the edge of the roadway. For most of its length, there are no sensitive receptors, but between Emerson Road and the Anahulu River, Alternate C passes through a residential area. Two homes on the seaward side of the highway fall within this 70 dBA impact zone, and one lies just beyond it on the inland side. A preliminary acoustic barrier design was developed for this section of the highway (Appendix D). It was found that an 8-foot wall along the seaward edge of the highway that extended for 175 feet (20 feet beyond the edge of either house) would reduce the exterior noise level at the two closest houses to 60 dBA (L_{10}). Allowing a 10 decibel loss inside, the resulting interior noise level would be 5 decibels less than the Federal criteria. A lower wall (4-5 feet) along the inland side would offer similar protection to the homes on that side of the highway. The design of these acoustic barriers must be finalized after the highway construction plans are settled, and more precise distances and elevations are known.

An estimate of construction noise (Appendix D) indicates that peak noise levels of 70-85 dBA could be experienced at the residences on the inland side of Haleiwa, with Alternate D producing the higher levels. Because this short-term impact would exceed the State's standard, construction would be limited to the hours between 7:00 A.M. and 6:00 P.M. (Public Health Regulations Chapter 44B, "Community Noise Control for Oahu").

8. Scenic Impacts. The Kamehameha Highway Realignment will be a visual intrusion into the agricultural lands through which it passes. Cuts and fills will be visible as scars on the green hillsides until revegetation is completed.

The intrusive aspects of the bypass will be most greatly felt by persons in closest proximity to the new highway. The roadway will create a visual separation within a residential neighborhood on the south bank of Anahulu Stream (see Social Impacts, below). The bridge for the new Anahulu Stream crossing will block stream views for nearby residences and its close physical presence will clash with the rural setting.

Downstream residences and persons using the existing bridge will also be affected. From the Anahulu Stream Bridge, the upstream view is one of quiet beauty with the rustic shelters, small boats, lush foliage, and still waters (Plate 2). This view would be altered by the introduction of a bridge for the highway's Anahulu Stream crossing. The bridges for Alignments A and C would be plainly visible from the old bridge (Plate 5). The bridge for Alignment D would be located behind the bend in the stream (Figure 7), and would not be visible above the trees, although the alignment along the bluff might be visible. This impact can be mitigated by the strategic planting of trees along the roadway.

The bypass road will serve as a vehicle for the enjoyment of the natural beauty of the North Shore. From its location above Haleiwa, the bypass road will offer panoramic views of Haleiwa Town, Kaena Point, and Waialua Bay which are unavailable from the existing Kamehameha Highway alignment through Haleiwa.

9. Relocation Impacts. A detailed report on the lands to be taken for the highway realignment and the relocation program is contained in Appendix A.

Alternate A will require portions of 26 parcels of land, four of which will be whole takings while the remainder will be partial takings. Seven residential homes and one farm will be affected by this route (Figure 14B).

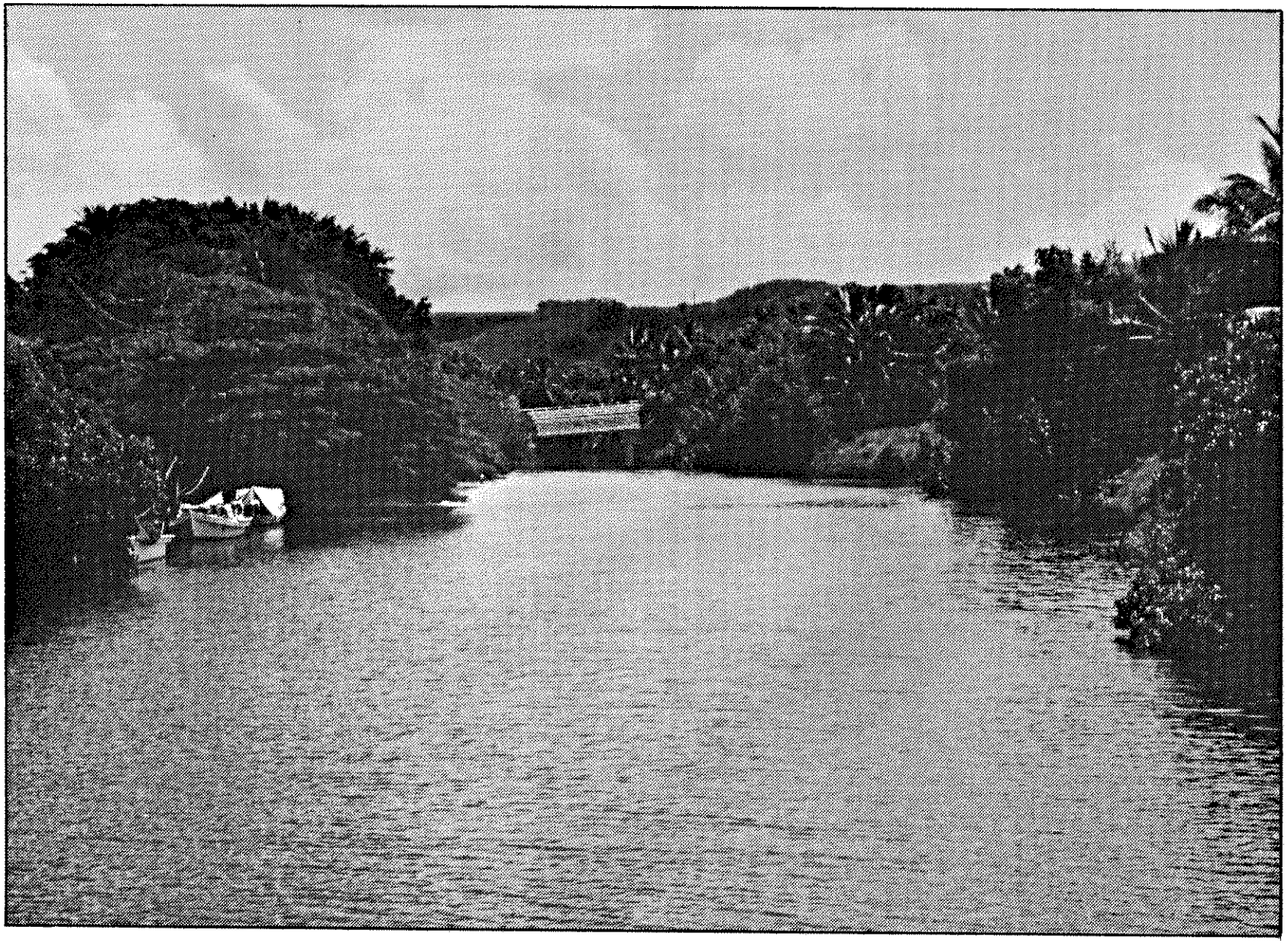


Plate 5 View up the Anahulu River with the new bridge superimposed (Alternate A or C). Some trees at the bridge site will be removed, but the screening trees in the foreground will remain.

Alternate C will require the whole taking of three parcels and the partial taking of 30 parcels. This route will also result in the loss of two residences and one farm (Figure 14A).

Alternate D involves thirty-three parcels of land, ten of which will be whole takings. This route will only displace one family (Figure 14B).

Displaced families will be relocated into equivalent housing as required by Federal law. The relocation will result in a disruption in the lives of the displaced families. The small number of families displaced will not significantly impact the North Shore housing market and the single displaced farm will not impact the local economy. Financial assistance and relocation services provided by the Department of Transportation cannot make up for the loss of a home.

The bypass will cross beneath the Hawaiian Electric Company's Wahiawa-Waimea 46 kv circuit and their Waimea-Kahuku 46 kv circuit which are the major sources of power to the North Shore (Figures 12 and 13). Telephone distribution cables will also be crossed at Paliuli Road (cane haul) and Emerson Road. The intersection with Kamehameha Highway near the traffic circle may affect a telephone facility, and the intersection near Haleiwa Beach Park will encounter power distribution circuits, telephone feeder cables, and the military's Joint Trunking System communications cables. Any relocations required to accommodate the bypass will be coordinated with the affected utilities. The alternate alignments have been designed to avoid all water wells in the project area whether actively used or abandoned. No natural gas systems will be affected.

10. Social Impacts. Upon completion of the Kamehameha Highway Realignment, traffic volumes will be divided between the existing alignment through Haleiwa and the new bypass road. In addition to the initial reduction of traffic volume through Haleiwa, the bypass will prevent increases in traffic congestion over the long term. Reducing the traffic volume through Haleiwa will reduce noise, air pollution, pedestrian-vehicle conflicts, and improve in-town traffic movement. Improvement in all of these categories will make for a more quiet and pleasant atmosphere in Haleiwa Town. This will benefit community residents who have been working to preserve the quiet, "country" life style of the North Shore.

The transportation benefits provided by the highway realignment will influence the travel patterns of both North Shore residents and drivers from other sections of Oahu. Many North Shore residents, who dislike heavy traffic, avoid traveling to Haleiwa on weekends. Reduction of traffic volume on the existing alignment would make the trip more pleasant, encouraging more residents to visit Haleiwa on weekends. Weekend trips to Honolulu would also be easier for North Shore residents with construction of the bypass road.

As the population of Oahu grows, the use of the island's recreational resources will also expand. Many of these resources, such as beaches and natural areas, cannot grow with the population and will be subject to higher intensities of use. The beaches and parks of the North Shore are popular destinations for weekend travelers from Honolulu. As the population of Honolulu continues to grow, weekend visitition of North Shore recreational resources will expand, generating higher weekend traffic through Haleiwa.

However, weekend traffic through Haleiwa cannot continue to grow indefinitely with existing facilities. Without the bypass, traffic congestion would grow for a time and then level off at a point where drivers begin to avoid Haleiwa. The impact of the bypass road will be to allow the growth of weekend recreational traffic up to the capacity of adjoining highway sections.

The actual magnitude of the impact of the bypass on recreational resources will be equivalent to the difference between increased visitation which will result with the bypass and the level of visitation which could result if the bypass were not constructed.

It is difficult to predict when traffic congestion might level off without the realignment. That volume would depend on the patience and tenacity of Hawaii's drivers. However, if traffic growth is not restricted by inadequate facilities, the weekend ADT through Haleiwa is expected to grow from 14,500 in 1978 to 23,000 by the year 2001.

While the increased accessibility of the North Shore will be a benefit to weekend travelers seeking escape from the urban environment of Honolulu, increased use of beaches, parks, and roadways north of Haleiwa will have a negative impact on North Shore residents.

The bypass road will have beneficial impacts for nondrivers in the Haleiwa area. Lower traffic volumes through Haleiwa will result in a reduced level of pedestrian-vehicle conflict, making for a safer and more enjoyable environment for all pedestrians, particularly the elderly and children. The safety of bicycle travelers will be improved, encouraging this form of transportation. Bus riders will travel more quickly with lower traffic volumes, and all residents will benefit from lower transportation costs. Unemployed North Shore residents will enjoy a small improvement in accessability to urban employment centers, and may enjoy some short term job opportunities from highway construction.

The Kamehameha Highway Realignment will not adversely affect overall community cohesion within Haleiwa, as the project traverses agricultural land over most of its length. In addition, diversion of through traffic to the bypass road will have a beneficial impact on social and commercial interaction within Haleiwa Town. The bypass road will divide a small residential/agricultural area on the south bank of the Anahulu Stream consisting of around 17 homes (Figure 14). Approximately 12 homes inland of the bypass road will be separated from the rest of the community. The presence of a controlled access highway within this rural neighborhood will degrade the quiet country atmosphere so prized by Haleiwa residents. However, this separation is not expected to have serious sociological implications. The area separated is not considered a cohesive community in itself and has always been somewhat physically isolated from the rest of Haleiwa. The residents' identification with Haleiwa, whether real or perceived, is not expected to change with construction of the bypass.

Emerson Road and a paralled cane haul road provide access to residences along Anahulu Stream (Figure 14). The bypass will sever Emerson Road, but access across the bypass road will be provided via a new Emerson Road Connector (Figure 14). This connector will be two lanes wide and will be at-grade with the bypass. Utilizing the connector, however, will be less direct and less convenient than it is now.

11. Economic Impacts. The expenditure of Federal funds for the Haleiwa Bypass will have a beneficial impact on the Oahu economy. Economic benefits arising from Federal expenditures will be short term, lasting only as long as the period of construction. The Waialua District will capture only a portion of these benefits. Highway contractors will be Hono-

lulu based, and workers will be drawn from an island-wide pool, distributing the economic benefits of highway construction over all of Oahu. However, expenditures by construction workers will enhance sales of Haleiwa restaurants and gas stations.

The total right of way requirements for the bypass road will be 53.4 acres with Alignment A, 50.6 acres with Alignment C, or 56.8 acres with Alignment D (Table 21). The connecting roads and new cane haul roads make up approximately 6-8 acres of the total (Table 21). Most of the property to be acquired for right of ways is classified as agricultural land, but several acres of residential land will be required (Figure 14).

Of the land classified as agricultural, just over one-half of the land in each alignment right of way is presently used for sugar cane production, and a small amount of land is used for other agricultural crops (Table 22). The remaining agricultural acreage has been left in an undeveloped state. These lands are forested, marsh, on steep slopes, or strewn with large rocks, and are left unused or utilized as pasture.

The loss of agricultural land to urbanization is a serious national problem which not only affects current food production, but also diminishes the stock of farmland available to future generations. In addition to its economic value, agricultural land is an important cultural and aesthetic resource, providing much needed open space.

The residential areas are located on the south bank of Anahulu Stream. Cane lands are located south of Anahulu Stream, and pasture and unused agricultural lands are located north of the stream. For Alignment C, approximately 13.4 acres of the agricultural land within the right-of-way is "Prime Agricultural Land", and the remainder is classified as "Other Important Agricultural Land" by the U.S.D.A. Soil Conservation Service (Figures 16A and 16B and Table 22).

The Kamehameha Highway Realignment may indirectly result in the loss of additional agricultural land beyond that needed for right of ways. Construction of the bypass road, connecting roads, and new cane haul roads will divide agricultural lands creating several remnant parcels which would be difficult to cultivate (Figure 25). Due to problems with small size, irrigation, or access, sugar cane cultivation on remnant parcels may be terminated. This could eventually lead to

TABLE 21

RIGHT OF WAY ACREAGES
(In Acres)

	Alignments A	C	D
Bypass Road	45.7	43.4	50.3
Connecting Roads	1.9	1.8	1.8
New Cane Haul Roads	5.8	5.4	4.7
	53.4	50.6	56.8

TABLE 22

RIGHT OF WAY LAND USE AND REMNANT PARCELS
(In Acres)

Existing Land Use	Alignments A	C	D
Cane Land	29.4	28.6	32.4
Other Agricultural	----	3.7	.9
Pasture/Unused Agricultural	27.2	22.4	26.7
Residential	1.2	1.9	1.4
TOTAL	57.8	56.6	61.4
Remnant Parcels of Cane Land	28.6	16.0	19.5
Total Caneland Affected	58.0	44.6	51.9
"Prime Agricultural Land"	9.3	13.4	21.0

their conversion to urban use. Any change in land use would require a change of zoning. Alignment A would produce 28.6 acres of remnant agricultural land, Alignment C 16.0 acres, and Alignment D 19.5 acres (Table 22). Although Alignment D requires the largest acreage for its right of ways, the total amount of agricultural land affected by Alignment A is greater than for any other alignment (Table 22).

Waialua Sugar Company presently has 15,144 acres under cultivation. The sugar cane lands located in the project area are highly productive, yielding on the average 13 tons of sugar and 4 tons of molasses from the two year growth cycle. The current prices per ton for sugar and molasses are $600 and $80, respectively. (These prices are currently in a State of rapid change, and should be used for comparison purposes only.) Table 23 lists the total sugar and molasses yields and the gross production value for each alignment. Of the three alignments, A would result in the greatest loss of agricultural production, while C would result in the least loss of production. This lost land will not result in any loss of employment at the Waialua Sugar Company

Lands acquired by the Department of Transportation for right of ways will not be subject to property taxation. The total 1979-80 property taxes on the right of ways are $1,289 for Alignment A, $1,185 for Alignment C, and $870 for Alignment D. Total taxation on right of ways for Alignment D is lower than for the other two alignments, since less residential land is involved.

Since revenues for property taxes are administered on an island wide basis, the loss of tax revenues will not specifically impact the Waialua District. Remnant parcels will still be subject to taxation unless the Department of Transportation is asked to purchase them. Should the parcels eventually convert to urban use, the lands would be taxed at a higher rate and provide greater revenues.

The Kamehameha Highway Realignment will not result in a significant increase in the property values of existing residential areas, since the partially controlled access highway will not provide any transportation advantages to surrounding property. The residential area on the south bank of Anahulu River, which will be isolated by the highway, may suffer some loss of property value. If remnant agricultural parcels are retained for pasture or left undeveloped they will lose value. However, if the project results in the rezoning of this land to urban use, its value will greatly increase.

TABLE 23

BI-ANNUAL SUGAR PRODUCTION

ON

AFFECTED AGRICULTURAL LANDS

	Alignment A	C	D
ROW* for Bypass Road, Connector Roads, New Cane Haul Roads			
Tons of Sugar	403	337	427
Tons of Molasses	118	114	130
Gross Value	$251,240	$211,320	$266,600
Remnant Parcels			
Tons of Sugar	377	211	257
Tons of Molasses	114	64	78
Gross Value	$235,320	$131,720	$160,440
TOTAL GROSS VALUE	$486,560	$343,040	$427,040

Note:

Sugar Cane has a two year growth cycle.

Source: Waialua Sugar Company

Construction of the Kamehameha Highway Realignment will reduce traffic volumes through Haleiwa by 60% and in so doing may affect the sales volumes of local businesses. Haleiwa is the local business center for the North Shore. The Haleiwa Business community is primarily made up of young, small businesses. A business survey of the Haleiwa Post Office service area in February of 1979 revealed 107 operating businesses. Most are small businesses, with over ninety-three percent having annual sales volumes of under one half million dollars (Table 24). Almost fifty-nine percent of these businesses employ only one to four workers (Table 24). Haleiwa's largest employers are Waimea Falls Park with 17 employees, Crawford's Convalescent Home with 55 employees, Haleiwa Super Market with 55 employees, and the Proud Peacock Restaurant with 50 employees. A majority of businesses are corporations (54%), but there are also a large percentage of proprietorships (44%), more than twice the percentage for Oahu as a whole (21%). Most Haleiwa businesses are young; forty percent have been established since 1975, and the majority (62%) are less than ten years old (Table 24). Only a third (33.5%) of Oahu businesses are less than ten years old.

Of the 107 businesses in the Haleiwa Post Office service area, 60 are located on Kamehameha Highway between Weed Junction and Haleiwa Beach Park (Table 25). These businesses are those most likely to be affected by the construction of the bypass road. Of these 60 businesses, 23 have a high roadway orientation (Table 25). Businesses with high roadway orientation are those which would attract visitors traveling through Haleiwa from other sections of Oahu. Gas stations, restaurants, fast food shops and attractive boutiques are types of business likely to catch the eye of the passing motorist. Another 22 businesses on Kamehameha Highway have low roadway orientation. These businesses do not have high appeal to visitors, but may have occasional sales to visitors browsing through Haleiwa. However, these businesses are likely to benefit from impulse buying on the part of North Shore residents pasing through Haleiwa (Table 25). The 16 remaining businesses have no roadway orientation; banks, doctor's offices, and beauty shops are unlikely to benefit from either visitor shopping or resident impulse buying.

TABLE 24

HALEIWA BUSINESS CHARACTERISTICS

SALES VOLUMES

Volume Category	Count	%	Oahu Average %
$ 1-5 Million	2	2.2	11.6
$ 0.5-1 Million	4	4.5	12.0
Under $500,000	84	93.3	70.6
	89	100.0	100%

EMPLOYEE RANGE ANALYSIS

Range	Count	%	Oahu Average %
60 and Above	1	1.0	7.4
50-59	3	2.9	2.0
40-49	3	2.9	2.2
30-39	3	2.9	3.6
20-29	2	1.9	6.3
10-19	13	12.5	14.6
5-9	18	17.3	20.4
1-4	61	58.6	43.5
	104	100%	100%

BUSINESS TYPES *

	Haleiwa Count	%	Island Average %
Corporation	54	54	74
Partnership	2	2	5
Proprietorship	44	44	21
	100%	100%	100%

AGES OF HALEIWA BUSINESSES

Established Since	Haleiwa	Oahu
1975	40%	----
1970	62%	33.5%
1965	76%	68.1%
1960	84%	----

* 114 businesses were surveyed, but complete information was not obtained for all businesses. Therefore, many of the analysis are for fewer than 114 businesses. The survey was conducted in February of 1979.

Data Provided by Hawaii Business Directory, Inc.

TABLE 25

KAMEHAMEHA HIGHWAY BUSINESS SURVEY[1]

No. Of Businesses		Type of Business	No. Of Employees	
		BUSINESSES WITH HIGH ROADWAY ORIENTATION		
5		Gas Stations	33	
7		Fast Food	33	
6		Restaurants	111	
1		Art Gallery	1	
1		Liquor Store	7	
1		Book Store	1	
2		Boutiques	5	
23	(38%)		191	(47%)
		BUSINESSES WITH LOW ROADWAY ORIENTATION		
2		Super Market	93	
1		Flower Shop	1	
1		Art Store	1	
1		Pet Store	1	
1		Surf Boards	3	
1		Natural Food	2	
1		Record Store	3	
4		Clothing	26	
1		Dive Shop	4	
2		Gardening Shop	5	
5		Hardware and Appliances	7	
2		Realty	5	
22	(36%)		151	(38%)
		BUSINESS WITH NO ROADWAY ORIENTATION		
4		Financial	20	
2		Beauty Shop	2	
2		Medical	14	
1		Attorney	1	
1		Photo	2	
1		Barber	1	
1		Washerette	6	
1		Travel	3	
1		Paper Products	1	
2		Auto Parts	10	
16	(26%)		60	(15%)

[1] Weed Junction to Haleiwa Beach Park, February 1979

A number of studies have been conducted to determine the effects of bypasses on community businesses (1,2,3).* These studies were conducted by measuring business gains and losses in bypassed communities. The general conclusions of all of the studies were quite similar. They found that, as a whole, communities which were bypassed by new highway construction did not suffer significant losses in retail sales, and many communities enjoyed increased sales volumes as a result of the bypass. All portions of the local business communities were not similarly affected. Roadway oriented businesses were affected more than businesses which were oriented to local community trade. Revenue losses were greatest for hotels and motels. Gasoline stations and restaurants also suffered losses, but the magnitude of those losses depended on the ability of the individual business to reorient to local trade. Businesses which had little or no highway orientation were either not affected, or experienced sales increases as a result of the bypass. Sales increases were attributed to reduced traffic congestion in commercial areas.

The most thorough study of bypass effects was conducted by Horwood, Zeller, and Ludwig (4) for the Transportation Research Board. Twenty-four previous studies that related to 72 communities varying in population from 125 to 135,000 were examined. The study found that smaller communities were affected most by the bypasses. The Horwood study found that after being bypassed the examined communities, on the whole, showed an 8.5% increase in overall retail sales (Table 26). This increase was 0.3% lower than the average for similar non-bypassed communities, which were used as a control group (Table 26). This led to the conculsion that the bypass had little effect on overall prosperity. However, communities with populations under 5,000 had an average gain of only 5.6% which was 3.5% lower than similar control communities (Table 30).

While overall prosperity was not much affected, highway-oriented sales suffered. Though highway-oriented sales increased by 21%, this gain was 10.6% lower than for the control communities (Table 26). Hardest hit were motels and hotels which suffered average losses of 23.1%. Restaurant sales were down 13% and service stations increased sales by 2.3%. Though service stations exhibited an increase in sales this gain was 3.2% below the gains made by service stations in control communities. However, non-highway oriented retail sales were improved by the bypasses. Sales of non-highway oriented businesses were up 10.3%, which was 5.8% higher than the control communities (Table 30).

* References are listed at the end of this Chapter.

TABLE 26

SUMMARY OF RETAIL SALES CHANGES IN BYPASSED TOWNS

POPULATION CATEGORY	AVG. CHANGE IN RETAIL SALES (%)	NO. OF TOWNS WITH GAIN IN SALES	NO. OF TOWNS WITH LOSS IN SALES	RANGE (%)	AVG. GAIN (%)	AVG. LOSS (%)	NO. OF TOWNS WITH CONTROL AREA	NO. OF TOWNS WITH MORE GAIN OR LESS LOSS THAN CONTROL	AVG. GAIN OR LOSS OVER CONTROL (%)
				(a) TOTAL RETAIL SALES					
Under 5,000	+ 5.6	16/20	3/20	— 6.4 – +22.5	+ 8.2	— 6.6	18	6/18	— 3.5
Over 5,000	+12.2	12/16	4/16	—13.0 – +49.0	+20.4	— 7.5	14	11/14	+ 3.7
5,000-10,000	+16.9	5/6	1/6	—13.0 – +38.0	+17.7	—13.0	6	4/6	+ 0.85
10,000-25,000	+ 7.3	5/7	2/7	— 3.1 – +40.5	+12.5	— 4.8	7	6/7	+ 4.1
25,000-50,000	—11.4	0/1	1/1	—	—	—11.4	—	—	—
50,000-100,000	—	—	—	—	—	—	—	—	—
100,000 & over	+22.6	2/2	0/2	+ 4.3 – +49.0	+22.6	—	1	1/1	+19.0
All towns	+ 8.5	28/36	7/36	—13.0 – +49.0	+12.9	—	32	17/32	— 0.30
				(b) HIGHWAY-ORIENTED SALES					
Under 5,000	+20.8	3/6	3/6	—14.7 – +60.9	+51.8	—10.3			
Over 5,000	+21.2	3/4	1/4	—11.8 – +50.4	+32.3	—11.8			
5,000-10,000	+41.5	1/1	0/1	—	+41.5	—			
10,000-25,000	+50.4	1/1	0/1	—	+50.4	—			
25,000-50,000	—11.8	0/1	1/1	—	—	—11.8			
50,000-100,000	—	—	—	—	—	—			
100,000 & over	+ 4.9	1/1	0/1	—	+ 4.9	—			
All towns	+21.0	6/10	4/10	—14.7 – +60.9	+42.5	—10.6			

16/20 indicates "16 of 20."

Source: David A. Crane and Partners, 1975 (5).

TABLE 27

SUMMARY OF SERVICE STATION RETAIL SALES CHANGES

POPULATION CATEGORY	AVG. CHANGE IN RETAIL SALES (%)	NO. OF TOWNS WITH GAIN IN SALES	NO. OF TOWNS WITH LOSS IN SALES	RANGE (%)	AVG. GAIN (%)	AVG. LOSS (%)	NO. OF TOWNS WITH CONTROL AREA	NO. OF TOWNS WITH MORE GAIN OR LESS LOSS THAN CONTROL	AVG. GAIN OR LOSS OVER CONTROL (%)
Under 5,000	— 0.47	8/17	9/17	—33.0 – +39.4	+14.3	—13.6	11	5/11	— 0.86
Over 5,000	+ 5.5	7/15	8/15	—21.0 – +39.0	+20.0	— 7.3	10	6/10	— 5.75
5,000-10,000	— 1.8	2/4	2/4	—21.0 – +17.0	+11.3	—15.0	3	2/3	—20.0
10,000-25,000	— 4.2	3/7	4/7	—10.0 – +33.9	+19.1	— 7.5	6	3/6	— 6.1
25,000-50,000	— 4.8	0/2	2/2	— 7.0 – — 2.5	—	— 4.8	—	—	—
50,000-100,000	—	—	—	—	—	—	—	—	—
100,000 & over	+30.3	2/2	0/2	+21.5 – +39.0	+30.3	—	1	1/1	+21.0
All towns	+ 2.3	15/32	17/32	—33.0 – +39.4	+16.9	—10.6	21	11/21	— 3.2

9/17 indicates "9 of 17."

Source: David A. Crane and Partners, 1975. (5).

TABLE 28

SUMMARY OF RESTAURANT SALES CHANGES IN BYPASSED TOWN

POPULATION CATEGORY	AVG. CHANGE IN RETAIL SALES (%)	NO. OF TOWNS WITH GAIN IN SALES	NO. OF TOWNS WITH LOSS IN SALES	RANGE (%)	AVG. GAIN (%)	AVG. LOSS (%)	NO. OF TOWNS WITH CONTROL AREA	NO. OF TOWNS WITH MORE GAIN OR LESS LOSS THAN CONTROL	AVG. GAIN OR LOSS OVER CONTROL (%)
Under 5,000	—16.1	4/15	11/15	—50.0 – + 4.6	+ 2.2	—22.8	9	1/9	—10.6
Over 5,000	— 8.9	3/11	8/11	—26.0 – +14.0	+ 9.1	—13.1	6	5/6	— 0.25
5,000-10,000	— 9.2	1/4	3/4	—26.0 – + 2.4	+ 2.4	—13.0	3	2/3	— 5.8
10,000-25,000	— 7.3	1/3	2/3	—21.0 – +11.0	+11.0	— 8.3	2	2/2	+ 1.5
25,000-50,000	— 8.3	0/2	2/2	—14.6 – — 2.0	—	— 8.3	—	—	—
50,000-100,000	—	—	—	—	—	—	—	—	—
100,000 & over	— 1.1	1/2	1/2	—16.2 – +14.0	+14.0	—16.2	1	1/1	+13.0
All towns	—13.0	7/26	19/26	—50.0 – +14.0	+ 5.1	—18.7	15	6/15	— 6.4

11/15 indicates "11 of 15."

Source: David A. Crane and Partners, 1975. (5).

TABLE 29

SUMMARY OF MOTEL AND HOTEL SALES CHANGES IN BYPASSED TOWNS

POPULATION CATEGORY	AVG. CHANGE IN RETAIL SALES (%)	NO. OF TOWNS WITH GAIN IN SALES	NO. OF TOWNS WITH LOSS IN SALES	RANGE (%)	AVG. GAIN (%)	AVG. LOSS (%)
Under 5,000	—32.4	1/4	3/4	—65.0 – + 2.0	+ 2.0	—43.8
Over 5,000	—13.9	1/4	3/4	—54.0 – +34.0	+34.0	—29.8
5,000-10,000	—	—	—	—	—	—
10,000-25,000	—15.5	0/1	1/1	—	—	—15.5
25,000-50,000	—37.0	0/2	2/2	—54.0 – +20.0	—	—37.0
50,000-100,000	—	—	—	—	—	—
100,000 & over	+34.0	1/1	0/1	—	+34.0	—
All towns	—23.1	2/8	6/8	—65.0 – +34.0	+18.0	+36.8

3/4 indicates "3 of 4."

Source: David A. Crane and Partners, 1975. (5).

TABLE 30

SUMMARY OF NONHIGHWAY-ORIENTED RETAIL SALES CHANGES IN BYPASSED TOWNS

POPULATION CATEGORY	AVG. CHANGE IN RETAIL SALES (%)	NO. OF TOWNS WITH: GAIN IN SALES	NO. OF TOWNS WITH: LOSS IN SALES	RANGE (%)	AVG. GAIN (%)	AVG. LOSS (%)	NO. OF TOWNS WITH: CONTROL AREA	NO. OF TOWNS WITH: MORE GAIN OR LESS LOSS THAN CONTROL	AVG. GAIN OR LOSS OVER CONTROL (%)
Under 5,000	+ 6.7	11/13	2/13	−14.8 – +32.0	+10.3	−12.6	8	6/8	+ 5.2
Over 5,000	+14.6	10/11	1/11	− 5.5 – +55.0	+16.6	− 5.5	6	5/6	+ 4.6
5,000-10,000	+11.2	4/4	0/4	+ 1.0 – +20.0	+11.2	—	2	2/2	+ 0.3
10,000-25,000	+11.2	3/4	1/4	− 5.5 – +38.0	+17.2	− 5.5	3	2/3	− 1.9
25,000-50,000	+ 6.9	2/2	0/2	+ 1.3 – +12.4	+ 6.9	—	—	—	—
50,000-100,000	—	—	—	—	—	—	—	—	—
100,000 & over	+55.0	1/1	0/1	—	+55.0	—	1	1/1	+19.0
All towns	+10.3	21/24	3/24	−14.8 – +55.0	+13.3	−10.3	14	11/14	+ 5.8

[a] 11/13 indicates "11 of 13."

Source: David A. Crane and Partners, 1975. (5).

The figures contained in the Horwood Study should not be looked upon as quantitative predictions of the impact of the bypass road on the Haleiwa business community. But they can be used as an indication of the relative effects of a bypass on the various sectors of a business community.

In addition to researching the available literature, Haleiwa merchants and shoppers were interviewed for their opinions. It was hoped that the interviews would afford a view of local conditions, which differ from the mainland communities examined in the bypass studies. All of the merchants agreed that highway-oriented businesses such as restaurants, boutiques, and gas stations would be most affected by the bypass, but held diverse opinions on the overall effect.

Managers of businesses with little or no highway orientation, such as apparel and grocery stores, were divided in their opinions. Though not oriented to highway trade, many of these store owners felt that some of their business was from passing visitors. Sales volumes attributed to visitors ranged from none to 50%. Some merchants with low roadway orientation felt that their businesses would be hurt, while others felt that the bypass would improve conditions or have no effect.

The managers of businesses with little or no roadway orientation who felt that their businesses would be hurt where somewhat concerned by the loss of visitor trade, but were more concerned over the potential loss of North Shore resident sales. These merchants were concerned that impulse buying would be reduced when North Shore residents utilize the bypass road and felt that this impulse buying was an important portion of their sales. Also of concern was the new shopping center planned for the Pupukea area. The bypass road would give the new shopping center a competitive advantage, as Haleiwa would be bypassed while traffic would continue to pass through Pupukea. The bypass road would make shopping in Pupukea more convenient for Sunset Beach residents than a stopoff in Haleiwa.

Other managers of businesses with low highway orientation felt that the bypass would have little effect, since visitors were not an important part of their sales, and North Shore residents would continue to stop in Haleiwa for their shopping. Merchants who were optimistic about the bypass believed that

traffic reductions would improve Haleiwa's business climate. They felt that a reduction of traffic congestion and pedestrian-vehicle conflicts could attract North Shore residents to Haleiwa on weekends and encourage stop-offs. Many North Shore residents currently avoid Haleiwa on weekends because of the existing traffic situation. It was also felt that Haleiwa was enough of an attraction that many weekend recreational drivers would continue to stop-off on the way to the North Shore.

Shoppers were interviewed in Haleiwa during a summer weekend and asked if they would change their travel and shopping patterns if the bypass were constructed. Among those interviewed were visitors from out-of-State, visitors from other parts of Oahu, and North Shore residents. It was the visitors from out-of-State who indicated that their travel patterns would be changed significantly by the bypass. A group of visitors from Georgia stated that they had never heard of Haleiwa before passing through the town, and only stopped because it was on their way around the island. They felt that if the bypass had been in existence they would have taken it, as Haleiwa had not been in their plans.

Most of the visitors from other sections of Honolulu felt that the bypass road would alter their travel patterns, but would not reduce the number of times they stopped in Haleiwa. Some visitors stated that they would continue to utilize the route through Haleiwa, because they liked the town, while others said that they would take the bypass road to the beach and return by way of Haleiwa. Most felt that they would still stop in Haleiwa, since it is the most convenient place on the North Shore to purchase food and gas. All interviewees had very positive feelings toward Haleiwa and considered it as an important part of their North Shore trip. Almost all of these visitors from other sections of Oahu stated that stopping in Haleiwa was a decision they had made in advance and not on impulse.

North Shore residents felt that the bypass road would change their travel patterns, but not the amount of shopping they do in Haleiwa. The most common response to questions concerning the bypass was that they would use it when they were in a hurry, but would use the existing route when they needed to buy something. Most residents stated that they did all of their shopping in Haleiwa, and that they rarely stopped on

impulse. A number of residents offered that they usually came into Haleiwa on weekdays to avoid the weekend crowds but would do more weekend shopping if traffic were reduced. When asked if the bypass road would encourage them to do more shopping in Wahiawa or Honolulu, most of the residents responded that they didn't like Honolulu and preferred to do their shopping in Haleiwa.

The interviews with merchants and shoppers would indicate that the conclusions of previous bypass studies probably hold true for Haleiwa. Highway-oriented businesses will be hurt the most, while the overall economy of Haleiwa will not be greatly affected. Adverse impacts of the bypass include the loss of tourist sales, the loss of sales due to impulse buying, and the loss of business to the proposed shopping center at Pupukea. The greatest beneficial impact of the bypass is the reduction of traffic problems in Haleiwa which would encourage visitation and weekend shopping by residents. Shopping by out-of-State visitors is most likely to be affected by the bypass. Tourists are unlikely to be aware of the charms of Haleiwa and are likely to bypass the town if the realignment is constructed. Impulse buying on the part of tourists will be lost without effective mitigation measures.

Many visitors from other sections of Oahu plan to stop in Haleiwa as part of their North Shore trip. This segment of the visitor trade will not be hurt, and may even be enhanced if Haleiwa becomes a more pleasant place to stop as a result of the bypass. Impulse buying on the part of visitors who had not intended to stop in Haleiwa will be lost. However, the magnitude of this impulse buying is uncertain. Many merchants feel that the occurrence of such buying is significant, while most shoppers stated that they rarely stopped on impulse.

The same uncertainty exists when examining impulse buying by North Shore residents. Several merchants felt that it was an important part of their business, while residents interviewed said that they rarely stopped on impulse. Much of this impulse buying would be eliminated by the bypass. The bypass alone should not hurt the amount of regular shopping North Shore residents conduct in Haleiwa. The bypass road could make the proposed shopping center at Pupukea Road (just north of Waimea) more desirable and increase its ability

to compete with Haleiwa for the North Shore trade. However, any sales losses from Haleiwa merchants to the new shopping center must be looked upon as a transfer of sales from one business to another, rather than a loss of revenue for the North Shore.

The reduction in traffic congestion will draw more North Shore residents to Haleiwa during weekends and have a positive effect on sales. Whether this positive influence will make up for other sales losses is dependent on the reaction of North Shore residents to improved traffic conditions resulting from the bypass road.

The segment of the Haleiwa economy most likely to be hurt by changes in consumer travel patterns, will be those businesses most highly oriented towards Kamehameha Highway. However, these businesses should not be as adversely affected as those highway oriented businesses examined in the previously cited bypass studies. Those towns were located on the mainland, they were not attractions, and the bypas roads resulted in the loss of most visitor traffic. Haleiwa is, and will remain, an attraction to visitors from other sections of Oahu. In addition, effective mitigation measures could entice out-of-State visitors off the bypass road and into Haleiwa.

The overall economy of Haleiwa should not be hurt by the bypass. The communities studied which suffered losses in total retail sales were small communities that were highly dependent on highway trade. The Haleiwa area has a solid enough industrial and agricultural base, in addition to businesses catering to resident trade, to withstand impacts to highway oriented businesses.

The principal reason that out-of-State visitors would utilize the bypass road rather than stop in Haleiwa is that they are unaware of its existence. If the highway signs at the termini of the bypass road indicated that the existing alignment was a scenic or historic route, tourist traffic would be diverted from the bypass road. In addition, Haleiwa could be promoted as one of Oahu's tourist attractions as is Lahaina on Maui. Should promotion be successful, the reduced traffic congestion would enhance Haleiwa's position as an attraction. If tourists were "aware" of Haleiwa, increased visitation and higher sales revenues would result. However, if such promotion were too successful, the quiet country atmosphere would dissappear as Haleiwa became more tourist-oriented. A very high tourist orientation for Haleiwa would be displeasing to local residents who have voiced opposition to visitor industry development on the North Shore.

12. Energy Analysis. In order to determine the net energy savings (or cost) of the proposed project, it is necessary to compare the energy used in the operation of the highway with the energy used to construct it. This is extremely difficult, since the true "energy equivalent" of a construction project involves large sectors of the economy. Using the Gross National Product, and the total energy expended to attain that GNP, one can equate any transaction (in dollars) to an energy equivalent (6). However, in Hawaii, the focus can be narrowed somewhat when dealing strictly with energy terms, since a great many "energy costs" are transferred to the mainland (eg. steel production) and are not felt locally as direct oil consumption. The State must import all of its oil (mostly from foreign sources), and relies on this oil for over 90% of its energy needs. Therefore, this analysis is primarily directed toward the energy costs of highway construction and operation that can be related to the consumption of oil that has been imported to Hawaii.

The following is not a true Benefit/Cost analysis, since many factors are not included, only those that can be related back to the consumption of oil that has been imported to the State. A large-scale Benefit/Cost analysis has been previously presented (Table 5). The procedures used to derive these ratios include some terms, such as decreased driving time and improved engine efficiency, that are directly convertable to energy consumption, but most terms are more appropriately expressed in dollars. The overall B/C ratio for any of the three alternates indicates that user benefits significantly outweigh costs. The following analysis is only one aspect of the overall project benefits and costs.

The factors required to compute gasoline consumption without and with the bypass for the study years 1978, 1985, and 2001 were developed in the air quality study (see Appendix C). The fuel economy (miles per gallon per vehicle) for each year without and with the bypass was determined according to the methodology presented in an EPA publication (7). Included are corrections for speed, stop-and-go versus free-flowing traffic, and vehicle age mixture. The results are given in Table 31, along with the vehicle-miles traveled and the resulting consumption of gasoline in gallons per day.

Two factors result in a significant reduction in gasoline consumption with the bypass operational in 1985. First, anti-

TABLE 31

FUEL CONSUMPTION WITHOUT AND WITH THE BYPASS

	1978	1985		2001	
	Without	Without	With	Without	With
Average Fuel Economy (mi/gal)[a]	18.5	23.8	33.4	27.9	42.6
Vehicle-Miles Traveled (mi/day)	33,580	39,430	40,780	53,450	54,800
Gasoline Consumption (gal/day)	1,815	1,660	1,220	1,915	1,285
Change Relative to 1978		-8.5%	-32.8%	+5.5%	-29.2%
Yearly Energy Equivalent (BTU)[b]	8.28×10^{10}	7.37×10^{10}	5.57×10^{10}	8.74×10^{10}	5.86×10^{10}
Yearly Energy Savings (BTU)			2.00×10^{10}		2.88×10^{10}

NOTES:

a. Weighted for peak hour vs. off hour and traffic split between Kamehameha Highway and the Bypass.

b. One gallon of gasoline has an energy value of 1.25×10^{5} BTU.

cipated engine improvements and lighter vehicles will cause the national average fuel economy to improve significantly through the 1980's, tapering off to an average of around 26-28 mpg after 1990 (combined city and highway driving). Secondly, reducing congestion through Haleiwa by diverting 60% of the traffic to the bypass will result in increased speeds on both highways, and fuel economy increases with speed (up to around 40 mpg). This will result in 33% less gasoline consumed between the traffic circle and Haleiwa Beach Park in 1985 than over the same distance in 1978. By the year 2001, increasing traffic and slightly lower speeds on the 2-lane bypass begin to offset the improvement in fuel economy; even so, 29% less gasoline will be used on this section of road than in 1978.

By comparison, if the bypass is not constructed, the slower vehicle speeds resulting from increasing congestion will almost offset the gain in national fuel economy. In 1985, fuel consumption through Haleiwa without the bypass will be only 8% less than the 1978 level. If the year 2001 traffic projection is reached, fuel consumption will increase by around 6% over the 1978 volume for this stretch of highway. The gallons of gasoline used per day has been converted to British Thermal Units (BTU), a standard term used to compare different forms of energy (Table 31). The yearly energy savings from the more efficient vehicle operation made possible by the bypass will be compared with the construction energy costs in Table 32.

Three different methods have been used to estimate the energy expenditure required to construct the bypass, the results of which are present in Table 32. (Only Alternate C has been used for this analysis; Alternate A would be essentially the same, and Alternate D would be roughly 20% greater.) The first method is based on the gross energy/GPN ratio previously mentioned (8). This is the least precise approach, since the only variable involved is the cost of the project. Two variations are presented in Table 32, the first based on total project cost, and the second based on construction costs only. The difficulty with this approach, as far as the present analysis is concerned, is that it factors in many energy costs that are expended throughout the national economy, rather than in Hawaii alone. As a result, the gross energy/GPN ratio method yields the highest thermal values (Table 32). This may be considered the best approach to the "true" energy cost of the project, but

TABLE 32

ESTIMATES OF CONSTRUCTION ENERGY AND LIMITED ENERGY TRADE-OFF ANALYSIS

	Estimate Method	Bypass Construction Energy (BTU)	Equivalent Fuel Oil (bbl)[a]
I.	Gross Energy/GNP		
	A. Total Project Cost	6.16×10^{11}	97,800*
	B. Construction Cost	4.85×10^{11}	77,000*
II.	Route H-3 Ratio	2.57×10^{11}	40,800*
III.	Energy Equivalents	1.49×10^{11}	23,600
		Annual Bypass Maintenance (BTU)[b]	
II.	Route H-3 Ratio	1.28×10^{8}	20
III.	Energy Equivalents	2.82×10^{8}	45
		Average Annual Savings With Bypass (BTU)	
From Table 31	1985	2.00×10^{10}	3,175
	2000	2.88×10^{10}	4,570

Equivalent Fuel Oil Trade-Off (Method III)

Construction ÷ (Annual Savings - Maintenance) = Break-even Point
23,600 bbl ÷ (3,436 bbl/Year - 45 bbl/Year) = 7.0 Years

Notes:

a. Equivalent Fuel Oil has a thermal value of 6.3×10^{6} BTU/Barrel
b. General maintenance only, no lighting.

* These methods include energy costs that can not be directly converted to Equivalent Fuel Oil Consumed in Hawaii.

the results can not be directly converted to an equivalent volume of oil imported to Hawaii, which is the focus of this present analysis.

The second estimate of construction energy cost uses a simple ratio (BTU/mile) derived from the "Energy Impact Analysis" performed for the Interstate Route H-3 EIS (9). The alternate route used for comparison is T-3, which consists of two lanes. This method produces a lower thermal value than the first method, but it is felt to be too high for the subject project. The T-3 alternate crosses mountainous terrain, is on structures for a relatively large percentage of its length, and has a long tunnel. These factors all result in high construction energy requirements, with steel and concrete making up 94% of the thermal value. By comparison, the proposed Haleiwa Bypass is on relatively level terrain, is not significantly elevated on structures (except Alternate D), and has no tunnels. Therefore, much less excavation and materials (steel and concrete) are required for the bypass. Since most steel production energy is expended on the mainland, the Route H-3 energy analysis can not be directly converted to an equivalent value of oil consumed in Hawaii for construction.

The third method used to derive a construction energy cost is the most precise, since it is based on the actual energy equivalents of the activities and materials that go into the construction of a highway. Prepared by the California Department of Transportation in 1978 (10), it is also the most current method found. This approach allows one to select any of a large number of energy parameters, to isolate specific aspects of construction energy. The parameters used in this analysis were; excavation and embankment, aggregates, asphalt-treated base, asphaltic-concrete paving, hauling (60 mile round trip from Barbers Point), base compacting, paving, and bridge structures. (The bridges include mainland steel costs, but are a small proportion of the energy consumption.) This method yields the lowest thermal value, but it can be directly related to local oil consumption. The results include direct energy use (asphalt, transportation, equipment operation) as well as indirect uses (aggregate drying, concrete production, bridge construction) that have multipliers through the local economy. The largest proportion of the energy goes into processing and applying the pavement (5.7×10^{10}BTU), followed by earthwork (4.8×10^{10}BTU). These values include the vehicle fuel used, but not the fuel used in transporting material to the site, which

amounts to 1.0×10^{10} BTU. Construction of all of the bridges for Alternates A or C would expend 3.4×10^{10} BTU, while construction of just the viaduct over the Anahulu River for Alternate D would require 3.6×10^{10} BTU (this is also reflected in the bridge costs, Table 3).

An allowance for annual highway maintenance has also been included on Table 32. The Route H-3 energy analysis (method I) presents actual petroleum used in maintaining the Pali and Likelike Highways, in addition to energy expenditures for highway lighting and tunnel lighting and ventilation. (It is not specified whether or not the petroleum value includes asphalt as well as vehicle fuel.) The reference for method III also includes an energy equivalent for general highway maintenance, which comes out to more than twice the value reported in the Route H-3 analysis. Neither value includes highway lighting, since it is not intended to light the bypass, except at intersections. To be conservative, the higher thermal value (2.8×10^{8} BTU/year) has been used.

To provide a more familiar unit of comparison, the thermal values in Table 32 are also expressed in barrels (bbl) of "Equivalent Fuel Oil", a standard reference used in the petroleum industry that has a thermal value of 6.3×10^{6} BTU/bbl EFO. Equivalent crude oil is sometimes used in energy analyses, but its thermal value per barrel varies widely depending on its source (eg. $5.6 - 6.0 \times 10^{6}$ BTU/bbl); using crude oil as a comparison would increase the oil equivalents by 5-10%. To put the oil quantities in Table 32 into perspective, the State used 39.6 million barrels of petroleum in 1976 (11) and roughly 48.5 million barrels in 1978 (12). A study conducted for the proposed Barbers Point Harbor projected that total State oil consumption would be 48.2 million barrels in 1980, 67.9 million barrels by 1990, and 92.0 million barrels by the year 2000 (13). The oil locally expended to construct the bypass (estimate method III) is 0.05% of the State's 1978 oil consumption.

The trade-off between the oil savings made possible by the bypass, and the oil used to construct and maintain it, has been determined by dividing the construction value by the prorated yearly savings (after subtracting maintenance). The results of this simple calculation show that it will take 7 years for the oil savings in vehicle efficiency to make up for the oil used in construction. After 7 years of use (1991 if the high-

way opens in 1985), the bypass will result in a net Equivalent Fuel Oil savings of approximately 3,740 to 4,525 barrels per year as fuel economy increases to the year 2001.

The State Energy Conservation Program has set energy savings goals for various categories of use (1980 State Energy Plan, Table 20). Under "Automobile Efficiency Promotion" the 1980 goal is 3×10^{12}BTU (4.76×10^{5}bbl EFO). After the break-even point (1991), the energy savings on the bypass will represent roughly 1% of this 1980 goal. However, by this time, the goal will probably be higher, so the bypass savings will represent a smaller proportion.

C. IMPACTS ON PROPERTIES AND SITES OF HISTORICAL AND CULTURAL SIGNIFICANCE

The recommended alignment, Alternate C, will have no effect upon any known historic or archaeological site on or likely to be eligible for inclusion in the Hawaii Register and/or National Register of Historic Places. In the event any unanticipated sites or remains are uncovered during construction, construction will be halted and the State Historic Preservation Officer will be contacted immediately.

The four previously-unrecorded sites found in the project area are described in Appendix E. They consist of a shallow historic deposit of bottles and debris (Site 1439), a wall fragment (Site 1440), wet agricultural terraces (Site 1441), and an old wood frame building (Site 1443). Site 1442, a masonry and wooden structure is not the original house of the Emerson Homestead, but may have been contemporary. Further investigation on the Emerson Homestead indicate that it no longer exists. Therefore, the proposed roadway cannot have any impact upon it.

The proposed bypass will have no direct impact on Sites 1439, 1440, 1441, or 1443 since they are located well outside of the right-of-way. The same is true for the "Site 1442". (See letter from the State Historic Preservation Officer, page V-3).

Since the identified properties of actual or potential historical significance are not affected by the preferred Alternate C, Section 106 of the National Historic Preservation Act does not apply.

D. UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Any major public works project which affects a large area will have unavoidable and unmitigatable impacts, and the Kamehameha Highway Realignment is no exception. This section will not include all of the impacts previously discussed, since many of those impacts are avoidable or can be mitigated to an acceptable level.

The loss of agricultural land will be an unavoidable impact of the construction of the bypass highway. Cultivation of sugar cane will be terminated on the remnant agricultural lands created by the realignment. Though sugar cane production will no longer be possible, lower intensity agricultural activities, such as grazing, can be conducted on remnant agricultural lands.

Two residences are within the highway right-of-way and will have to be relocated. Though relocation assistance will be provided, affected residents will have their lives disrupted by moving and may suffer emotionally from the loss of their homes.

A residential neighborhood located on the south bank of Anahulu Stream will be divided by the bypass highway. Access to the portion of the neighborhood east of the new highway will be available via the Emerson Road Connector, but it will be less direct than the existing Road.

The visual impacts of the new highway will be partially mitigatable, but will still be very apparent. As viewed from a distance, the highway will be an intrusion into the lush green of the sugar cane fields through which it passes, especially in areas of cut and fills. The highway will be visible from the existing Anahulu River bridge, though the dense trees along the banks will provide screening. The greatest visual impact of the highway and bridge will be felt by those living in closest proximity. The presence of a large concrete structure will degrade the quiet pastoral setting of the neighborhood located along the south bank of Anahulu Stream.

Although local merchants may be able to adjust to changing conditions, the diversion of traffic around Haleiwa will initially result in a loss of sales for highway-oriented businesses.

As the population of urban Honolulu continues to grow, weekend visitation of the North Shore recreation areas will also increase. However, this growth will be limited by the capacity of bottlenecks on Kamehameha Highway such as Haleiwa Town. The proposed bypass at Haleiwa will enable traffic to increase up to the capacity of adjoining sections. The result will be that the North Shore will experience a greater volume of traffic and a correspondingly higher use of recreational resources, such as beaches and parks, than would have been possible without the bypass. This impact will be beneficial to Honolulu residents who wish to visit the North Shore, but will be an adverse impact on North Shore residents who prefer uncrowded conditions.

Construction of the highway will create noise, fugitive dust, silt, and exhaust emissions. Excess siltation from construction near streams may result if intense rainfall occurs prior to stabilization.

Vegetation within the right of way will be removed. No native vegetation will be affected.

Runoff waters from the highway surface will contain pollutants which will contribute slightly to degradation of downstream water quality.

E. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The use of agricultural land for the Kamehameha Highway Realignment will provide transportation benefits, but will also terminate the use of that land for agricultural production. This land will be removed from the stock of agricultural lands which future generations have available to them. While immediate transportation benefits will have been gained, the long-term agricultural production on this land will be foregone. In addition to the 50.6 acres of right-of-way needed, approximately 16 acres of remnant agricultural land will no longer be used to produce sugar cane.

F. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The construction of the Kamehameha Highway Realignment at Haleiwa will require the commitment of materials, manpower, energy resources, and public funds. None of the construction materials used for the bypass road will be recoverable. Public funds and labor, once expended, are irretrievable. None of these resources, with the exception of public funds, are in such short supply that their use for the highway realignment will necessitate a curtailment of their use for other purposes. Public funds are not unlimited, and their expenditure has an opportunity cost represented by the other government projects to which the money could have been devoted. In addition, the opportunity cost of any government expenditure is the lost income of the tax payers who are paying for the project. However, as the Hawaii State Department of Transportation allocates funds on a priority basis, highway projects which will be denied funding are those which are of less importance than the Kamehameha Highway Realignment.

Agricultural land is another resource which will be committed to the highway project. Though the removal of land from agricultural use is theoretically not an irretrievable commitment, it is in practice. The principal difference between marginal and important agricultural lands is the cost of cultivation. Lands once used for highways could, at a high cost, be restored to agricultural use. However, the additional costs of restoring the land, above and beyond the normal costs of cultivation, make it unlikely that it would occur. Therefore, land devoted to highway should be considered an irretrievable commitment. Sugar cane cultivation will be abandoned on remnant agricultural lands due to increased agricultural production costs. For the same reasons as outlined above, the creation of remnant cane land should be considered a permanent commitment of agricultural resources.

G. GOVERNMENTAL POLICIES WHICH OFFSET ADVERSE ENVIRONMENTAL EFFECTS

Federal legislation and policies designed to protect the environment have been followed throughout the planning of this project. These include the National Environmental Policy Act, the Endangered Species Act, the Federal Water Pollution Control Act, Executive Order 11990 (Protection of Wetlands), Executive Order 11988 (Floodplain Management), and the Historic Preservation Act.

Major State environmental policies include Hawaii Revised Statutes Chapter 343 (EIS), and Public Health Regulations Chapters 37A (Water Pollution), 37B (Erosion Control), 42 and 43 (Air Quality), and 44B (Community Noise). These set guidelines and standards, of which contractors are held responsible, for the mitigation of environmental impacts. In addition, the State participates in the National Coastal Zone Management (CZM) Program through the Hawaii Coastal Zone Management Act of 1977 (Chapter 205A, HRS). This act is administered by the Department of Planning and Economic Development, which has established objectives and policies in seven categories: recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards and managing development. Following is a summary of the project's consistency with the pertinent CZM objectives and policies in each of these categories.

1. Recreational Resources. The project will not reduce or degrade any coastal recreational opportunities. By greatly relieving traffic congestion in front of Haleiwa Beach Park, access to this park will be improved, and existing noise and air quality impacts will be reduced.

2. Historic Resources. The historic and cultural resources in the immediate project area have been identified, and the determination has been made by the State Historic Preservation Officer (page V-3) that the preferred route (Alternate C) will not adversely affect these resources.

3. Scenic and Open Space Resources. The proposed bypass will remove some agricultural open space and will be visible from the existing highway at several points in Haleiwa, including the Anahulu River Bridge. However, the view of the coastline from the new highway will be greatly improved.

4. Coastal Ecosystems. The proposed project will affect three streams at or near the upper tidal limit, and will cross the outlet of Ukoa Marsh. Construction of the stream crossings will temporarily increase silt levels, but no permanent barriers to fish movement will be created. The U.S. Fish and Wildlife Service has concluded that Alternate C will have no unacceptable adverse effect on endangered waterbirds utilizing Ukoa Marsh (page V-4).

5. Economic Uses. The proposed project will have no effect on economic uses of the coastline.

6. Coastal Hazards. The proposed project lies outside of the Coastal High Hazard Zone as delineated on the official Flood Insurance Rate Maps (Figure 17). The stream crossings will be designed so that the new structures do not result in any adverse increase in the regulatory flood elevations. The project is in conformance with the City and County of Honolulu flood hazard ordinance.

7. Managing Development. Full opportunity has been provided for agency and public participation in the planning and development of this project to insure coordination of regulatory goals.

REFERENCES CHAPTER IV.

(1) Horwood, E.M., and Boyce, R.R., 1959. Studies of the Central Business District and Urban Freeway Development. University of Washington Press, Seattle.

(2) Michigan State University, 1961 Economic and Social Effects of Highway Improvements. Highway Traffic Center.

(3) U.S. Department of Transportation, Federal Highway Administration, 1974. Social and Economic Effects of Highways.

(4) Horwood, et. al, 1959. Op. cit.

(5) David A. Crane and Partners, 1975. The No-Build Alternative. National Cooperative Highway Research Program, Transportation Research Board, National Research Council.

(6) Lavine, J.J., T.J. Butler, and A.H. Meyburg, 1979. Energy Analysis Manual For Environmental Benefit/Cost Analysis of Transportation Actions (2 Volumes). National Cooperative Highway Research Program, Transportation Research Board, National Research Council. Project 20-11B.

(7) U.S. Environmental Protection Agency, 1977. Supplementary Guidelines for Lead Implementation Plans (Draft). Office of Air and Waste Management, Office of Air Quality Planning and Standards.

(8) Lavine, M.J. , et.al., 1979. Op. Cit.

(9) Parsons Brinkerhoff Quade & Douglas, Inc., 1977. Final Supplement to the Interstate Route H-3 Environmental Impact Statement, Appendix E "Energy Impact Analysis". Federal Highway Administration and State of Hawaii Department of Transportation.

(10) California Department of Transportation, 1978. Energy and Transportation Systems.

(11) State of Hawaii Department of Planning and Economic Development, 1978. Energy Use in Hawaii (Revised). State Energy Office.

(12) State of Hawaii Department of Planning and Economic Development, 1980. State Energy Plan.

(13) Tudor Engineering Company, 1976. Petroleum Demand and Facilities. U.S. Army Corps of Engineers, Pacific Ocean Division.

CHAPTER V. PROJECT APPROVALS AND CLEARANCES REQUIRED

The proposed highway improvements require the following clearances and permits:

	Obtained Refer to Page:
1. Clearance from the Department of Land and Natural Resources.	V-2
2. Clearance from the State Historic Preservation Officer that the project would have no adverse impacts on features of historical or archaeological significance.	V-3
3. Clearance from the U.S. Fish and Wildlife Service that the project would have no unacceptable adverse effect on endangered waterbirds.	V-5
4. Finding of "only practicable alternative" pursuant to Executive Order 11988, Floodplain Management.	V-10
5. Wetlands finding in accordance with Executive Order 11990.	V-12
6. Clearance from City and County Department of Land Utilization for structures in Flood Hazard District. (Pending completion of construction plans.)	V-16
7. Special Management Area permit (under the Coastal Zone Management Act) from the City and County of Honolulu, Department of Land Utilization. (Pending completion of construction plans,)	
8. Permits from the U.S. Army Corps of Engineers for the four stream crossings. (Pending completion of construction plans.)	
9. Bridge permit from the U.S. Coast Guard for the construction of the Anahulu River Bridge, since it is over navigable tidewaters. (Pending completion of construction plans.)	
10. Grading permit from City and County of Honolulu, Department of Public Works. (Pending completion of construction plans.)	

TO: Department of Transportation

FROM: Department of Land and Natural Resources

CLEARANCE FORM

COORDINATION OF HIGHWAY PROJECTS WITH LAND AND NATURAL RESOURCES INTERESTS

This is to certify that Project Kamehameha Highway Realignment, Project No. F-083-1(15), has been reviewed by this Department and insofar as economically practicable, has been coordinated in terms of land and natural resources interests in accordance with Section 109, Title 23, United States Code.

for Chairman and Member
Board of Land and Natural Resources
Department of Land Natural Resources

June 18, 1979
Date

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

April 23, 1980

The Honorable Ryokichi Higashionna
Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

Subject: Kamehameha Highway Realignment
Haleiwa Bypass Reconnaissance Survey
TMK 6-2-02:3, 4, 5, 6, 7, 12
6-2-04:18, 19, 20

In response to your letter of April 7, 1980, requesting our review of the Chiniago Inc. reconnaissance (REV March 1979) of the Kamehameha Highway Realignment, the following is offered:

It appears from the revised reconnaissance report that four sites were located within the study area boundary: Site 1439, 1440, 1441, and 1443. Of these, only Site 1441 appears to be potentially threatened by the proposed development, and then only if alternate B or alternate D were to be chosen for the highway alignment.

If either alternate Alignment B or Alignment D are chosen for development, it will be necessary for the Department of Transportation to initiate the National Register Eligibility Determination Process (36 CFR 63) for Site 1441 in consultation with the Historic Preservation Officer as the second step of conformance with 36 CFR 800.

It is our understanding that the realignment design furnished us and included in the reconnaissance are of a preliminary nature and do not necessarily reflect actual areas of impact. We therefore request that when you finalize your design for this proposed development that you transmit these final plans to this office for our review and comment.

For your information, the contractor has contacted Patricia Beggerly of our staff and has:

1. Transmitted the artifactual data to the Historic Preservation Office.

2. Included vertical and horizontal information for Sites 1439, 1440, 1441.

3. Prepared National Register documentation sites for 1439, 1440, 1441.

4. Included photographs for excavations within Site 1439.

5. Delivered the materials generated by the research to the Historic Preservation Office, Division of State Parks.

6. Included Figure 5 on draft report as Figure 6 in the revised report.

It might be noted that on both reports, the date of 1979 should be changed to 1980.

If further information is needed, please have your staff contact Patricia Beggerly at 548-7460.

Sincerely yours,

Susumu Ono
Chairman of the Board and
State Historic Preservation
Officer

United States Department of the Interior

FISH AND WILDLIFE SERVICE
LLOYD 500 BUILDING, SUITE 1692
500 N.E. MULTNOMAH STREET
PORTLAND, OREGON 97232

May 23, 1980

In reply refer to:
AFA-SE, #1-2-80-F-3

Mr. Ralph T. Segawa
Division Administrator
Federal Highway Administration
Box 5206
Honolulu, Hawaii 96850

Dear Mr. Segawa;

This responds to your February 22, 1980, request for consultation under Section 7 of the Endangered Species Act of 1973, as amended, on your Project F-083-1(5), Kamehameha Highway Realignment, Weed Junction to the Haleiwa Beach Park, a construction project. At issue are the possible impacts the project may have on the endangered 'alae ke'o ke'o (Hawaiian coot), Fulica americana alai; ae'o (Hawaiian stilt), Himantopus mexicanus knudseni; koloa (Hawaiian duck), Anas wyvilliana; and 'alae 'ula (Hawaiian gallinule), Gallinula chloropus sandvicensis. This represents the biological opinion of the U.S. Fish and Wildlife Service in accordance with Section 7 "Interagency Cooperation Regulations" (Federal Register Vol. 43, No. 2, January 4, 1970), on three alternative route alignments for this project. We reviewed the biological information that you provided along with other pertinent information in our files. In addition, the following individuals were contacted:

Mr. Ronald Walker, Leader, Hawaiian Waterbirds Recovery Team;
Mr. Tim Burr, Hawaii Division of Fish & Game (Non-game biologist);
Mr. Eugene Kridler, U.S. Fish & Wildlife Service (Retired); and
Mr. David Woodside, Hawaii Division of Fish & Game (Retired non-game biologist).

Copies of pertinent documents and documentation of personal communications are contained in an administrative record maintained by the Pacific Islands Area Office of Endangered Species.

Species Account

The 'alae ke'o ke'o, ae'o, and koloa have been observed adjacent to the route alignment project in Ukoa Marsh. Only a small resident population of the 'alae ke'o ke'o is present in this marsh due to the minimal availability of the open water habitat that this species prefers. Ae'o have been observed in this area, particularly when portions of the marsh used as pastures are flooded. Koloa have been seen at Ukoa Marsh and the Haleiwa Wetlands. They are believed to have dispersed from Hawaii Fish and Game releases at Waimea Falls Park. The koloa are not thought to be permanent residents of Ukoa Marsh. Use of Ukoa Marsh by these three species is marginal. At the present time it does not have the quantity and quality of habitat required to sustain these species. It should be noted that the Hawaiian Waterbirds Recovery Team recommended that Ukoa Marsh be acquired and managed as a refuge in cognizance of its inherent value to these species, and that it is undergoing agency review for its consideration to be designated as critical habitat for Hawaiian waterbirds.

Ukoa Marsh is of greatest value to the 'alae 'ula; consequently, the possible impacts of the project on this species will be discussed in detail. The 'alae 'ula is presently known to occur only on the islands of Kauai and Oahu. Historically it was reported in the late 1880'a as common throughout Hawaii, Oahu, Maui, and Kauai. Its decline was particularly noted in the late 1940's when it was reported that its status was precarious on Maui, Molokai, and Hawaii. Although this species was observed on Molokai as recently as 1971, it is believed to be absent from all of its former range except for Kauai and Oahu. The 'alae 'ula is probably the rarest of the endangered Hawaiian waterbirds.

Recent surveys of Ukoa Marsh indicate a resident population of between 18-30 'alae 'ula. Although no evidence of successful nesting has been recorded from this area since 1965, it is believed that this species utilizes bulrushes for nesting and the floating aquatic vegetation for feeding. Since this species is considered the rarest of the waterbirds, any adverse impacts to important nesting and feeding habitats could seriously affect the precarious status of this species. In this regard, it should be noted that the Hawaiian Waterbirds Recovery Team identified protection and acquisition of Ukoa Marsh as the fourth priority item, up from its former eleventh position.

Analysis of Impacts

Three alternative route realignments for Kamehameha Highway are described in the project document furnished by your agency. We believe that Alternate D should be eliminated from consideration due to its greater potential for adversely impacting Ukoa Marsh by crossing over a wider portion of the outlet channel, and by being closer to the marsh proper than the other alternative routes. In addition, this alignment will result in the elimination of several lotus and taro ponds in the Haleiwa Wetlands. The lotus ponds of these wetlands have been identified as being important feeding and nesting areas for the 'alae 'ula. Consequently, such habitat losses may adversely impact this species.

All three alternative routes would result in greater visibility of Ukoa Marsh from the elevated bridge which would cross over the marsh outlet into Loko Ea pond. This may result in increased human disturbance due to a greater awareness of the pond. No greater accessibility is attributed to the route alignment since the marsh is presently readily accessible from many points, as indicated by the presence of fishermen and ornithologists. Control of this disturbance would best be addressed through establishment of a wildlife refuge at Ukoa Marsh, with appropriate management regulations.

Of major concern are the temporary fill and culverts that may be required for construction of the elevated bridge over the marsh outlet. We commend the design engineers for this project in selecting a route that crosses the outlet at its narrowest point and in using a single span bridge construction on piers (instead of fill) on both sides of the outlet channel. These design considerations intended to prevent constriction of the outlet channel so that the present existing flow characteristics will not be altered indicate your agency's commitment to promote conservation of endangered species as provided in Section 7(a)(1) of the Act.

It should be noted that the 'alae 'ula nests throughout the year, with a primary nesting period extending from March through September. It is imperative that construction activities do not result in increasing the water level of the marsh during this critical period. Removal of vegetation, mostly California grass (Brachiaria mutica) and the bulrushes (Scirpus californicus and S. validus) should be kept to a minimum. Although eventual creation of open water may be beneficial to the ke'o ke'o, it may adversely affect the 'alae 'ula. Upon completion of the bridge, the temporary crossing must be removed in such a manner that none of this material would add to the siltation problem at Ukoa Marsh.

Biological Opinion

In summary, it is the biological opinion of the U.S. Fish and Wildlife Service that only alternative routes A and C of Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, should be considered, and that selection of either route is not likely to jeopardize the continued existence of the listed species discussed in this opinion. Construction of alternative route D is likely to jeopardize the continued existence of the 'alae 'ula, but is not likely to jeopardize the continued existence of the 'alae ke'o ke'o, ae'o, and koloa.

The 1978 amendments to the Endangered Species Act require this Service to provide "reasonable and prudent alternatives' when a Biological Opinion indicates jeopardy to a listed species. "Reasonable and prudent alternatives" refer to alternative courses of action open to the Federal agency with respect to an activity or program that are technically capable of being implemented and consistent with the intended primary purpose of the activity. We believe it is unnecessary to provide any alternative to avoid jeopardy because alternative routes A and C fulfill the requirement of reasonable and prudent alternatives.

The Federal Highway Administration is reminded of its continuing responsibility to review its activities and programs in light of Section 7 and to reinitiate this consultation if new information becomes available which identifies that the Kamehameha Highway Realignment between Weed Junction and Haleiwa Beach Park may affect listed species, the action as described here is modified, or a new species or new critical habitat area is listed that may be affected by the proposed action.

Sincerely yours,

R. Kahler Martinson
Regional Director

REFERENCES

Burr, Tim. April 28, 1980. Telcon and meeting to discuss impacts of highway realignment on Ukoa Marsh and 'alae 'ula.

Federal Highway Administration (no date). Biological Assessment for the Haleiwa Bypass. Project Description for F-083-1(5).

Kridler, Eugene. April 16, 1980. Discussion regarding highway realignment between Weed Junction and Haleiwa Beach Park, on Ukoa Marsh and 'alae 'ula.

Proby, Fred (no date). Informal meeting regarding Haleiwa Road Realignment.

U.S. Army, Engineer District, Honolulu. 1977. An ornithological Survey of Hawaiian Wetlands. Contract DACW 84-77-0-0036, Robert J. Shallenberger, Principal Investigator, December, 1977.

U. S. Fish and Wildlife Service. June 19, 1978. Hawaiian Waterbirds Recovery Plan.

Walker, Ronald. April 28, 1980. Discussion regarding up-grading of priority for acquisition of Ukoa Marsh and critical habitat designation for that area.

Woodside, David. April 25, 1980. Telcon regarding highway realignment between Weed Junction and Haleiwa Beach Park on Ukoa Marsh and 'alae 'ula.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION NINE, HAWAII DIVISION

Only Practicable Alternative Finding
Pursuant to Executive Order 11988 Floodplain Management
for
Kamehameha Highway Realignment (FAP 83, Oahu, Hawaii)
Project Number F-083-1(5)

A. Reasons for Locating the Proposed Action in the Floodplain

The need for a Bypass around the town of Haleiwa has been thoroughly established. The present congestion on the highway through town causes long delays during weekend traffic and hampers the movement of emergency vehicles. Furthermore, the community has consistently supported the concept of a bypass.

The topography of the project area is that of a typical coastal plan, bissected by three streams; Helemano, Opaeula and Anahulu. To bypass Haleiwa, it is necessary to cross this coastal plain, which is impossible to do without crossing the three streams.

B. Alternatives Considered

There are no alternatives to crossing the three streams in the project area. However, several alternative schemes for the stream crossings have been considered. A bridge, which would have required the placement of fill in the floodway, was originally proposed for Helemano Stream. This has been rejected in favor of a viaduct structure, which will have a negligible backwater effect. At the Anahulu River, a viaduct crossing farther upstream (Alternate D) was considered which would have had a negligible backwater effect. However, this route would have crossed through a marsh important to endangered waterbirds, and would have affected several archaeological sites, so it was rejected.

The proposed bridge at the Anahulu River requires the placement of fill in the floodway, causing a backwater effect of approximately 4 inches (0.31 foot) with the 100-year flood flow. Doubling the width of the bridge would reduce the backwater effect to approximately 0.1 foot, but would add $350,000 to the cost of the project. The 100-year flood depths in a rural residential area (7 homes) upstream from the crossing would be 2-4 feet under existing conditions. The additional 4 inches added by the bridge would be insignificant with respect to the total anticipated flood damage under existing conditions.

C. Conformance to Floodplain Protection Standards

The City and County of Honolulu recently adopted an ordinance regulating activities in flood hazard districts as established on the Flood Insurance Rate Maps prepared by the Federal Insurance Administration. This ordinance specifically exempts "street, roadways, off-street parking lots, including private driveways, bridges and walkways" (Section 21-1115(k)) provided that a statement from a registered professional engineer or architect is submitted stating that "to the best available technical knowldge and information, the new structure does not result in any adverse increase in the regulatory flood elevations" (Section 21-1115). A drainage study has been prepared by a registered professional engineer which verifies that the proposed Anahulu Bridge will increase backwater from the regulatory (100-year) flood by approximately 4 inches, which is not considered to be an adverse increase in flood elevation. Similarly, the study concludes that the Helemano and Opaeula Stream crossings will have a negligible effect on flood elevations. The proposed project is therefore consistent with the applicable floodplain protection standards.

MAR 25 1981
Date

for Division Administrator
Federal Highway Administration

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAYS ADMINISTRATION
REGION NINE, HAWAII DIVISION

Executive Order 11990
Wetlands Finding

KAMEHAMEHA HIGHWAY REALIGNMENT

HALEIWA BYPASS
FAP Route 83, Oahu, Hawaii
Project Number F-083-1(5)

This statement sets forth the finding that there is no practicable alternative to construction in the wetland at the outlet of Ukoa Marsh, and that the highway proposal includes all practicable measures to minimize harm to the wetland which may result from such use. This finding is made in accordance with the requirements of Executive Order 11990 on the Protection of Wetlands, dated May 24, 1977.

DESCRIPTION OF THE PROJECT

The proposed project involves construction of a bypass highway around the inland side of Haleiwa on the Island of Oahu, Hawaii. The new road will begin at the Weed Junction Traffic circle and will rejoin Kamehameha Highway near the Haleiwa Beach Park. The total project length is approximately 2.3 miles. Right-of-way will be acquired for four lanes, but only two lanes will be constructed initially. Expansion to four lanes will depend on traffic demand and improvements to the adjacent highway segments.

DESCRIPTION OF THE WETLAND

Ukoa Pond and its surrounding marsh comprise one of the larger freshwater wetlands on Oahu. The maximum extent of the marsh is approximately 115

acres, including the narrow outlet. The marsh is dominated by a sedge (Cladium leptostachyum), two species of bulrush (Scripus californicus and S. validus), and California grass (Brachiaria mutica). Roughly 10-15 acres in the southeastern portion of the marsh were formerly cultivated in taro and lotus (neither of which remain), and large areas of the southerly and westerly portion are accessible to cattle. As a result of these disturbances, plus irrigation water diversion, the southerly and westerly portions of the marsh are periodically dry (at least to several inches below the soil surface), and "facultative" wetland plants (i.e. not requiring constantly waterlogged soil) are important constituents. Two shrubby species, (Pluchea indica and P. odorata), give these marignal areas a very non-marshy appearance, but the presence of water hyssop (Bacopa monnieria) confirms that the areas are frequently inundated. The outlet of the marsh, where the bypass corridor crosses, is approximately 80 feet wide, and clearly demarcated by coral outcrops forming banks on both sides. The outlet is completely filled with large bulrushes and California grass floating in a tight mat of roots and old stems. The water in the channel is at least several feet deep, with the level being controlled by a dike and weir at the Loko Ea fishpond, near the point where the marsh discharges to the ocean.

WETLANDS AFFECTED

The recommended alignment, Alternate C, will cross the outlet of Ukoa Marsh just below the main body of the marsh. The outlet is 80-100 feet wide at this point, which is the narrowest part of the marsh. The highway will be elevated on piers (instead of fill) on both sides of the channel, and the channel itself will be crossed with a single span. No piers or fill will be permanently placed in the outlet channel, so the existing flow characteristics will not be altered. the bypass is downstream from the main body of the marsh, so it will not cut off any sources of water to the marsh.

ALTERNATIVES CONSIDERED

Do Nothing. If the present traffic situation through Haleiwa is not

changed, congestion will continue to worsen. This will adversely affect air quality and fuel consumption, and will seriously degrade the rural quality of Haleiwa which is highly valued by its residents. There would be no effect on wetlands from this alternative.

Other Alignments. Two other alignments were carefully evaluated. Alternate A would cross Ukoa Marsh at the same point as the recommended alignment, but would have greater landform modification impacts elsewhere. Alternate D would have adversely affected another marsh near the Anahulu River as well as crossing Ukoa Marsh at a wider point than Alternates A or C. It would not be practical to circumvent the marsh, since it would require a much longer roadway, and would place the highway upstream from the marsh. This could affect the marsh's water sources and subject the marsh to roadway pollutants.

Alternative To Do Least Harm To The Wetland. Alternate C, the recommended alignment, will cross Ukoa Marsh at its narrowest point, and will be elevated on piers. This will have the least possible impact on the marsh.

MEASURES TO MINIMIZE HARM

An alignment has been selected which crosses the least amount of wetland possible, and a bridge design has been adopted which will not result in any permanent filling of the wetland. Upon completion of the bridge, all temporary fill material will be removed.

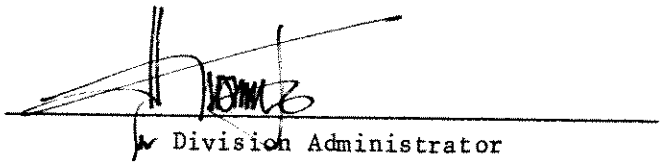
COORDINATION AND PUBLIC INVOLVEMENT

The State Division of Fish and Game and the U.S. Fish and Wildlife Service were consulted prior to the preparation of the Draft EIS, when the alternatives were being developed and evaluated. The USFWS Endangered Species Coordinator has given clearance to the proposed project. Opportunity for early public review was provided at information meetings in the Haleiwa in 1962, 1970, 1979 and 1980.

CONCULSION

The above factors and considerations establish that there is no practicable alternative to construction in the Ukoa Marsh located near Haleiwa, Oahu, Hawaii, and that the highway proposal includes all practical measures to minimize harm to the wetland which may result from such use.

3.25.81
Date



Division Administrator
Federal Highway Administration

DRAINAGE STUDY FOR HALEIWA BYPASS

Log of Contacts

September 29, 1978	Received from Albert Ching Division of Water & Land Development Department of Land & Natural Resources State of Hawaii 1 set Flood Insurance Rate Maps, Proof, effective January 3, 1979 1 copy FIA Flood Insurance Study (Proof), dated July 3, 1978
December 4, 1978	Received copy of letter from Kisuk Cheung, Chief Engineering Division US Army Engineer District to R. Higashionna, Director Department of Transportation State of Hawaii with Preliminary Flood Insurance Rate Map of the general project site
January 22, 1980	Contacted Thomas Ushijima, Chief Flood Plain Management Section Corps of Engineers US Army Engineer Division by phone: 438-2883 in regard to flood insurance studies for Waialua-Haleiwa area
February 4, 1980	Meeting with George Kimura Corps of Engineers US Army Engineer Division Received copies of updated FIA maps: Preliminary Floodway map and Preliminary Flood Insurance Rate map, dated 25 January 1980
March 7, 1980	Meeting with George Kimura, COE to obtain additional information
July 3, 1980	Obtained back-up data from Corps of Engineers for "Frequency-Discharge Drainage Area Curves, Waialua-Haleiwa Streams, Figure 18."
August 13, 1980	Contacted Arthur Muraoka Department of Land Utilization City & County of Honolulu in regard to FIA maps; obtained Ordinance 8062 relating to Flood Hazard Districts

CHAPTER VI. COMMENTS AND COORDINATION

A. COMMENTS ON THE EIS PREPARATION NOTICE

1. U.S. GOVERNMENT

	Response Dated
Advisory Council on Historic Preservation	No Response
Department of Agriculture	
Agricultural Stabilization and Conservation Service	No Response
Soil Conservation Service	3/30/79 *
Department of Defense	
U.S. Army Corps of Engineers	3/28/79
Department of Housing and Urban Development	
Federal Housing Administration	4/5/79 *
Department of the Interior	
Fish and Wildlife Service	No Response
Geological Survey	No Response
Department of Transportation	
Federal Aviation Administration	No Response
U.S. Coast Guard	No Response
Environmental Protection Agency	No Response

2. STATE OF HAWAII

Department of Accounting and General Services	4/12/79
Department of Agriculture	4/11/79
Department of Education	3/21/79
Department of Hawaiian Home Lands	3/15/79 *
Department of Health	3/15/79 *
Department of Land and Natural Resources	4/12/79
Department of Planning and Economic Development	3/16/79 *
Department of Social Services and Housing	4/2/79 *
Office of Environmental Quality Control	3/16/79 *
University of Hawaii, College of Tropical Agriculture	No Response
Environmental Quality Commission	3/14/79

* (Denotes "no comment")

3. CITY AND COUNTY OF HONOLULU

Board of Water Supply	3/29/79
City Council	No Response
Department of Economic Development	No Response
Department of General Planning	3/21/79
Department of Housing and Community Development	3/22/79 *
Department of Land Utilization	3/19/79
Department of Parks and Recreation	4/11/79
Department of Public Works	3/15/79
Department of Transportation Services	4/3/79
Office of the Mayor	No Response
Police Department	3/30/79
Fire Department	3/23/79

4. ORGANIZATIONS

Alliance of North Shore Associations	No Response
American Lung Association	No Response
Belt Collins & Associates	4/12/79
B. P. Bishop Trust Estate	No Response
Castle and Cooke, Inc.	No Response
Festivals Hawaii Association	No Response
Gasco, Inc.	3/20/79 *
Haleiwa Businessman's Association	No Response
Haleiwa Community Association	No Response
Haleiwa Surf Owners Association	No Response
Hawaiian Electric Company	4/3/79
Hawaiian Historical Society	No Response
Hawaiian Telephone Company	4/24/79
Hawaii Sugar Planters Association	No Response
Life of the Land	4/9/79
North Shore Business and Professional Assoc.	4/9/79
North Shore Neighborhood Board No. 27	3/30/79
Shoreline Protection Alliance	No Response
Sierra Club	No Response
Sunset Beach Community Association	No Response
The Outdoor Circle	No Response
Waialua Community Association	3/26/79
Waialua Sugar Company	3/28/79

4648

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DEPT OF TRANS
STATEWIDE TRANS.
PLANNING OFFICE

DIRECTOR'S OFFICE

P. O. Box 50004, Honolulu, HI 96850

APR 3 9 52 AM '79

APR 2 10 19 AM '79

March 30, 1979

DEPT. OF
TRANSPORTATION

Dr. Ryokichi Higashionna
Director, Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Dear Dr. Higashionna:

Subject: Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Project No. F-083-1(5), EIS Preparation Notice

We have reviewed the subject EIS preparation notice. It appears you have acknowledged those items of concern to SCS. We will await the draft EIS review.

Should you need detailed evaluations of prime agricultural areas, soil evaluations, etc., please contact:

Mr. Otis M. Gryde, District Conservationist
Honolulu Field Office
Soil Conservation Service
Rm. C130, Prince Kuhio Federal Building
Honolulu, HI 96850
Phone: 546-8326

VI-3

Thank you for the opportunity to review this document.

Sincerely,

Jack P. Kanalz
State Conservationist

cc: O. M. Gryde

4640

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858

DEPT OF TRANS
STATEWIDE TRANS.
PLANNING OFFICE

DIRECTOR'S OFFICE

APR 2 10 01 AM '79

MAR 30 3 11 PM '79

DEPT. OF
TRANSPORTATION

PODED-PV

28 March 1979

Dr. R. Higashionna, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, HI 96813

Dear Dr. Higashionna:

We have reviewed the Environmental Impact Statement (EIS) Preparation Notice for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Project No. F-083-1(5) which was forwarded to our office on 12 March 1979. The proposed project does not affect any US Army Corps of Engineers projects in the Haleiwa District.

We note that portions of the proposed realignment corridor pass through the 100-year riverine flood areas for Anahulu, Opaeula, and Helemano Streams and the 100-year tsunami zone as defined by the preliminary Flood Insurance Rate Maps prepared by the US Department of Housing and Urban Development, Federal Insurance Administration (FIA). A revised map illustrating the proposed highway corridor superimposed over these floodprone areas is provided (Incl 1) to supplement our previous letter of 28 November 1978. Riverine flood elevations within the corridor vary between 10 and 20 feet above Mean Sea Level (MSL). The approximate tsunami elevation at the northern end of the corridor is 13 to 15 feet above MSL. Project planning for the stream crossings should include measures to protect the bridge abutments from flood damage, measures to prevent the aggravation of flood hazards, and damages or losses to adjacent lands and structures by construction of the bridge. These considerations should be reflected in the Draft Environmental Impact Statement (DEIS).

A Department of the Army (DA) permit may be required for the stream crossings and the crossing over the outlet of Ukoa Pond marsh pursuant to Section 404 of the Clean Water Act of 1977. As the EIS Preparation Notice does not provide specific bridge (or alternate crossing) details, we request that plans and design drawings be submitted for our review as soon as possible so that we may determine the need for a DA permit.

PODED-PV 28 March 1979
Dr. R. Higashionna

In addition, information which identifies the work to be performed in the streams, the type and quantity of fill to be used, the source of the fill material, the presence or absence of toxic materials in the fill (in accordance with EPA regulations 40 CFR 230.4), the erosion controls to be implemented to prevent any fill from being washed into the stream or adjacent wetland, and the measures being taken to prevent the disruption of the natural migratory movements of indigenous aquatic fauna in the streams, should be provided.

The DEIS should also contain a biological and physicochemical description of the affected stream environments. The Ukoa Pond marsh serves an important biological function as habitat for significant populations of the endangered Hawaiian gallinule (Gallinula chloropus sandvicensis). Any reduction of suitable marsh habitat or change in the natural hydraulics of the marsh as a result of the proposed highway crossing may have significant adverse impacts on these waterbirds. We therefore urge that filling portions of the marsh be avoided. We further recommend that the DEIS contain sufficient information on the need to locate the proposed highway realignment in the wetland, and data on the basis of which the availability of feasible alternative sites can be evaluated.

VT-4

Inclosed for your information and use are portions of the report entitled "Wetlands and Wetland Vegetation of Hawaii" prepared by M. E. Elliott and E. M. Hall, 1977, for the US Army Corps of Engineers (Incl 2) and of the report "An Ornithological Survey of Hawaiian Island Wetlands" prepared by Ahuimanu Productions, 1977, for the US Army Corps of Engineers (Incl 3) which concern the Ukoa Pond wetland and use of the area by endangered Hawaiian waterbirds.

We appreciate the opportunity to respond to the EIS preparation notice and look forward to receipt of the DEIS.

Sincerely yours,

B. R. Schlapak

B. R. SCHLAPAK
Lt Col, Corps of Engineers
Deputy District Engineer

3 Incl
As stated

GEORGE R. ARIYOSHI
GOVERNOR

RYOKICHI HIGASHIONNA, PH D
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
JAMES R. CARRAS

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

IN REPLY REFER TO:
LT-PA
2.51089

May 31, 1979

Mr. Kisuk Cheung, Chief
Engineering Division
Department of the Army
U.S. Army Engineer District,
Honolulu
Building 230
Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

Subject: EIS Preparation Notice for the
Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park

Thank you for your letter of March 28, 1979. We are aware of the Department of the Army Permit requirements and will submit an application at the appropriate time.

We appreciate the information provided in your enclosures. The Draft EIS will include information regarding impacts of the proposed project on floods, wetlands, and the aquatic life found in the project area.

Very truly yours,

James R. Carras

cc Ryokichi Higashionna

4712

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
AREA OFFICE
300 ALA MOANA BLVD., RM. 3318, P.O. BOX 50026
HONOLULU, HAWAII 96850

REGION IX
450 Golden Gate Avenue
P.O. Box 36003
San Francisco, California 94102

DEPT. OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE

April 5, 1979

APR 9 10 22 AM '79

IN REPLY REFER TO:
9.1SS (Johnson/546-5554)

Mr. Ryokichi Higashionna, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

APR 6 2 42 PM '79
DEPT. OF TRANSPORTATION
DIRECTOR'S OFFICE

Dear Mr. Higashionna:

Subject: Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Project No. F-083-1(5), Environmental Impact Statement Preparation Notice

We have no comments to make at this time on the environmental issues identified in the Environmental Impact Statement Notice of Preparation for Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Project No. F-083-1(5).

We look forward to reviewing the Draft EIS.

Sincerely,

Alvin K. H. Pang
Area Manager

VI-5

4806

GEORGE R. ARIYOSHI
GOVERNOR

HIDEO MURAKAMI
COMPTROLLER

MIKE N. TOKUNAGA
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 119, HONOLULU, HAWAII 96810

DEPT. OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE

APR 20 9 44 AM '79

APR 16 1 35 PM '79

LETTER NO. (P)1337.9

APR 12 1979

Honorable Ryokichi Higashionna
Director
Department of Transportation
State of Hawaii
Honolulu, Hawaii

Dear Mr. Higashionna:

Subject: Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park
Project No. F-083-1(5)
Environmental Impact Statement
Preparation Notice

This is in response to your letter No. LT-PA 2.49735 dated March 12, 1979. We have reviewed the subject notice and have determined that the subject project will have some effect on our Waialua-Haleiwa Civic Center site selection study. However, we feel that the effects will be beneficial rather than adverse, providing the civic center planning can be coordinated with the subject project.

Preliminary studies on the civic center site selection area assumes that it would fall along Kamehameha Highway between Weed Circle and Anahulu Stream bridge. Thus, our comments will be based on this preliminary assumption as follows:

1. Accessibility

The civic center will attract clientele from the North Shore and Mokuleia areas. In order for these people to have convenient access to the civic center utilizing the by-pass road, the civic center, if possible, should be located close to the connector road with the Haleiwa town. Thus, it will be important to know the location of the connector road(s) before we evaluate the alternative sites for the civic center.

2. Adverse Effects from Adjacent Activities

The civic center may be adversely affected by a cane haul road that generates noise, exhaust fumes, dust and vibration. Thus, it will be important to know what cane haul roads, if any, will be realigned.

3. Population Distribution

The optimum location of the civic center is largely dependent upon the distribution of the population within the service area. As such, it would benefit us if we know the by-pass roads' impact on the population pattern, if any.

4. Traffic Congestion

In our EIS Preparation Notice for the proposed Waialua-Haleiwa Civic Center, we had identified as a major impact the potential traffic congestion around the civic center frontage. With this by-pass road, traffic will not be a major impact. This is an example of a beneficial impact to our facility.

We would appreciate it if we could be made consulted parties for the subject project. If you have any questions, please call the Public Works Division at 548-5460.

Very truly yours,

HIDEO MURAKAMI
State Comptroller

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

IN REPLY REFER TO
LT-PA
2.51012

May 18, 1979

The Honorable Hideo Murakami
Director
Department of Accounting and
General Services
P.O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Murakami:

Subject: EIS Preparation Notice for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

Thank you for your letter of April 12, 1979. We appreciate your support of the proposed project.

We have not yet determined which streets will serve as connectors to Haleiwa town, since several different alignments are being studied.

It appears that the cane haul road which now parallels Haleiwa Town will be realigned mauka of the bypass road. The EIS will discuss the potential effects of the project on population distribution.

Very truly yours,

James R Carras
for Ryokichi Higashionna

4768

GEORGE R. ARIYOSHI
GOVERNOR

JOHN FARIAS, JR.
CHAIRMAN, BOARD OF AGRICULTURE

YUKIO KITAGAWA
DEPUTY TO THE CHAIRMAN

DIRECTOR'S OFFICE

APR 12 3 52 PM '79

BOARD MEMBERS

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MAUI MEMBER

WILLIAM Y. THOMPSON
EX OFFICIO MEMBER

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
1428 SO. KING STREET
HONOLULU, HAWAII 96814

DEPT. OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE
APR 17 11 14 AM '79

April 11, 1979

MEMORANDUM

To: Honorable Ryokichi Higashionna, Director
State Department of Transportation

Subject: Kamehameha Highway Realignment,
Weed Junction to Haleiwa Beach Park,
Project No. F-083-1(5),
EIS Preparation Notice

The Department of Agriculture has reviewed the subject Preparation Notice and offers comments as follows.

We are pleased to see that impacts upon prime agricultural lands, sugar lands, and taro lands will be considered in the EIS.

Additionally, we ask that the EIS address the potential impact of increased urbanization, after completion of the realignment, between the existing Kamehameha Highway and the new realigned highway. Our concern is that not only the acreage actually used for the highway will be lost to agricultural use, but the agricultural lands between the new and old routes will also be subject to loss. A prime example of such loss is the agricultural land between Kamehameha Highway and H-2.

Thank you for the opportunity to comment.

JOHN FARIAS, JR.
Chairman, Board of Agriculture

VI-7

GEORGE R. ARIYOSHI
GOVERNOR

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

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES G. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO:
LT-PA
2.51011

May 18, 1979

The Honorable John Farias, Jr.
Chairman
Board of Agriculture
1428 South King Street
Honolulu, Hawaii 96814

Dear Mr. Farias:

Subject: EIS Preparation Notice for the
Kamehameha Highway Realignment,
Weed Junction to Haleiwa Beach Park
Reference: Your memorandum dated
April 11, 1979

Your concerns with regard to the impact of increased urbanization and to remnant agricultural lands will be considered and addressed in our Environmental Impact Statement. Thank you for your continued cooperation.

Very truly yours,

James R. Carras

for Ryokichi Higashionna

GEORGE R. ARIYOSHI
GOVERNOR

CHARLES G. CLARK
SUPERINTENDENT

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

DIRECTOR'S OFFICE
MAR 28 2 57 PM '79
DEPT. OF TRANSPORTATION

March 21, 1979

DEPT. OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE
MAR 29 2 52 PM '79

MEMO TO: Hon. Ryokichi Higashionna, Director
Department of Transportation

F R O M: Charles G. Clark, Superintendent
Office of the Superintendent

SUBJECT: Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park
Project No. F-083-1(5)
Ref. LT-PA, 2.49735

VI-8

We have reviewed the Preparation Notice for the subject EIS and concur with the following comment.

The reduction in traffic volume flow through Haleiwa will benefit the movement of our school buses transporting students from Kawailoa and Haleiwa town to Haleiwa Elementary, Waialua Elementary and Waialua High-Intermediate Schools. The point about the narrow bridge over Anahulu River being hazardous for truck and bus traffic is well taken.

Thank you for the opportunity to review and comment on the project.

CGC:HE:th

cc Mr. Hubert Minn
Central Oahu District

RECEIVED
MAR 30 9 21 AM '79
FACILITY PLANNING BRANCH

RECEIVED
MAR 29 9 05 AM '79
PLANNING DIVISION

GEORGE R. ARIYOSHI
GOVERNOR

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

RYOKICHI HIGASHIONNA, PH.D
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES D. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO:

LT-PA
2.51088

May 24, 1979

The Honorable Charles G. Clark
Superintendent
Department of Education
Liliuokalani Building
1390 Miller Street
Honolulu, Hawaii 96813

Dear Mr. Clark:

Subject: EIS Preparation Notice for the
Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park

Thank you for your memormorandum dated March 21, 1979, regarding informaton on school bus service. Providing a safer highway with less congestion is our primary objective.

Very truly yours,

James R. Carras
for Ryokichi Higashionna

4494

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

PROJECT OFFICES

WAIMEA OFFICE
P. O. BOX 125
KAMUELA, HAWAII 96743

KEAUKAHA OFFICE
P. O. BOX 833
HILO, HAWAII 96720

PROJECT OFFICES

MAUI OFFICE
P. O. BOX 22
KAHULUI, MAUI 96732

MOLOKAI OFFICE
P. O. BOX 198
HOOLEHUA, MOLOKAI 96729

KAUAI OFFICE
P. O. BOX 332
LIHUE, KAUAI 96766

DEPT. OF TRANS.
STATEWIDE TRANS. PLANNING OFFICE
MAR 19 10 21 AM '79

DIRECTOR'S OFFICE
MAR 16 2 17 PM '79

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1879
HONOLULU, HAWAII 96805

DEPT. OF TRANSPORTATION

March 15, 1979

LAND UTILIZATION DIVISION
FACILITIES PLANNING BRANCH
MAR 20 3 01 PM '79

Mr. Ryokichi Higashionna,
Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Higashionna:

SUBJECT: Kamehameha Highway Realignment,
Weed Junction to Haleiwa Beach

Reference is made to your letter LT-PA 2.49735, dated March 12, 1979, relative to the subject project.

Because it does not affect our lands, the Department of Hawaiian Home Lands has no comments. Thank you for the opportunity to comment.

LT-9

Sincerely yours,

Georgiana K. Padeken
Chairman

KB GW:kt

4496

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

DEPT. OF TRANS.
STATEWIDE TRANS. PLANNING OFFICE
MAR 19 10 20 AM '79

DIRECTOR'S OFFICE
MAR 16 3 09 PM '79

GEORGE A. L. YUEN
DIRECTOR OF HEALTH

Audrey W. Mertz, M.D., M.P.H.
Deputy Director of Health

Henry N. Thompson, M.A.
Deputy Director of Health

James S. Kumagai, Ph.D., P.E.
Deputy Director of Health

In reply, please refer to
File EPHS - SS

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

DEPT. OF TRANSPORTATION

March 15, 1979

LAND UTILIZATION DIVISION
FACILITIES PLANNING BRANCH
MAR 20 3 01 PM '79

Mr. Ryokichi Higashionna
Department of Transportation
869 Punchbowl St.
Honolulu, Hawaii 96813

Dear Mr. Higashionna:

Subject: Request for Comments on Proposed Environmental Impact Statement (EIS) for Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Project No. F-083-1(5)

Thank you for allowing us to review and comment on the subject proposed EIS. Please be informed that we have no comments or objections to this project at this time.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

Sincerely,

for JAMES S. KUMAGAI, Ph.D.
Deputy Director for
Environmental Health

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

DEPT. OF TRANS.
STATE OF HAWAII
PLANNING OFFICE
APR 20 1979

APO
4809

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES
EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN
DIVISIONS:
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

APR 17 1 51

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

April 12, 1979

REF NO.: APO-347
YOUR: LT-PA 2,49735

Honorable Ryokichi Higashionna
Director of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Sir:

We have reviewed the EIS preparation notice for the Kam Highway realignment between Weed Junction and Haleiwa Beach Park.

No registered historic sites are known to be located within the alignment study corridor because no archaeological survey has been conducted there. While agricultural development has been extensive in the southern section of the corridor, it is strongly recommended that a reconnaissance survey be conducted over ungraded, uncultivated rock outcrops which are located within the agricultural fields. It is also strongly recommended that a reconnaissance survey which includes selective test pitting be conducted in the northern section of the corridor for the area in and adjacent to Ukoa Pond. The results of this survey should then be incorporated into appropriate sections of the EIS and submitted to this office for final comments and review.

VI-10

Our records show there are several existing wells within or near the proposed Kamehameha Highway realignment coorridor. Two of the wells are presently being used for irrigation and one well is a USGS observation well. Hence, in the determination and design of the new alignment, the location of these wells should be considered and not disturbed.

The forthcoming EIS should discuss mitigating measures to alleviate impacts upon water quality, and marine life existing in Helemano, Opaeula, and Anahulu Streams, and in the Waialua Bay areas adjacent to Haleiwa. Additionally, construction methods should be detailed in the EIS along with discussions of the disposal site location(s) for excavated material.

An assessment of the macrofauna in the three major streams would be essential should the proposed construction plans require channel modifications and alterations. It would then be necessary to address the probable adverse impacts of this project upon the fisheries values of the three streams.

Investigations should address the impact of the proposed highway realignment on water-dependent agriculture such as lotus (hasu) in addition to taro which may be used by waterbirds. Alternate alignments outside of the proposed study corridor (mauka of Ukoa Pond) must be fully examined and evaluated from this standpoint as well.

Thank you for this opportunity to comment on your project.

Very truly yours,

Susumu Ono

SUSUMU ONO, Chairman
Board of Land and Natural Resources

GEORGE R. ARIYOSHI
Governor

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

RYOKICHI HIGASHIONNA, PH.D.
Director

Deputy Dirs.
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO
LT-PA
2.51013

May 18, 1979

The Honorable Susumo Ono
Chairman
Board of Land and Natural
Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Subject: EIS Preparation Notice for the
Kamehameha Highway Realignment,
Weed Junction to Haleiwa Beach Park

VI-11

Thank you for your letter of April 12, 1979. As requested, we will conduct an archaeological reconnaissance survey of the project area. This data will be presented in the EIS.

We are aware of the water wells you mention, and are laying out the alternative alignments to avoid them. The EIS will present information on the aquatic life found in the project area, and will evaluate the potential impacts to fish and wildlife. We are also aware of the taro and lotus farming activites in the area, and will be avoiding them.

Very truly yours,

James R. Carras

for Ryokichi Higashionna

4517

GEORGE R. ARIYOSHI
Governor

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

HIDETO KONO
Director

FRANK SKRIVANEK
Deputy Director

Kamamalu Building, 250 South King St., Honolulu, Hawaii • Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

DEPT. OF TRANS.
STATEWIDE TRANS.
PLNG. OFFICE
MAR 21 10 14 AM '79

Ref. No. 8548

March 16, 1979

DIRECTOR'S OFFICE
MAR 20 3 33 PM '79
DEPT. OF TRANSPORTATION

The Honorable Ryokichi Higashionna
Director
Department of Transportation
State of Hawaii
Honolulu, Hawaii

Dear Dr. Higashionna:

Subject: EIS Preparation Notice - Kamehameha Highway
Realignment, Weed Junction to Haleiwa Beach Park,
Project No. F-083-1(5)

We have no comments to offer at this time but would appreciate the opportunity to review the EIS document when prepared.

Sincerely,

HIDETO KONO

RECEIVED
STATE OF HAWAII
DEPT. OF TRANSPORTATION
MAR 22 3 08 PM '79
PLANNING BRANCH

4709

GEORGE R. ARIYOSHI
GOVERNOR

DIRECTOR'S OFFICE
APR 5 12 33 PM '79

FRANKLIN Y. K. SUNN
EXECUTIVE DIRECTOR

WILLIAM A. HALL
ASSISTANT EXEC. DIRECTOR

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY
P. O. BOX 17907
HONOLULU, HAWAII 96817

DEPT. OF TRANSPORTATION

IN REPLY REFER TO:
DEPT. OF TRANS.
STATEWIDE TRANS. PLANNING OFFICE
APR 6 10 42 AM '79

April 2, 1979

MEMORANDUM

TO: Department of Transportation

FROM: Franklin Y. K. Sunn, Executive Director

SUBJECT: Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Project No. F-083-1(5), Environmental Impact Statement Preparation Notice

The Hawaii Housing Authority has reviewed the subject Environmental Impact Statement and has no comments to offer.

Thank you for allowing us the opportunity to review the E.I.S.

Executive Director

APR 10 9 08 AM '79

VI-12

GEORGE R. ARIYOSHI
GOVERNOR

DIRECTOR'S OFFICE
MAR 19 12 42 PM '79

RICHARD L. O'CONNELL
DIRECTOR

TELEPHONE NO.
548-6915

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
OFFICE OF THE GOVERNOR
550 HALEKAUWILA ST
ROOM 301
HONOLULU, HAWAII 96813

DEPT OF TRANSPORTATION

March 16, 1979

MAR 20 9 00 AM '79

MEMORANDUM

TO: Ryokichi Higashionna, Director
Department of Transportation

FROM: for Richard L. O'Connell, Director
Office of Environmental Quality Control

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE FOR KAMEHAMEHA HIGHWAY REALIGNMENT, WEED JUNCTION TO HALEIWA BEACH PARK, OAHU

We appreciate the opportunity to participate in the environmental consultation process for the subject project. Unfortunately, we are not always available to accommodate every request for consultation we receive. We will, however, plan to participate in the review of the EIS when it is officially filed with the Environmental Quality Commission for public review.

MAR 20 9 00 AM '79

4491

GEORGE R. ARIYOSHI
GOVERNOR

DONALD A. BREMNER
Chairman
KEN T. TAKAHASHI
Executive Secretary
TELEPHONE NO.
(808) 548-6915

STATE OF HAWAII
ENVIRONMENTAL QUALITY COMMISSION
OFFICE OF THE GOVERNOR
550 HALEKAUWILA ST
ROOM 301
HONOLULU, HAWAII 96813

March 14, 1979

Mr. R. Higashionna, Director
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Higashionna:

SUBJECT: EIS PREPARATION NOTICE OF KAMEHAMEHA HIGHWAY REALIGNMENT, WEED JUNCTION TO HALEIWA BEACH PARK, HALEIWA, OAHU

The subject preparation notice was transmitted to us by the Office of Environmental Quality Control for publication in the EQC Bulletin. The notice of determination will be published on March 23, 1979.

We ask that for proper administrative procedure, notices of determinations prepared in compliance with Chapter 343, HRS requirements be filed with the Environmental Quality Commission.

Further, please be advised that contrary to the statement in paragraph two of the transmittal notice, the period for making written comments regarding the environmental effects of the proposed action is thirty (30) days from the receipt of the proposing agency's written request for comments (EIS Regulation Section 1:41(b)). Note also that the period for requests to be a consulted party in the preparation of the EIS is thirty (30) days from the date the preparation notice is published in the EQC Bulletin (EIS Regulation Section 1:31(d)).

We hope this clarifies Chapter 343, HRS procedural requirements in regard to your transmittal to us of the subject preparation notice. However, should you have any questions on this matter, feel free to contact us. Your cooperation in the Environmental Impact Statement process is greatly appreciated.

Sincerely,

Ken Takahashi
Executive Secretary

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

FRANK F. FASI, Mayor
YOSHIE H. FUJINAKA, Chairman
KAZU HAYASHIDA
Manager and Chief Engineer

DIRECTOR'S OFFICE

March 29, 1979

APR 3 3 25 PM '79
DEPT. OF TRANSPORTATION

APR 4 3 06 PM '79
DEPT. OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE

Dr. Ryokichi Higashionna
Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

YOUR LETTER OF MARCH 12, 1979 RELATING TO KAMEHAMEHA HIGHWAY REALIGNMENT, WEED JUNCTION TO HALEIWA BEACH PARK, PROJECT NO. F-083-1(5), EIS PREPARATION NOTICE

We have no objections to the proposed project. We request that the construction plans for the project be submitted for our review and approval.

If you have any questions on this matter, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

VI-14

GEORGE R. ARIYOSHI
Governor

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

RYOKICHI HIGASHIONNA, Ph.D.
Director

Deputy Directors
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES D. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO:
LT-PA
2.51007

May 18, 1979

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania
Honolulu, Hawaii 96813

Dear Mr. Hayashida:

Subject: EIS Preparation Notice for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

Thank you for your letter of March 29, 1979. As requested, we will furnish you with a set of our construction plans for your review and approval.

Very truly yours,

James R Carras
for Ryokichi Higashionna

4VT3

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

GEORGE S. MORIGUCHI
CHIEF PLANNING OFFICER

DEPT. OF TRANS.
PLANNING OFFICE
MAR 23 10 35 AM '79

DEPT. OF TRANSPORTATION
MAR 22 3 12 PM '79

DGP3/79-784(CT)

March 21, 1979

Dr. Ryokichi Higashionna, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii

Dear Dr. Higashionna:

Environmental Impact Statement Preparation Notice
Kamehameha Highway Realignment, Weed Junction to
Haleiwa Beach Park, Project No. F-083-1(5)
Comments Requested 3/12/79, DOT Ref. No. LT-PA 2.49735

VT-15

We offer the following comments.

1. It is recommended that you follow EPA Region X guidelines for preparation of environmental impact statements for highway projects (Environmental Impact Statement Guidelines, Environmental Protection Agency, Region X, April, 1973, Section IV-A, pp. 35-49--copy enclosed).

2. It is indicated that "Highway plans were prepared in 1970, but received adverse reactions from the public and were set aside" (p. 3). The EIS should indicate what these reactions were and how they are addressed in the new plans.

3. It is indicated that " . . . traffic through Haleiwa is expected to increase by approximately 25% from 1978 to 1985 and by 46% from 1985 to 2001" (p. 3). The basis for these projections should be clearly stated.

4. There should be coordination with the Department of Land Utilization with respect to visual or aesthetic impacts since that department is considering establishing a historic, scenic and cultural district in Haleiwa.

5. The section on agricultural impacts should consider not only the loss of sugar lands, but also the impacts on cane hauling and the irrigation system.

6. Haleiwa is the area in which most of Oahu's lotus roots (hasu) are grown. Will any hasu-producing areas be affected by highway construction or drainage from the highways?

Thank you for affording us the opportunity of reviewing your EIS preparation notice.

Sincerely,

GEORGE S. MORIGUCHI
Chief Planning Officer

GSM:fmt

Enclosure

GEORGE R. ARIYOSHI
GOVERNOR

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
James R. Carras

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

May 29, 1979

IN REPLY REFER TO:
LT-PA 2.51094

Mr. George Moriguchi
Chief Planning Officer
Department of General Planning
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Moriguchi:

Subject: EIS Preparation Notice for the
Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park

Thank you for your letter of March 21, 1979. Our response to your comments are as follows:

VT-16

1. The EIS will be prepared according to the format developed by the Federal Highway Administration. These guidelines are in compliance with the EPA guidelines.

2. The EIS will summarize public input into the project to date and will relate the proposed action to this point.

3. The EIS will provide a thorough analysis of the population projections used for the traffic assignment.

4. We are aware of the Department of Land Utilization's plans and will continue to coordinate with them.

5 & 6. The EIS will address all impacts to agricultural activity in the project area. We are working closely with the Waialua Sugar Company to insure minimal disruption to their activities. The alternative alignments being considered will not affect any areas of current lotus farming.

Very truly yours,

James R Carras

for Ryokichi Higashionna

4588

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4161

DIRECTOR'S OFFICE
MAR 23 12 52 PM '79
DEPT. OF TRANSPORTATION

FRANK F. FASI
MAYOR

EDWARD Y. HIRATA
MANAGING DIRECTOR

BARRY CHUNG
DIRECTOR

WILMA M. TAKASAKI
DEPUTY DIRECTOR

DEPT. OF TRANS. STATEWIDE TRANS. PLANNING OFFICE
MAR 27 10 32 AM '79

March 22, 1979

Mr. Ryokichi Higashionna
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Higashionna:

Subject: Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park
Project No. F-083-1(5)
Environmental Impact Statement
Preparation Notice

We have reviewed the Environmental Impact Statement Preparation Notice for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, and have no comments.

Thank you for forwarding the preparation notice for our perusal.

Very truly yours,

Barry Chung

Barry Chung

4578

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
STATEWIDE TRANS PLANNING OFFICE
650 SOUTH KING STREET DIRECTOR'S OFFICE
HONOLULU, HAWAII 96813

MAR 21 10 15 AM '79

MAR 20 3 39 PM '79
DEPT. OF TRANSPORTATION

FRANK F. FASI
MAYOR

TYRONE T. KUSAO
DIRECTOR

79/EC-9(SE)
LU3/79-967
F-6963

March 19, 1979

Dr. Ryokichi Higashionna, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

EIS Preparation Notice
Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park
Project No. F-083-1(5)
LT-PA 2.49735

VI-17

We have reviewed the above EIS Preparation Notice and offer the following comments.

In general, the Preparation Notice identifies all the major impacts which might occur as a result of the proposed highway realignment.

We are particularly pleased that major emphasis will be given to visual and aesthetic impacts of the project. In this vein, we hope that undergrounding of utilities will be considered.

However, we feel two areas did not receive sufficient emphasis.

1) Potential growth of the Haleiwa-Waialua area which could be encouraged by the proposed highway realignment; and

2) Consideration of the Oahu Development Plans for the area currently being prepared by the Department of General Planning.

We would like to remind you that portions of the proposed highway corridor are within the Special Management Area. Therefore, a Shoreline Management Permit will be required for the project under Ordinance No. 4529.

Should you have any further questions on this matter, please call Mr. Scott Ezer of our staff at 523-4077.

Very truly yours,

TYRONE T. KUSAO
Director of Land Utilization

TTK:sl

cc: Mayor

4849

GEORGE R. ARIYOSHI
GOVERNOR

RYOKICHI HIGASHIONNA, PH.D
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
James R. Carras

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

IN REPLY REFER TO:
LT-PA
2.51095

May 30, 1979

Mr. Tyrone T. Kusao
Director
Department of Land Utilization
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Kusao:

Subject: EIS Preparation Notice for the
Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park

VT-18

Thank you for your letter of March 19, 1979. Our response to your comments are as follows:

Undergrounding Utilities. The utilities affected by the project are several 46 kv circuits and telephone cables at four points. Since these cross, rather than parallel the alignment, undergrounding would have little benefit.

Growth Inducement and Development Plans. The EIS will thoroughly address the issue of growth and will relate the proposed project to the plans being developed for Haleiwa.

SMA Permit. We are aware of the need for an SMA permit, and will submit the appropriate information when the EIS is accepted.

Very truly yours,

James R. Carras

Dr. Ryokichi Higashionna

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

RAMON DURAN
DIRECTOR

APR 20 1 27 PM '79
DEPT. OF TRANSPORTATION

APR 24 9 50 AM '79
DEPT. OF TRANS.
STATEWIDE TRANS. PLANNING OFFICE

April 11, 1979

Dr. Ryokichi Higashionna
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

SUBJECT: KAMEHAMEHA HIGHWAY REALIGNMENT, WEED JUNCTION TO HALEIWA BEACH PARK, PROJECT NO. F-083,1-1(5), ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE

The Department of Parks and Recreation does not have any objection to the proposed realignment of the Kamehameha Highway from Weed Junction to Haleiwa Beach Park.

In reference to the stated environmental impacts of the realignment on recreation on Page 10, we find questionable the statement that the reduction in travel time "will increase crowding on the beaches" on the North Shore and that "if North Shore beaches experience heavier use, beaches in other parts of the island would experience a corresponding reduction in use."

We think it would be better to point out that all Oahu's beaches are and will continue to be heavily used and that the realignment will relieve Haleiwa of through traffic, particularly by those intending to travel to other recreation areas on the North Shore.

Thank you for the opportunity to comment on this project.

Sincerely,

RAMON DURAN, Director

RD:ls

GEORGE R. ARIYOSHI
GOVERNOR

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

RYOKICHI HIGASHIONNA, PE.D
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO:
LT-PA
2.51015

May 18, 1979

Mr. Ramon Duran
Director
Department of Parks and
Recreation
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Duran:

Subject: EIS Preparation Notice for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

Thank you for your letter of April 11, 1979. We appreciate your comments regarding beach use and the potential effects of the proposed project. The EIS will reflect your views on this matter.

Very truly yours,

James R. Carras

for Ryokichi Higashionna

VI-19

4532

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

DIRECTOR'S OFFICE
MAR 21 12 43 PM '79
DEPT. OF TRANSPORTATION

DEPT. OF TRANS.
STATEWIDE TRANS. PLANNING OFFICE
MAR 21 2 38 PM '79

WALLACE MIYAHIRA
DIRECTOR AND CHIEF ENGINEER

ENV 79-68

RECEIVED
STATE DEPARTMENT OF TRANSPORTATION
MAR 23 10 33 AM '79
FACILITIES DIVISION
PLANNING BRANCH

March 15, 1979

Mr. Ryokichi Higashionna, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Higashionna:

Subject: EIS Preparation Notice for Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Project No. F-083-1(5)

We have reviewed the subject Preparation Notice, transmitted by covering letter LT-PA 2.49735, dated March 12, 1979, and have the following comments.

1. There is no municipal sanitary sewer system in the Haleiwa area. At the present time there appears to be no conflict between the proposed alignment corridor and future sewer improvements.

2. The City has an active flood control project makai of Kamehameha Highway under the Haleiwa Road Drainage Improvement project. We do not have any plans to improve Helemano, Opaeula and Anahulu Streams makai of Kamehameha Highway in the near foreseeable future. Any bridge crossing of these streams should be coordinated with the Drainage Section of the Division of Engineering.

Very truly yours,

Wallace Miyahira

WALLACE MIYAHIRA
Director and Chief Engineer

cc: Div. of Engineering, Drainage Section

GEORGE R. ARIYOSHI
GOVERNOR

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

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO
LT-PA
2.51004

May 18, 1979

Mr. Wallace Miyahira
Director and Chief Engineer
Department of Public Works
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Miyahira:

Subject: EIS Preparation Notice for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

Thank you for your letter of March 15, 1979. As requested, we will coordinate our plans for stream crossings with your Department.

Very truly yours,

James R Carras

for Ryokichi Higashionna

VI-20

46 94

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

DIRECTOR'S OFFICE
APR 4 2 39 PM '79
DEPT. OF TRANSPORTATION

ROBERT R. WAY
DIRECTOR

TE3/79-721

April 3, 1979

DEPT. OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE
APR 5 11 09 AM '79

Dr. Ryokichi Higashionna, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

Subject: Your Letter Dated March 12, 1979 (LT-PA2.49735) Regarding Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Project Number F-083-1(5), EIS Preparation Notice

We submit the following information on Public Transportation in the project area for your use:

1. The Haleiwa area is presently served by two bus routes.

2. Bus service will remain on Kamehameha Highway to serve businesses and residences along the highway.

Thank you for providing us this opportunity to review and comment on the project.

Very truly yours,

Robert R Way

ROBERT R. WAY
Director

4604

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

RYOKICHI HIGASHIONNA, PH.D.
Director

Deputy Directors
WALTER M. ARIKI
DOUGLAS S. SAKAMOTO
CHARLES D. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO:
LT-PA
2.51006

May 19, 1979

Mr. Robert R. Way, Director
Department of Transportation
Services
City and County of Honolulu
650 South King Street
Honolulu, Hawaii 96813

Dear Mr. Way:

Subject: EIS Preparation Notice for the
Kamehameha Highway Realignment,
Weed Junction to Haleiwa Beach Park

Thank you for your letter of April 3, 1979. Your information on the bus service is appreciated. As noted in the subject EIS Preparation Notice, the proposed project will benefit bus transportation and other public services by reducing congestion.

Very truly yours,

James R Carras

for Ryokichi Higashionna

VI-21

FIRE DEPARTMENT
CITY AND COUNTY OF HONOLULU
1455 S. BERETANIA STREET, ROOM 305
HONOLULU, HAWAII 96814

FRANK F. FASI
MAYOR

B. K. AIU
CHIEF

MAR 28 3 01 PM '79
DEPT. OF TRANSPORTATION

DEPT. OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE
MAR 29 10 17 AM '79

March 23, 1979

Mr. Ryokichi Higashionna, Director
State Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Higashionna:

SUBJECT: Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park
Project No. F-083-1(5)
Environmental Impact Statement
Preparation Notice (LT-PA 2.49735)

We have reviewed your proposed project and have no objections, provided, that access to Emerson and Opaeula Roads is maintained to the mauka side of the by-pass.

Very truly yours,

Boniface K. Aiu

BONIFACE K. AIU
Fire Chief

BKA:JAF:lhc

RECEIVED
MAR 30 1 14 PM '79
DEPARTMENT OF TRANSPORTATION
PLANNING DIVISION

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

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO
LT-PA
2.50996

May 17, 1979

Mr. Boniface K. Aiu
Fire Chief
Fire Department
City and County of Honolulu
1455 South Beretania Street
Room 305
Honolulu, Hawaii 96813

Dear Mr. Aiu:

Subject: EIS Preparation Notice for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

Thank you for your letter of March 23, 1979. Access to Emerson and Opaeula Roads will not be restricted by the proposed project.

Very truly yours,

James R. Carras
for Ryokichi Higashionna

4649

POLICE DEPARTMENT
CITY AND COUNTY OF HONOLULU
1455 SOUTH BERETANIA STREET
HONOLULU, HAWAII

DEPT OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE
APR 3 9 52 AM '79

APR 5 11 04 AM '79
APR 2 10 15 AM '79
TRANSPORTATION

LT-PA
2.49735

March 30, 1979

Ryokichi Higashionna, PhD, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

Subject: Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Project No. F-083-1(5), Environmental Impact Statement Preparation Notice

This department has reviewed the proposed Kamehameha Highway Realignment. We find that the proposal has a positive effect on police operations; e.g., alleviate traffic congestion in the business section of Haleiwa town and quicker response time for emergency vehicles.

We hope this information will be of assistance to you.

Sincerely,

FRANCIS KEALA
Chief of Police

BY Harold Falk
HAROLD FALK
Deputy Chief of Police

NM:es

GEORGE R. ARIYOSHI
GOVERNOR

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
JAMES R. CARRAS

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

IN REPLY REFER TO
LT-PA
2.51005

May 18, 1979

Mr. Francis Keala
Chief of Police
Police Department
City and County of Honolulu
1455 South Beretania Street
Honolulu, Hawaii 96814

Dear Mr. Keala:

Subject: EIS Preparation Notice for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

Thank you for your letter of March 30, 1979. We appreciate your information on the benefits of the proposed project with regard to police operations.

VT-23

Very truly yours,

James R. Carras

for Ryokichi Higashionna

4782

GASCO, INC.
A PACIFIC RESOURCES, INC. COMPANY
P O Box 3379, Honolulu, Hawaii 96842

DEPT. OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE
MAR 23 10 36 AM '79

DIRECTOR'S OFFICE
MAR 22 2 32 PM '79

DEPT OF
TRANSPORTATION

March 20, 1979

Ryokichi Higashionna, Ph.D.
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

Subject: LT-PA, 2.49735

Thank you for the opportunity to comment on the Environmental Impact Statement Notice of Preparation for Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Project No. F-083-1(5).

We have reviewed the subject Environmental Impact Statement Preparation Notice and find that the project does not appear to have any adverse impact on Gasco, Inc.

Very truly yours,

Francis T. Tanaka
Manager of Environmental Affairs

4707

DEPT OF TRANS.
STA COMP TRANS.
APR 6 10 42 AM '79

HAWAIIAN ELECTRIC COMPANY, INC.
Box 2750 / Honolulu, Hawaii 96840

April 3, 1979

JOHN C. McCAIN, PH.D.
MANAGER, ENVIRONMENTAL DEPARTMENT

ENV 2-1
General
NV/G/NV

APR 5 1 12 PM '79
DEPT. OF TRANSPORTATION
RECEIVED

Mr. Ryokichi Higashionna
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Higashionna:

Subject: Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Project No. F-083-1(5), Environmental Impact Statement Preparation Notice

I am writing in response to your request for comments on the EIS Preparation Notice for the Kamehameha Highway Realignment Project. A substantial portion of our Waimea-Kahuku 46 kv circuit will be affected by the proposed project. This circuit provides the major source of power along the North Shore on Oahu. The line is now located on perpetual easements, therefore, any relocation of the lines due to the project will be funded 100% by the State under the provision of a civil suit. If substitute perpetual easements cannot be obtained from private property owners, generally parallel to the present alignment alongside the new highway right-of-way, Hawaiian Electric Company will either have to condemn in order to obtain the easements or be allowed to relocate the lines to within the new highway right-of-way.

VT-24

In addition, the Wahiawa to Waimea 46 kv circuit crosses the right-of-way of the proposed project near the western end of the highway and, therefore, may require relocation. Hawaiian Electric also has a perpetual easement in this area and the State would be required to bear 100% of any relocation cost.

At the eastern end of the new highway alignment near its intersection with the old Kamehameha Highway, distribution circuits on Kamehameha Highway may also require relocation. This work would probably be accomplished by cost sharing under the provisions of HRS 264-3.

Thank you for the opportunity to comment on the EIS Preparation Notice. If you have any questions, please do not hesitate to call me at 548-6880.

Yours truly,

John C. McCain

JCMc:cm

GEORGE R. ARIYOSHI
GOVERNOR

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES D. SWANSON
JAMES R. CARRAS

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

IN REPLY REFER TO
LT-PA
2.51009

May 18, 1979

Dr. John C. McCain, Manager
Environmental Department
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840

Dear Dr. McCain:

Subject: EIS Preparation Notice for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

Thank you for your letter of April 3, 1979. We appreciate the information you have provided regarding your electrical circuits and easements. You may be assured that we will coordinate our plans with you to avoid any conflict.

Very truly yours,

James R. Carras
for Ryokichi Higashionna

4-839

DEPT. OF TRANS.
STATEWIDE TRANS.
DIRECTOR'S OFFICE

HAWAIIAN TELEPHONE COMPANY

P.O. BOX 2200 - HONOLULU, HAWAII 96841 - CABLE ADDRESS: HAWTEL - TELEX 7733 - CABLE ADDRESS: HAWAII

APR 27 9 52 AM '79

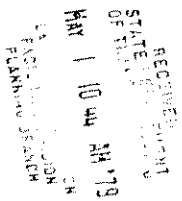
APR 25 2 41 PM '79

April 24, 1979

DEPT. OF TRANSPORTATION

HERMAN S. L. HO
NETWORK PLANNING & ENGINEERING MANAGER

Mr. Ryokichi Higashionna
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813



Dear Mr. Higashionna:

Kamehameha Highway Realignment,
Weed Junction to Haleiwa Beach
Park, Project No. F-083-1(5),
Environmental Impact Statement
Preparation Notice
(Ref. LT-PA 2.49735 dated 3-12-79)

We have reviewed your Environmental Impact Statement, Preparation Notice, and have comments as follows:

VI-25

Hawaiian Telephone Company Cable Facilities

Hawaiian Telephone Company's equipment building is located at the makai, Kaena Point corner of Waialua Beach Road and Haleiwa Beach Road. There are two feeder cable routes from this office that pass the proposed project area. One route runs east along Waialua Beach Road to Weed Junction then north along Kam Highway to Anahulu Place. The feeder cables along Kam Highway on this route are outside the project area and will not be disturbed. However, the distribution cables along Paliuli Road and Emerson Road will be affected. These distribution cables are small and the cost of relocating them should be minimal if they can be reconstructed to cross over the new highway close to it's present locations.

The second cable route runs north along Haleiwa Beach Road, meets Kam Highway near Anahulu Stream, then runs north along Kam Highway to Kawailoa, Waimea and Sunset Beach. The feeder cable on this route, especially near Haleiwa Beach Park, and a distribution cable along Lokoea Place will be close to the proposed construction and may be affected by the project.

An open wire facility along Kam Highway near the traffic "rotary" at Weed Junction may also be affected. These locations, where HTCo's facilities may be affected, are shown in red on the attached map.

Joint Trunking System Cables

Joint Trunking System (JTS) cables are U.S. Government military communication cables which are maintained by HTCo. One of these cables is buried on the mauka side of Kam Highway and may be affected near Haleiwa Beach Park where the proposed highway connects to Kam Highway. The location of this cable is shown in green on the attached map.

Future Land Use

As noted in Chapter III, para. B.2. of your Environmental Impact Statement, Preparation Notice, if development does eventually take place mauka of the proposed highway, Hawaiian Telephone Company would like to cross the highway as close to our Waialua Central Office as possible.

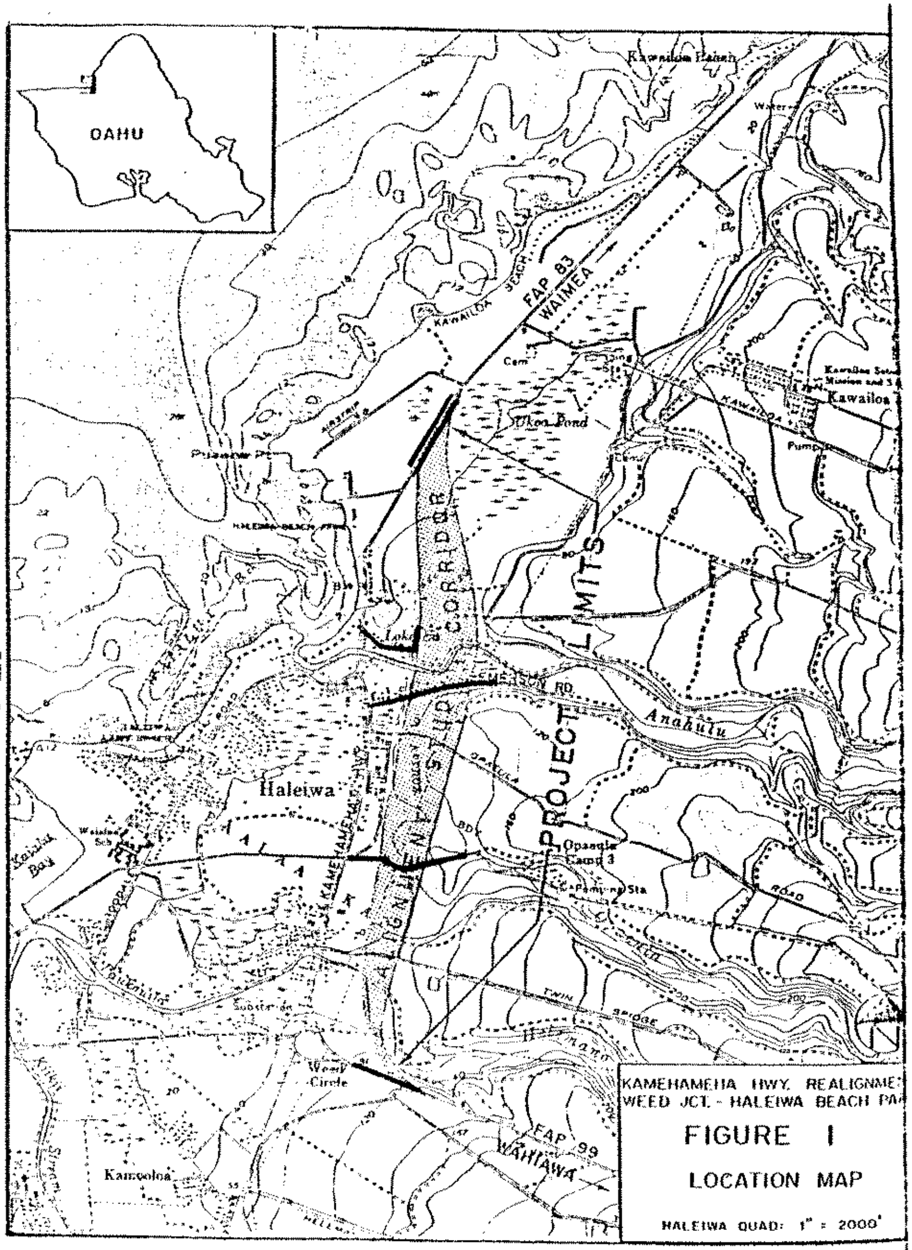
Impact on the Environment

Hawaiian Telephone Company does not foresee any adverse effects on the environment resulting from our work requirements.

If we can be of further assistance please call Mr. G. Kaneko at 836-6121.

Sincerely,

Russ K. Saito for
H. Ho



KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE 1

LOCATION MAP

HALEIWA QUAD: 1" = 2000'

GEORGE R. ARIYOSHI
GOVERNOR

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

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO
LT-PA
2.51014

May 19, 1979

Mr. Herman S. L. Hu
Network Planning &
Engineering Director
Hawaiian Telephone Company
P.O. Box 2200
Honolulu, Hawaii 96841

Dear Mr. Hu:

Subject: EIS Preparation Notice for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

Thank you for your letter of April 24, 1979. We appreciate the information you have provided regarding your telephone cables. You may be assured that we will coordinate our plans with you to avoid conflict.

Very truly yours,

James R. Carras
for Ryokichi Higashionnna

4757

DEPT OF TRANS.
STATEWIDE TRANS PLANNING OFFICE
APR 12 10 03 AM '79

DIRECTOR'S OFFICE
APR 11 2 10 PM '79

LIFE OF THE LAND
A GROUP FOR ENVIRONMENTAL RESEARCH AND ACTION

DEPT OF TRANSPORTATION

April 9, 1979

Ryokichi Higashiona
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: Comments to EIS Preparation Notice
Kamehameha Highway Realignment Weed
Junction to Haleiwa Beach Park,
Project Number F-083-105

Dear Sir:

Life of the Land is in complete agreement as to the need for a Haleiwa Bypass. On reviewing the criteria mentioned for assessment under Chapter V page 14, we have nothing further to add. We wish to remain a consulted party in the hopes that most of the negative environmental and aesthetic problems can be solved to our mutual satisfaction. We look forward to reviewing your EIS. Mahalo for your consideration.

Sincerely,

Dee Dee Letts
Administrator

DDL:cc

VI-27

404 PIIKOI STREET HONOLULU HAWAII 96814 TELEPHONE 521 1300

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU HAWAII 96813

RYOKICHI HIGASHIONA, PED
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
JAMES R. CABRAS

IN REPLY REFER TO
LT-PA
2.51010

May 22, 1979

Ms. DeeDee Letts
Administrator
Life of the Land
404 Piikoi Street
Honolulu, Hawaii 96814

Dear Ms. Letts:

Subject: EIS Preparation Notice for the
Kamehameha Highway Realignment,
Weed Junction to Haleiwa Beach Park

Thank you for your letter of April 9, 1979. We greatly appreciate the support of Life of the Land on this project. We will be pleased to keep you informed of our plans.

Very truly yours,

James R. Cabras

for Ryokichi Higashionna

4664

NORTH SHORE NEIGHBORHOOD BOARD NO. 27
P. O. Box 607
HALEIWA, HAWAII 96712

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
APR 6 11 02 AM '79

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
COUNTY OF HONOLULU
STATE OF HAWAII
PLANNING BRANCH

DIRECTOR'S OFFICE
APR 2 2 38 PM '79
DEPT. OF TRANSPORTATION

March 30, 1979

APR 3 9 53 AM '79
DEPT OF TRANS.
STATEWIDE PLANNING OFFICE

MR. RYOKICHI HIGASHIONNA, DIRECTOR
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, HI 96811

Subject: Kamehameha Highway Realignment -
Weed Junction to Haleiwa Beach Park
Project No. F-083-1 (5)

Dear Mr. Higashionna:

The North Shore Neighborhood Board has reviewed the Environmental Impact Statement Preparation Notice forwarded with your letter of March 12, 1979. We concur in the need for the proposed project and agree on the alignment study corridor proposed.

We have listened to presentations on various routes and at this time are favorably impressed with the most makai alignment since it appears to offer the least objections to the Waialua Sugar Co., one of our constituents and the one over whose land the bypass road is to be installed. Of the numerous environmental design constraints listed, we are particularly concerned with the aesthetic impact and the impact of noise on adjacent areas. The other environmental design constraints appear to apply equally to each of the alternate routes but we agree they should be explored.

Please be assured of our desire to be kept informed on the progress of this project and willingness to cooperate in your efforts.

Yours very truly,

Merl W. Hawthorne

Merl W. Hawthorne
Chairman

VI-28

GEORGE R. ARIYOSHI
GOVERNOR

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

RYOKICHI HIGASHIONNA, P.E.
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES G. SWANSON

IN REPLY REFER TO:
LT-PA
2.51008

May 22, 1979

Mr. Merl W. Hawthorne
Chairman
North Shore Neighborhood
Board No. 27
P. O. Box 607
Haleiwa, Hawaii 96712

Dear Mr. Hawthorne:

Subject: EIS Preparation Notice for the
Kamehameha Highway Relignment,
Weed Junction to Haleiwa Beach Park

Thank you for your letter of March 30, 1979. We are in the process of refining the alternate alignments. Your comments regarding aesthetics and noise impact are appreciated.

Very truly yours,

James R. Carras
for Ryokichi Higashionna

4619

WAIALUA COMMUNITY ASSOCIATION, INC.

DEPT OF TRANS. HIGHWAYS STATE OF HAWAII
MAR 30 9 23 AM '79

TELEPHONE
WAIALUA 637-4606

P. O. BOX 604
WAIALUA, HAWAII 96791

March 26, 1979

MAR 29 2 25 PM '79
DEPT. OF TRANSPORTATION
DIRECTOR'S OFFICE

Ryokichi Higashionna
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Higashionna:

The Waialua Community Association appreciates your information concerning the ENVIRONMENTAL IMPACT STATEMENT, PREPARATION NOTICE on the KAMEHAMEHA HIGHWAY REALIGNMENT, WEED JUNCTION TO HALEIWA BEACH PARK, Project Number F-083-1(5). (LT-PA 2.49735 reference number.) The Waialua Community Association, in a united community effort, supports the concept of the Kamehameha Highway Realignment.

The Association agrees that the proposed project will decrease the traffic congestion in Haleiwa Town. We are concerned with several areas that could adversely impact our community. These areas of concern are briefly outlined as follows:

1. Prime Agricultural Land. We realize that the proposed route necessitates the use of prime agricultural land, but we prefer such use be minimal. We concur with the proposed route developed by the Waialua Sugar Company which minimizes the use of agricultural land by routing the highway through two existing gravel areas. The Waialua Sugar Company will be submitting its proposals to your office.
2. Other Agricultural Land. We are concerned with the disruption of other agricultural lands where taro and hasu can be grown.
3. Haleiwa Town. Noise and pollution caused by the realignment could have an adverse effect on Haleiwa Town, both business and residential areas. We would prefer a route further away from the town that would have a minimal effect.
4. Aesthetic Impact. There is concern in the community about the visual impact of a bridge over Anahulu Stream. A preferred route would be one where the newly constructed bridge would not be seen from Anahulu Bridge.

VI-29

WAIALUA COMMUNITY ASSOCIATION, INC.

TELEPHONE
WAIALUA 637-4606

P. O. BOX 604
WAIALUA, HAWAII 96791

The Environmental Impact Statement Preparation Notice seems to be a comprehensive proposal that addresses all areas of concern of the Waialua Community Association.

Sincerely yours,

Laura Bolles

Laura Bolles
Vice President

Jacob Y.N. Ng
President

GEORGE R. ARIYOSHI
GOVERNOR

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

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO:
LT-PA
2.51092

May 31, 1979

Ms. Laura Bolles, Vice President
Waialua Community Association
P.O. Box 604
Waialua, Hawaii 96791

Dear Ms. Bolles:

Subject: EIS Preparation Notice for the
Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park

VI-30

Thank you for your letter of March 26, 1979. We greatly appreciate your support of the project's concept. Our on-going alignment studies are taking advantage of the excellent community input we have received, and we are confident that the various concerns can be handled to everyone's satisfaction.

We are evaluating an alignment through the rock outcrops, and it does appear to offer a good compromise. We are also taking into consideration taro and hasu plots and will attempt to avoid wetland areas.

We are evaluating an alignment mauka of the bend in the Anahulu River, in terms of engineering feasibility and visual impact.

The EIS will evaluate the noise and air quality impacts of the alternative alignments.

Your cooperation in our planning efforts has been very helpful.

Very truly yours,

James R. Carras

for Ryokichi Higashionna

4641

Waialua Sugar Company, Inc.
P. O. Box 665
Waialua, Hawaii 96791

DEPT OF TRANS.
STATEWIDE TRANS.
PLANNING OFFICE
APR 2 10 01 AM '79

DIRECTOR'S OFFICE
MAR 30 2 37 PM '79
DEPT OF
TRANSPORTATION

March 28, 1979

Mr. Ryokichi Higashionna, Director
Department of Transportation
STATE OF HAWAII
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Higashionna:

The Waialua Sugar Company continues to endorse the proposed Kamehameha Highway realignment project, the subject for your letter of March 12, 1979. We believe now, as we did several years ago, that the most makai route is the most viable of the alternatives offered since it presents a possibility of crossing two reasonably large waste areas not in sugar cane in which we have stored rocks and stones taken from cultivated areas. We recognize and remember the objections to the makai route offered approximately ten years ago. We believe that the presentation at that time did not adequately address the objections raised by residents at the hearing in which visual impact was the most prominent point of discussion. We believe that an attractively designed bridge across the Anahulu Stream will offer no serious objection even though visible from the present Anahulu Bridge. The route for that river crossing being the most makai will be the easiest to construct from a topographical point of view. Waialua Sugar Company further believes that route presents the least potential damage from creating remnant areas of present agricultural lands that would be too small to cultivate. We recognize that in any of the routes, the major impact will be to our cultivated areas and to the canehauler road crossings of the proposed realignment highway. In this matter the topography is of major importance.

The proposal that the Kemehameha Highway realignment crosses the Anahulu Stream above the bend in the river so that the bridge would not be visible from the present Anahulu Bridge, offers a number of serious objections. The elevation of the road at this point probably would make the structure visible from a greater distance than the more makai route and would certainly be far more expensive. In addition, it would offer serious problems in the handling of canehauler traffic and would suggest a number of crossings of the realigned highway. The makai route can be suitably screened from a noise impact and we believe this should be fully explored in the Draft EIS.

Please be assured of the willingness of the Waialua Sugar Company to cooperate on this proposed project and of the need to be kept informed fully because of the impact on our operations.

Sincerely,

WAIALUA SUGAR COMPANY, INC.

F. O. Gross, Director
Civil Engineering and
Environmental Standards

GEORGE R. ARIYOSHI
GOVERNOR

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

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO
LT-PA
2.51093

May 31, 1979

Mr. F. C. Gross, Director
Civil Engineering and
Environmental Standards
Waialua Sugar Company, Inc.
P.O. Box 665
Waialua, Hawaii 96791

Dear Mr. Gross:

Subject: EIS Preparation Notice for the Kamehameha Highway Realignment Weed Junction to Haleiwa Beach Park

Thank you for your letter of March 28, 1979. Your endorsement of the proposed project is appreciated.

We are presently evaluating an alignment through the two waste areas, and it appears to offer a viable compromise. Your comments regarding alignments farther mauka will be considered and evaluated in the EIS.

As in the past, we will give you frequent opportunity for input on our plans with regard to the cane haul roads and irrigation system.

Very truly yours,

James R. Carras

for Ryokichi Higashionna

Belt, Collins & Associates
A division of Lyon Associates, Inc.
Engineers • Planners • Landscape Architects • Architects
514 Hawaii Building • 745 Fort Street • Honolulu, Hawaii 96813 • Telephone (808) 521-5361

April 12, 1979

Mr. Douglas Orimoto
Department of Transportation
Land Transportation Facilities Division
Planning Branch, Room 301
600 Kapiolani Boulevard
Honolulu, Hawaii 96813

Dear Mr. Orimoto:

Thank you for sending us a copy of the Environmental Impact Statement Preparation Notice for the proposed realignment of Kamehameha Highway between Weed Junction and Haleiwa Beach Park. As I indicated in my letter to you, we are consultants to a number of landowners in the North Shore area and want to make sure that we keep abreast of the Department of Transportation's plans in that region.

There are a number of questions and/or topics related to the proposed realignment that we believe should be addressed in the EIS, and they are stated very briefly below.

1. Project Justification. From the EISPN, it appears that the justification for the proposed project is based largely on the present and expected levels of weekend traffic. We would like to see the detailed analysis supporting this conclusion, including the specific weekend traffic counts that were used. Is it the Department of Transportation's general policy to base decisions regarding highway widening and realignment on peak traffic periods regardless of whether they occur during the normal weekday rush hour or on weekends? What is the rationale for this? Is an exception being made in this case? If so, why?

2. Other Bottlenecks. How do the traffic flow/capacity and accident situations at Haleiwa compare with those at other bottlenecks, especially Waimea Bay? How will highway improvements at Haleiwa affect traffic flow past Waimea Bay? Are highway improvements planned for that location as well as at Haleiwa? If so, what would they consist of and when would they be made? In particular, will the changes referred to in a 1975 memorandum from E. Alvey Wright to the Office of the Governor (Reference HWY-OM 2.24960) be implemented within the foreseeable future?

3. Regional Population Growth. The EISPN notes that the project would probably "... promote North Shore growth." We would very much like to see the growth estimates quantified. I presume this has already been done during the preparation of the traffic projections on which the need for the project is partially based, and it would be helpful if you could send us a copy of the growth patterns on which the traffic projections are based.

4. Effect On Agriculture. I believe the realignment could affect lands designated by the Department of Agriculture as being of agricultural importance to the State. Will the removal of some 40 to 45 acres of prime agricultural land have a significant detrimental effect on agriculture on Oahu?

5. Secondary Growth Effects. In specific terms, how will the population growth induced by the proposed project affect the semi-rural lifestyle that now prevails on the North Shore? Can either the magnitude of the increase or the type of people who would be attracted to and/or retained in the area as a result of the project be expected to significantly alter the existing situation? If so, how? What evidence is there that supports these conclusions?

Thank you very much for your attention to these questions. The information you provide will be of great help to us in advising our various clients. If any clarification of the points listed here is needed, please call me at 521-5361.

VI-32

Sincerely,

Perry J. White

PJW:gk

cc: Office of Environmental Quality Control

GEORGE R. ARIYOSHI
GOVERNOR

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

RYOKICHI HIGASHIONNA, P.E.D.
DIRECTOR

DEPUTY DIRECTORS
WALLACE ADKI
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON
JAMES R. CARRAS

IN REPLY REFER TO:
LT-PA
2.51090

May 24, 1979

Mr. Perry J. White
Belt, Collins & Associates
514 Hawaii Building
745 Fort Street
Honolulu, Hawaii 96813

Dear Mr. White:

Subject: EIS Preparation Notice for the Kamehameha Highway Realignment Weed Junction to Haleiwa Beach Park

Thank you for your letter of April 12, 1979. The questions you have raised are important ones, and will be addressed in the EIS. Our specific responses follow:

1. The nationally accepted criteria for design volume is the 30th highest hourly traffic volume, which in the present case falls on a weekend. However, the proposed project is also justifiable using peak week-day traffic, since congestion such as found at almost all hours through Haleiwa is highly undesirable. The EIS will present our traffic projections and supporting data.

2. Haleiwa is, at present, the most critical segment on the North Shore due to the high volume of through traffic mixed with local traffic movement. The proposed project will improve circulation in and around Haleiwa by separating these movements. The proposed project involves only Haleiwa. Plans for improvements in the vicinity of Waimea Bay are beyond the scope of this project.

3 & 5. The EIS will thoroughly address the growth issue.

4. The impact to agricultural lands will be covered in the EIS.

Very truly yours,

James R. Carras

for Ryokichi Higashionna

Rcd. 4/9/79

NORTH SHORE BUSINESS AND PROFESSIONAL
ASSOCIATION

Mr. Doug Orimoto
State of Hawaii Dept. of Transportation
Palnning Department

Dear Mr. Orimoto,

In response to the Environmental Imapct Statement preparation notice for the Kamehameha realignment (Weed junction to Haleiwa Beach park) #F-083-1(5), we would like to state that we agree in theory to the project. However there are some important factors that need to be addressed.

Specifically;

How are the accesses to the proposed by-pass from Wahiawa and Kahuku to be situated? We would strongly recomend that the access be designed in such a way as to promote the Haleiwa business district. Also that signage be placed to promote the area. (i.e. directional signs reading "Historic Haleiwa Town" and "Kawailoa by-pass".) This would provide for residents, who are going to be the primary users of the by-pass, while still promoting the business district as a place for tourist and residents to do their shopping.

We would like to see a detailed study done on the economic impact that this proposed by-pass would have on all forms of business in Haleiwa. If your projections are correct and 50% of the traffic would be rerouted that would affect all forms of business and not just the tourist related ones.

Finally what would the overall impact be on the North Shore in regard to future land use? Would the future of Haleiwa as a business community be threatened by easier access to areas that are not presently developed? What could be done to forestall such development?

We would appreciate being kept up to date on the study and allowed to comment and make suggestions regarding this project.

The future of the Haleiwa area depends heavily on a strong economic business community. To develop ways to insure the quality of life and to improve it for residents and businesses is of primary concern to us, as we are sure it is to you.

We await further study and developments.

Sincerely,

Gary A. Powell

Gary A. Powell secretary North Shore Business and Professional Association
P.O. Box 606, Haleiwa, HI 96712

GEORGE R. ARIYOSHI
GOVERNOR

RYOKICHI HIGASHIONNA, PH.D.
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
DOUGLAS S. SAKAMOTO
CHARLES D. SWANSON
James R. Carras

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

May 24, 1979

IN REPLY REFER TO:
LT-PA 2.51091

Mr. Gary A. Powell, Secretary
North Shore Business and
Professional Association
P. O. Box 606
Haleiwa, Hawaii 96712

Dear Mr. Powell:

Subject: EIS Preparation Notice for the
Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park

Thank you for your letter which we received on April 9, 1979. Our response to your comments are as follows:

Accesses. The intersections at either end of the project will be designed to channel through traffic to the new highway segment. However, ample left and right turn pockets will be provided to simplify access to Haleiwa. These turn-offs will be clearly signed and lighted.

Economic Impacts. Our social, economic and environmental consultant, VTN Pacific, will be evaluating the potential effects of the proposed project on the economy of Haleiwa. They will be contacting you in the course of their study.

Land Use. The EIS will examine this important issue; however, the scope of this project is to provide a bypass road for just Haleiwa town. Access to and through Haleiwa will be improved. Improvement of access beyond the limits of the project will be limited to the existing two-lane roadway.

Very truly yours,

James R. Carras
for Ryokichi Higashionna

B. DRAFT EIS MAILING LIST AND RESPONDENTS
(The Draft EIS was publiched on May 8, 1980)

	Response Dated
1. U.S. GOVERNMENT	
Advisory Council on Historic Preservation	6/2/80
Department of Agriculture	
Agricultural Stabilization and Conservation	
Forest Service	6/12/80
Soil Conservation Service	5/21/80
Department of The Army	
U.S. Army Corps of Engineers	6/16/80
U.S. Army Support Command, Hawaii	6/23/80
Department of Commerce	
National Oceanographic & Atmospheric Admin.	6/23/80
Office of Environmental Affairs	
Department of Energy	
Division of NEPA Affairs	
Department of Health Education and Welfare	
Department of Housing and Urban Development	5/21/80
Department of the Interior	
Fish and Wildlife Service	6/20/80
Office of Environmental Project Review	
Office of the Secretary	6/4/80
Department of Transportation	
Federal Aviation Administration	6/9/80
U.S. Coast Guard	5/13/80
Office of the Secretary	6/02/80
Environmental Protection Agency	
EIS Coordinator	6/24/80
Office of Federal Activities	
2. STATE OF HAWAII	
Department of Accounting and General Services	5/8/80
Department of Agriculture	
Department of Defense	4/30/80
Department of Education	5/1/80
Department of Hawaiian Home Lands	5/1/80
Department of Health	5/13/80
Department of Land and Natural Resources	5/28/80
Department of Planning and Economic Development	6/24/80
Department of Social Services and Housing	
Environmental Quality Commission	5/8/80
Office of Environmental Quality Control	6/25/80
University of Hawaii	
Environmental Center	6/17/80
Water Resources Research Center	
3. CITY AND COUNTY OF HONOLULU	
Board of Water Supply	5/16/80
Building Department	5/7/80

City Council	
Department of Economic Development	
Department of General Planning	5/30/80
Department of Housing and Community Development	
Department of Land Utilization	5/12/80
Department of Parks and Recreation	5/12/80
Department of Public Works	4/30/80
Department of Transportation Services	5/15/80
Neighborhood Commission	
Office of the Mayor	
Police Department	
Fire Department	

4. ORGANIZATIONS

Alliance of North Shore Associations	
American Lung Association	
Bishop Museum	
Conservation Council	
Haleiwa Businessman's Association	
Haleiwa Community Assciation	
Hawaii Audubon Society	
Hawaiian Electric Company	
Hawaiian Historical Society	
Hawaiian Telephone Company	5/14/80
Hawaii Sugar Planters Association	
Life of the Land	6/3/80
North Shore Business and Professional Association	
North Shore Neighborhood Board No. 27	6/24/80
Pacific Resources, Inc.	4/29/80
Sierra Club	
Sunset Beach Community Association	
The Outdoor Circle	
Waialua Community Association	
Waialua Sugar Company	6/9/80

5. LIBRARIES

Hawaii State Library, Main Branch
Waialua Library
University of Hawaii (Sinclair and Hamilton)
DPED Library
Municipal Library
State Archives
Legislative Reference Bureau

6. NEWS MEDIA

Honolulu Advertiser
Honolulu Star Bulletin
North Shore Community Review

Advisory Council On Historic Preservation

This response does not constitute Council comment pursuant to Section 102(2)(C) of the National Environmental Policy Act, Section 106 of the National Historic Preservation Act, or Section 2(b) of Executive Order 11593.

1522 K Street, NW
Washington, DC 20005

Reply to:

Lake Plaza South, Suite 616
44 Union Boulevard
Lakewood, CO 80228

June 2, 1980

Mr. Ralph T. Segawa
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
P.O. Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

The Council has reviewed your draft environmental impact statement (DES) for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, circulated for comment pursuant to Section 102(2)(C) of the National Environmental Policy Act. We note that the undertaking will affect properties which may be eligible for inclusion in the National Register of Historic Places. Circulation of a DES, however, does not fulfill your agency's responsibilities under Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. Sec. 470f, as amended, 90 Stat. 1320).

VI - 36

The Council staff, in reviewing the DES, commend the preparers of the document for their efforts to survey and identify the cultural resources which are significant not only from a scientific standpoint, but also from the less tangible aspect of cultural attitudes. In the area of cultural resource management, the staff believes that the selection of alternative "C" appears to avoid impact of the sites surveyed. Our office also encourages your office to consider, in consultation with the State Historic Preservation Officer (SHPO), measures which recognize and protect the cultural significance of Loko Ea Fishpond, the agricultural terraces, sites 1439, 1440, and 1442 (Emerson Homestead).

1A

1B

Finally, the staff suggests that a multiple resource National Register district be considered for the project area. Such a district would recognize the cultural diversity of the resources which are found in close proximity to each other. It would also provide your office and the SHPO with a means of addressing cultural resource mitigation from the collective standpoint of a district and not on a site by site basis.

1C

Prior to the approval of the expenditure of any Federal funds or prior to the granting of any license, permit, or other approval for an undertaking, Federal agencies must afford the Council an opportunity to comment on the effect of the undertaking on properties included in or eligible for inclusion in the National Register of Historic Places in accordance with the Council's regulations, "Protection of Historic and Cultural Properties" (36 CFR Part 800). Until these requirements are met, the Council considers the DES incomplete in its treatment of historical, archeological, architectural, and cultural resources. You should obtain the Council's substantive comments through the process outlined in 36 CFR Sec. 800.9. These comments should then be incorporated into any subsequent documents prepared to meet requirements under the National Environmental Policy Act. Mr. Robert Fink may be contacted at (303) 234-4946, an FTS number, for further assistance.

1D

Sincerely,

Louis S. Wall
Chief, Western Division of
Project Review

EVALUATION

ADVISORY COUNCIL ON HISTORIC PRESERVATION 6/2/80

A. Alternate C has been recommended as the preferred alternate.

B. Consultation with the SHPO has been pursued, and he concurs that Alternate C will not endanger the cultural significance of the identified sites (see page V-3).

C. Your suggestion of a multiple resource National Register district will be forwarded to the SHPO's office for their consideration.

D. Since the identified properties or sites of actual or potential historical significance are not affected by the preferred bypass Alternate C, Section 106 of the National Historic Preservation Act does not apply.

VI-37

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
Pacific Southwest Region
1151 Punchbowl Street, Room 323
Honolulu, Hawaii 96813

1950
(PIF)
June 12, 1980

Mr. Ralph Segawa
Federal Highway Administration
U. S. Department of Transportation
P. O. Box 50206
Honolulu, Hawaii 96850

Dear Ralph:

We have read the Haleiwa Bypass Draft EIS dated 4/8/80. We have no comments to make as the project appears not to have any significant adverse impacts on forest, range or wildlife system.

Sincerely,

Bob

ROBERT V. CLAYTON
Pacific Islands Forester

NO EVALUATION REQUIRED

United States Department of Agriculture

Soil Conservation Service

P. O. Box 50004
Honolulu, Hawaii
96850

May 21, 1980

Mr. Ralph Segawa
Division Administrator
Federal Highway Administration
P. O. Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Subject: Draft EIS - Kamehameha Highway Realignment
FAP Route 83, Weed Junction to Haleiwa Beach Park

We have reviewed the subject draft EIS and note that you have addressed the issue of losing prime and other important agricultural lands as a result of installing any one of the proposed alternatives.

We have no other comment to offer on this draft.

Thank you for the opportunity to review this document.

Sincerely,

JACK P. KANALZ
State Conservationist

VI-38

NO EVALUATION REQUIRED

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Productivity, Technology, and Innovation
Washington, D.C. 20230
(202) 377-4335

June 23, 1980

Mr. Ralph Segawa
Division Administrator
Federal Highway Administration
U.S. Department of Transportation
P.O. Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

This is in reference to your draft environmental impact statement entitled "Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, Hawaii." The enclosed comments from the National Oceanic and Atmospheric Administration are forwarded for your consideration.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving three (3) copies of the final statement.

Sincerely,

Bruce R. Barrett

Bruce R. Barrett
Acting Director, Office
of Environmental Affairs

Enclosure Memo from: Robert B. Rollins
National Ocean Survey
National Oceanic and Atmospheric Administration

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

JUN 17 1980

OA/C52x6:JLR

TO: PP/EC - Joyce M. Wood

FROM: OA/C5 - Robert B. Rollins

SUBJECT: DEIS #8004.38 - Haleiwa Bypass; Island of Oahu, Hawaii

The subject statement has been reviewed within the areas of the National Ocean Survey's (NOS) responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

2A Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project includes the cost of any relocation required for NOS monuments.

Attachment
DEIS #8004.38 (File Copy)

VI-39

EVALUATION

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION 6/23/80

2A. If any geodetic control survey monuments are encountered, NOAA will be given at least 90 days notification. The cost for relocation will be included in the construction budget.

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT SHAFTER, HAWAII 96858

PODED-PV

16 June 1980

Mr. Ralph T. Segawa
Division Administrator
Federal Highway Administration
Region Nine, Hawaii Division
U.S. Department of Transportation
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

VI-40

We have reviewed your Draft Environmental Impact Statement (DEIS) for the "Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park" forwarded to us by your agency on 18 April 1980. We have prepared the following comments for your consideration.

3A The proposed project does not affect any U.S. Army Corps of Engineers projects. A Department of the Army (DA) permit may be required for the stream crossings and the crossing over the outlet of Ukoa Pond marsh pursuant to Section 404 of the Clean Water Act of 1977. As the DEIS does not provide specific bridge (or alternate crossing) details, we suggest that plans and design drawings be submitted for our review as soon as possible so that we may determine the need for a DA permit. In addition, information which identifies the work to be performed in the streams, the type and quantity of fill to be used, the source of the fill material, the presence or absence of toxic materials in the fill (in accordance with EPA regulations 40 CFR 230.4), the erosion controls to be implemented to prevent any fill from being washed into the stream or adjacent wetland, and the measures being taken to prevent the disruption of the natural migratory movements of aquatic fauna in the streams, should be provided.

3B Line 10 of paragraph 1 on page IV-9 states that " .... require the placement of fill in the floodway, ..." If the proposed revisions to the

Honolulu City and County Comprehensive Zoning Code are adopted as planned (by 3 September 1980), no fills will be permitted in the floodway. We appreciate the opportunity to respond to your DEIS.

Sincerely,

KISUK CHEUNG
Chief, Engineering Division

EVALUATION

DEPARTMENT OF THE ARMY - U.S. ARMY ENGINEER DISTRICT, HONOLULU 6/16/90

3 A. The requested information will be provided with the application for a DA permit at such time as the construction plans are being finalized.

3 B. Highways and bridges are permitted under the City and County Floodplain Ordinance with the condition that backwater elevations shall not be significantly increased. The Helemano Stream crossing will be on a viaduct instead of fill as originally proposed, which will cause negligible backwater. The Opaeula bridge will have a negligible backwater effect, and the backwater effect of the Anahulu bridge will be less than 4 inches for a 100-year flood.

VT-41

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
FORT SHAFTER, HAWAII 96858

REPLY TO ATTENTION OF:

APZV-EHE-E

23 JUN 1990

US Department of Transportation
Federal Highway Administration
P.O. Box 50206
Honolulu, Hawaii 96850

Gentlemen:

The Draft Environmental Impact Statement (DEIS) for the Kamehameha Highway Realignment from Weed Junction to Haleiwa Beach Park has been reviewed. As stated in the DEIS, traffic congestion occurs on weekends and is caused by visitors from Honolulu. The Army occasionally uses that portion of Kamehameha Highway to gain access to the Kahuku Training Area. However, Army use of the highway is primarily on weekdays and we do not expect it to be affected by the proposed project.

Thank you for the opportunity to comment on the DEIS. We look forward to receiving a copy of the final document.

Sincerely,

FOR PETER D. STEARNS
COL, EN
Director of Engineering and Housing

NO EVALUATION REQUIRED

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
HONOLULU AREA OFFICE
300 ALA MOANA BLVD., ROOM 3318
P.O. BOX 50007
HONOLULU, HAWAII 96850

May 21, 1980

REGION IX

IN REPLY REFER TO:
9.1SS (Johnson/
546/5554)

Mr. Ralph T. Segawa, Division Administrator
U.S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Subject: Hawaii F-083-1(5), Draft Environmental Impact Statement, FHWA-HI-EIS-80-01-D, Kamehameha Highway Realignment, West Junction to Haleiwa Beach Park

The proposed realignment of Kamehameha Highway that would bypass the town of Haleiwa was reviewed for its impact on HUD programs and projects in the area.

We find that the proposed action will not have an adverse impact on HUD activities in Haleiwa, however, we would appreciate receiving a copy of the Final EIS.

VI-42

Sincerely,

Frank L. Johnson
Community Planner

NO EVALUATION REQUIRED

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P.O. BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:
ES
Room 6307

June 20, 1980

Mr. R. Hagashionna
Director, Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Re: Haleiwa Bypass, Oahu
Project No. F-083-1(5)

Dear Sir:

In response to your request for comments on the referenced project, we are enclosing our recent comments on the Federal EIS (EE 80/406). I trust that you will find these sufficiently describe our concerns.

Thank you for the opportunity to comment.

Sincerely yours,

Nevin D. Holmberg
Deputy Project Leader
Division of Ecological Services

Enclosure

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SECRETARY
PACIFIC SOUTHWEST REGION
BOX 36098 • 450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102
(415) 556-8200

ER80/406

June 4, 1980

Division Administrator
Federal Highway Administration
U.S. Department of Transportation
P.O. Box 50206
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Dear Mr. Segawa:

The Department of the Interior has reviewed the Draft Environmental Impact Statement for Haleiwa Bypass, Kamehameha Highway Realignment from Weed Junction to Haleiwa Beach Park, Oahu, Hawaii (ER-80/406) and offers the following comments.

VI-43

General Comments

4A Preparation of a Section 4(f) statement may be appropriate for the proposed project because of potential adverse impacts on the Emerson Homestead Historic Site. The proposed project may also involve a taking of proposed park lands in the Anahulu River area.

4B Since feeding and nesting habitat for the Hawaiian gallinule and feeding habitat for the Hawaiian stilt, both endangered species, are involved in the project area and a biological opinion has been issued by the Fish and Wildlife Service, these aspects should be fully covered in the Final EIS. Of particular concern is Alternative D which would eliminate up to 3.5 acres of wetland habitat used by both endangered species and which would not appear to meet the requirements of Executive Order 11990 (Protection of Wetlands).

4C We are pleased to note that bridge piers, rather than permanent fills, would be used where the proposed highway crosses existing streams and wetland areas. Piers would be constructed on either side of existing channels to insure that normal stream flows are unrestricted and to permit unimpeded migration of diadromous aquatic fauna.

However, we are still concerned that temporary fills, if necessary for highway bridge construction, could restrict flows through the outlet of Ukoa Marsh. The backwater created thereby could have serious adverse impacts on nesting gallinule, due to inundation of nests, especially during the peak nesting season from March through September. Measures must be taken to avoid these impacts during this critical period.

Specific Comments

Cultural Resources

4D The conclusion that no direct impact on the Emerson Homestead will result from any of the proposed alternatives (Page IV-41) is subject to question. Figures 14A, B and C depict the boundary of the Historic Site in relation to the alternate Emerson Road Connector proposals. Alternate C would clearly involve taking of a portion of the site for highway construction. Alternate A may result in a significant increase in noise and pollution levels at the Historic Site due to the proximity of the highway corridor. Selection of Alternate C for the proposed project would likely require the preparation of a Section 4(f) Statement and approval by the Secretary of Transportation for taking of a portion of the Emerson Homestead Site, considered eligible for the National Register of Historic Places.

Recreational Resources

4E Figure 24, the Detailed Land Use Map for the North Shore Neighborhood, indicates that a portion of the Anahulu River Area is zoned for future park development. The City and County of Honolulu Department of Parks and Recreation has indicated that improved utilization of existing parks and improved traffic circulation in the area is more important than loss of potential park lands. Development of the park lands in the Analulu River area is not contemplated in the near future.

4F We suggest that the Department of Parks and Recreation be included in the corridor selection process to minimize loss of potential park lands.

4G Page IV-19 cites improved bicycle travel in the Haleiwa area as a direct beneficial impact of project completion. We suggest that inclusion of recreational facilities, such as hike-bikeways or rest areas, be evaluated for addition to the proposed project.

Fish and Wildlife Resources

4H In accordance with Section 7 of the Endangered Species Act of 1973, as amended, the Federal Highway Administration initiated formal consultations with the U.S. Fish and Wildlife Service regarding the proposed realignment of Kamehameha Highway from Weed Junction to Haleiwa Beach Park. On May 23, 1980, the Service rendered its biological opinion on the impacts of the proposed project on Federally-listed endangered species which inhabit Ukoa Marsh and adjacent wetlands.

Although this opinion was not issued prior to publication of the Draft Environmental Impact Statement, it serves as the basis for recommendations which the Service deems necessary to avoid adverse impacts on these species, particularly the Hawaiian gallinule (Gallinula chloropus sandvicensis). This document should be included as an appendix to the Final Environmental Impact Statement, and the recommendations therein addressed in the body of the Statement.

Foremost of these is the recommendation that alignment Alternative D be eliminated from further consideration because of its greater potential for adverse impacts on endangered species habitat than either Alternatives A or C.

Alternative D would cross the outlet of Ukoa Marsh at a wider point than A or C and would pass in closer proximity to the marsh proper. In addition, it could result in the elimination of up to 3.5 acres of wetland habitat on the south bank of the Anahulu River, now cultivated in lotus and taro. This area is known to provide valuable feeding and nesting habitat for gallinule, as well as feeding habitat for the Hawaiian stilt (Himantopus mexicanus knudseni).

Page III-10, paragraph 2, line 4: Change "Leucaena latisfliqua" to "Leucaena leucocephala".

Page IV-7, paragraph 4: The U.S. Fish and Wildlife Service considers the lotus ponds to be important feeding and nesting habitat for the Hawaiian gallinule.

Summary

Because of the greater potential of Alternative D to adversely impact the habitat of two endangered species, we recommend that this alternative be dropped from further consideration.

Thank you for the opportunity to comment on this document. If you have any questions, please contact me directly.

Sincerely yours,

Patricia A. Port

Patricia Sanderson Port
Regional Environmental Officer

cc: Director, OEPR (w/copy incoming)
Director, Fish and Wildlife Service
Director, Heritage Conservation & Recreation Service
Director, Geological Survey
Reg. Dir., FWS
Reg. Dir., HCRS
Reg. Dir., GS

U.S. DEPARTMENT OF THE INTERIOR, OFFICE OF THE SECRETARY 6/4/80

A. The site boundaries indicated for the "Emerson Homestead" on Figures 14A, B, and C of the DEIS were informally proposed by the State Department of Land and Natural Resources prior to conducting a thorough site or archival research. Consequently, they were only "advisory" in nature. The archaeological and historical study conducted for this project revealed that the Emerson Homestead no longer exists. The only remains is a single building (Site 1442) that was apparently contemporary with the Emerson home. There is therefore no justification for retaining the boundaries indicated on Figures 14A, B, and C, so they have been deleted from this Final EIS. Site 1442 will not be directly or indirectly (e.g. noise) affected by the recommended Alternate C. A driveway and a row of houses, a distance of 130 feet, separates site 1442 from the proposed roadway (see Figure 14A, page 11-14). The State Historic Preservation Officer has also concurred that site 1442 will not be affected. Secondly, the area designated for park use at the Anahulu River as shown on the Detailed Land Use Map (Figure 24) will be greatly reduced when the Development Plan Map (Figure 25) is adopted by the City and County of Honolulu. When this occurs, none of the alternates will affect existing or proposed park lands. For these reasons, a Section 4(f) Statement is not justified for this project.

B. The USFWS Biological Opinion on this project is included in Chapter V (Approvals and Clearances) of this FEIS. The endangered waterbirds and their habitat are discussed on pages III-10 to 13 and on pages IV-6 to 8. Alternate D is no longer being considered.

C. Surface flow out of Ukoa Marsh is controlled by a weir at the Loko Ea fishpond, and by the dense aquatic vegetation in the lengthy outlet channel. Under these existing conditions, a backwater effect will occur from a major storm. When temporary fill is placed in the channel during construction, culverts will be provided to accommodate storm flows. However, backwater from the remaining vegetation clogged channel is still likely. Correction of this problem is beyond the scope of this project. The changes in the channel resulting from removal of the fill will be so minor as to have virtually no effect on its hydraulic behavior.

EVALUATION (Continued)

U.S. DEPARTMENT OF THE INTERIOR, OFFICE OF THE SECRETARY 6/4/80

4D. With respect to the "boundaries" of the Emerson Homestead site, refer to the evaluation of comment A. The noise level at Site 1442 resulting from Bypass Alternate C will not exceed 65 dBA. For these reasons, we feel that the conclusion is still valid that there will be no impact on the Emerson Homestead. Therefore, a Section 4(f) Statement is not justified in this case.

4E. Refer to the evaluation of Comment A.

4F. The City and County Department of Parks and Recreation, and the State Division of Parkks were consulted prior to circulation of the DEIS (see pages VI-1, 2, 10, 18, and 19), and were included in the DEIS mailing list (pages VI-34, 35). The City and County states that the project will not have any detrimental impact on their recreational facilities.

4G. Bicyclists will be able to utilize the paved shoulders of the Bypass. Hiking can not be promoted outside of the right-of-way since it passes through private property. Due to the relatively short length of the bypass and the proximity of Haleiwa with its parks and other amenities, rest areas are not justified.

4H. Alternate C has been selected, see evaluation of Comments B and C. The specific name of Leucaena has been corrected. The reference to the marsh crossed by Alternate D has been revised.

VI-43

Rcd 6/9/80

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

PACIFIC-ASIA REGION
P. O. BOX 50109
HONOLULU, HAWAII 96850

Mr. Ralph T. Segawa
Division Administrator
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa;

This is in response to your April 18 request, HDA-HI, for comment on the DEIS for the Kamehameha Highway Realignment at Haleiwa.

We have reviewed the DEIS and find that it does not impact any of the program areas of the FAA Pacific-Asia Region. Therefore, we have no comment on the proposed action.

Thank you for the opportunity to comment.

Sincerely,

Horace O. Adams
HORACE O. ADAMS
International Aviation Affairs Officer

NO EVALUATION REQUIRED

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

COMMANDER (dpl)
Fourteenth Coast Guard District
Prince Kalanianaole Federal Bldg.
300 Ala Moana Blvd.
Honolulu, Hawaii 96850

16450
13 May 1980

U.S. Department of Transportation
Federal Highway Administration
Region Nine
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Gentlemen:

The Coast Guard has reviewed the Environmental Impact Statement on the Construction of Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park and has no objection to the plan or constructive comments to offer at the present time.

Sincerely,

J. P. OTRANTO
Commander, U. S. Coast Guard
District Planning Officer
Fourteenth Coast Guard District
By Direction of the District Commander

VI-46

Copy to:
COMDT (G-WEP/7)

NO EVALUATION REQUIRED

Form DOT F 1320.1 (1-69)

DEPARTMENT OF TRANSPORTATION
OFFICE OF THE SECRETARY
UNITED STATES GOVERNMENT

memorandum

Subject: HAWAII
Draft Environmental Impact Statement for Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park, F-083-1(5), City and County of Honolulu, FHWA-HI-EIS-80-01-D

Date: 2 JUL 1980

From: Director, Office of Environment and Safety

Reply to Attn. of:

To: Chief, Environmental Programs Division, HHA/HEV-10

We have reviewed the draft EIS for the Kamehameha Highway realignment, a proposed bypass around Haleiwa. We have the following comments:

Land Use Impacts. The final EIS should discuss actions which will be taken to control new highway-oriented commercial development at the northern end of the project, since such development might adversely impact the existing Haleiwa business district. If Alternative D is selected, consideration should be given to eliminating the intersection at Emerson Road in order to minimize new development in areas currently zoned for agricultural uses.

Endangered Species Impacts. The final EIS should reflect the results of consultation with the Fish and Wildlife Service, including FWS's biological opinion on the impacts of the proposal on the Hawaiian Stilt, Hawaiian Coot, and Hawaiian Gallinule. These endangered water birds are found in the Ukoa Marsh near the proposed project.

Permits. We note that the project will require both bridge permits and section 404 permits. The final EIS should reflect coordination with the Coast Guard and the Corps of Engineers. The recently signed Memorandum of Agreement with the Corps provides for close coordination with the Corps prior to EIS approval. The final EIS should indicate the general location and amounts of fill and estimated construction grades.

Agricultural Lands. The proposed project will impact cane fields classified as prime and important agricultural lands. The selected alignment should minimize agricultural land taken by the project and left as remnant parcels (severed from cane fields).

We appreciate the opportunity to review this draft EIS.

Martin Convisser

EVALUATION

U.S. DEPARTMENT OF TRANSPORTATION, OFFICE OF THE SECRETARY

Land Use Impacts: Future use of the land is in the hands of the owner. Presently, land at the northern end of the project is zoned either agriculture or residential. Conversion to commercial usage will require compliance with zoning regulations and would require some measure of community support to be successful.
Alternate D is no longer being considered.

Endangered Species Impacts: The USFWS Biological opinion on this project is included in Chapter V (Approvals and Clearances) of this FEIS. The endangered waterbirds and their habitat are discussed on pages III-10 to 13 and pages IV 6-8.

Permits: Coordination with the Coast Guard and the Corps of Engineers has been reflected in the Final EIS. The bridge and Section 404 permits will be obtained when the construction plans are completed. The general location and amounts of cuts and fill and estimated construction grades are described in Chapter II-A, pages II - 1 to 16.

Agricultural Lands: The selected alignment (Alternate "C") minimizes the impact on agricultural lands.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

JUL 26 1 55 PM '80

DEPT OF TRANSPORTATION

Project #D-FHW-K40076-HI

Ryokichi Higashionna, Director
Department of Transportation
869 Punchbowl Street
Honolulu HI 96813

24 JUN 1980

Dear Mr. Higashionna:

The Environmental Protection Agency (EPA) has received and reviewed the Draft Environmental Impact Statement (DEIS) titled HALEIWA BYPASS, KAMEHAMEHA HIGHWAY REALIGNMENT FROM WEED JUNCTION TO HALEIWA BEACH.

The EPA's comments on the DEIS have been classified as Category LO-2. Definitions of the categories are provided by the enclosure. The classification and the date of the EPA's comments will be published in the Federal Register in accordance with our responsibility to inform the public of our views on proposed Federal Actions under Section 309 of the Clean Air Act. Our procedure is to categorize our comments on both the environmental consequences of the proposed action and the adequacy of the environmental statement.

The EPA appreciates the opportunity to comment on this DEIS and requests three copies of the Final Environmental Impact Statement when available.

If you have any questions regarding our comments, please comment Susan Sakaki, EIS Coordinator, at (415)556-7858.

Sincerely yours,

Jake Mackenzie

Jake Mackenzie, Director
Surveillance and Analysis Division

Enclosure

VI-47

Air Quality Comments

5-1. The DEIS uses the same traffic volumes to predict air quality impacts for the "with bypass" and "without bypass" cases (page C-6). Traffic volumes are, however, likely to be greater in the "with bypass" because: (1) traffic volume will be restricted by capacity restraints for the "without bypass" case during peak hours; and (2) as congestion is relieved and traffic flow speeds are increased, new traffic will probably use the new facility. Traffic volume predictions should be reanalyzed in the Final Environmental Impact Statement (FEIS) in light of the above comments.

5-2. The DEIS does not address the impact of the proposed project on the Federal and State 8-hour Carbon Monoxide Ambient Air Quality Standards. This issue should be addressed in the FEIS.

EIS CATEGORY CODES

Environmental Impact of the Action

LO—Lack of Objections

EPA has no objection to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER—Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU—Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1—Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2—Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3—Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

EVALUATION

U.S. ENVIRONMENTAL PROTECTION AGENCY 6/24/80

5-1. The traffic projections include all anticipated growth in traffic to the North Shore. This same traffic volume was then applied to the "with" and "without Bypass" situations to obtain extreme worst case conditions. The Bypass is not anticipated to have significant impact on growth (see page IV-1). Capacity of the highway will still be constrained by the adjacent two lane sections. It is pointed out in several places in the DEIS (pages I-11, and C-7) that the projected volume for 2001 will probably never be reached. Since this figure is used for the air quality analysis, and the results indicate that CO concentrations exceed the standards at worst only four times per year, it can be concluded that air quality is not a critical concern. Improved air quality is a benefit of the project, but the somewhat inflated values used in this analysis are not presentd as a justification for the project. The serious congestion through Haleiwa at the present time is the primary justification for the project.

5-2. The air quality assessment has been revised to include a discussion on 8-hour CO.

VI-48

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
P. O. BOX 119, HONOLULU, HAWAII 96810

HIDEO MURAKAMI
COMPTROLLER

MIKE N. TOKUNAGA
DEPUTY COMPTROLLER

LETTER NO. (P)1513.0

MAY 8 1980

Mr. Ralph T. Segawa
Division Administrator
Federal Highway Administration
U.S. Department of Transportation
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Subject: Hawaii F-083-1(5), Draft Environmental Impact Statement, FHWA-HI-EIS-80-01-D, Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

This is in response to your Letter No. HDA-HI dated April 18, 1980. We have reviewed the draft EIS and note that all of our comments or questions presented in our Letter No. (P)1337.9 dated April 12, 1979 have been answered in the subject report.

We understand that there will be only one cane haul road undercrossing and one connector road that will intersect the Kamehameha Highway By-Pass. These proposals were made clear in the discussion and description presented for Figures 11, 12A, 12B, 14A, 14B and 14C.

The clarification presented in the various alternate routes will assist us in determining the probable site of the proposed Waialua-Haleiwa Civic Center.

6A However, we do have a question in regards to the planned Emerson Road Connector. Figures 14A, 14B and 14C presents the alternate means of this connector route. It is presumed that Emerson Road will also continue beneath the proposed highway. This consideration was not addressed in any of the schematics or discussion presented in Chapter II of the EIS.

We are still in the planning process of the Waialua-Haleiwa Civic Center. As such, we would appreciate maintaining our

status as a consulted party for the subject project. If you have any questions, please call the Public Works Division at 548-5460.

Very truly yours,

HIDEO MURAKAMI
State Comptroller

STATE DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES 5/8/80

6A. Emerson Road will be provided with an at-grade crossing at the Bypass, not an underpass.

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD, HONOLULU, HAWAII 96816

VALENTINE A. SIFFERMANN
MAJOR GENERAL
ADJUTANT GENERAL

THOMAS S. TEO
BRIGADIER GENERAL
DEPUTY ADJUTANT GENERAL

HIENG

30 APR 1980

U.S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Gentlemen:

Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park

Thank you for sending us a copy of the above subject project Environmental Impact Statement. We have no comments to offer at this time. The attached document is returned for your use.

Sincerely,

Jerry M. Matsuda

JERRY M. MATSUDA
Captain, HANG
Contr & Engr Officer

OC-11

Enclosure

NO EVALUATION REQUIRED

GEORGE R. ARIYOSHI
GOVERNOR

CHARLES G. CLARK
SUPERINTENDENT

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

May 1, 1980

U.S. Dept. of Transportation
Federal Highway Administration
P.O. Box 50206
Honolulu, Hawaii 96850

Attn: Mr. Ralph T. Segawa
Division Administrator

Dear Mr. Segawa:

SUBJECT: Hawaii F-083-1(5), Draft Environmental Impact Statement, FHWA-HI-EIS-80-01-D, Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

Although we have no comments to offer at this time, may we reconfirm our earlier comments contained in our letter of March 21, 1979 as cited on page VI-8 of the EIS document.

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

Sincerely,

CHARLES G. CLARK
Superintendent

CGC:HL:jl

cc: Central Oahu District
Dept. of Transportation

NO EVALUATION REQUIRED

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

PROJECT OFFICES
WAIMEA OFFICE
P. O. BOX 175
KAMUELA, HAWAII 96743
KEAUKAHA OFFICE
P. O. BOX 833
HILO, HAWAII 96720

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1879
HONOLULU, HAWAII 96805

PROJECT OFFICES
MAUI OFFICE
P. O. BOX 32
KAHULUI, MAUI 96732
MOLOKAI OFFICE
P. O. BOX 190
HOOLEHUA, MOLOKAI 96729
KAUAI OFFICE
P. O. BOX 332
LIHUE, KAUAI 96766

May 1, 1980

Mr. Ralph T. Segawa, Division Administrator
U. S. Department of Transportation
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

SUBJECT: Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park
Comments on Draft EIS

VT-C1

The Department of Hawaiian Home Lands has reviewed the draft EIS on the subject project and has no comments, as the proposed action would not have any effects on the lands under our jurisdiction.

Thank you for the opportunity to review and comment on the proposed action.

Sincerely yours,

Georgiana K. Padeken
Chairman

GKP:GW:jn

Attachment

NO EVALUATION REQUIRED

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

GEORGE A. L. YUEN
DIRECTOR OF HEALTH

VERNE C. WAITE, M.D.
DEPUTY DIRECTOR OF HEALTH

HENRY N. THOMPSON, M.A.
DEPUTY DIRECTOR OF HEALTH

JAMES G. KUNAGAI, Ph.D., P.E.
DEPUTY DIRECTOR OF HEALTH

FADAO BEPPU
DEPUTY DIRECTOR OF HEALTH

May 13, 1980

In reply, please refer to:
File: EPHS-SS

MEMORANDUM

To: Mr. Ralph T. Segawa, Division Administrator
Federal Highway Administration, U.S. DOT

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

Thank you for allowing us to review and comment on the subject EIS. On the basis that the project will comply with all applicable Public Health Regulations, please be informed that we do not have any objections to this project.

7A The short term primary impact on air from construction activities and proposed mitigation measures should be discussed.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

by MELVIN K. KOIZUMI

cc: Office of Environmental Quality Control

EVALUATION

STATE DEPARTMENT OF HEALTH 5/13/80

7 A. A discussion of construction-related air quality impacts is included in the Final EIS on page IV-11.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

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

May 28, 1980

REF. NO.: APO-1682
YOUR REF. NO.: HDA-HI

Mr. Ralph T. Segawa
Division Administrator
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

We have reviewed the Haleiwa Bypass Draft EIS and find that the archaeological resources have been adequately addressed. We would like to note that if Alternate D is chosen, it would have an effect on Site 1441, a site likely to be eligible to the National Register of Historic Places
8A based on the criteria set forth in 36 CFR 63 and 36 CFR 800. It is recommended that the U. S. Department of Transportation request an opinion, in writing, from the Secretary of the Interior respecting the eligibility of this site for inclusion in the National Register before any further determination of effect is applied, if this route is chosen.

8B The draft EIS adequately covers the concerns for Hawaii's endangered waterbirds found utilizing Ukoa Marsh except that there is no assurance that the bypass would not cause a change in the water level at Ukoa Marsh, such as clearing or widening the outlet, especially during the construction phase. Also, there was no mention of an alternate route that would entirely bypass Ukoa Marsh. As a reminder, it is not clear whether the U. S. Department of Transportation has met with the USFWS Endangered Species Office for consultation in accordance with the 1973 Endangered Species Act, a necessary procedure when Federal funds are to be used on a project that may affect endangered species or their habitat.

Very truly yours,

SUSUMU ONO, Chairman
Board of Land and Natural Resources

EVALUATION

STATE DEPARTMENT OF LAND AND NATURAL RESOURCES 5/28/80

8A. Alternate D has been rejected in favor of Alternate C, which will have no effect on the identified cultural resources.

8B. Surface flow out of Ukoa Marsh is controlled by a weir at the Loko Ea fishpond and by the dense aquatic vegetation in the lengthy outlet channel. The minor changes in the channel resulting from construction will not affect either of these factors, so no effect on the water level in the marsh is expected.

There is only one route that would circumvent the marsh and stil meet the traffic engineering criteria of the project. This would be to extend the Bypass along the inland side of the marsh, rejoining Kamehameha Highway beyond Kawailoa Road. This would add approximately one mile to the length of the project and increase the cost by at least 40%. Furthermore, it would place the highway upstream from the marsh (as opposed to the proposed downstream location), where there would be a potential for intercepting surface flow to the marsh and introducing roadway pollutants into the primary waterbird habitat.

The USFWS Biological Opinion is included in Chapter V of this Final EIS.

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
Kamamalu Building 250 South King St. Honolulu, Hawaii · Mailing Address P.O. Box 2359 Honolulu, Hawaii 96804

GEORGE R. ARIYOSHI
HIDETO KONO
FRANK SKRIVANEK

June 24, 1980

Ref. No. 1584

Mr. Ralph T. Segawa
Division Administrator
Federal Highway Administration
U.S. Department of Transportation
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Subject: Haleiwa Bypass Draft Environmental Impact Statement

We have reviewed the subject draft EIS and offer the following comments for your consideration.

9 1) The narrative discussion on potential environmental impacts and proposed mitigating measures within Chapter IV does not specify the anticipated duration of construction activity for the proposed alternative alignments. The omission of a construction time framework makes it difficult to adequately assess the permanence or severity of identified impacts to the environment and community.

9 2) As the draft EIS indicates that the proposed project may significantly impact various coastal ecosystems and resources near Haleiwa, may we recommend that the final EIS assess pertinent objectives and policies of the Hawaii Coastal Zone Management Program, as contained within Chapter 205A, Hawaii Revised Statutes.

For example, it is an objective of the Hawaii Coastal Zone Management Program to "protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems" [Chapter 205A § (2)(b)(3)]. Chapter 205A also contains objectives and policies dealing with Scenic and Open Space Resources, Coastal Hazards, and Historic Resources. Appropriate policies should be assessed, and where required, mitigating measures proposed to ensure that the subject highway construction project conforms with Federal consistency provisions of the Hawaii Coastal Zone Program. For a list of Federal licenses and permits

subject to Consistency Review, refer to Appendix 14 of the Final EIS for the Hawaii Coastal Zone Management Program.

Thank you for the opportunity to review and comment upon this document.

Sincerely,

Frank Ikeuchi

for Hideto Kono

cc: Dr. Ryokichi Higashionna, Director
Department of Transportation
State of Hawaii

Mr. Richard O'Connell, Director
Office of Environmental Quality Control

EVALUATION

STATE DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT 6/24/80

9·1. The duration of construction activities has been included in a revised discussion of air quality and noise impacts in Chapter IV, Section B, Paragraphs 6 and 7.

9·2. The objectives and policies of the Hawaii CZM Program are included in an expanded discussion of Government Policies in Chapter IV, Section G.

GEORGE R. ARIYOSHI
GOVERNOR

DONALD A. BREMNER
Chairman

Executive Secretary

TELEPHONE NO.
(808) 548-6915

STATE OF HAWAII
ENVIRONMENTAL QUALITY COMMISSION
OFFICE OF THE GOVERNOR
550 HALEKAUWILA ST
ROOM 301
HONOLULU, HAWAII 96813

May 8, 1980

Mr. Ralph Segawa
Division Administrator
Federal Highway Administration
U.S. Department of Transportation
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Dear Mr. Segawa,

SUBJECT: EIS FOR KAMEHAMEHA HIGHWAY REALIGNMENT, WEED JUNCTION TO HALEIWA BEACH PARK, OAHU

This EIS was officially received by the EQC on May 5, 1980.

Availability of the EIS was published in the May 8, 1980, EQC Bulletin. The deadline date for comments was noted as June 25, 1980, although according to EQC Rules and Regulations (1:61), the 30-day review period would end on June 7, 1980.

Please send us a copy of the Final EIS when it becomes available.

Sincerely,

for Donald A. Bremner
Chairman

cc: OEQC

VI-35

NO EVALUATION REQUIRED

GEORGE R. ARIYOSHI
GOVERNOR

RICHARD O'CONNELL
DIRECTOR

TELEPHONE NO.
548-6915

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
OFFICE OF THE GOVERNOR
550 HALEKAUWILA ST
ROOM 301
HONOLULU, HAWAII 96813

June 25, 1980

Mr. Ralph Segawa
Division Administrator
Federal Highway Administration
U.S. Department of Transportation
P.O. Box 50206
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Dear Mr. Segawa:

SUBJECT: Draft Environmental Impact Statement for the Haleiwa Bypass, Kamehameha Highway Realignment, Oahu

We have reviewed the subject statement and offer the following comments:

10 1) It should be indicated either on the title or summary page that this EIS is intended to satisfy the State's Chapter 343, HRS requirements and should also state that the Governor is the accepting authority for the State EIS.

10 2) Page I-3. This figure and all the others using the 1:24000 topographic map as a base are outdated due to the shoreline modification near the Haleiwa Boat Harbor.

10 3) Page I-7. The bypass will also provide for a quicker evacuation of the North Shore during times of extremely high surf and tsunamis, as in the case of the recently built Kalapana bypass on Hawaii Island.

10 4) Page I-8. What is "3% of D.H.V.?" D.V.H. is not defined.

10 5) Page III-8. We believe that the tsunami inundation area is further inland than that shown in figure 17, 17A and 17B. Previous tsunamis have impacted portions of Haleiwa south of the Anahulu River Bridge. Also, the realigned shoreline at the mouth of the Anahulu River has decreased the river's length by approximately 1,000 feet. This shortening of length and realignment does not appear to have been considered in the planning for this project. The potential effects of a tsunami on the proposed project should be closely examined in light of the shoreline modifications that have taken place. We also note that the civil defense tsunami inundation maps show a larger area of tsunami inundation than do figures 17, 17A and 17B (see attached sheet).

10 6) Page III-17. It might be mentioned that the Haleiwa area was formerly served by a railroad which brought visitors to the Haleiwa Hotel.

10 7) Page IV-3. The potential use of the remnant agricultural parcels for agricultural or aquacultural uses other than sugar should not be overlooked, especially if the zoning is for agriculture.

10 8) Page IV-8. The flood hazard evaluation should also discuss potential tsunami inundation as mentioned above.

10 9) Page IV-10. Will a reduction in sugar lands have any effect on Ukoa marsh through a reduction in water pumping?

10 10) Page IV-15. The visual impact of the proposed Anahulu Stream bridge structure for alignments A and C can be mitigated in part by providing planter boxes along the downstream side of the bridge structure. Another mitigation alternative is to paint the bridge green on the downstream side to blend with the existing vegetation.

10 11) Page IV-22. We believe that the values for sugar and molasses have recently increased, making the economic impacts understated. Will the abandoned cane haul roads be put back into cane cultivation?

VI-56

10 12) Page IV-31. If the bypass is south of Pupukea, how will Sunset Beach residents, who live north of Pupukea, find it more convenient to shop in Pupukea due to the bypass? The long-term effects of increasing gas prices may encourage more shopping in Haleiwa by North Shore residents than at present.

The EIS regulations allow the accepting authority to consider responses received beyond the fourteen day response period. We intend to consider such responses to comments on this EIS.

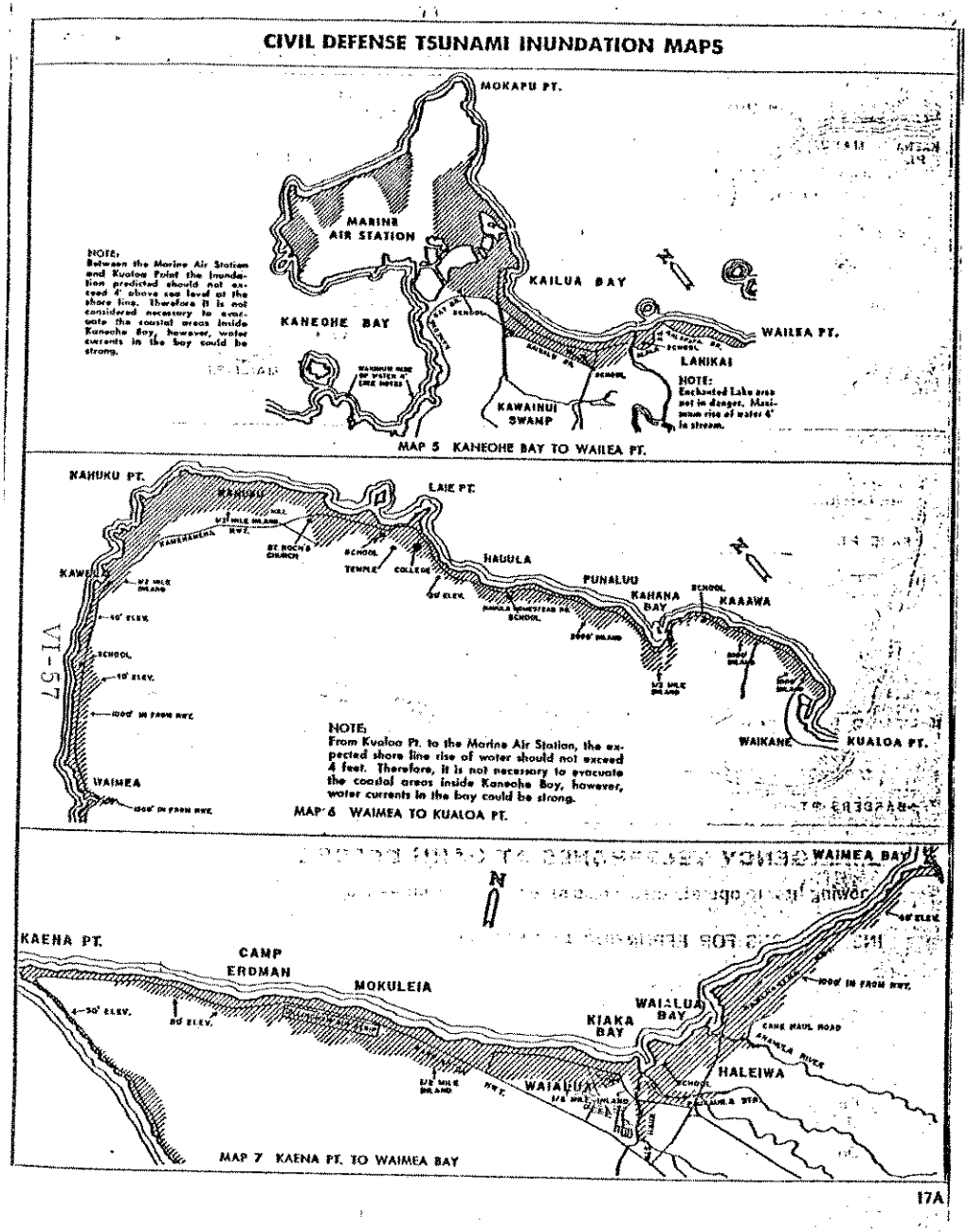
We thank you for the opportunity to review the subject EIS and look forward to the revised statement.

Sincerely,

Richard L. O'Connell
Director

Enclosure

cc: State DOT (w/enclosure)



17A

EVALUATION

STATE OFFICE OF ENVIRONMENTAL QUALITY CONTROL 6/25/80

10 1. Reference to HRS 343 has been added to the FEIS title page.

10 2. The shoreline on Figure 2 has been revised to show the Haleiwa Boat Harbor, and a notation refering to this correction has been added to the remaining figures.

10 3. This comment has been added to the FEIS.

10 4. DHV refers to Design Hourly Volume, in this case the peak weekend one-hour traffic volume in the year 2001

10 5. The recently-adopted U.S. Department of Housing and Urban Development "Flood Insurance Rate Maps" were used for the design parameters on this project, and were the source of Figures 17, 17A, and 17B. It is felt that these maps are more appropriate for the purposes of this project than the generalized Civil Defense maps.

10 6. Thank you for this information.

10 7. Future use of the land is obviously, in the hands of the owner. In discussing the conversion of the land to urban use, the EIS brings to light the "worst case" situation from the standpoint of the community's expressed desire to retain a rural atmosphere. Conversion to urban use would require changes in both State and County zoning designations which would require some measure of community support to be successful. Therefore, it is most likely that, for the time being, the remnant parcels will remain in some form of agricultural use, if they are used at all.

10 8. According to the current Flood Insurance Rate Maps, the Bypass is not subject to tsunami inundation.

10 9. The cane lands affected by the project are irrigated from the Wahiawa Ditch, which is fed by Wilson Reservoir.

10 10. These ideas will be considered during the design phase. However, they may pose a very costly maintenance problem.

10 11. The calculations on cane land value have been updated. The abandoned cane roads below the bypass will be part of the remnant parcels, but those above the bypass may eventually be included in the cane fields.

10 12. This concern of some Haleiwa store owners is based on the assumption that people do much of their shopping in Haleiwa on their way home from work in Wahiawa and Honolulu. Some merchants felt that if these commuters can bypass Haleiwa, it might be more convenient to stop in Pupukea.

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

Office of the Director

June 17, 1980

RE:0308

Mr. Ralph Segawa, Division Administrator
Federal Highway Administration
U.S. Department of Transportation
P.O. Box 50206
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Draft Environmental Impact Statement
Haleiwa Bypass
Haleiwa, Oahu

The Environmental Center has reviewed the above cited document with the assistance of Winona Char, Botany; James Yamamoto, Urban and Regional Planning; and Colleen Brady, John Sorensen, Environmental Center. Our reviewers have found the DEIS to be well written and the information clearly presented. There are, however, a few areas that require additional comments.

11 A Traffic Accidents

The DEIS states, in the chapter dealing with purpose and need for the project, that "a clear indication of the need for improving traffic flow through Haleiwa is the high rate of accidents that have occurred in town as opposed to adjacent highway segments" (p. I-1). The document goes on to state, "The reasons for the relatively high accident rates in Haleiwa are the mixture of through traffic with cross traffic, turning movements, and other distractions that occur in town but are not as frequent on the open highway" (p. I-4). The assumption that a bypass will resolve this basic problem deserves closer scrutiny. The increased speeds at which motorists will be traveling on the bypass, combined with the left-turn traffic at the three proposed intersections connecting the bypass to Kamehameha Highway may well create a significant accident rate of its own. There should be a statement that addresses the accident potential associated with the proposed bypass and how the new combined rate compares to the rate without the bypass.

11 B Congestion

The DEIS states that one major problem with the highway, as it exists, is that its capacity through Haleiwa is not adequate for the present traffic volume. The Anahulu River bridge is cited as a significant constraint to traffic flow, because it is barely wide

enough for two autos, and not wide enough for an auto and a truck or a bus to pass. It is questionable as to whether the proposed bypass will alleviate this traffic hazard. As it is the expressed desire of the Haleiwa business community to maintain its position as a tourist attraction, tour bus traffic will most likely be encouraged to continue utilizing the present route through town, thereby perpetuating the traffic congestion and resultant traffic hazard at the Anahulu River bridge.

11 C Vegetation Surveys

In the Vegetation Section, the report states, "with the exception of some of the marsh plants, virtually none of the vegetation encountered by the bypass is native to Hawaii, likewise, rare endangered plants are not found in the project area due to the long history of cultivation" (p. III-10). Is this determination an assumption or was a field survey actually performed? A paragraph concerning the methods utilized to make this determination would be appropriate.

11 D Remnant Agricultural Lands

An expanded discussion should be included as regards the future use of the remnant agricultural lands that the proposed bypass will create. The nature of the use to which these lands are put may result in significant secondary social and environmental impacts.

11 E Impact on North Shore Residents

VI-59

The DEIS states that, "while the increased accessibility of the North Shore will be a benefit to weekend travelers seeking escape from the urban environment of Honolulu, increased use of beaches, parks, and roadways of Haleiwa will not have a negative impact on North Shore residents" (p. IV-18). However, the residents of Kahuku may be the indirect beneficiaries of the proposed Haleiwa bypass. The bypass design suggests a four-lane roadbed but a two-lane design---accommodating a future expansion capacity based on projected growth in Kahuku. As was stated in the DEIS (p. III-39), North Shore residents would like to maintain their rural character which may suggest that having the bypass would disturb this possibility. Was input solicited from residents of Kahuku or other areas on the North Shore in the preparation of this document?

11 F Alternatives

It appears that Alternatives A and C will have fewer potential negative environmental impacts. Alternative D eliminates several small lotus and taro terraces and infringes more extensively upon Ukoa Pond. This could result in further disruption to the habitat of the endangered species of birds that frequent or reside in the area. As was stated in the DEIS, a 1977 State Senate Concurrent Resolution urges preservation of agricultural lands where taro can be grown, and also that the removal of wildlife habitat should be minimized, and any disturbance of endangered species should be strictly avoided.

Thank you for the opportunity to comment on this document.

Sincerely,

Doak C. Cox
Director

DCC/cu

cc: OEQC
Department of Transportation
Winona Char
James Yamamoto
Colleen Brady
John Sorensen

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

KAZU HAYASHIDA
Manager and Chief Engineer

May 16, 1980

Mr. Ralph T. Segawa
Division Administrator
U. S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Subject: Your Letter of April 18, 1980, on the Draft Environmental Impact Statement for the Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

We do not anticipate any adverse effects to existing or future potable water resources from the proposed project. However, the construction plans should be submitted to us so that we can coordinate the pipeline from our proposed Paalaa Kai Wells with the highway realignment. This pipeline is presently under construction and is expected to be completed before the roadway construction is initiated.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

NO EVALUATION REQUIRED

Pure Water ... man's greatest need ... use it wisely

EVALUATION

UNIVERSITY OF HAWAII ENVIRONMENTAL CENTER 6/17/80

II A. Higher speeds do not necessarily result in accidents if the roadway is designed for higher speeds. The intersections will be provided with protected left-turn lanes with adequate sight distances in all directions. The accident rate on the Bypass and the resulting overall improvement is addressed on Page I-7.

II B. No claim is made that the Bypass will alleviate the hazards of the Anahulu River Bridge. Rather, it will circumvent those hazards.

II C. Observations on the vegetation were made by VTN Pacific's staff environmental biologist. The judgement on the likelihood of rare or endangered plants in the area was derived from these observations and from informal consultation with USFWS botanist Derral Herbst.

II D. Future use of the land is, obviously, in the hands of the owner. In discussing the conversion of the land to urban use, the EIS brings to light the "worst case" situation from the standpoint of the community's expressed desire to retain a rural atmosphere. Conversion to urban use would require changes in both State and County zoning designations which would require some measure of community support to be successful. Therefore, it is most likely that, for the time being, the remnant parcels will remain in some form of agricultural use, if they are used at all.

II E. A four lane right-of-way is proposed so as not to foreclose the option of expansion should it prove necessary in the future. No proposal is being made to widen adjacent highway sections to four lanes. Therefore, the Bypass, in itself, will not have a significant growth inducing impact. It will only eliminate one of the bottlenecks along the North Shore. Although the EIS Preparation Notice was not sent directly to the Kahuku Neighborhood Board, its availability was published in the EQC Bulletin, and that community has had notice of all public information meetings through legal notices published in the major newspapers.

II F. Alternate C has been selected as the recommended alignment.

BUILDING DEPARTMENT
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
850 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

HOWARD M. SHIMA
DIRECTOR AND BUILDING SUPERINTENDENT

PB 80-339

May 7, 1980

Mr. Ryokichi Higashionna
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Higashionna:

Subject: Haleiwa Bypass Draft EIS
Kamehameha Highway Realignment
Weed Junction to Haleiwa Beach Park

VI-61

In reference to your letter HDA-HI, dated April 18, 1980, the Building Department has no comments.

Thank you for the opportunity to comment on the draft EIS.

Very truly yours,

HOWARD M. SHIMA
Director and Building Superintendent

AF:lo
cc: J. Harada

NO EVALUATION REQUIRED

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

GEORGE S. HONIGUCHI
CHIEF PLANNING OFFICER

DGP4/80-1110(CT)

May 30, 1980

U. S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Gentlemen:

Draft Environmental Impact Statement for
Haleiwa Bypass, FAP Route 83 Weed Junction
to Haleiwa Beach Park, Project No. F-083-1(5)

We have reviewed the draft impact statement and offer the following comments.

12 A Impact on Lotus Root Farming

In our comments of March 21, 1979 on the EIS preparation notice, we noted

> "6. Haleiwa is the area in which most of Oahu's lotus roots (hasu) are grown. Will any hasu-producing areas be affected by highway construction or drainage from the highways?" (dEIS, p. VI-15).

We received the following response dated May 29, 1979:

> "The alternative alignments being considered will not affect any areas of current lotus farming" (dEIS, p. VI-16).

The draft EIS indicates

> "A small marsh, now cultivated in lotus is located on the south bank of the Anahulu River at the bend (Figure 18)" (dEIS, p. III-10).

Figure 18 shows one of the highway alignments passing through the lotus area.

Later, it is indicated

> "If alternative D is selected, the State policy to preserve wetland cultivation (e.g., taro and lotus) will be infringed upon. A formal wetlands finding pursuant to E.O. 11990 will be included in the Final EIS, if it is warranted" (dEIS, p. IV-8).

The draft EIS appears to contradict the response from the State Director of Transportation.

12 B Relationship to County Development Plan

The dEIS recognizes that the preliminary Development Plan Map does not show the proposed bypass highway or other proposed roadways. But it indicates

> "Transportation guidelines in the Development Plan state that the land transportation system should conform to the Oahu Metropolitan Planning Organization's Long Range Transportation Plan" (dEIS, p. III-47).

VI-62

This reference to OMPO's Tranportation Plan is no longer in the Development Plan Ordinance, dated April 1980, now being considered by the City Planning Commission.

12 C Impact on Marsh

The impact of Alternate D is discussed in the dEIS.

> "Constructing a viaduct across this area would unavoidably eliminate some, but not necessarily all, of the cultivated terraces. The viaduct will be located downslope from the springs that feed this marsh, but there is the possibility that highway construction could decrease their flow. It is difficult to predict the nature of this potential impact without test borings and detailed plans for the viaduct footings (see Ground Water, below" (dEIS, p. IV-7).

In view of ground water problems and community concerns, is Alternate D a viable alternative?

12 D Connection to Emerson Road

What is being proposed at this time is a two-lane highway, extending for about 2.3 miles, a relatively short distance. Ultimately, a four-lane facility is planned. Grade separations are presently proposed for the cane haul road or roads that may have to cross the proposed bypass.

In the light of highway standards, the EIS should discuss first, the need for the intervening connection from the bypass to Haleiwa town, and second, the basis for the selection of Emerson Road with an intersection seemingly at grade, rather than at some other intervening location, say at Opaeula Road.

The criteria used for the selection of Emerson Road for the proposed intersection should be discussed in the draft EIS.

Thank you for affording us the opportunity of reviewing the impact statement.

Sincerely,

GEORGE S. MORIGUCHI
Chief Planning Officer

GSM:fmt

EVALUATION

CITY AND COUNTY DEPARTMENT OF GENERAL PLANNING 5/30/80

12 A. At the time the response to your letter was written, it was thought that only taro was being cultivated in the marsh under question. Subsequent investigation revealed that hasu is also present.

12 B. This reference will be deleted.

12 C. For these and other reasons, Alternate D is no longer considered a viable alternative.

12 D. A grade separation is only proposed for the cane haul road. Emerson road will have an at-grade crossing. Emerson Road was selected as the intervening connection in order to serve the existing residences in Anahulu Valley. Any other road would have meant mixing residential and cane haul traffic.

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4432

FRANK F. FASI
MAYOR

TYRONE T. KUSAO
DIRECTOR

79/EC-6(SM)
LU4/80-1930

May 12, 1980

Mr. Ralph Segawa, Division
Administrator
Federal Highway Administration
U.S. Department of Transportation
P.O. Box 50206
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Draft Environmental Impact Statement
Haleiwa Bypass
FAP Route 83-Weed Junction to Haleiwa Beach Park

We have reviewed the above and have found it to be a thorough disclosure of the proposed project. Therefore, we have no substantive comments to offer. However, it should be noted that Chapter II, "Alternatives Including the Proposed Action", in our copy of this document, was collated backwards.

We understand that the final selection of the preferred alternative will occur after a series of public hearings, and that we will be apprised of that selection at the time that you apply for a Shoreline Management Permit.

If there are any questions, please contact Sampson Mar of our staff at 523-4077.

Very truly yours,

TYRONE T. KUSAO
Director of Land Utilization

TTK:sl

NO EVALUATION REQUIRED

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

DIRECTOR

May 12, 1980

Mr. Ralph T. Segawa, Division Administrator
U.S. Department of Transportation
Federal Highway Administration
Region Nine, Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

VI-64

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT
KAMEHAMEHA HIGHWAY REALIGNMENT,
WEED JUNCTION TO HALEIWA BEACH PARK

The proposed action will not have any detrimental impact on our recreational facilities in the area.

Thank you for the opportunity to comment on this project.

Warm regards.

Sincerely,

GILBERT SCOTT, SR.
Acting Director

NO EVALUATION REQUIRED

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

WALLACE MIYAHIRA
DIRECTOR AND CHIEF ENGINEER

ENV 80-137

April 30, 1980

U. S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Gentlemen:

Subject: Hawaii F-083-1(5), DEIS,
FHWA-HI-EIS-80-01-D,
Kamehameha Highway Realignment,
Weed Junction to Haleiwa Beach Park

We have reviewed the subject DEIS and have no additional comments.

Very truly yours,

WALLACE MIYAHIRA
Director and Chief Engineer

NO EVALUATION REQUIRED

DEPARTMENT OF TRANSPORTATION SERVICES

CITY AND COUNTY OF HONOLULU

HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

DIRECTOR

TE580-1309

May 15, 1980

Mr. Ralph T. Segawa
Division Administrator
U. S. Department of Transportation
Federal Highway Administration
Region Nine
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Subject: Your letter dated April 18, 1980 (HDA-HI) Regarding Hawaii F-083-1(5), Draft Environmental Impact Statement, FHWA-HI-EIS-80-01-D, Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

VI-6

We have reviewed the Environmental Impact Statement for this project and have no comments on its contents. However, we call your attention to Chapter II which is bound backwards.

Please send us a copy of the final Environmental Impact Statement for our files.

Very truly yours,

AKIRA FUJITA
Acting Director

NO EVALUATION REQUIRED

HAWAIIAN TELEPHONE COMPANY

P O BOX 2200 • HONOLULU, HAWAII 96841 • TELEPHONE (808) 537-7111 • CABLE TELHAWAII

May 14, 1980

U.S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Gentlemen:

Hawaii F-083-1(5), Draft Environmental Impact Statement, FHWA-HI-EIS-80-01-D, Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

We have reviewed the subject Draft Environmental Impact Statement and have no other comments to offer or changes to make to our April 24, 1979 letter which is shown on Page VI-25 of this Draft EIS.

Sincerely,

Richard Mau
Engineering and Construction
Staff Manager

NO EVALUATION REQUIRED

LIFE OF THE LAND

A GROUP FOR ENVIRONMENTAL RESEARCH AND ACTION

June 3, 1980

Dr. Ryokichi Higashionna
Director, Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

Thank you for allowing us the opportunity to comment on the Haliewa Bypass Environmental Impact Statement, #FHWA-HI-EIS-80-01-D.

As stated previously, Life of the Land supports the Bypass project. We feel that the final choice in routes should be made by the affected community.

13 A,B However, we still have concerns as to the project's effects on endangered waterbirds and habitat in Ukoa marsh, and the long-range impacts on growth and land use along the highway, especially at access points.

Generally, the EIS is well-written and comprehensive, and appears to meet the necessary criteria as outlined in EIS Regulations 1:42.

Mahalo for your consideration.

Sincerely,

Dee Dee Letts
Executive Director

DDL/jdm

cc: South Shore Neighborhood Board No. 22

404 PIKOI STREET HONOLULU HAWAII 96814 TELEPHONE 521-1300

VI-66

EVALUATION

LIFE OF THE LAND JUNE 3, 1980

13A. We have taken every measure possible to minimize harm to Ukoa Marsh. Please refer to the USFWS Biological Opinion on Page V-13.

13B. Frontage on the bypass will not be permitted. Future land use authorizations elsewhere will, of course, be subject to zoning regulations.

NORTH SHORE NEIGHBORHOOD BOARD NO. 27
P. O. Box 607
HALEIWA, HAWAII 96712

June 24, 1980

U.S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Subject: Kamehameha Highway Realignment, Haleiwa Bypass, Project No. F-083-1(5), Island of Oahu

Attention: Ralph T. Segawa

Dear Mr. Segawa:

14A The North Shore Neighborhood Board supports Route C for the proposed Haleiwa Bypass with modification to the river crossing with respect to minimizing displacement of residents. The Board is concerned with the seven families and one farm that will be affected by route C. The Board recommends that modifications be made in the populated area to decrease the displacement of these families as in route D. The Board also recommends limiting the bypass right-of-way so that a two-lane highway, rather than an eventual four-lane highway, is the result.

VI-67

Sincerely yours,

Laura Bolles

Laura Bolles
Chairman
NSNB

PACIFIC RESOURCES, INC.
1000 BISHOP STREET
P.O. BOX 3379 HONOLULU, HAWAII 96842

April 29, 1980

Mr. Ralph T. Segawa
Division Administrator
U.S. Department of Transportation
Region Nine
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Subject: Hawaii F-083-1(5), Draft Environmental Impact Statement, FHWA-HI-EIS-80-01-D, Kamehameha Highway Realignment, Weed Junction to Haleiwa Beach Park

Thank you for allowing us the opportunity to review your Notice of Preparation for the proposed construction of approximately 2.3 miles of new roadway bypassing the town of Haleiwa.

We have no comments at this time.

Very truly yours,

Francis T. Tanaka
Government Affairs Coordinator

FTT:skk

cc: Chuck Fong

EVALUATION

NORTH SHORE NEIGHBORHOOD BOARD NO. 27 6/24/80

14A. Your concern for the displacement has been taken into account, and Alternate C has been revised accordingly. The present alignment will now remove only one house on Emerson Road, and one on the other side of the Anahulu River. A four lane right-of-way is proposed so as not to foreclose the option of expansion should it prove necessary in the future.

NO EVALUATION REQUIRED

Waialua Sugar Company, Inc.
P. O. Box 665
Waialua, Hawaii 96791

June 9, 1980

Dr. Ryokichi Higashionna, Director
Department of Transportation
State of Hawaii
369 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

The Waialua Sugar Co. wishes to restate its agreement with the need for and support of constructing a Haleiwa Bypass road.

89-1-68

Our comments on the Draft Environmental Impact Statement (DEIS) must be somewhat general at this time since a specific route has not yet been selected and details of construction not determined. However, the location of the Bypass will have a great impact on the Waialua Sugar Co. (WSCo) since the major portion of the Bypass will go over lands now cultivated by WSCo and the Bypass will require relocation of about 5,000 feet of our caneland roads.

Three alternates are presented in the DEIS - A, C and D. We have reviewed these with a view toward insuring that the relocated caneland roads continue to be functional for their primary use. It appears that the 250-foot radius on curves that we must have has been met. However, the 6% grades we find necessary are exceeded if the roads are located on the ground surface. The 6% grades can be obtained by cuts and fills, but this quickly leads to much greater area loss with the 2:1 maximum cut and fill side slopes.

15A

It appears that the further downslope the Bypass is located, the better the terrain on which to relocate the caneland roads. For this reason, we favor a combination of Alternates C and D - D to the point where it crosses C and then C crossing Anahulu Stream. The difficulty with D beyond crossing C is that its location further up (mauka) Anahulu gulch would make the caneland road route nearly impossible considering the steep rocky gulch shoulder above the canehaul road in this area. It also appears that with route D, the proximity of the canehaul road, the Emerson Road connection and the Bypass is undesirable.

We cannot overemphasize the need for acceptable grades and curves for the relocated canehaul road. Any change from the present will mean less desirable canehauling conditions resulting in increased canehauling costs which will continue in the future for half of our total cane area. Approximately 400,000 tons of field cane are hauled annually over the cane roads to be relocated. In 40 ton truck loads, this represents 17,500 hauler trips.

Besides the approximate 24.5 acres of caneland that will be lost to the Bypass itself, an additional 3 plus acres will be lost to relocation of the caneland road and both new road locations will result in approximately 40 acres of caneland that will become remnants because of the difficulty of irrigation, cultivation and harvesting certain areas below either of the roads. The differences in cane area lost in selecting any one of the three proposed routes are small.

Each of the three alternate routes for the Bypass will impact the WSCo powerline paralleling the Hawaiian Electric Co. powerline shown on the plan. Relocation of a portion of the powerline will be necessary.

We understand that relocation costs for the roads, powerline, water conveyances, etc. are part of the costs of the Bypass project. We do not expect any facilities to be upgraded but it will be necessary that roads are fully stabilized for our truck weights with equivalent surfaces.

Sincerely,

WAIALUA SUGAR COMPANY, INC.

F. C. Cross, Director
Civil Engineering and
Environmental Standards

EVALUATION

WAIALUA SUGAR COMPANY, INC. 6/9/80

15A. The grade on the cane haul road will be improved by moving Alternate C slightly makai. The State Highways Division will coordinate the design of the cane haul roads with the Waialua Sugar Company. Relocation costs will be part of the construction budget.

C. SUMMARY OF PUBLIC HEARING TESTIMONY

A combined highway corridor and design public hearing was conducted by the Department of Transportation in the Waialua Elementary School Cafetorium on June 10, 1980, at 7:50 P.M., to receive testimony and evidence relating to the location and design of the project. Approximately 65 people were present at the hearing.

The public was given up through June 25, 1980 to submit written testimonies.

James Carras, Deputy Director, Department of Transportation, State of Hawaii, was moderator for the hearing.

Mr. Carras briefly discussed the history of the project, the purpose of the public hearing, the guidelines for the hearing, the relocation program and the procedures relating to a final decision following the public hearing.

Yoshie Fujinaka, of Fujinaka & Fujinaka, Engineers, made the presentation for the Department of Transportation. Slides were used to describe the project and to summarize the major social, economic and environmental impacts associated with each of the proposed alternative alignments. Alternate C was mentioned as the preferred solution of the State.

The following is a summary of the testimonies received at the public hearing and of written testimonies received subsequent to the hearing, through June 25, 1980. An evaluation follows each testimony.

1. Testimony: Kenneth Asano, representing North Shore Neighborhood Board No. 27.

   The Board generally endorses Alternate C, but reserves the right to make a final statement after the public hearing, until June 25, 1980.

   Evaluation

   Alternate C is the preferred solution of the State, and community support will enhance the State's position.

2. Testimony: Merl Hawthorne, representing Waialua Community Association.

The Association agrees that the proposed bypass is needed to relieve traffic congestion in Haleiwa and supports the construction of Alternate C. The Board of Trustees favors "providing the necessary flexibility of modifying Route C which will maximize the needs of the community".

Evaluation

Alternate C is the preferred solution. If selected for final design, the vertical and horizontal alignments will be refined to minimize impacts.

3. Testimony: Fred Gross, Manager, representing Waialua Sugar Company.

The Waialua Sugar Company agrees on the need for a Haleiwa Bypass road. The location of the Bypass will have a great impact on cane land and roads, requiring approximately 24.5 acres of cane land for the Bypass, over 3 acres for relocated cane land roads plus approximately 40 acres of remnants, and the relocation of about 5,000 feet of cane land roads. Acceptable grades and curves for the relocated roads (6% maximum grade and 250-foot minimum radius) are important to maintain desirable cane hauling conditions and costs. Relocated roads must be fully stabilized to support truck weights. Relocation of a portion of the Waialua Sugar Company's power line paralleling the Hawaiian Electric Company's power line will be necessary. The Waialua Sugar Company prefers a combination of Alternates C and D, but if a combination route is at variance with the DEIS, Alternate C is acceptable.

Evaluation

The alignments of the relocated cane haul roads shown are preliminary. Once an alternate is selected, details of cane haul road design and power line relocation can be worked out with the plantation engineers to minimize the impact on plantation operations. A pavement structure equivalent to the existing cane haul roads will be provided for the relocated road.

4. Testimony: Robert Reeves, Resident.

The traffic projections do not take into account rising gasoline prices and decreasing automobile sales, and the possibility that vehicular traffic may decrease by the year 2001, so that a highway may not be needed. The speaker objects to a highway cutting through Haleiwa to provide freer transportation to the North Shore which would encourage development at Kuilima. He suggests that the highway be placed somewhere else. He does not want Haleiwa to change.

Evaluation

The North Shore area will continue to grow, and the Haleiwa Bypass is a feasible solution to the traffic congestion problem in Haleiwa. Community support for this project indicates that a problem does exist.

5. Written Testimony dated June 24, 1980: Laura Bolles, Chairman, North Shore Neighborhood Board No. 27.

The Board supports Alternate C, but recommends that it be modified at the Anahulu River crossing to decrease displacement of seven families and one farm affected by the route. It also recommends limiting the bypass right of way to a two-lane highway rather than for an eventual four-lane highway.

Evaluation

(See Evaluation 2).

By the year 2001, the proposed bypass may reach its design capacity, based on traffic projections. With land values escalating at present day rates, it would be more economical to initially acquire sufficient right of way to accommodate future needs.

A question and answer period followed the testimonies.

1. A question was raised in regard to relocation allowance and whether it included the price of the affected property. In the discussion that followed, it was explained that the relocation allowance does not include the price of property, and that property value would be set at prevailing market prices determined by two independent appraisers. It was also explained that the State would try to find comparable housing in the neighborhood for the displaced families.

Evaluation

Displacement of families by the bypass is of great concern to the community, as well as to the people directly affected by it. Although only a few families will be displaced by the proposed project, relocation assistance and financial compensation will not fully make up for the loss of the homes. The right of way requirements of the selected alternate should be refined during the design stage to impact as few families as possible.

2. Gordon Lorenzo, property owner, raised a question on what was considered peak hours in Haleiwa. It was explained that traffic projections were based on holiday and weekend traffic and that the peak hours were not the usual peak hours of downtown traffic. Mr. Lorenzo suggested that left turns be banned during peak hours in Haleiwa on Saturdays, Sundays and holidays, because he thought that vehicles making left turns at shopping areas caused much of the traffic congestion, and that traffic would flow freer if left turns were allowed only at Weed Junction and at Haleiwa Beach Park.

   Evaluation

   Weed Junction and Haleiwa Beach Park are almost 2 miles apart. Local traffic would be forced to travel a circuitous route to accommodate through traffic.

   Allowing U-turns at Haleiwa Beach Park during times of heavy park use could create additional problems of traffic circulation and safety.

There being no further questions, Mr. Carras closed the public hearing at 9:05 P.M.

D. UNRESOLVED ISSUES

At this stage of the project (Final EIS), there are no major unresolved issues. Alternate C is clearly a superior alignment, since it avoids the archaeological sites and wildlife habitat impacted by Alternate D, and is less costly than Alternate A. A number of project clearances are yet to be obtained (see Chapter V), but these can not be processed until construction plans are developed in more detail. The various concerns of the reviewing agencies that handle these permits have been addressed in this EIS. As indicated by the public hearing testimony, the proposed project has broad community support.

E. PREPARERS OF THE EIS

This Environmental Impact Statement was written under contract with the:

State of Hawaii
Department of Transportation
Highways Division
Project manager; Douglas Orimoto, P.E. Civil Engineering, Highway planning.

ENVIRONMENTAL CONSULTANT

VTN Pacific
1164 Bishop Street Suite 906
Honolulu, Hawaii 96813
Project Manager; Fred Proby, B.A. Environmental Biology (8 years experience in environmental analysis and planning)
Social Economist; Otis Ginoza, B.A. Economics and Enviromental Studies (2 years experience in socioeconomic studies).

SPECIAL STUDIES

Stream Survey; Amadeo Timbol, Ph.D. Zoology (10 years experience in fisheries studies and one of the State's foremost authorities on native stream fauna).
Archaeological Survey; Chiniago, Inc. William Barrera, Jr. President, M.A. Anthropology (10 years experience in archaeological research in Hawaii).

Historical Survey; Spencer Leineweber, A.I.A. Architect and Planner (5 years experience as an Architectural Historian).

Haleiwa Business Inventory; Hawaii Business Directory, Inc. John Witwer, President (20 years experience in data processing and compiler of exhaustive tabulation of Hawaiian businesses).

Economic Analysis; Otis Ginoza (2 years experience).

Noise Assessment; Fred Proby (6 years experience in noise monitoring and prediction, and State Dept. of Health certified for noise level measurements).

Air Quality Assessment; Fred Proby (4 years experience in air pollution studies), assisted by State DOT Materials Testing Branch, Gary Choy, P.E. Services and Development Engineer.

ENGINEERING CONSULTANT

Fujinaka & Fujinaka Engineers
23 South Vineyard Suite 201
Honolulu, Hawaii 96813

Project Manager; Ivan Fujinaka, P.E. Civil and Structural Engineering.

Project Engineer; Yoshie Fujinaka, P.E. Civil and Structural Engineering.

PERSONS CONTACTED BY VTN PACIFIC IN THE PREPARATION OF THE EIS

US Army Corps of Engineers
Rob Shallenberger, Ornithologist

US Fish and Wildlife Service
Maury Taylor, Field Supervisor, Div. of Ecological Services
Ernie Kosaka, Endangered Species Coordinator

US Soil Conservation Service
Dean Renner, Soil Scientist

Hawaii Division of Fish and Game
Tim Burr, Wildlife Biologist
Dave Woodside, Wildlife Biologist

Hawaii Historic Sites Office
Pat Beggerly, Archaeologist

City and County of Honolulu
Department of General Planning
Bennet Mark, Planner
Department of Land Utilization
Scott Ezer, Planner
Benjamin Torigoe, Planner

American Lung Association
Jim Morrow, Air Pollution Specialist

Waialua Sugar Company
Fred Gross, Chief Engineer

APPENDIX A

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION
CONCEPTUAL STAGE RELOCATION PROGRAM PLAN, KAMEHAMEHA HIGHWAY REALIGNMENT, WEED JUNCTION TO HALEIWA BEACH PARK
PROJECT NO. F-083-1(5), REVISED

The following is a discussion of our findings, the relocation problems we may encounter, if any, and their probable solutions for the various alternates under consideration for the project. Field inspections of the proposed alternates were conducted on September 18, 1979 and September 12, 1980.

The proposed project is located between Weed Junction and the north end of Haleiwa Beach Park, Haleiwa and is about 20 miles from Honolulu. It is within Census Tract 99-02-100. This area resembles a sleepy plantation town of the past.

The population of the area is approximately 9,171 with an ethnic composition of 32% Filipino (2,934), 31.8% Caucasian (2,195), 24.1% Japanese (2,211), 6.7% Hawaiian/Part Hawaiian (617), 2% Chinese (181) and the rest Koreans, Black and others (313).*

Of the various alternatives under consideration, Alternate "A" will affect seven (7) residences and a backyard piggery operated for home consumption; Alternate "C" will affect two (2) residences and Alternate "D" will affect one residence.

The backyard piggery is situated on a portion of a parcel within the caneland and is operated for home consumption. There are twelve pigs in all. The operation was confirmed with the owner of the piggery.

The number of parcels affected and the number of displacements of the various alternatives are shown on the following page.

* Source: U.S. Bureau of the Census, 1970 Census of Population.

PROPERTIES AFFECTED

	Residential	Part.	Whole	Agriculture	Part.	Whole	Total
"A"	8	4	4	18	18	0	26
"C"	12	11	1	20	20	1 roadway	33
"D"	8	1	7	25	22	3	33

DISPLACEMENTS

	Residential	Other	Total
"A"	7	1 (Piggery)	8
"C"	2	0	2
"D"	1	0	1

ALTERNATE "A"

This route, one of three under consideration, involves the acquisition of twenty-six (26) parcels of land of which four (4) are whole takings and the other twenty-two (22) are partial takings. Eight (8) of the parcels are residential-zoned land and the others are agricultural-zoned land. It is anticipated that seven (7) families--two (2) owner-occupants and five (5) tenant-occupants and the backyard piggery will be affected by this route. The families and individuals to be affected include two Filipinos, four part Hawaiians and a Caucasian family. It is apparent that relocation problems will be encountered for the following reasons:

1. The presence of low to moderate income families.

2. The presence of elderly persons among the potential displacees.

3. The low inventory of available rental houses.

It is not anticipated that any problem will exist for the piggery as there is enough area to move the pens to.

A survey for presently available and probable availability of replacement housing was conducted from September 20, 1979 to October 6, 1979. Classified newspaper advertisements, multiple listing information and governmental agencies were the sources used. The survey data is shown as Attachment "A".

In addition to the data, there is an elderly housing project called Kupuna Home-O located on Goodale Avenue in Waialua. This project is composed of 24 studio units and 16 one-bedroom units. The rental is 25% of the tenant's income. The turnover rate on this project is very small.

A study of the data compiled (Attachment "A") indicates that rents being asked on private rentals range from $325 a month for a two-bedroom to $550 a month for a four-bedroom, 2-bath dwelling. Rentals are not readily available in this area. There are quite a few homes for sale ranging from $63,500 (leasehold) to $210,000 (fee simple) for three-bedroom dwellings.

ALTERNATE "C"

This alternative involves thirty-three (33) parcels of land of which one is by whole taking and thirty-two (32) by partial takings. Most of the land involved is agricultural-zoned land. Twenty (20) of the parcels are zoned agricultural and twelve (12) are residential-zoned land. One parcel is a roadway. It is

anticipated that there will be two (2) residential displacements on this route. One is an owner-occupant and the other is an individual (elderly). As indicated on the inventory of available houses for sale, there is an adequate supply of houses for sale to accommodate the owner-occupant. The elderly individual, tenant-occupant, will qualify for the Hawaii Housing Project Kupuna Home-O.

ALTERNATE "D"

This route also involves thirty-three (33) parcels of land of which ten (10) parcels are whole takings and twenty-three (23) are partial takings. Eight (8) of the parcels are zoned residential and twenty-five (25) are agricultural-zoned land. Most of the agricultural-zoned land is cultivated with cane by the Waialua Sugar Company. It is anticipated that one residence (owner-occupant) will be affected by this alternate. The indications are that there will be no problems anticipated in the relocation of this family to another dwelling in the area.

The indications provided by our study are applicable as of the present. Future surveys might indicate otherwise at such point in time.

CONCLUSION

Our survey indicates that of the three (3) alternatives under consideration, one will affect only one family (residence), one will affect a family and an individual (elderly) and the other will affect seven (7) residences and a backyard piggery. Alternate "A" will definitely have sociological impact, but Alternates "C" and "D" will have a lesser degree of impact.

All Federally aided highway programs must comply with the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. The State of Hawaii has appropriate enabling legislation and the State Department of Transportation has an organization equipped and staffed to administer a relocation assistance program in accordance with the Federal and State laws.

INDIVIDUAL AND/OR FAMILIES

An examination of the Federal law as well as the State program which is described in the Relocation Advisory Assistance and Relocation Payments Brochure (available at the State DOT Highways Division Rights of Way Branch) reveals that certain statutory limits exist with respect to replacement housing payments that can be made to tenant and owner-occupant displacees. Under the typical relocation assistance program, a displaced tenant will be eligible for up to a maximum of $4,000,

which, in actuality amounts to a maximum of $83.33 per month rental subsidy covering a period of four years, or in the case of an owner-occupant a lump sum payment of up to $15,000 including increased interest and incidental expenses can be made to enable him to purchase a comparable, decent, safe and sanitary replacement dwelling. These payments are in addition to moving payments and other services to which the relocatee is entitled to receive.

Due to the high cost of rental and "for sale" homes in Hawaii, the above benefit maxima sometimes are insufficient to accommodate the satisfactory relocation of families displaced by public projects. State and Federal regulations require that a person or family must be relocated within his financial means. This simply means that a tenant must be relocated in such a way that the replacement dwelling will not increase his "out of pocket" costs in terms of rent over and above what was paid at the property relocated from, considering the rental subsidy paid by the State.

The treatment of homeowners is similar although the payment, if any, is made on a lump sum basis to enable him to buy a house comparable to what he had, and therefore, be no worse off financially in terms of housing costs that he had before.

The conceptual relocation study made for this project shows there is indication that the statutory requirements would have to be exceeded to satisfactorily relocate families. Where this is the case, a procedure called "Housing of Last Resort" Section 206 of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970) can be relied on to satisfactorily relocate displaced families.

Housing of Last Resort can take several forms as follows:

1. Land improved with an existing dwelling can be purchased.

2. Existing dwelling can be rehabilitated.

3. New dwellings can be constructed.

4. State-acquired dwellings from the right-of-way project can be relocated and refurbished.

All these various methods are accomplished under the auspices of the State highway agency and such housings so provided are either rented to the highway displacee or made available for sale to him, depending on his occupancy status.

In addition to the above alternatives, if justified, the replacement housing payment can be increased beyond the statutory limits to allow a relocatee to purchase on his own or rent a dwelling within his financial means. Under this procedure, the owner-occupant relocatee would simply be aided by an amount in excess of $15,000 on a lump sum basis toward the purchase of a comparable DSS replacement dwelling, or in the case of a tenant, the maximum of $4,000 would be exceeded. In either case, the amount to be received will go directly into escrow in owner-occupant situations and to the landlord in cases of rentals.

Federal and State procedures also have additional safeguards in the sense that construction cannot be authorized to begin on any project until such time as all displacees have satisfactorily relocated to comparable DSS housing within their financial means or such housing is in place and has been made available to the relocatee.

At the time an alternative alignment is selected for this project which would involve the creation of utilization of Last Resort Housing, a detailed study for Housing of Last Resort will be initiated so that the relocatees can be accommodated in a manner compatible with the scheduling of the highway project development of construction.

BUSINESS, FARMS AND NON-PROFIT ORGANIZATIONS

Our relocation assistance program also has the following benefits available for this type of displacees:

1. Actual moving costs up to 50 miles will be paid.

2. Searching costs incurred in connection with the obtainment of a new business site can be reimbursed.

3. In lieu of items 1 and 2 above, a fixed payment based upon net income of the business not to exceed $10,000 or a minimum of $2,500 can be paid if the business cannot be re-established without substantial loss of existing patronage.

4. Benefits of the small business disaster loan program under Section 7(b)(3) of the Small Business Act (15)U.S.C. 636(b)(3) may be available to eligible business relocatees and to those businesses outside of the project (but not displaced) where substantial economic injury results because of the highway project.

5. State relocation advisory services are available.

HOUSING AVAILABILITY SURVEY

RENTALS

	Address:	Bedrooms:	Rent:
1.	67-211 Kahaone Loop	2-bdrm 1 bth (dpl)	$350
2.	66-214 B. Kam Hwy	2-bdrm 1 bth	325
3.	68-040 Au Street	2-bdrm 1 bth (4 plx)	350
4.	66-138 Kunahele Street	4-bdrm 2 bth	550

SALES

1.	66-481 Kililoe Pl.	4-bdrm 2 bth	5,058 sq. ft.	$ 96,500.
2.	66-381 Haleiwa Rd.	3-bdrm 1 bth	6,300 " "	63,500 (Lse)
3.	67-267 Kiapoku St.	3-bdrm 1 bth	7,831 " "	96,000
4.	Kapuwai/Kam Hwy	3-bdrm 2 bth	10,800 " "	139,000
5.	61-489 Kam Hwy	3-bdrm 1 bth	10,800 " "	135,000
6.	61-427 Kam Hwy	3 bdrm 2 bth	7,653 " "	210,000
7.	66-409 Paalaa Rd.	3-bdrm 1½ bth)	20,455 " "	175,000
8.	66-409-A Paalaa Rd.	3-bdrm 1½ bth)		
9.	59-508 Kam Hwy	3 bdrm 2 bth	5,040 " "	89,000
10.	59-415 Alapio Rd.	3 bdrm 1½ bth	1.5 acres	169,000

Attachment "A"

Aquatic Macrofaunal Survey of Paukauila and Anahulu Streams and Ukoa Marsh in Haleiwa, Oahu

by

Amadeo S. Timbol, Ph. D.

Aquatic Biologist

Introduction

This limited biological reconnaissance was undertaken at the request of VTN Pacific, in connection with the Department of Transportation's plan to realign Kamehameha Highway at Haleiwa. The proposed realignment will cross two tributaries of Paukauila (Helemano and Opaeula), Anahulu Stream and Ukoa Marsh. This survey will identify aquatic macrofauna (fishes, crustaceans, and mollusks) and describe some physicochemical features of the immediate vicinity of the planned highway. The resulting list of resident aquatic animals will be checked for threatened, rare or endangered species. If such a species be present, what aspects of its life cycle might be sensitive to highway construction activities will be considered.

There are no published literature on the biology of Paukauila and Anahulu Streams. Ukoa Marsh was identified by the U. S. Fish and Wildlife Service (1977) as of value to waterbirds (gallinule, coot, stilts). Elliott and Hall (1977) described the marsh as well as its vegetation. An insight on impacts of construction activities similar to the proposed Department of Transportation project at Haleiwa on the biology of wetlands is presented by Darnell (1976).

Study Areas and Methods

Study Areas

Paukauila Stream

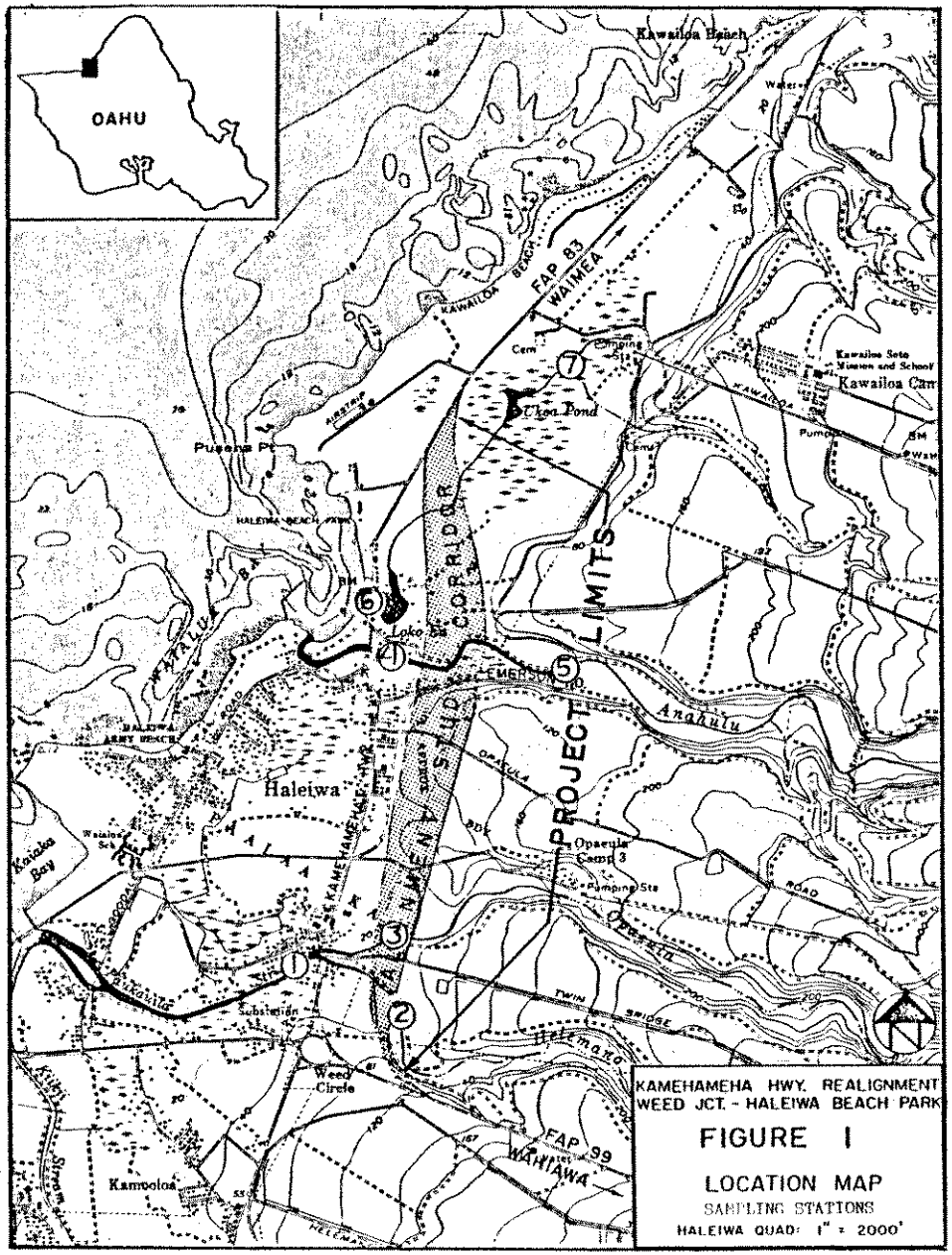
The headwaters of Paukauila and its tributaries, Helemano and Opaeula, originate from the Koolau mountain range. The stream consists of approximatelly 11.5 km of channel with a drainage basin of about 25 km^2. Paukauila mainstream, by itself, runs only about 2 km before it joins Kaiaka Bay. Its drainage basin at low elevation consists partly, of Haleiwa town, and partly, sugar cane fields; at mid elevation, of sugarcane fields; and at high elevations, of Kawailoa Forest Reserve. Water from both Helemano and Opaeula tributaries is diverted for agricultural use. Because of these diversions, net flow to the sea in summer, is small.

Three sampling sites were set in this stream: one at Paukauila mainstream, one at Helemano tributary, and one at Opaeula tributary (see Fig. 1).

Anahulu Stream

As with Paukauila, its headwaters originate from the Koolau mountain range. Anahulu has a total channel length of about 7.5 km and drainage basin approximately 9.7 km^2. It has two major tributaries, Kawaiiki and Kawainui, which join at mid elevation to form a 10 km mainstream before it flows into Waialua Bay. Its drainage basin consists of Haleiwa town at low elevation, sugar cane fields at low and mid elevations, and Kawailoa Forest Reserve at high elevations. Again, water from both Anahulu tributaries is diverted for agriculture use. Thus, the net flow to Waialua Bay is small in summer.

Two stations were selected at Anahulu, one downstream and one upstream of project site (Fig. 1).



Ukoa Marsh

This largely freshwater marsh of about 1.3 km^2 located near Haleiwa is owned by the Bishop Estate. The water level was lowered many years ago and it has been kept low by diversion of water (by pump) to nearby sugar cane fields. Much of the marsh is covered with California grass (Brachiaria mutica), great bulrush (Scirpus validus), sawgrass (Cladium leptostachyum) and water lettuce (Pistia stratiotes) (Elliott and Hall 1977). A few open water areas are found at both ends of the marsh. One intermittent stream drains into the marsh. Ukoa opens to the sea through the Loko Ea drainage. The open water on the Sunset Beach direction (Ukoa Pond, Figs. 2 a-b) is almost a daily recreational fishing spot for several children (and parents) living in the vicinity. There are evidences of some gill netting (for tilapia) on occassions.

Several waterbirds are seen feeding in the marsh. Unfortunately, plastic bread wrappers and styrofoam meat trays can also be seen floating among the water lettuce where the birds feed. The garbage could be from spills from trucks on their way to unload at a nearby sanitary landfill.

Two stations were selected at Ukoa Marsh; one at the Loko Ea drainage which is immediately by the mouth (where the marsh connects to the sea) and one at the open water area (Ukoa Pond).

Methods

Sampling stations were set both downstream and upstream of the proposed project as follows: three at Paukauila Stream, two at Anahulu Stream, and two at Ukoa Marsh.

Figs. 2 a-b. Ukoa Pond, one of few open water areas in Ukoa Marsh.
Top: open water surrounded by California grass and bulrush.
Bottom: water lettuce covering two "open" water areas in background.

A stretch of 20 x 1 m of stream (or marsh) channel was pre-measured and animals which could be seen with the naked eye were identified and counted. Observations were made (by snorkeling) with the aid of a face mask and snorkel. Some specimens were caught with a hand net for positive identification but were released live in the same area. Boulders and cobbles in the upstream stations were also examined for the endemic freshwater mollusk, Neritina granosa or hihiwai. Additional information was obtained through interviews of residents living nearby.

Distances were measured along stream channels as shown in USGS topography maps (scale 1:62,500) using a KE map measurer. A mercury thermometer was used to measure water temperature.

Terms used in this report designating the origin of animals are: endemic, occurring naturally in Hawaii only; indigenous, occurring naturally in Hawaii and also elsewhere; introduced, the animal was brought to Hawaii by intent or by accident; and native, means both endemic and indigenous animals. Terms and symbols describing relative abundances are: absent (0), it was neither seen nor collected in the 20 x 1 m site; uncommon (+), only one was sighted or collected; common (++), between two and five were present; and abundant (+++), more than five were found. Brackish water means water with measurable salinity over 0.5 °/oo. Estuarine means subject to rise and fall of tide.

The biota list was checked for endangered and threatened species using the following list and scientific publication: Miller (1972) and USFWS List of Endangered and Threatened Species (1977 a). Native (Hawaiian) names come from Pukui and Elbert's 1971 Hawaiian Dictionary.

Results

Physicochemical

Each of the water bodies studied was sampled in at least two stations, all on their terminal reaches. These preliminary physicochemical features come from two sampling dates. For locations of sampling sites, refer to Fig. 1.

Station 1, Paukauila Mainstream

This station is situated just downstream of the junction where Helemano meets Opaeula to form Paukauila or 1.8 km upstream of mouth. The stream channel at this point is about 45 m wide, 60 - 90 cm deep. Both banks are lined with riparian trees and shrubs. Residential houses are also found on both sides of the stream. No flow seaward is apparent to the naked eye and water level is subject to tides.

The substrate consists of mud, silt and decaying vegetation. Water turbidity ranged from turbid to highly turbid. Visibility at the upper 30 cm (one foot) layer is about 30 cm; at the bottom 30 cm (one foot) layer, only about 3 cm. Water is brackish and temperature is between 27.0 and 27.5°C at subsurface.

Station 2, Helemano Tributary

Located about 2.7 km upstream from mouth, this station site is 1¼ m wide and about 150 cm deep. Trees and shrubs line both banks. No flow seaward is apparent.

Substrate is of mud and silt. Water turbidity is from slightly turbid to turbid with about 30 cm visibility at the upper 30 cm (one foot)

layer. The bottom 30 cm (one foot) layer is highly turbid, with visibility limited to 3 cm. Water is brackish; temperature is between 28.0 and 28.5°C at subsurface.

Station 3, Opaeula Tributary

This station is 2.5 upstream from the mouth. At this point, the channel is about 15 m wide and between 15 and 45 cm deep. Both banks are lined with riparian trees and shrubs. Water is brackish and there is only a very slow flow seaward.

Substrate is of mud and silt on a base of gravel and small boulders. Green and bluegreen algae coat the surface of boulders and gravel. Water is highly turbid with a visibility of only about 15 cm at the upper 30 cm (one foot) layer and about 5 cm at the bottom 30 cm (one foot) layer. Water is brackish and has a temperature between 26.5 and 27.0°C at subsurface.

Station 4, Lower Anahulu

This station located just upstream of the present Anahulu bridge is only about 0.7 km from the stream mouth. The channel at this site is about 44 m wide and 150 cm deep. Riparian trees, shrubs as well as residential houses line both banks.

Substrate is of mud and some silt, characterized by small mounds of mud (about 5 - 8 cm diameter) dotting the channel floor. Water is only slightly turbid with visibility about 90 cm at the upper 30 cm (one foot) layer and about 30 cm at the bottom 30 cm (one foot) layer. Water is brackish and its temperature is between 26.0 and 26.5°C at subsurface.

Station 5, Upper Anahulu

This upper station is located 2.4 km off stream mouth. At this site, the channel measures about 23 m wide and between 30 and 60 cm deep. Stream banks have only sparse riparian vegetation. There was a slow flow downstream on one occassion and no discernable flow another time.

The substrate of mud, gravel and boulders is coated with green and bluegreen algae. Water is highly turbid and visibility is reduced to about 15 cm at the upper 30 cm (one foot) layer and only about 6 cm at the lower 30 cm (one foot) layer. Water is brackish with temperatures between 27.0 and 27.5°C.

Station 6, Loko Ea Drainage

This is only 0.003 km from mouth. At present, the water is slightly brackish and is connected to the sea only at high tide. The seaward flow (and depth) depends on how much water is being let out of the fishpond. During the field work days, water depth was between 5 and 10 cm. Water was clear; water temperatures were between 27.0 and 28.5°C. Vegetation in this and the next station has been discussed in a previous section.

Substrate is of sand and mud. Grass also grows on channel floor.

Station 7, Ukoa Pond

About 1.9 km from mouth, this station is on open water by Kawailoa Road. Water is clear, with a maximum depth of about 300 cm. Water temperature is between 22.0 and 22.5°C. Hawaii Cooperative Fisheries Research Unit unpublished data show salinity at 1.5 °/oo. This summer there is no open channel connection between Ukoa Pond and the Loko Ea drainage.

Substrate is of water-logged decaying vegetation with black clayey mud and silt.

A summary of these physicochemical features are in Appendix A.

Biological

Species Inventory

A total of at least 19 species of prawns, shrimps, crabs, and fishes were found in the three bodies of water surveyed. These include 4 species of prawns and shrimps, 3 species of crabs, and 12 species of fishes. Of these, a total of nine species are native to Hawaii and two of the nine are endemic. These are the o'opu okuhe (Eleotris sandwicensis), and aholehole (Kuhlia sandvicensis). The o'opu okuhe lives naturally in mixohaline waters and lower elevation freshwaters. The aholehole lives in marine, mixohaline, and fresh waters. Capsule life histories of these two follow.

Eleotris sandwicensis (o'opu okuhe). This fish is similar in appearance to the gobies but lacks the fused pectoral fins characteristic of true gobies. It is ubiquitous in distribution. Okuhe grows up to 25 cm and is sometimes taken as a food fish. The okuhe is a carnivore, ingesting fishes, insects and benthic animals (Timbol 1972).

Kuhlia sandvicensis (aholehole). This silvery, bass-like endemic is a stream itinerant. Freshwater is not an essential part of its life cycle and only juvenile aholehole are found in estuaries and lower portions of streams. Juveniles and sub-adults are carnivorous (Timbol 1972). A change

Table 1. List of Aquatic Macrofauna in Paukauila and Anahulu Streams and Ukoa Marsh (July- August 1979).

Scientific Name	Local Name	Origin[1]	List[4]
A. Prawns, Shrimps			
Palaemon debilis	opae huna	indigenous	none
Procambarus clarkii	crayfish	introduced	none
Macrobrachium grandimanus	opae oeha'a	indigenous	none
Macrobrachium lar	Tahitian prawn	introduced	none
B. Crabs			
Metopograpsus thukuhar	papa'i alamihi	indigenous	none
Scylla serrata	Samoan crab	introduced	none
Thalamita crenata	papa'i maku'e	indigenous	none
C. Fishes			
Awaous genivittatus	o'opu naniha	indigenous	none
Eleotris sandwicensis	o'opu okuhe	endemic	none
Gambusia affinis	mosquitofish	introduced	none
Kuhlia sandvicensis	aholehole	endemic	none
Mugil cephalus[2]	ama'ama	indigenous	none
Poecilia latipinna	sailfin molly	introduced	none
Poecilia mexicana	mexican molly	introduced	none
Poecilia reticulata	wild guppy	introduced	none
Sarotherodon (=Tilapia) mossambica[3]	tilapia	introduced	none
Sphyraena barracuda	kaku	indigenous	none
Xiphophorus helleri	swordtail	introduced	none
Xiphophorus maculatus	moonfish	introduced	none

[1] Terms used in this column and text:
endemic - occurring naturally in Hawaii only
indigenous - occurring naturally in Hawaii only and elsewhere
introduced - brought to Hawaii either intentionally or accidentally

[2] Two additional mullet species, Ecomyxus chaptalii (indigenous, no listing) and Chelon engeli (introduced, no listing) may be present.

[3] There may be more than one tilapia species. Other species (T. macrochir, T. melanopleura, and T. zilli) are known to be established in Hawaii's streams.

[4] Considered as rare, endangered, threatened, or depicted in official registers or scientific publications, e.g., Miller 1972, USFWS 1979a.

in diet components accompany growth - larger aholehole ingest larger prey.

The species list was checked for threatened or endangered species and not one is in either the Miller (op. cit.) or USFWS (op. cit.) lists.

Distribution and Abundances

Paukauila Stream. In Station 1 (Paukauila mainstream), snorkeling and hand netting surveys turned up at least 11 species: 2 prawns and shrimps, 3 crabs, and 6 fishes. The most abundant among these is the ama'ama (mullet). The aholehole and o'opu okuhe are both common. Of the two prawns (shrimps) present, there are more opae oeha'a than opae huna. Of crabs, there are more papa'i maku'e than Samoan crabs.

Except for the absence of kaku and the presence of papa'i alamihi, all species found in Station 1 are also found in Station 2 (Pelemano tributary). The difference is that the animals are lower in abundance in Station 2 as compared with Station 1, e.g., fewer ama'ama.

In Station 3 (Opaeula tributary), no crabs were found, although an additional crustacean (Tahitian prawn) was present. As compared with the Pelemano site, animals are lower in abundance in Opaeula.

These data and those for Anahulu and Ukoa Marsh (sections that follow) are summarized in Table 2; refer to Table 1 for scientific name equivalents.

Anahulu Stream. There are at least 11 species in lower Anahulu (Station 4). Three species are abundant: two fishes (ama'ama, aholehole) and a prawn (opae oeha'a). In general, animals are more abundant in this Anahulu station than in Paukauila stream stations.

Table 2. Distribution and Relative Abundances of Aquatic Macrofauna in Paukauila Stream, Anahulu Stream, and Ukoa Marsh (July-August 1979). Legend: +++ = abundant, ++ = common, + = uncommon, 0 = not seen, probably absent.

Scientific Name	Sampling Station						
	Paukauila			Anahulu		Ukoa	
	1	2	3	4	5	6	7
A. Prawns, Shrimps							
Macrobrachium grandimanus	++	++	++	+++	+++	0	0
Macrobrachium lar	0	0	+	0	+	0	0
Palaemon debilis	+	+	+	+	0	0	0
Procambarus clarkii	0	0	0	0	0	+	+
B. Crabs							
Metopograpsus thukuhar	0	+	0	+	0	+	0
Scylla serrata	+	+	0	+	0	0	0
Thalamita crenata	++	0	0	++	0	0	0
C. Fishes							
Awaous genivittatus	+	+	+	+	+	0	0
Eleotris sandwicensis	++	++	+	++	++	0	0
Gambusia affinis	0	0	0	0	0	+++	+++
Kuhlia sandvicensis	++	+	+	+++	+	0	0
Mugil cephalus[1]	+++	++	++	+++	++	0	0
Poecilia latipinna	0	0	0	0	0	+	++
Poecilia mexicana	0	0	0	0	0	+	+
Poecilia reticulata	0	0	0	0	0	++	+++
Sarotherodon mossambica[2]	+	++	+	+	+	+++	+++
Sphyraena barracuda	+	0	0	+	0	0	0
Xiphophorus helleri	0	0	0	0	0	++	+++
Xiphophorus maculatus	0	0	0	0	0	0	+

[1] Probably includes two other mullet species ; Neomyxus chaptalli, and Cholon engeli.

[2] There may be more than one tilapia species as T. macrochir, T. melanopleura, and T. zilli, are established in Hawaii streams.

The upper Anahulu site (Station 5) harbors only seven species, four less than the lower Anahulu site. Only opae oeha'a, a native prawn, is abundant in this station. The difference between this upper Anahulu station and the lower Anahulu station, is the absence of crabs as well as the kaku (Sphyraena barracuda) in this station.

Ukoa Marsh. Station 6 (Loko 'a drainage site) has at least 8 species: 6 fishes, 1 crayfish, and 1 crab. Two fishes, mosquitofish and tilapia are abundant and another two (swordtail and wild guppy) are common.

Station 7 (Ukoa Pond site) also has at least eight species: 7 fishes and 1 crayfish. Four fish species are abundant: tilapia and three poeciliids (mosquitofish, swordtail, wild guppy). As compared with Loko 'a drainage, Ukoa Pond has no crabs but has one more poeciliid fish species. Also, the poeciliids are more abundant in Ukoa Pond.

Discussion

Physicochemical

Paukauila and Anahulu

These streams are characterized by turbid waters and little net flow to the sea. Suspended particulate matter causes poor visibility as in Stations 1, 2, 3, and 5. As suspensoids reach more saline water, as in Station 4, these coagulate and settle resulting in comparatively clearer water. Where the stream is shallow, the substrate is coated with minute animal and plant materials, condition indicative of warmer waters.

Compared with other North Shore streams (as with Waimea Stream), both Anahulu and Paukauila are slightly more degraded. The more turbid water in these study streams appear to come from both agricultural and residential uses. On the other hand, Waimea Stream which has been observed to have only slightly turbid to clear water, is maintained as a park. Water temperatures for Paukauila and Anahulu were slightly higher than a comparatively less degraded stream. Unfortunately, no water temperature data is available for Waimea Stream but the terminus of Kahana Stream on windward Oahu registered between 23.2 and 28.3°C (Timbol 1972). Compare this with 24.0 - 28.2°C for the study streams. The elevated temperatures could be due to higher turbidity and sparse riparian vegetation at Anahulu and Paukauila.

Ukoa Marsh

Ukoa Pond, like the Loko Ea Drainage site, is also brackish. Ukoa Pond have about the same salinity as Kawainui Marsh. Bienfang (1974) reported a salinity of 2 °/oo at five locations in Kawainui and unpublished Hawaii Cooperative Fisheries Research Unit data showed 1.5 °/oo for Ukoa. Water temperature for Ukoa appear to be slightly lower than Kawainui (22 versus 24°C). This could be due to the deeper water at Ukoa than at Kawainui.

Biological

Higher turbidity causing poor visibility in both Paukauila and Anahulu could mean that the stream animals are under represented both in number of species and number of individuals. Ukoa Pond was exceptionally clear and results from that pond are representative of the animals there. The possible exception to this is the bias against species that hide during the day as in the Chinese catfish (Clarias fuscus) and the dojo (Misgurnus anguillicaudatus).

Species Inventory

Streams. There appears to be no significant differences between the animal populations of Paukauila and Anahulu. Both had the same number and complement of species. However, some species, e.g., ahole and opae oeha'a, are more abundant in Anahulu than in Paukauila.

Aquatic animals found therein are also characteristic of Hawaiian estuaries and lower reaches of streams. Missing are organisms that are resident of mid and upper elevations. For example, three native gobies

live at mid and upper reaches of streams: o'opu nakea (Awaous stamineus) o'opu nopili (Sicydium stimpsoni), and o'opu alamo'o (Lentipes concolor). Also expected to be found is the opae kala'ole (Atya bisulcata). Of these four species, o'opu nakea and opae kala'ole are expected to be found in the mid and higher elevations of both Paukauila and Anahulu. O'opu nakea and opae kala'ole were both found in nearby Kaukonahua-Poamoho stream system which has about the same physical conditions as Anahulu and Paukauila (Kawate 1969, Hawaii Cooperative Fisheries Research Unit unpublished data, see also Appendix B).

Not expected to be found is the rare goby, Lentipes concolor (o'opu alamo'o). It has not been reported on Oahu in the past 50 years or so. The third missing goby, o'opu nopili, is also not expected to be present in either Paukauila or Anahulu since it requires fast flowing, clear and cool water. Both Anahulu and Paukauila streams are diverted upstream, leaving minimal flow in stream channels except during freshets. The lower and middle reaches have been cleared of its original riparian vegetation leaving the stream subject to strong insolation resulting in elevated temperatures.

There are probably at least two snails in small numbers that may be present but were not found due to poor visibility and time constraints. These are the brown ui (Theodoxus vespertinus, native, not threatened) and an estuarine snail (Melampus parvulus, origin not known). Bivalve mollusks were also not found and may be absent due to substrate instability. Timbol (1972) found the same condition at Kahana Estuary, Oahu.

Ukoa Marsh. Ukoa (area 1.3 km^2) is about one-half the size of Kawainui Marsh (2.5 km^2). Analysis of results in this study and those of Ford's (1975) indicates about the same number of species present in both marshes. Ford (ibid.) reported no crayfish in Kawainui while the crayfish was found in Ukoa. On the other hand, Ford (ibid.) found the rice field eel (Monopterus alba) in Kawainui but was not found in Ukoa in this study. More intensive and extensive samplings in both marshes may show that both the crayfish and rice field eel are present in both marshes. Table 3 lists the resident animals in both marshes. The comparison is only approximate since Ford (ibid.) did not identify his poecilliid fishes down to species.

Interviews with residents fishing in Ukoa Pond indicate that the koi (Cyprinus carpio) may also be in Ukoa Pond. It is also highly probable that cryptic fishes such as dojo and Chinese catfish are also present. Apparently absent or at least uncommon, is the mollusk component of the animal community. The pond snail (Physa sp.) was expected to be found in Ukoa Marsh but was not. Ford (ibid.) states that Physa is the most abundant invertebrate in Kawainui Marsh. Physa is said to be a secondary host for bird parasite (schistosome) and is claimed to cause "swimmer's itch."

The value of Ukoa Marsh is as a residence for threatened avifauna (USFWS 1977). As already mentioned, most of the fishes in Ukoa are poecilliids which serve as forage for these threatened and endangered birds.

Table 3. Comparison of aquatic macrofauna in Ukoa (Haleiwa) and Kawainui (Kailua). Legend: / = present, 0 = not seen nor collected, probably absent.

Scientific Name (Common Name)	Ukoa[1] (This Study)	Kawainui[2] (Ford 1975)
A. Shrimps and Prawns		
Procambarus clarkii (crayfish)	/	0
B. Crabs		
none		
C. Fishes		
Cyprinus carpio (koi)	probably present[3]	probably present
Gambusia affinis (mosquitofish)	/	probably present[4]
Monopterus alba (ricefield eel)	0	/
Poecilia latipinna (sailfin molly)	/	probably present[4]
Poecilia mexicana (mexican molly)	/	probably present[4]
Poecilia reticulata (wild guppy)	/	probably present[4]
Sarotherodon mossambica (tilapia)	/	/
Xiphophorus helleri (swordtail)	/	probably present[4]
Xiphophorus maculatus (moonfish)	/	probably present[4]

[1] Ukoa marsh: area = 1.3 km^2, one short intermittent (flowing only during freshets) flows into it.
[2] Kawainui marsh: area = 2.5 km^2, two larger, continuously flowing streams flow into it.
[3] Not seen by author. Interviews with children yielded this information.
[4] Ford (1975) did not identify Kawainui poecilliids to species level.

Effects of Construction Activities in Wetland Areas

Human activity has greatly affected wetlands to such an extent that it is difficult to find any wetland which has not been in some way altered. This is especially true in Hawaii where only 14% of its 366 perennial streams (Timbol and Maciolek 1978) are still physically pristine. There is no comparable statewide study for marshes in Hawaii. A study on the Kaneohe Bay watershed area showed that there was a 83% loss in wetland area between 1900 and 1977 (USFWS 1978b). Under these circumstances, especial care is necessary to preserve the few remaining wetland ecosystems, for the more rarer they become, the more valuable they become to society as a means of preserving components of a living system.

Going from general to specific, the most damaging effect of construction activities in wetland areas is direct habitat loss. This is accomplished by draining, filling, damming, ditching, and channelization. Habitat loss, especially on such a small (ca. 1.3 km^2) marsh as Ukoa should be avoided if the integrity of the marsh as a habitat for endangered waterbirds is to be maintained. Already, in summer, the open water area is less than one-tenth of the total.

The second most severe impact will be the increase of suspended solids to both Paukauila and Anahulu streams. Work without adequate provision for the prevention of erosion will farther aggravate the already turbid waters. It has been shown by King and Ball (1964) that increased erosion has resulted in great reduction in the invertebrate populations in the Red Cedar River caused by the building of an interstate highway in Michigan. Increased turbidity as a result of erosion will have the same

detrimental effect on Ukoa Marsh. Increased turbidity will decrease the snail and insect larvae populations which serve as food for forage fishes and endangered waterbirds. The poeciliid fishes in Ukoa also serve as food for the waterbirds. It has been observed elsewhere that even small amounts of fine washings from quarried sand eliminated some mayflies and stoneflies (Hamilton 1961).

The Ukoa Marsh may also be detrimentally affected by draining - ranging from the total loss of the marsh if the draining is complete to a partial loss if draining is partial. Even partial draining will result in a decrease of the open water area. Lowering the water level will result in elevated water temperatures. Hathaway (1978) and Norton, et. al. (1978) have preliminary results on the effect of elevated water temperatures on freshwater fishes in Hawaii. These studies and that of Darnell (op. cit.) should be consulted for more details.

Summary and Conclusions

Seven sampling stations were set in the three bodies of water studied, four upstream and three downstream of proposed Haleiwa bypass. All seven stations are in brackish water.

Anahulu and Paukauila streams are turbid and silty. Visibility is highly limited. Ukoa has much clearer water.

Water temperature in the streamsare slightly higher than those of more pristine streams. Ukoa Marsh has a slightly lower temperature than Kawainui Marsh in Kailua.

At least 19 species of aquatic macrofauna are present. Of these, only two are endemic. Neither of these endemics is listed as threatened, rare or endangered.

There are no threatened, rare or endangered aquatic macrofauna in Paukauila, Anahulu, and Ukoa.

There is only one species (tilapia fish, introduced) that is found in Paukauila and Anahulu streams as well as Ukoa Marsh.

The streams are characterized by the presence of one native prawn (Macrobrachium grandimanus), one native swimming crab (Thalamita crenata), and three native fishes (Mugil cephalus, Eleotris sandvicensis, Kuhlia sandvicensis).

Ukoa Marsh is characterized by poeciliid fishes, all introduced fishes.

Only one goby fish (o'opu nanilha) is found in the areas studied. It is highly probable that another (o'opu nakea) is present.

It is highly probable that a third goby (o'opu nopili) which requires strongly flowing, clear, and cool water, is absent.

It can be safely assumed that the fourth goby (o'opu alamo'o or Lentipes concolor), a candidate for the endangered species list, is absent in Paukauila and Anahulu streams. O'opu alamo'o does not live in marshes and therefore, is also absent in Ukoa.

No mollusks were found during this survey but it is highly probable that at least one species is present in Ukoa Marsh and another in both Paukauila and Anahulu streams. Neither is endangered, threatened or rare.

Some damaging effects which construction activities may have on wetlands in general, which may occur in Paukauila and Anahulu streams, and Ukoa Marsh, are discussed.

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Appendix B

Aquatic Macrofauna in Kaukonahua-Poamoho Stream System at Three Elevations (Waialua, Oahu)

Legend: +++ = abundant, ++ = common, + = uncommon, 0 = not collected, probably absent

Scientific Name (Common Name)	Elevation Lower (6 m)[1]	Middle (115 m)[2]	Upper (536 m)[2]
A. Prawns, Shrimps			
Atya bisulcata (opae kala'ole)	++	0	+++
Macrobrachium grandimanus (opae oeha'a)	++	0	0
Macrobrachium lar (Tahitian prawn)	+++	0	0
B. Crabs			
None			
C. Fishes			
Awaous stamineus (o'opu nakea)	+	0	+
Clarias fuscus (Chinese catfish)	0	+	0

[1] Hawaii Cooperative Fisheries Research Unit unpublished data

[2] From Kawate 1969

Appendix A

Some Preliminary Physicochemical Features of Paukauila and Anahulu Streams and Ukoa Marsh (July-August 1979)[1]

Sampling Station (No. & Location)	Parameter: Water Temperature °C	Substrate	Turbidity, Visibility	Nature of Stream Flow	Water Classification
1. Paukauila mainstream, 1.8 km from stream mouth	27.0 - 27.5	Mud, silt	Turbid; visibility at upper = 30 cm; lower layer = 3 cm	No apparent seaward flow, subject to tides	Brackish
2. Kelemano tributary, 2.7 km from stream mouth	28.0 - 28.5	Mud, silt, decaying vegetation	Slightly turbid to turbid; upper layer = 30 cm, lower = 3 cm	No apparent seaward flow, subject to tides	Brackish
3. Opaeula tributary, 2.5 km from stream mouth	26.5 - 27.0	Mud, boulder, gravel	Highly turbid; upper = 15 cm, lower = 5 cm	Very slow flow seaward	Brackish
4. Anahulu (lower), 0.2 km from stream mouth	26.0 - 26.5	Mud, some silt	Slightly turbid; upper = 90 cm, lower = 30 cm	No apparent seaward flow, subject to tides	Brackish
5. Anahulu (upper), 2.4 km from stream mouth	27.0 - 27.5	Mud, gravel, boulder	Highly turbid; upper = 15 cm, lower = 6 cm	Slow flow to no flow, subject to tides	Brackish
6. Loko Ia Drainage, 0.002 km from stream mouth	27.0 - 27.5	Mud, silt	Clear, not measured	Flow depends fishpond discharge, tides	Brackish
7. Ukoa Pond 1.9 km from stream mouth	22.0 - 22.5	Mud, rotting vegetation	Clear, not measured	No flow	Brackish

[1] All measurements are along stream channels as shown in USGS topographic maps. Stream mouth means the point where stream water enters bay or harbor.

Appendix C

Aquatic Macrofauna in Hawaiian Fishponds

Ukoa Marsh includes one fishpond in operation. Although not studied in this survey, it is important to note that the Loko ?a fishpond is more saline than the almost freshwater Ukoa Pond. This difference and human intervention in the fishpond, it is expected to have an animal population distinct from that of Ukoa Pond. It is reasonable to assume that most of the fishpond animals will be in the list on Table 4.

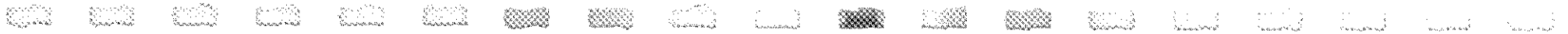
Table 4

Checklist of Fishes and Macroinvertebrates found in Kuapia and Kolii Fishponds on Kaneohe Bay Watershed Area, Oahu (adapted from USFWS 1977b)

Scientific Name	Common Name, Hawaiian Name	Origin[1]	List[2]
A. Mollusk			
Crassotera virginicus	Eastern oyster	introduced	none
B. Prawns, Shrimps			
Palaemon debilis	opae huna	indigenous	none
Periclemenes grandis	shrimp	introduced	none
C. Crabs			
Metopograpsus thukuhar	papa'i alamihi	indigenous	none
Thalamita crenata	papa'i maku'e	indigenous	none
Portunus sanguinolentus	papa'i kuhonu	indigenous	none
Podophthalmus vigil	papa'i mo'ala	indigenous	none
D. Fishes			
Acanthurus sandvicensis	manini 'elekubo	endemic	none
Albula vulpes	pua o'io	indigenous	none
Chanos chanos	awa	indigenous	none
Gambusia affinis	mosquitofish	introduced	none
Harengula vittata	Marquesan sardine	introduced	none
Mugil cephalus	mullet, ama'ama	indigenous	none
Poecilia latipinna	sailfin molly	introduced	none
Poecilia mexicana	mexican molly	introduced	none
Tilapia (=Sarotherodon) sp.			

[1] Terms used in this column: endemic = occurring naturally in Hawaii only
indigenous = occurring naturally in Hawaii and elsewhere
introduced = brought to Hawaii either intentionally or accidentally

[2] Considered as rare, endangered, threatened, or depleted in official register or scientific publications, e.g., Miller 1972, USFWS 1979a.



APPENDIX C AIR QUALITY ASSESSMENT

CONTENTS

CONTENTS (Continued)

A. INTRODUCTION

The purpose of this assessment is to provide background data for the consideration of air quality impacts from the proposed realignment of Kamehameha Highway from Weed Junction to Haleiwa Beach Park (Haleiwa Bypass) on the Island of Oahu, Hawaii. The primary objective of the study is to estimate "worst case" Carbon Monoxide (CO) concentrations with and without the proposed project. These concentrations can then be compared with Federal and State air quality standards to determine if the project will have a significant effect. A secondary objective is the determination of mass emission rates (pollutant burden) for Hydrocarbons (HC), Nitrous Oxides (NO_x), Lead (Pb), Particulates (Part.), and Sulfur Oxides (SO_x).

The data on CO, HC, and NO_x emissions and CO concentrations was derived through the use of a computer program developed by the Environmental Protection Agency, termed MOBILE 1. This program generates CO, HC, and NO_x emission factors for any combination of analysis year, speed, temperature, cold start fraction, vehicle type, etc. In the present study, a set of tables generated by MOBILE 1 was used, rather than the program itself ("Tabulation of Selected Low-Altitude Vehicle Emission Factors Based on EPA's Mobile Source Emission Factors Dated March 1978". Noise and Air Quality Branch, office of Environmental Policy, Federal Highway Administration, Washington, D.C. 20590 September, 1978). The tables allow a great deal of flexibility in selecting the five variables noted above and is a simple and accurate method for estimating CO, HC, and NO_x emission factors. Lead emissions were estimated by the methodology outlined in a 1977 EPA publication, while Particulate and Sulfur Oxide emissions were estimated using EPA's "Compilation of Air Pollutant Emission Factors" (See below).

After the emission factors (grams/vehicle-mile) to be used for CO were determined, they were multiplied by the traffic volume (determined by the State Department of Transportation for this project) to obtain emission rates. These rates were then fed into EPA's HIWAY computer model for the calculation of CO concentrations at selected receptor points. The version of HIWAY used for this study is stored on the State Department of Transportation's PDP 11/40 computer, and operates in an interactive mode. In addition to the emission rate, the model requires input for wind direction, wind speed, mixing height (turbulent layer) and atmospheric stability. These parameters were selected to represent conditions under which the highest CO concentrations would be obtained. The frequency of occurrence of these conditions was determined by analyzing meteorological data collected by the Waialua Sugar Company at Waialua, and by the USAF Air Weather Service at Mokuleia Field (Dillingham airstrip) and at Hickam AFB.

The following sections present the traffic projections used for this study, the emission factors and assumptions made in deriving them, a description of the methodology used in the HIWAY analysis, and the results of that analysis.

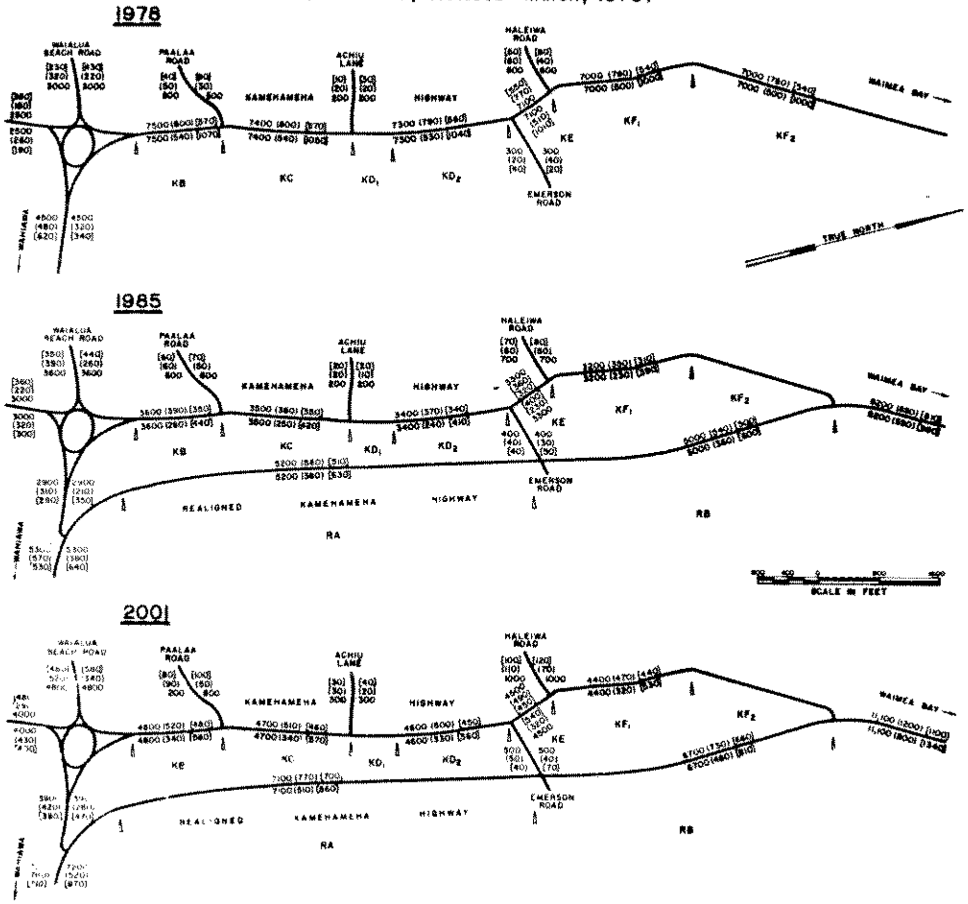
This study was conducted by Fred Proby of VTN Pacific, with assistance from Gary Choy of the State DOT Materials Testing Branch in the running of the HIWAY program.

B. TRAFFIC DATA

The objective of the proposed project is to reduce traffic through Haleiwa by providing a bypass route on the inland (east) side of town. The traffic projections made by the State DOT are based on the assumption that approximately 60% of the traffic will take the bypass route. These projections show that traffic through the project area will increase by 17% from 1978 to 1985 and by 35% from 1985 to 2001. This represents an annual growth rate of around 2.5%. Tables 1 and 2 summarize the traffic data presented in detail on Figure 1. The peak 8-hour traffic volumes in in Table 1A were derived from actual counts at Haleiwa in 1978, and adjusted upward for 1985. This detailed traffic data for each highway segment was used in the calculation of emission rates for the HIWAY model.

The typical traffic peak occurs on weekend afternoons, between 12 and 3 PM, and is about evenly distributed in both directions. This demonstrates that the North Shore is a popular recreational area, used by both leeward (Honolulu) and windward (Kaneohe-Kailua) residents.

FIGURE I HALEIWA BYPASS TRAFFIC ASSIGNMENT (TA 78-18, Revised March, 1979)



KEY TO NOTATIONS: —— ADT, (——) AM PEAK, [——] PM PEAK

WEEKDAY ADT = 95% ADT	PEAK TRUCK VOL (T) = 3.0%
WEEKEND ADT = 112% ADT	24-HOUR TRUCK VOL. (T_{24}) = 5.0% ADT
MORNING PEAK (K-am) = 9.0% ADT	MORNING DISTRIBUTION (D-am) = 60%/40%
AFTERNOON PEAK (K-pm) = 11.0% ADT	AFTERNOON DISTRIBUTION (D-pm) = 55%/45%

[illegible] CONDITIONS

1. The Kamehameha Highway Realignment will be open to traffic by 1985.
2. The traffic assignment projections will reflect the higher [illegible] holiday [illegible] hour traffic that [illegible] of a facility [illegible] social/recreational area.

BASIC ASSUMPTIONS

1. The traffic assignment will be based on the Peep 1 Trip Table and on [illegible] ground counts taken at Station No. C-23-A, Kamehameha Highway at Anahulu Bridge and ground counts taken at Station No. 23-A, Kamehameha Highway and Kaukonahua Road [illegible] Road.
2. The diversion of [illegible] from the existing facility to the proposed facility will be based on the diversion developed for Traffic Assignment 78-8, Kamehameha Highway Realignment, Weed Junction to Haleiwa [illegible] to Bypass, [illegible] on Kamehameha)
3. Truck Factors will be based on the [illegible] ground count at Station No. C-23-B, Kamehameha Highway at Waialua Twin Bridge and Station No. C-15-A, [illegible] Highway at Waimea Bridge.

TABLE 1 AVERAGE DAILY TRAFFIC
(Vehicles per 24 Hours, Total of Both Directions)

Segment	1978	1985	2001
Kam Highway Without Bypass	14,500	17,000	23,000
Kam Highway With Bypass	------	6,800 (40%)	9,200 (40%)
Bypass Alignment	------	10,200 (60%)	13,800 (60%)

Note: 1. Average Weekday traffic = 0.952 x ADT
Average Weekend traffic = 1.120 x ADT
2. Average daily truck traffic is 5.0% of ADT.
3. Annual increase is 2.5%.

TABLE 1A PEAK 8-HOUR WEEKEND TRAFFIC IN 1985
(Vehicles per Hour, Total of Both Directions)

Hour	1000	1100	1200	1300	1400	1500	1600	1700
In Town	1314	1485	1580	1714	1733	1504	1561	1276
Outside Town	1268	1432	1524	1653	1671	1452	1506	1231

TABLE 2 PEAK HOUR TRAFFIC VOLUME VS CAPACITY
(Vehicles per Hour, Total of Both Directions)

Segment	Capacity	1978		1985		2001	
		AM	PM	AM	PM	AM	PM
Kam Highway Without Bypass	1,265-1,440	1,310	1,580	1,535	1,870	2,070	2,530
Kam Highway With Bypass	1,265-1,440			610	745	830	1,010
Bypass Alignment	1,700			925	1,125	1,250	1,525

Note: 1. Morning peak hour is 9.0% of ADT, and afternoon peak hour is 11.0% of ADT.

2. Morning distribution is 60% toward Honolulu and 40% toward Waimea, while afternoon distribution is 45% toward Honolulu and 55% toward Waimea (Based on traffic counts).

3. Peak hour truck traffic is 3.0% of DHV.

C. EMISSION FACTORS (EF)

In using the MOBILE 1 tables for CO, HC and NO_x emission factors, the age distribution of vehicles in each study year is assumed to be the national average. Since Hawaii has a slightly older distribution than the average, the resulting EF's may be slightly lower than actual. The MOBILE 1 tables also assume that no air conditioning is being used, which would not be true for the project area. This would further contribute to an underestimate. Other assumptions are that the fraction of cold starts are the same for catalytic and non-catalytic vehicles and the hot-transient mode is equal to zero; these may not hold true for this study, as discussed below. Whether or not these (and other) "built-in" assumptions balance out can not be determined with the available information. In any event, the contribution that these factors would make to the EF is minor. There are five important variables in determining an emission factor with the MOBILE 1 tables; study year, speed, ambient temperature, fraction of vehicles operating from a cold start , and the fraction of vehicles in each size class. These are discussed in the following paragraphs.

1. Study Years. The study years used in this assessment are set by the time schedule of the proposed project; base year (1978), completion year (1985), and 15 years after completion (2001). Since this provides a good time span (23 years), additional analysis years were not considered necessary.

2. Vehicle Speed. An important parameter for determining the emission factor is the speed of the vehicles, so an analysis was conducted by the State DOT to determine approximate average speeds through Haleiwa under the different traffic conditions (Table 3). This proved difficult to accomplish for 1985 and 2001 for the No Project condition, since very heavy congestion will result. For example, a driving time of 2.5 hours through Haleiwa (2.5 mph) was obtained for Kam Highway in 2001 without the Bypass. It is more likely that drivers will avoid Haleiwa before congestion gets this bad. Since the MOBILE 1 tables only go as low as 5 mph, this value was used (instead of 2.5 mph) for 2001 calculations without the Bypass.

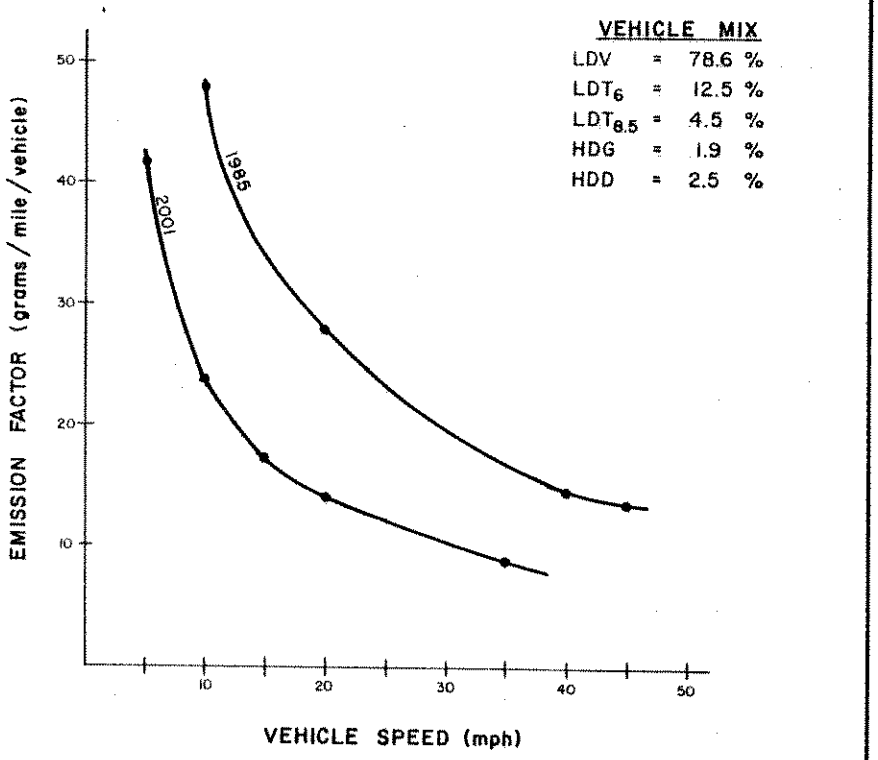
While these speeds might not apply to every 1985 or 2001 weekend afternoon without the Bypass, due to driver avoidance, circumstances will conceivably occur when the slow speeds and high volumes used in this study would apply. Examples would be the annual Sea Spree at Haleiwa Beach Park, the major surfing contests, and weekends with exceptionally large surf. Taking these considerations into account, the speeds for 1978, and 1985 and 2001 with the Bypass, are believed to be representative of heavy peak hour weekend traffic, though probably not every weekend. The actual speed on each highway segment may be higher or lower, but it has not been possible to obtain this level of refinement in the projections. The MOBILE 1 tables use speeds in 5 mph increments, so to obtain Carbon Monoxide EF's for intermediate speeds a graph was constructed (Figure 2) and the values interpolated.

TABLE 3 AVERAGE SPEED THROUGH HALEIWA (MPH)

	1978	1985		2001	
	Without	Without	With	Without	With
Kamehameha Hwy.	15	5	20	5	17.5
Bypass			40		33

3. Ambient Temperature. Since the typical traffic peak occurs in the afternoon, the daily maximum temperature is appropriate for use in determining emission factors. Also, beach use is greatest in the summer (though the largest surf occurs in the winter), when the highest temperatures are recorded. According to the Atlas of Hawaii (University Press of Hawaii, 1973), the mean daily maximum temperature ranges from the low 70's (December-April) to the low 80's (May-November). Therefore, a temperature of 80° F was used to obtain the emission factors. A lower temperature would result in higher emissions.

FIGURE 2 COMPOSITE CARBON MONOXIDE EMISSION FACTOR VS VEHICLE SPEED



4. Cold Starts. A "cold start" occurs when an engine is started after being off for a given period of time (4 hours or more for non-catalytic-equipped vehicles, 1 hour or more for catalytic-equipped vehicles). During the first few minutes of engine operation after a cold start, emissions are higher than when the engine has warmed up. For the purpose of measurement, this "cold-transient" mode as been defined as the first 505 seconds (8.4 minutes) of engine operation after a cold start. If there is a large percentage of cold-transient vehicles in the traffic flow (as would be found during the morning rush hour near a residential area), the emission rates will be higher than if the majority of the vehicles have been operating long enough to warm up. In the present case, it is evident that the percentage of cold start vehicles will be very low, since the majority of the traffic through Haleiwa on a weekend afternoon originated well outside of town.

To determine the cold start fraction, a method developed by the Alabama Highway Department was employed (Ellis, G.W. et al, 1978, "The Determination of Vehicular Cold and Hot Operating Fractions for Estimating Highway Emissions," U.S. Department of Transportation, Federal Highway Administration, Office of Environmental Policy). This technique requires the proportion of trips in each category (work, recreation, through traffic, etc.), the average length of each trip, and the average fraction of vehicles in each trip category operating from a cold start. Since an origin-destination study has not been conducted for this project, the trip categories and lengths had to be estimated based on the assumptions that the majority of trips originated outside of the area (50-60%), and those trips originating in Haleiwa are primarily for recreation (10-25%) and shopping (20%) rather than for work (3-5%). Given that the peak traffic occurs on a weekend afternoon, these assumptions should be valid. Data on the cold start fraction for each trip category was obtained from the referenced publication. Two analyses were conducted, the first using an average of reported cold start fractions for the afternoon, the second using the highest afternoon cold start fractions. The results (Table 4) are low, as expected. Based on this analysis, a cold start fraction of 10% was used with the MOBILE 1 tables for all analysis years and conditions. No attempt was made to speculate whether or not the nature of the trips or the time of peak traffic would change through the study period with or without the Bypass.

TABLE 4 COLD START FRACTIONS

	Non-Catalytic Cold Start	Catalytic Cold Start	Total Cold Start	Catalytic Hot Start
Average Est.	2.5%	5.4%	7.9%	4.1%
High Est.	5.8%	11.9%	11.7%	5.9%

5. Vehicle Mix. Different types of vehicles have significantly different emission characteristics. The emission factor used in the HIWAY model must be a composite factor, determined by multiplying the emission factor of each vehicle type by the fraction of that vehicle type in the traffic flow. Vehicle mix is one of the most important variables in determining the total emissions from a highway, and must be selected for each highway section under consideration. The vehicle mix for the present project was determined by the State DOT to be: Light Duty Vehicles (autos) 78.6%; Light Duty Trucks (less than 3 tons) 12.5%; Light Duty Trucks (3-4.25 tons) 4.5%; Heavy Duty Gasoline Trucks, 1.9%; and Heavy Duty Diesel Trucks 2.5%. This mix was used for all study years and highway segments with and without the Bypass. If the Bypass is constructed, the fraction of trucks may be higher on it than on Kamehameha Highway. This would increase the proportion of autos on Kamehameha Highway, resulting in slightly higher Carbon Monoxide EF's than used for this analysis.

6. Lead Emissions. Lead emission factors were calculated according to the equations presented in the EPA publication, "Draft Supplementary Guidelines for Lead Implementation Plans", Office of Air Quality Planning and Standards, November 1977. In simple terms, the concentration of lead in gasoline (grams/gallon) is multiplied by the traffic volume (vehicles/day) and divided by the fuel economy (miles/gallon) to yield an emission factor (grams/vehicle-mile/day). Modifying elements include the fraction of lead exhausted at various speeds, corrections for stop and go versus free flowing traffic, and adjustment of fuel economy by analysis year and vehicle speed. It is

assumed that light duty vehicles (autos) and light duty trucks have the same lead emission characteristics, and that heavy duty trucks have no significant lead emissions. As a result, the lead pollutant burden is on the conservative side, since trucks are included in the total vehicle miles traveled used to compute the lead burden.

Since vehicle speed is such an important variable in this (and other) pollutant EF's, full corrections were made using the appropriate speeds for the analysis years and conditions (Table 3). Unlike CO and HC, Pb emissions significantly increase with increased speeds. Fuel economy increases with speed (up to 40 mph), so less lead is consumed per mile at higher speeds. However, as the speed increases, the fraction of lead exhausted increases. Even more important than speed, is the average concentration of lead in the gasoline. The EPA study indicates the "probable pooled average lead content of gasoline" for 1978 as 0.8 gm/gal., for 1985 as 0.15 gm/gal., and for 1990 (=2001) as 0.05 gm/gal. The higher lead content given for 1978 results in a significantly higher emission factor (Table 5) and pollutant burden (Table 7). It is not known whether or not the gasoline used on Oahu had a similar average lead content in 1978. Lead emissions will decrease with time as the percentage of vehicles using unleaded fuel increases and as fuel economy improves.

7. Particulates and Sulfur Oxides. Emission factors for these pollutants were obtained from EPA's "Compilation of Air Pollutant Emission Factors" (AP-42, Supplement 5, December 1975). These are relatively minor pollutants, and have not been revised by the more recent supplements. Particulate emissions are separated into exhaust and tire wear. Both depend on vehicle type, so composite EF's have been derived according to the vehicle mix used for this study. An important component of the exhaust particulates is lead, which will decrease with the decrease in gasoline lead concentration. The fraction of vehicles using leaded and unleaded gasoline in each study year was obtained from the previously cited publication used for lead EF's, and adjusted according to the City and County of Honolulu vehicle age distribution (which is skewed to older vehicles relative to the national average). The resulting proportion of autos and

light duty trucks using unleaded gasoline is; 1978 = 12%, 1985 = 59%, and 2001 = 98%. Exhaust particulate emissions are highest for heavy diesel trucks, but these make up a relatively small fraction of the vehicle mix. Tire particulate emissions (ie. rubber) remain constant through the study period. Since light and heavy vehicles differ in tire wear, a composite EF was derived. To determine the contribution from heavy trucks, an average of twelve tires per truck was assumed.

Sulfur Oxide emissions also remain constant through the study period, since they are not affected by vehicle speed or emission controls (at least to the level of refinement used in AP-42). As with the other pollutants (except lead), a composite emission factor was derived.

8. Summary of Emission Factors. The various emission factors derived for this study are listed in Table 5 for each analysis year and condition. With most pollutants, there is a decrease in the emission factor with time, as various control programs are applied. Furthermore, there is a significant improvement in most EF's with the Bypass, since vehicles will operate more efficiently. An exception to this is lead, since the EF increases as vehicle speed increases. All of these emission factors are estimates (though the formulas used to derive them are based on fairly extensive sampling), and are subject to change if the Clean Air Act is amended. Should the deadlines for various emission standards be extended, the emission factors used in this study would be underestimated slightly. The effects of the Clean Air Act will level off by the year 2000, so that no further improvements in emissions will be realized unless the Act is revised.

9. Pollutant Burdens. The emission factors are expressed as grams per mile per vehicle. To convert this to a total pollutant load, the emission factor is multiplied by the vehicle miles traveled in the project area. Vehicle-miles traveled per day (VMT) is a product of the average daily traffic (ADT) and the length of highway. The total VMT with and without the Bypass is given in Table 6 (the Bypass figures are based on Alternates A or C; Alternate D VMT would be 1-2% higher, since it is slightly longer).

TABLE 5 SUMMARY OF EMISSION FACTORS (grams/mile/vehicle)

	CARBON MONOXIDE (CO)		
Segment	1978	1985	2001
Kam Hwy without Bypass	70.0	78.6	41.8
Kam Hwy with Bypass		28.3	16.0
Bypass		14.9	9.0

From MOBILE 1

	HYDROCARBONS (HC)		
Segment	1978	1985	2001
Kam Hwy without Bypass	7.7	7.6	4.4
Kam Hwy with Bypass		2.6	1.5
Bypass		1.5	0.9

From MOBILE 1

	NITROUS OXIDES (NO_x)		
Segment	1978	1985	2001
Kam Hwy without Bypass	3.2	2.5	1.6
Kam Hwy with Bypass		2.3	1.6
Bypass		3.0	2.0

From MOBILE 1

	LEAD (Pb)		
Segment	1978	1985	2001
Kam Hwy without Bypass	.0065	.0007	.0002
Kam Hwy with Bypass		.0008	.0002
Bypass		.0013	.0003

From EPA Lead Implementation Guidelines

	1978	1985	2001
Particulates (exhaust)	.341	.211	.102
Particulates (tires)	.218	.218	.218
Sulfur Oxides	.210	.210	.210

These EF's do not change with speed, so are the same for all segments. From EPA, AP-42.

TABLE 6 VEHICLE-MILES TRAVELED (VMT) IN MILES PER DAY

	1978	1985	2001
Without Bypass	33,580	39,428	53,446
With Bypass		40,784	54,796

TABLE 7 POLLUTANT BURDEN *

Pollutant	Units	1978	1985		2001	
		Without	Without	With	Without	With
Carbon Monoxide	ton/day	2.590	3.415	.912	2.462	.716
Hydrocarbons	ton/day	.285	.330	.087	.259	.069
Nitrous Oxides	ton/day	.118	.109	.122	.094	.111
Lead	lb/day	.482	.059	.101	.233	.030
Total Particulates	lb/day	41.3	37.2	38.5	37.7	38.7
Sulfur Oxides	lb/day	15.5	18.2	18.8	24.7	25.3
TOTAL	ton/day	3.022	3.882	1.150	2.846	0.928

* grams/vehicle-mile x vehicle-miles/day x (1.102×10^{-6} Ton/gram) or (2.204×10^{-3} lb/gram)

These figures include only Kamehameha Highway and the Bypass; there are few side streets in Haleiwa, and their traffic load is very light compared to Kamehameha Highway. The total VMT with the Bypass is 2-3% higher than without it. This is due to an increase in the total length of highway rather than an increase in ADT.

The pollutant burdens with and without the Bypass are itemized on Table 7. There is no standard with which the pollutant burden can be compared, but it does indicate the relative contribution of the different pollutants and their trend over time with and without the project. Carbon Monoxide is the most significant pollutant, contributing around 85% of the total load (75% in 2001). Although most emission factors improve each year (Table 5), the total burden increases from 1978 to 1985 without the Bypass. This is due to the increasing traffic volume on Kamehameha Highway, resulting in congestion and inefficient engine operation. By the year 2001, the pollutant burden without the bypass should be slightly below the 1978 level as a result of better emission controls. When the same volume of traffic is divided between Kamehameha Highway and the Bypass, the total pollutant burden drops 53% in 1985 and 68% in 2001, relative to what it would be without the Bypass. The proposed project will therefore have a significant beneficial impact on air quality.

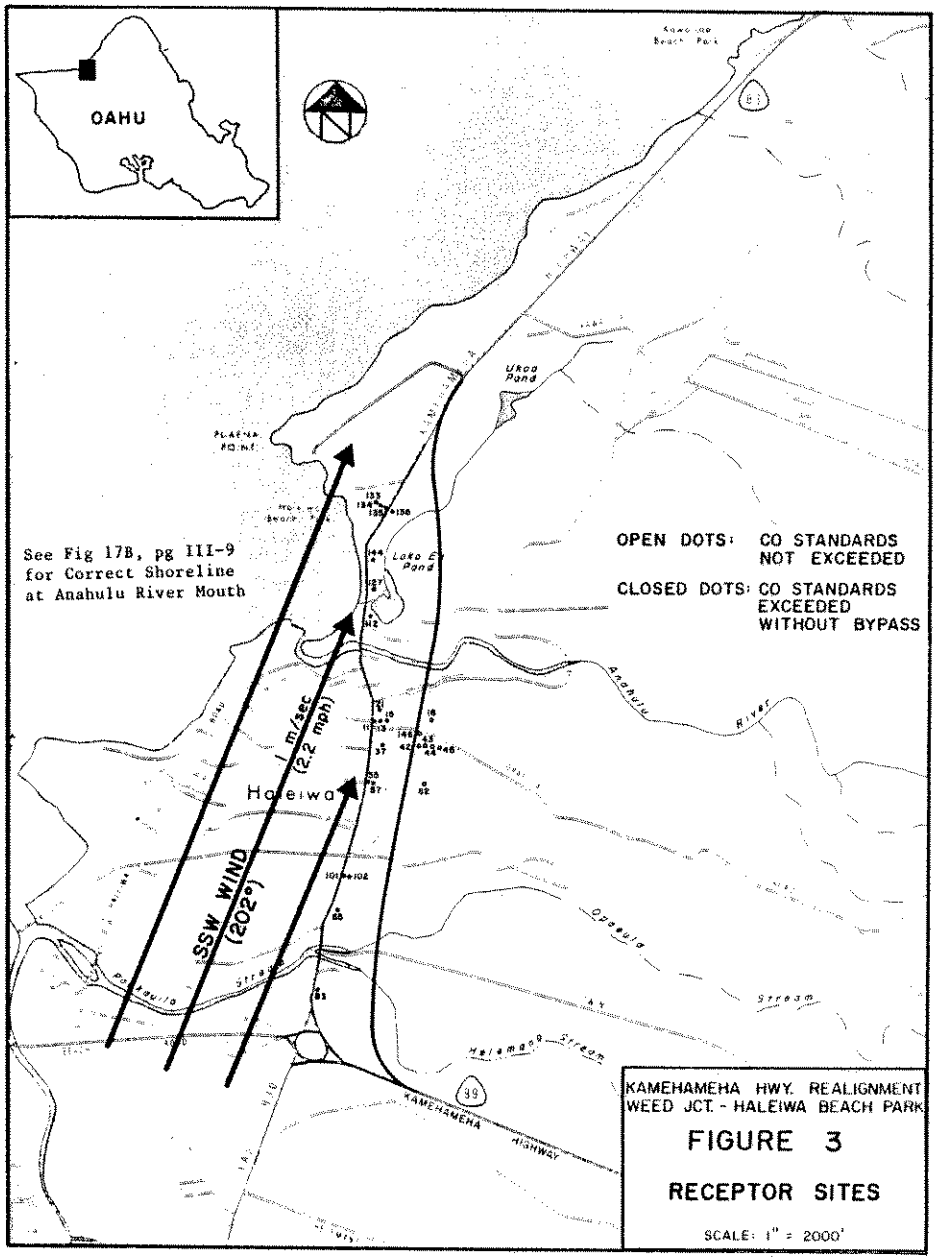
D. CARBON MONOXIDE CONCENTRATIONS USING "HIWAY"

As previously noted, EPA's highway air pollution computer model, HIWAY, was used to estimate the CO concentrations resulting from traffic on Kamehameha Highway and the Bypass. The workings of the model will not be described here except to say that it takes the "line source" emission rate of the highway (grams/sec /meter) and traces the downwind dispersion of the pollutant, giving its concentration at any specified point. (See Zimmerman, J.R. and R.S. Thompson, 1975, "User's Guide for HIWAY , Highway-Air Pollution Model", EPA, and Axtelle, Kenneth Jr., 1975, "Application of the HIWAY Model for Indirect Source Analysis - User's Manual", EPA). The following paragraphs discuss the rationale behind selecting the various input parameters used in this application of the model.

1. Organization of Study. The focus of this assessment has been Kamehameha Highway, since it is the point of traffic congestion. It is also important since it passes through Haleiwa, exposing homes and businesses to air pollution. From the pollutant burden analysis, it is apparent that the Bypass will significantly decrease the total pollutant load. Therefore, the objective of this study has been to determine how serious CO pollution can become without the Bypass, and to what extent will the Bypass reduce CO concentrations in Haleiwa.

Using a single set of "worst case" conditions of wind direction, wind velocity, and atmospheric stability, the one-hour CO concentrations from Kamehameha Highway without a Bypass were obtained for 1978, 1985, and 2001. Using the same set of conditions, years, and receptors, the CO concentrations from Kamehameha Highway were derived with the Bypass carrying 60% of the traffic load. Then, the concentration from the Bypass itself was determined. Finally, the average 8-hour CO concentrations were determined for two receptors on Kamehameha Highway that had the highest 1-hour concentrations in 1985. A total of 56 computer runs were made, using 63 different receptor locations (872 calculations). Not all receptors were tested for all conditions, since the first few computer runs were made to determine the most critical areas, namely, those where the State Carbon Monoxide standard may be approached or exceeded. As a result of this screening, 25 receptors were selected; 18 of these have been plotted to define the area along Kamehameha Highway where the standard may be exceeded, and 7 to detail the CO concentration along the Bypass (Figure 3).

2. Line Sources. The HIWAY model requires a straight highway as the line source, so Kamehameha Highway was divided into seven segments that approximate straight lines. These segments also correspond closely to the highway sections used by the State DOT for the traffic assignment (Figure 1; "KB", "KC", etc.). Using this many segments increased the number of computer runs (each segment is run separately for each set of receptors), but is more accurate than if a fewer number of longer segments were used, since shorter segments can be made to fit the actual highway more closely. The Bypass alignment was divided into two segments. For simplicity, only Alternate C was used in this analysis. With some minor adjustment, the results obtained can be applied to the other alternates, since they all have the same emission rates. It was assumed that the Bypass would still be two lanes in 2001. This produces slightly higher emission rates than if the bypass was 4 lanes, since the projected level of peak hour traffic for the year 2001 will result in slower speeds (Table 3).



3. Receptor Points. Receptor points along Kamehameha Highway were selected to include "critical receptors" (eg. Haleiwa Community Association Building, Liliuokalani Church, Sea View Inn), and to provide a representative CO profile at regular distances away from the highway (25 feet to 2,000 feet). The data obtained from these profiles enable rough interpolation of the CO concentration at points not specifically calculated. The points were plotted on an aerial photo map of Haleiwa at a scale of 1" = 200', and identified for the computer by a reference grid oriented to north. The height of the receptors was set at 2 meters ("nose height").

4. Wind. A south by southwest wind (202°) was used for all of the computer runs. This wind is almost parallel to Kamehameha Highway and Bypass Alternate C, resulting in accumulation of CO along the highway, rather than dispersion away from it. Each segment has a slightly different orientation, but on the average, a SSW wind strikes the highway at an angle of around 12 degrees. With this wind direction, the inland (east) side of the highway is downwind (except at Haleiwa Beach Park), and receives virtually all of the pollutants. If the wind direction was reversed (ie, coming from the NNE at 22 degrees), similar concentrations would be obtained on the seaward side of the highway. Since the average orientation of Kamehameha Highway is around 190 degrees, winds from the south or from the north would also produce high CO concentrations.

The wind velocity used for the 1-hour CO analysis was 1.0 meters per second (2.2 mph or roughly 1.9 knots), which is the minimum recommended velocity for use with HIWAY. According to the HIWAY user's manual, increasing the velocity from 1.0 m/sec to 2.0 m/sec would cut the resulting CO concentrations in half. This low velocity was selected to provide an extreme worst case situation; winds corresponding to the afternoon traffic peak are usually much greater. For the 8-hour analysis 1.0 m/sec was used for the hours 1000-1200 and 1600-1800, and 2.0 m/sec was for the mid-day period 1200-1600

Wind data was obtained for two locations near the project area: Waialua, 1.3 miles west of the start of the project, and Mokuleia Field (Station 22507, the former Dillingham AFB), 6 miles west of the project. The Waialua data was provided by the Waialua Sugar Company for 1977 (wind direction) and 1930-1946 (wind velocity). No greater sample period was

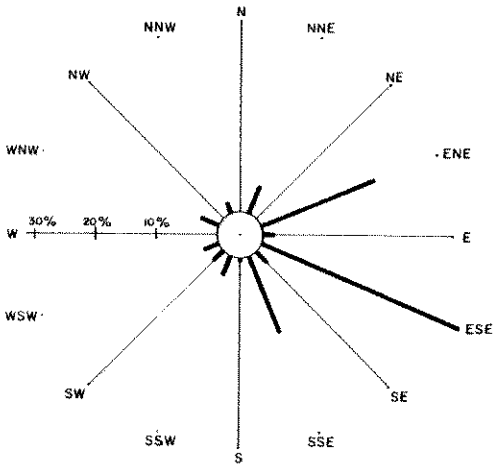
available for wind direction. This data is plotted on Figure 4, and is directly applicable to the project area. The Mokuleia data was collected by the U.S. Air Force Air Weather Service from 1942-1945. It is much more detailed than the Waialua data, but is not directly applicable to the project area, since the station is sheltered from southerly and westerly winds by a steep ridge.

The frequency of occurrence of a SSW wind at Waialua is only 0.034 (3.4% of the time for all velocities and hours). If all four worst case directions (SSW, NNE, S and N) are combined, the frequency comes to 0.084. Frequency by velocity was not available for Waialua, but at Mokuleia, the annual frequency of occurrence of a 1.0 m/sec (1-3 knot) wind from any direction is 0.167 (minimum of 0.101 in August, maximum of 0.27 in January and February). This is on a 24-hour basis, but the peak traffic period is in the afternoon from around noon to 3 PM (1200 to 1500 hours). As shown on Figure 4, the average wind velocity during this period is around 5m/sec, and the typical low velocity is around 3 m/sec. The overall frequency of the worst case wind conditions is the combined frequency of direction, velocity, and time. The Waialua data obtained for this study is not detailed enough to yield this information, but at the Mokuleia Station, the combined frequency of any of the four worst case winds at 1.0 m/sec from noon to 3 PM is approximately 0.023. To be on the conservative side, this frequency will be assumed to be 0.05 in the project area.

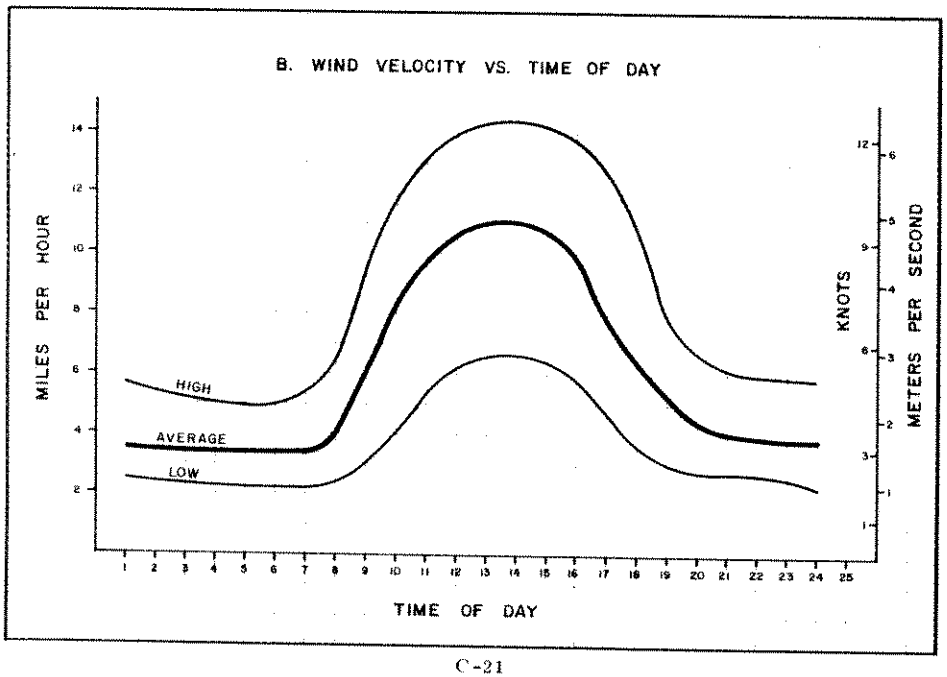
5. Stability Class and Mixing Height. The stability class is a 7-step index of air turbulence, ranging from Class A, "extremely unstable", to Class G, "extremely stable". The more stable the air is, the less pollutants are dispersed, resulting in higher concentrations. Stability Class E, "slightly stable", was selected for this analysis. A lower class (more turbulent) would not provide a worst case situation, and a higher class (more stable) is very unlikely in the afternoon when the traffic peak occurs. The frequency of occurrence of E stability at Hickam AFB is 0.17 for all wind speeds ("Stability Wind Roses, Hickam AFB, Hawaii. U.S. Air Force Air Weather Service, Report 7461, September 4, 1974). However, the actual frequency at Haleiwa may be higher, since it is a rural environment, in contrast to

FIGURE 4 WIND CONDITIONS AT WAIALUA
(Waialua Sugar Co. Office)

A. WIND ROSE (FREQUENCY OF DIRECTION)



B. WIND VELOCITY VS. TIME OF DAY



the urban environment surrounding Hickam AFB. Therefore, a frequency of 0.25 for stability Class E is assumed for this analysis. The mean mixing height at Hickam with E stability and a 1-3 knot SSW wind is 534 meters, which is assumed to be appropriate for the project area.

E. RESULTS

1. Occurrence of Worst Case Conditions. The critical set of conditions assumed for the determination of CO concentrations was a weekend afternoon from noon to 3 PM, with a SSW wind blowing at 1.0/m/sec during E stability conditions. The total potential time during which the peak traffic can occur is 312 hours (52 weekends x 2 x 3 hours). In the preceeding discussion of wind conditions, it was pointed out that a NNE, N, or S wind would also produce high CO concentrations, so all four winds have been combined into a single frequency. This frequency, for a velocity of 1.0 m/sec in the afternoon, is assumed to be 0.05. Taking 5% of the 312 hours leaves 15.6 hours. Finally, the frequency of E stability is assumed to be 0.25, which leaves 3.9 hours per year in which the worst case conditions may occur. Due to the manner in which the wind data is collected (hourly observations), this does not necessarily yield four 1-hour periods. In fact, it is very unlikely that these conditions would occur together for a full hour, since the total time is so low. But if this possiblity is allowed, there is a maximum of four times per year during which the 1-hour CO concentrations obtained with the HIWAY model can be expected to occur. If the CO concentration at a given receptor exceeds the State or Federal 1-hour standard (Table 8) then it may be considered to be four separate violations. There is a strong likelihood that a weekend with peak 1-hour traffic will have peak 8-hour traffic also, so this frequency estimate is valid for both standards.

The strategy of this analysis has been to obtain the maximum feasible concentrations. Because the traffic volume through the project area is relatively low (compared to the major weekday commuter corridors) the assumed conditions had to be very severe in order to obtain significant values. Once the "ceiling" is established, minimizing factors can be applied

TABLE 8

STATE OF HAWAII AND FEDERAL AMBIENT AIR QUALITY STANDARDS

	Pollutant	Sampling Period	Federal Standards		State Standards	Objective
			Primary	Secondary		
1.	Suspended Particulate Matter	Annual Geometric Mean	75	60		
	(micrograms per cubic meter)	Annual Arithmetic Mean	--	--	55	To prevent health effects attributable to long continued exposure.
		Maximum Average in Any 24 Hours	260	150	100	
2.	Sulfor Dioxide	Annual Arithmetic Mean	80	60	20	
	(micrograms per cubic meter)	Maximum Average in Any 24 Hours	365	260	80	To prevent pulmonary irritation and odor
		Maximum Average in Any 3 Hours		1300	400	
3.	Carbon Monoxide	Maximum Average in Any 8 Hours		10	5	To prevent interference with the capacity of the blood to transport oxygen.
	(milligrams per cubic meter)	Maximum Average in Any 1 Hour		40	10	
4.	Hydrocarbons, Non-methane	Maximum Average in Any 3 Hours		160	100	
	(micrograms per cubic meter)					
5.	Photochemical Oxidants	Maximum Average in Any 1 Hour		160	100	To prevent eye irritation and possible impairment of lung function in persons with chronic pulmonary disease, and to prevent damage to vegetation.
	(micrograms per cubic meter)					
6.	Nitrogen Dioxide	Annual Arithmetic Mean		100	70	To prevent possible risk to public health and atmospheric discoloration
	(micrograms per cubic meter)	Maximum Average in Any 24 Hours			150	

Source: State Department of Health, *Hawaii Air Quality Data*, Environmental Health Division, Air Sanitation Branch, February 20, 1973.

without additional computer runs. For example, a 2.0 m/sec wind would cut the CO concentration in half, and faster vehicle speeds would reduce it 30-40%. In the same manner, the combined occurrence of the worst case conditions can be reduced to less than one hour per year by slightly reducing the frequency of any of the factors.

2. Carbon Monoxide Concentrations. The CO concentrations (in miligrams per cubic meter) obtained with HIWAY are listed on Table 9. All of these values include a background CO concentration of 1.1 mg/m^3 (1 ppm), which is typical natural background level. (This is supported in the project area by several hours of monitoring by the State DOT with a portable CO analyzer, which yielded values of 1-2 ppm in rural areas, and 2-3.5 ppm in areas directly influenced by traffic.) As previously noted, receptors were selected to define the areas where the highest concentrations would result. The highest values were obtained for 1985 without the Bypass, when 25 receptors were found that registered CO concentrations equal to or exceeding the stringent State 1-hour standard of 10 mg/m^3 (18 of these receptors are listed on Table 9). All of these receptors were within 300 feet of Kamehameha Highway, and 75% were 100 feet or less from the highway. Of the 25 points greater than 10 mg/m^3, 8 were over 20 mg/m^3, 6 were over 25 mg/m^3, and 2 were over 30 mg/m^3. The highest value obtained was 40.0 mg/m^3 (receptor 135) which equals the Federal 1-hour standard. The State 8-hour standard would be exceeded at the six receptors with the highest 1-hour concentrations.

These results show that in 1985 with the Bypass the zone of greatest potential air pollution impact is within 300 feet of Kamehameha Highway (Figure 3). This includes almost all of the businesses in Haleiwa, and many residences. (No schools are included in this zone, but there would be no impact if there were, since the worst case occurs on a weekend.) Within this zone, both the State 1-hour and 8-hour CO standards can be expected to be exceeded no more than four times per year, if at all. If the Bypass is not operational in 1985, there is also a potential for the Federal 1-hour CO standard to be exceeded immediately downwind from Kamehameha Highway (within 25 feet). In 1978 and 2001 without the Bypass, the width of the impact zone is slightly less than in 1985 (within 225 feet of the highway), and the CO concentrations are around 25% lower.

TABLE 9 CARBON MONOXIDE CONCENTRATIONS (mg/m^3) *

Receptor	Dist.f/ Hwy.	Maximum Carbon Monoxide Concentrations 1978 Without 1-Hour	1985 Without 1-Hour	1985 Without 8-Hour	1985 With 1-Hour	2001 Without 1-Hour	2001 Without 8-Hour	2001 With 1-Hour
KAM HWY								
11	25'	17.5	22.8		3.9	16.8		3.4
13	100'	11.9	15.3		2.9	11.3		2.6
15	300'	8.9	11.4		2.5	8.6		2.2
21	140'	10.2	13.2		2.8	9.8		2.4
37	225'	11.0	14.2		2.9	10.2		2.5
55	25'	21.3	27.9		4.7	20.3		4.0
57	100'	20.1	26.0		4.7	19.1		3.9
65	100'	11.1	14.2		3.1	10.3		2.6
83	50'	12.2	15.5		3.2	11.1		2.7
101	25'	29.4	37.9	9.3	6.4	27.5	7.0	5.1
102	100'	10.2	13.1		2.8	9.6		2.5
112	100'	9.8	12.4		2.7	9.4		2.4
127	100'	10.8	13.7		2.8	10.3		2.5
133	100'	9.6	12.2		2.7	9.1		2.4
134	50'	21.1	27.3		4.8	19.9		4.0
135	25'	30.7	40.0	9.6	6.5	29.0	7.2	5.4
136	25'	10.0	12.8		2.7	9.5		2.4
144	50'	13.4	17.3		3.4	12.7		2.8
BYPASS								
18	230'	1.9	2.5		2.4	1.8		2.2
42	100'	1.8	2.2		3.4	1.7		2.9
43	200'	1.8	2.2		2.5	1.7		2.2
44	300'	1.1	1.1		2.0	1.1		1.8
45	400'	1.1	1.1		1.7	1.1		1.6
62	310'	1.1	1.1		1.8	1.1		1.7
146	25'	1.1	1.1		4.2	1.1		3.6

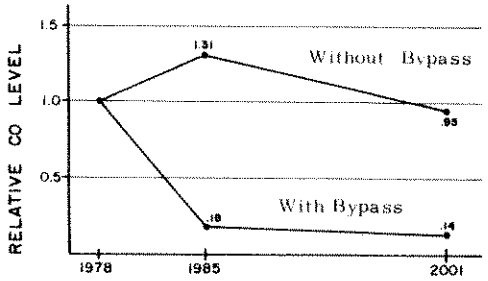
* Background Concentration of 1.1 mg/m^3 (1 ppm) has been added.

When the Bypass shares the traffic load, CO concentrations will drop well below the State standards, even under the extreme worst case condidions used in this study. The highest 1985 one-hour concentration obtained on the Bypass was 4.2 mg/m^3 (see the last 7 rows of Table 9). Alternate C was used in this analysis, but the results are valid for the other alignments. Where Alternate D comes within 500 feet of Kamehameha Highway, the concentration 25 feet downwind from the Bypass would be roughly 0.4 mg/m^3 higher than for Alternate C (i.e. 4.6 mg/m^3) in 1985, and 0.3 mg/m^3 higher (i.e. 3.9 mg/m^3) in 2001. At distances greater than 200-800 feet, the CO from Kamehameha Highway makes a negligible contribution (less than 0.2 mg/m^3) to the concentration downwind from the Bypass.

3. Hydrocarbons and Nitrous Oxides. These pollutants are very important in air quality management, since they are the primary precursors to "photochemical oxidant", a class of air pollutants that has serious health implications. Although HC and NO_x were not analyzed with HIWAY, a rough estimate of their maximum concentrations can be obtained by comparison with the CO results. For any given highway segment and receptor, the pollutant concentration is proportional to the emission rate (grams/sec /meter). Since HIWAY makes no distinction between the diffusion characteristics of different molecules, the ratio of emission rate to concentration obtained for CO at specific receptors will hold for HC and NO_x. However, the assumption is made that within the short distances used for this analysis (25-300 feet from the highway), the photochemical reactions typical of HC and NO_x do not significantly reduce their concentrations. Using this approach, the highest Hydrocarbon concentration obtained is approximately 3560 micrograms/m^3, and the highest Nitrous Oxide concentration is approximately 1170 micrograms/m^3. These values are for receptor 101 in 1985 without the Bypass. If the Bypass is operational in 1985, the maximum HC and NO_x concentrations at this receptor would drop to around 510 $\mu g/m^3$ and 170 $\mu g/m^3$, respectively. These are 1-hour maximums that may occur no more than four times per year, if at all. However, the State and Federal standards (Table 8) are based on averages over longer periods of time, so direct comparisons can not be made.

4. Summary. The critical year for Carbon Monoxide pollution in Haleiwa is 1985 without the Bypass. Although emission factors are generally less than in 1978, the assumptions was made that traffic congestion would result in much slower speeds, which causes higher CO emissions. This is demonstrated by the following graph (Figure 5), which shows the change in CO concentration, relative to the base year (1978 = 1.0), with the Bypass and without the Bypass. As the graph shows, the CO concentration in 1985 without the Bypass is 1.31 times higher than in 1978, and by 2001 it only drops slightly below the 1978 level. On the other hand, the CO concentration in Haleiwa is significantly reduced when traffic is divided between Kamehameha Highway and the Bypass, being approximately 1/7 of what it would be without the Bypass.

FIGURE 5 CHANGE IN CO CONCENTRATION RELATIVE TO 1978



APPENDIX D. NOISE ASSESSMENT

This Appendix presents the data and calculations upon which the discussion of existing noise and future noise impact in the EIS text is based. The assessment of noise in Haleiwa included measurement of existing sound levels and prediction of noise from traffic using several different methods.

The "Ambient Noise Survey Data Sheets" reproduced here are the field notes and analyses of noise level monitoring conducted in Haleiwa. The readings were taken on Saturday, May 26, 1979. Ten readings were made at seven locations with the measurement periods ranging from 10 to 30 minutes. The sites are plotted on Figure D-1 and sketched on the back of each data sheet. Readings were made at intervals from 9:30 A.M. to 3:00 P.M. Automatic traffic counters were set up at the Twin Bridges and at the Anahulu Bridge to record traffic flow during the monitoring period. Traffic was relatively high (due to good beach weather that day), ranging from 645 vehicles per hour (vph) at 9:00 A.M. to a peak of 1,325 vph at 3:00 P.M.

The results of the noise measurements are presented in Table D-1. The morning background noise level was around 45 dBA (decibels on the "A" scale), which is typical of a small town environment (1). The L_{10} noise level (the dBA level exceeded 10% of the time) at 50 feet from the highway was around 64-67 dBA, depending on traffic volume. The attenuation rate (volume drop-off with distance) was found to be around 4.5 dBA for a doubling of distance, which agrees very closely with the theoretical rate (2).

Predictions of traffic noise were made for two statistical descriptors, L_{10} and L_{eq}. As previously noted, the L_{10} noise level is the value exceeded 10% of the time; it is considered to represent "peak" noise. The L_{eq}, or "energy equivalent" noise level equates a variable noise source such as a highway to a steady-state source, taking into account the duration and magnitude of all of the sounds occurring in the time period (3). The L_{10} value is more commonly used in noise ordinance and other applications, but L_{eq} is gaining popularity as a universal noise measure (4). The noise levels produced by traffic were predicted using

the traffic assignment data with and without the bypass (see Appendix C, Figure 1). The methodology employed is that of the "FHWA Highway Traffic Noise Prediction Model" (5). In this case, a programmable calculator (HP-67) was employed using a program developed by the FHWA (Technical Advisory T5040.5 9/5/78 rev. 10/17/78). The calculation sheets are included at the back of this Appendix, and the results are summarized in Table D-2 and Figure D-2.

The "predicted" L_{eq} noise levels for 1978 conditions along Kamehameha Highway (Table D-1) came out approximately 2-5 decibels higher than the measured L_{eq} values. Most of this difference can be attributed to the uncertainity of actual vehicle speeds. The sites close to the highway had the greatest discrepancies, which is to be expected, since the measurements at these sites are not in a steady-state noise environment. The predicted values in Table D-2 can therefore be considered conservative ("worst case") estimates by several decibels.

Noise levels were predicted at two "sensitive recepters" in Haleiwa, the Liliuokalani Church and the Waialua Community Association Building. The exterior L_{10} noise levels at these locations in 1985 will be 60 dBA or less with or without the bypass. The noise level actually decreases if the bypass is not built, since slower traffic is quieter, even though there will be more vehicles. With the front door of the church closed and the windows open, the peak interior noise level attributable to traffic should be around 15 decibles less than the exterior noise level (6), or approximately 45 dBA in 1985 with the bypass. The Community Building is a wood frame structure with more windows than the Church, so the noise reduction would be around 10 decibels (7). Thus, the peak interior noise level from traffic in 1985 with the bypass should be approximately 50 dBA. These noise levels are within the Federal and the Oahu design standards (Table D-3).

A graphic representation of the existing and predicted noise environment is given in Figures 26 and 27 in the EIS text. These contour maps were prepared from the noise prediction data, attenuated at a rate of 4.5 dBA per double distance (Figure D-2).

Because of the greater traffic volume and higher speed on the bypass, it will generate more noise than Kam Highway. The applicable Federal Design Noise Level of 70 dBA (L_{10}) will be exceeded within 75 feet of the edge of the highway along most of its length. If the highway is widened to four lanes in 2001 (with a 10 foot median), the noise level will be reduced, so that the 70 dBA (L_{10}) standard will not be exceeded beyond 65 feet from the near edge of either side of the highway. For most of its length the highway passes through sugar cane field, so the Federal Design Noise Level does not apply. However, there are two houses on the seaward side of Alternate C between Emerson Road and the Anahulu River. Alternate C has been revised by moving it seaward and using retaining walls to hold the fill. This has reduced the number of houses that will have to be removed, but it will place these two homes 15-20 feet from the retaining wall (25-30 feet from the near traffic lane). The relationship between the houses and the highway is shown on Figure D-3.

With no noise attenuation, the exterior sound level would be around 75 dBA (L_{10}) at these homes, clearly in violation of the Federal Design Noise Level. Allowing for a 10 dBA noise reduction going inside (wood frame, open windows), the interior of the homes would have peak noise levels of 65 dBA attributable to traffic, which would interfere with normal speech. Therefore, a preliminary acoustic barrier design has been developed to bring the projected traffic noise at these homes down to an acceptable level. It was found that a concrete or hollow tile wall placed at the edge of the highway, rising 8 feet above the road surface and extending 175 feet (20 feet beyond the edge of each house), would reduce the exterior noise level at the closest house to 60 dBA (L_{10}). This would give a 50 dBA interior noise level, which is 5 decibels below the Federal criteria and equals the State criteria for new highway construction adjacent to hospitals and other highly sensitive receptors.

The homes inland from the new highway will be just outside of the 70 dBA impact zone. However, interior noise levels will probably exceed 55 dBA, so a second acoustic barrier will be necessary to minimize noise impact at these locations, also. This barrier need only be 4-5 feet high. If a second set of 2 lanes is added, a full acoustic barrier on the inland side of the roadway will be required. The design of these acoustic barriers must be finalized after the construction plans for the highway are settled, and more precise distances and elevations are known.

Construction of the bypass will generate short-term noise impacts, particularly during the grading phase. The theoretical magnitude of this impact can be estimated by assuming that three of the loudest pieces of equipment are operating simultaneously in close proximity to each other. Assume, then, a front loader (85 dBA @ 15m), a bulldozer (94 dBA @ 15m), and a grader (85 dBA @ 15 m) operating in a configuration to produce a maximum point-source sound level of 95 dBA @ 15m. Without knowing the operating cycles or minimum sound levels, the L_{eq} of the machinery can not be calculated per reference 8. Taking this value as the L_{10} and applying a point-source attenuation rate of 6 decibels per doubling of distance, gives peak noise levels ranging from 70 dBA to 85 dBA at the first row of residences. This "worst case" estimate would only apply for short periods during the several months of rough and final grading.

TABLE D-1 NOISE MONITORING RESULTS
Haleiwa 5/27/79

Site	Distance From Edge of Hwy.	Time	Hourly Traffic Volume	dBA* Measured L_{10}	dBA* Measured L_{eq}	Predicted L_{eq}
1	500'	0932 - 1002	885	50	47	45
2	150'	1015 - 1030	980	57	54	57
3	30'	1040 - 1055	1090	64	62	64
4	50'	1120 - 1135	1334	66	64	67
5	180'	1145 - 1200	1392	52	50	55
6	50'	1227 - 1242	1316	65	64	67
7	140'	1300 - 1315	1174	57	56	60
1	500'	1415 - 1425	1265	52	49	47
2	150'	1430 - 1440	1265	60	57	58
3	30'	1445 - 1500	1265	64	62	65

* Measured L_{10} levels are all within a 95% confidence interval, and most are within a 99% confidence interval. L_{eq} is calculated by formula from the measurements, and is thus accurate for the samples taken. The predicted L_{eq} assumes the following: vehicle distribution; Autos 78.6%, medium trucks 17.0%, heavy trucks 4.4%; speed 15-25 mph; flow and speed equal in each direction.

TABLE D-2 NOISE PREDICTION RESULTS

a) L_{10} and L_{eq} Noise Levels 50 feet from edge of the highway (dBA)

Segment	1978 L_{10}	1978 L_{eq}	1985 L_{10}	1985 L_{eq}
Kam. Hwy. Without Bypass	67	64	65	61
Kam. Hwy. With Bypass	--	--	66	63
Along Bypass Alignment	--	--	73	70

b) L_{10} and L_{eq} Noise Levels in front of Liliuokalani Church, 150 feet from Kamehameha Highway (dBA).

	1978 L_{10}	1978 L_{eq}	1985 L_{10}	1985 L_{eq}
Without Bypass	60	57	58	54
With Bypass	--	--	59	56

c) L_{10} and L_{eq} Noise Levels in Front of Waialua Community Association Building, 100 feet from Kamehameha Highway (dBA).

	1978 L_{10}	1978 L_{eq}	1985 L_{10}	1985 L_{eq}
Without Bypass	62	59	60	56
With Bypass	--	--	61	58

Table D-3 NOISE STANDARDS

For Reference

Sound Levels and Human Response

Common Sounds	Noise Level (dB)	Effect
Jet take-off (300 feet)	140	Painfully loud
	130	
Discotheque	120	Maximum vocal effort
Auto horn (3 feet)		
Pile drivers	110	
Rock band	100	
Heavy truck (30 feet) City traffic	90	Very annoying Hearing damage (8 hours)
Alarm clock (2 feet) Hair dryer	80	Annoying
Noisy restaurant Freeway traffic Man's voice (3 feet)	70	Telephone use difficult
Air conditioning unit (20 feet)	60	Intrusive
Light auto traffic (100 feet)	50	Quiet
Living room Bedroom Quiet office	40	
Library Soft whisper (15 feet)	30	Very quiet
Broadcasting studio	20	
	10	Just audible
	0	Hearing begins

This decibel (dB) table compares some common sounds and shows how they rank in potential harm to hearing. Note that 70 dB is the point at which noise begins to harm hearing. To the ear, each 10 dB increase seems twice as loud.

Environmental Protection Agency

Standards

FEDERAL HIGHWAY ADMINISTRATION NOISE STANDARDS*

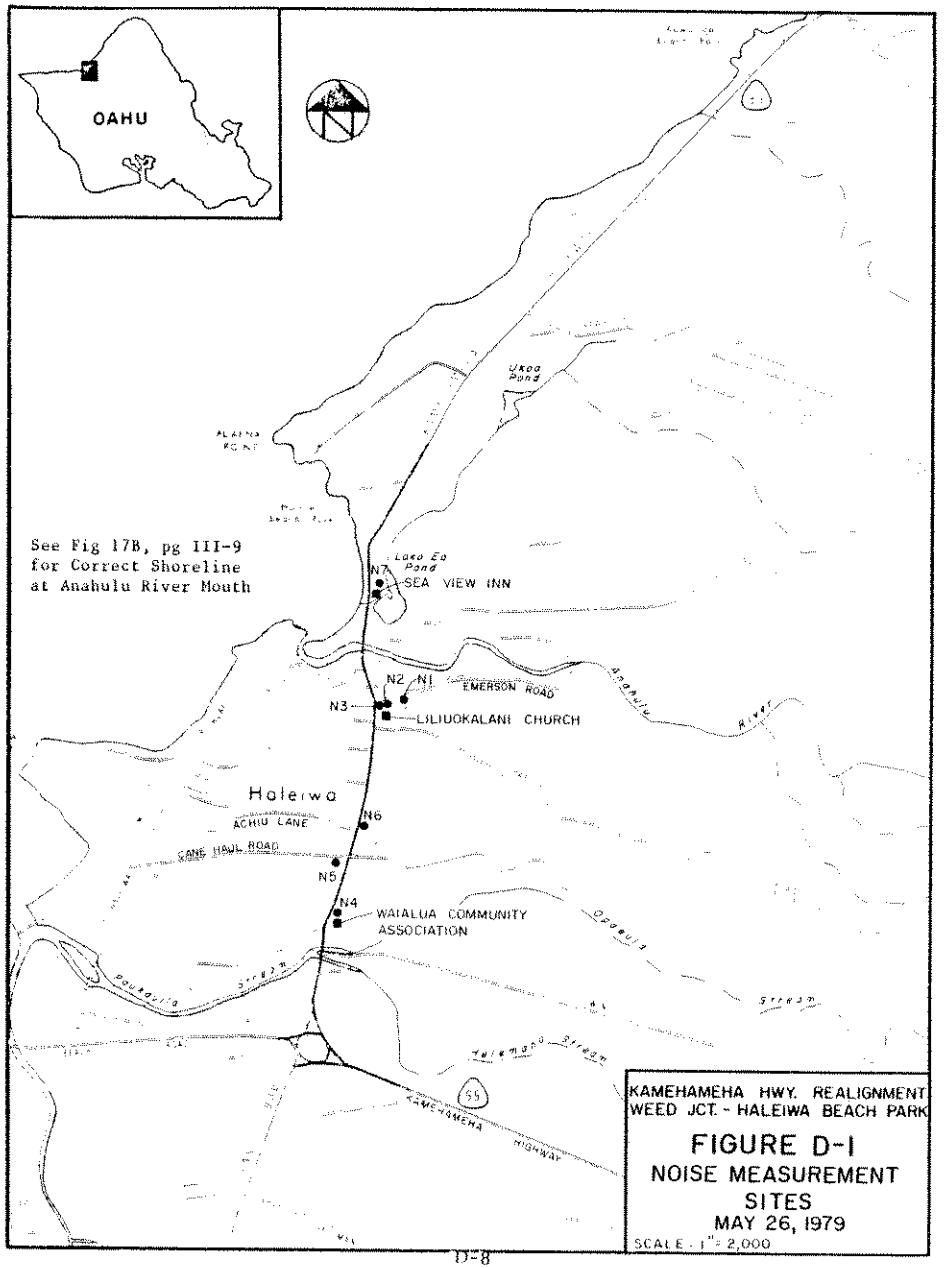
LAND-USE CATEGORY	DESIGN NOISE LEVEL/LAND-USE RELATIONSHIP: DESIGN NOISE LEVEL, L_{eq}	DESCRIPTION OF LAND-USE CATEGORY
A	60 dBA (exterior)	Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces that are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
B	70 dBA (exterior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas, and parks.
C	75 dBA (exterior)	Developed lands, properties or activities not included in categories A and B.
D	—	For requirements on undeveloped lands see *FHPM* 7-7-3(3).
E	55 dBA (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

* *FHPM* Vol 7, Ch 7, Sec 3 (3)

ISLAND OF OAHU
(for new highway construction)

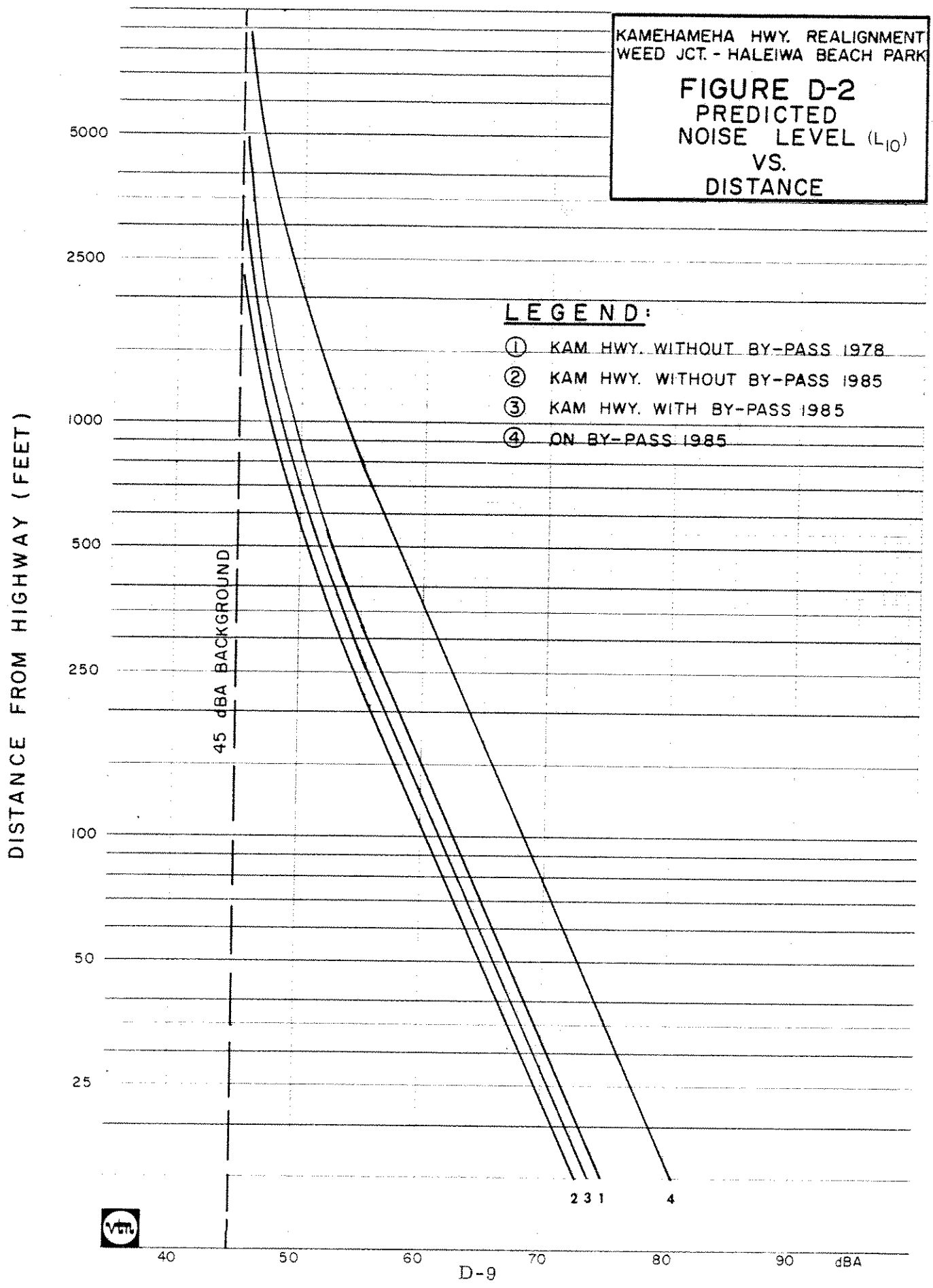
Land Use	Noise Limit
School, library, multi-purpose room, hospital, rest home.	50 dBA (interior)

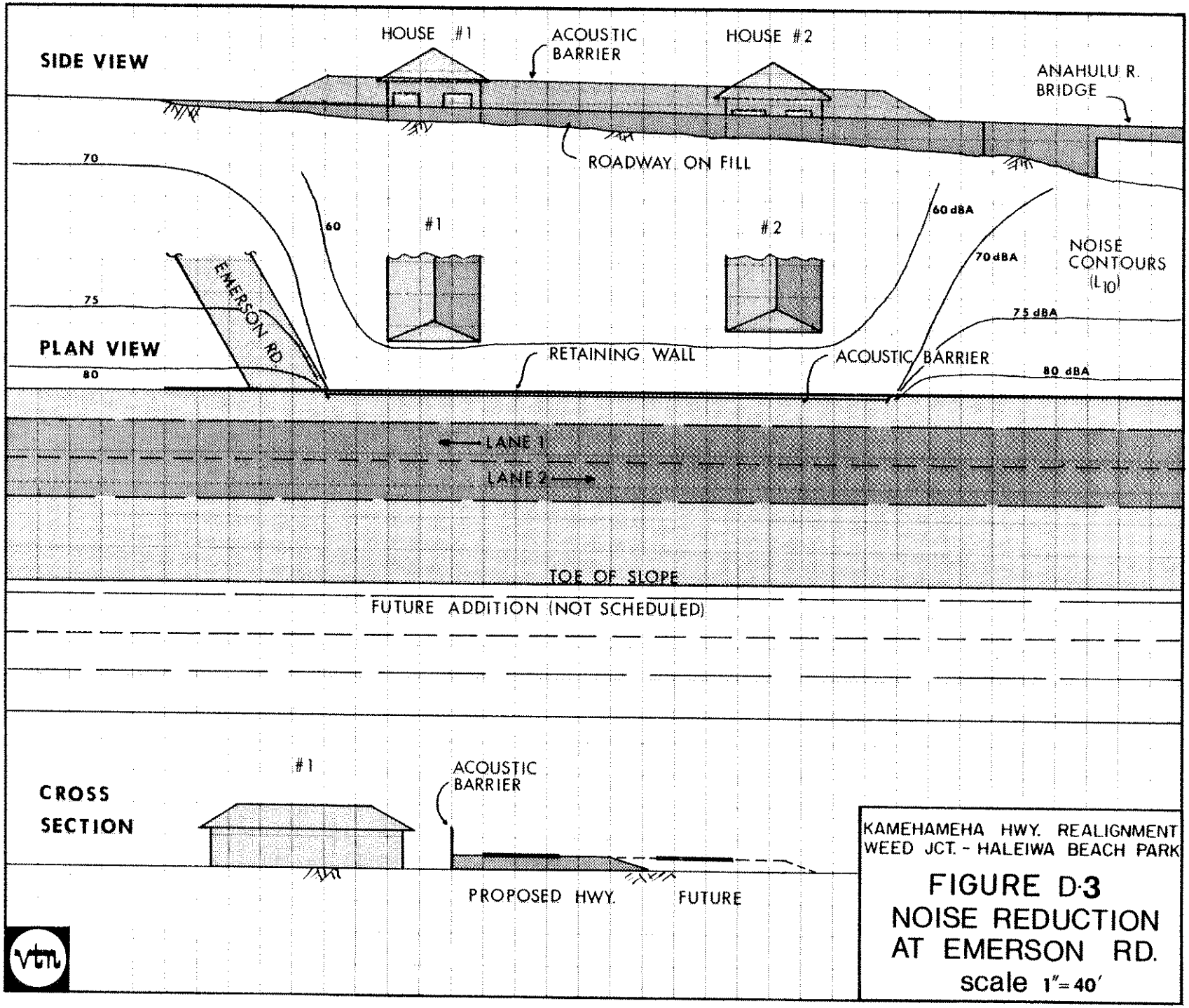
State of Hawaii Department of Health
PHR chapter 44B



KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK

FIGURE D-2
PREDICTED NOISE LEVEL (L_{10}) VS. DISTANCE




SIDE VIEW
HOUSE #1
ACOUSTIC BARRIER
HOUSE #2
ANAHULU R. BRIDGE
ROADWAY ON FILL
70
60
#1
#2
60 dBA
70 dBA
NOISE CONTOURS (L_{10})
75
75 dBA
PLAN VIEW
EMERSON RD.
RETAINING WALL
ACOUSTIC BARRIER
80
80 dBA
LANE 1
LANE 2
TOE OF SLOPE
FUTURE ADDITION (NOT SCHEDULED)
CROSS SECTION
#1
ACOUSTIC BARRIER
PROPOSED HWY.
FUTURE
KAMEHAMEHA HWY. REALIGNMENT
WEED JCT. - HALEIWA BEACH PARK
FIGURE D-3
NOISE REDUCTION AT EMERSON RD.
scale 1"=40'

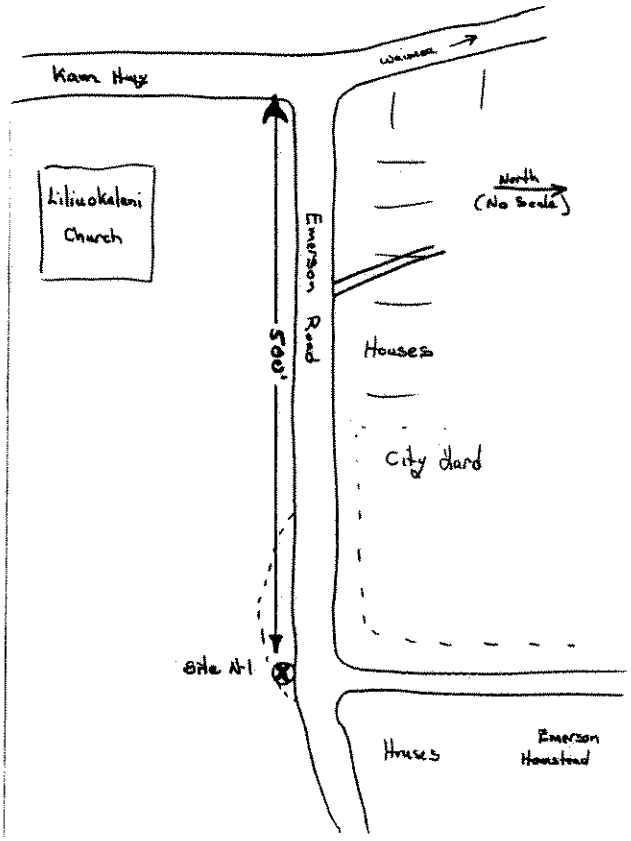
AMBIENT NOISE SURVEY DATA SHEET 1 of 10

PROJECT: Waianu Bypass 18-106
LOCATION: N-1 (morning) Emerson Rd. opposite City Yard 500' S Kam Hwy. SKETCH ON REVERSE
ENVIR: Quiet side street
SOURCE: Traffic on Kam Hwy, birds, bees
TIME: 9:32 - 10:02 INT: 1 Sec A-Wtd SCALE
SKY: High clouds WIND: 0
TEMP: 78°F RH: BARO:
MISC: Readings for background - close by truck route eliminated (Aug)
METER: GR1565B # 22780 SCALE: A RESP: Slo
CAL: GR1567 # 15461 REC: On Dat. Sheet
BY: FLP/MW DATE: 5/21/90

STATISTICAL ANALYSIS
TOTAL SAMPLES = 168 RANGE = 16 dB
L_{10} = 60.2 dB CONFIDENCE = 99 %
L_{50} = 46.2 dB CONFIDENCE = 99 %
L_{90} = 43.2 dB L_{eq} 47

READINGS
% OF TOTAL
EXCEEDED %

D-11



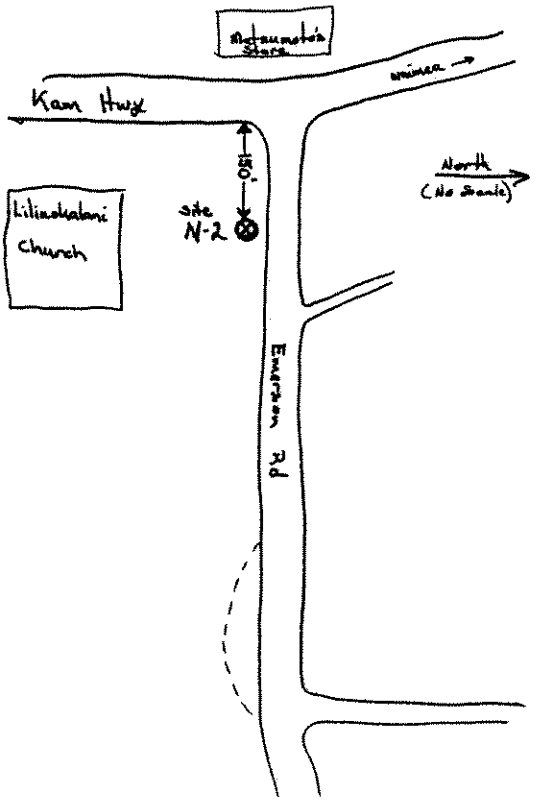
AMBIENT NOISE SURVEY DATA SHEET 2 of 10

PROJECT: Waianu Bypass
LOCATION: N-2 (morning) Emerson Rd. adj to Liliuokalani Church 150'S Kam Hwy. SKETCH ON REVERSE
ENVIR: Neighborhood / Hwy
SOURCE: Traffic on Kam Hwy @ 150'
TIME: 10:15 - 10:30 INT: 5 Sec A-Wtd SCALE
SKY: High Cloud WIND:
TEMP: NEI RH: BARO:
MISC: Birds dominant background
METER: GR1565B # 22780 SCALE: A RESP: Slo
CAL: GR1567 # 15461 REC: On Tape A4
BY: FLP/MW DATE: 5/25/90

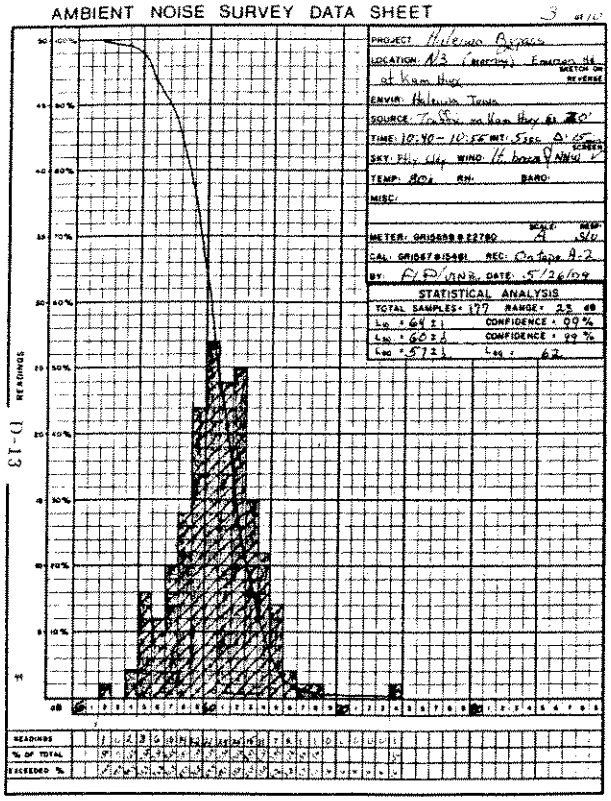
STATISTICAL ANALYSIS
TOTAL SAMPLES = 177 RANGE = 19 dB
L_{10} = 57.2 dB CONFIDENCE = 99 %
L_{50} = 51.2 dB CONFIDENCE = 99 %
L_{90} = 50.2 dB L_{eq} 54

READINGS
% OF TOTAL
EXCEEDED %

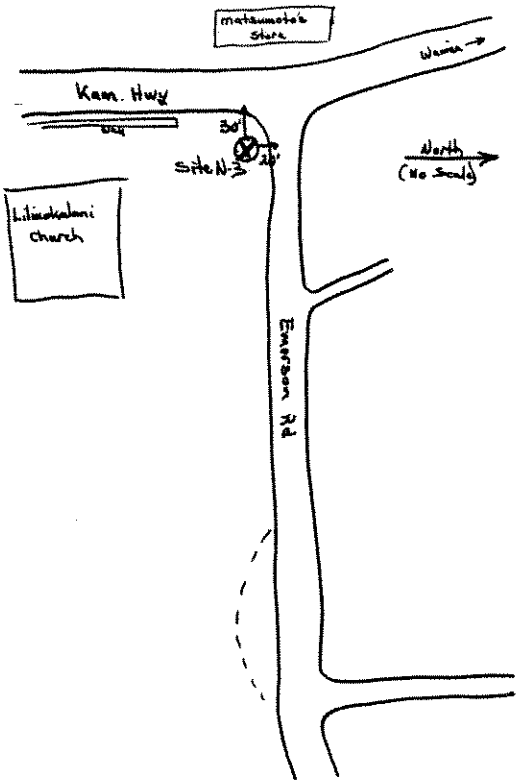
D-12



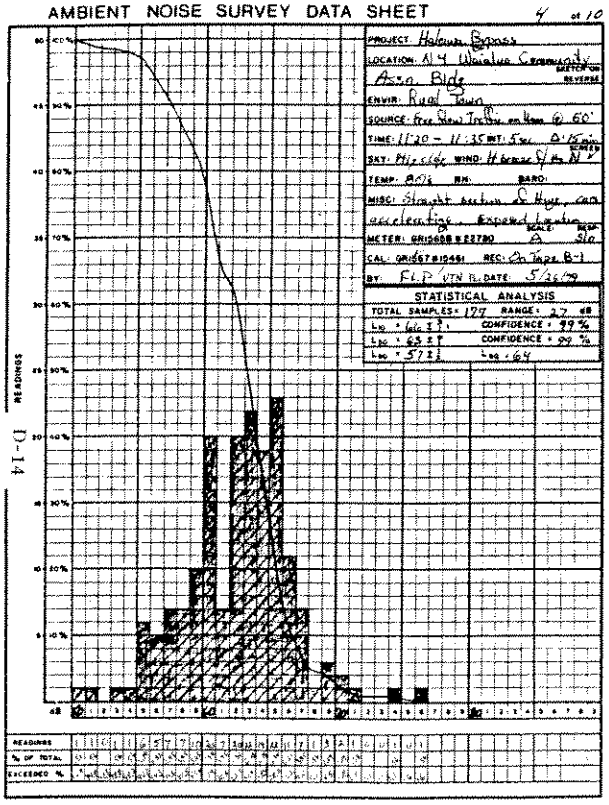
AMBIENT NOISE SURVEY DATA SHEET 3 of 10



C-13



AMBIENT NOISE SURVEY DATA SHEET 4 of 10



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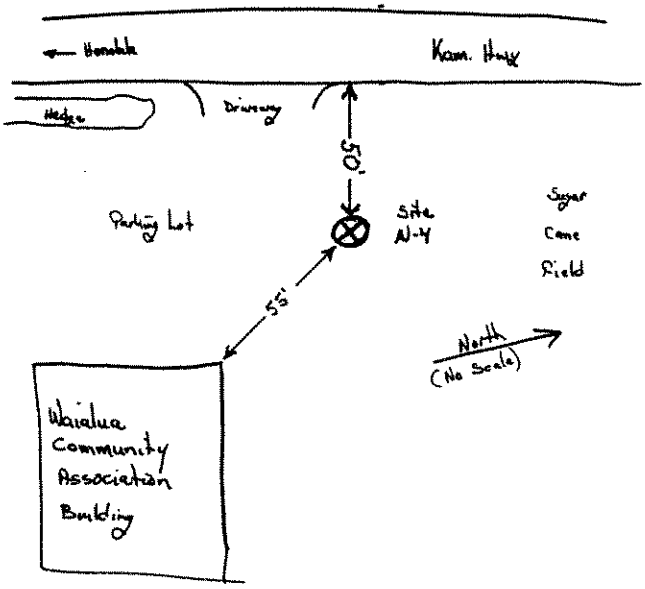


AMBIENT NOISE SURVEY DATA SHEET

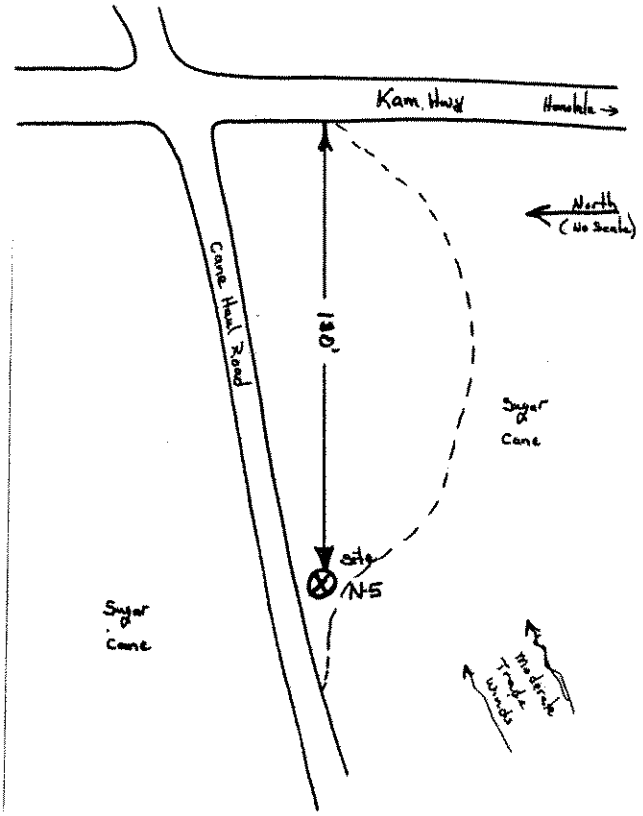
5 of 10

D-15

PROJECT: Halawa Bypass
LOCATION: N5 Cane Field makai of Kam Hwy, 180' (SKETCH ON REVERSE)
ENVIR: Rural
SOURCE: Free flow traffic on Kam & Wind in Cane
TIME: 11:56 - 12:00 INT: 5 sec A: F (SCALE)
SKY: Partly cldy WIND: Mod Trade (NW)
TEMP: 80's RH: BARO:
MISC: Background level is 43-45 dBA Cane wind in cane. Equip. noise on 48's
METER: GR1565B #22780 SCALE A SLOW
CAL: GR1567 #1546 REC: On Tape to Start
BY: FLP VTN DATE: 5/26/09

STATISTICAL ANALYSIS
TOTAL SAMPLES = 176 RANGE = 20 dB
L_{10} = 52 ± 1 CONFIDENCE = 99 %
L_{50} = 48 ± 1 CONFIDENCE = 99 %
L_{90} = 45 ± 1 L_{eq} = 50

READINGS
% OF TOTAL
EXCEEDED %



AMBIENT NOISE SURVEY DATA SHEET

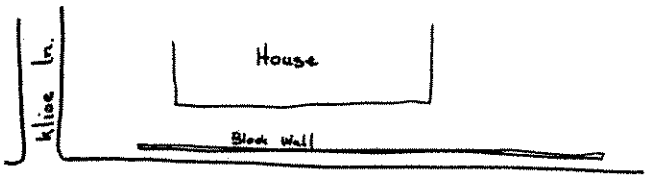
6 of 10

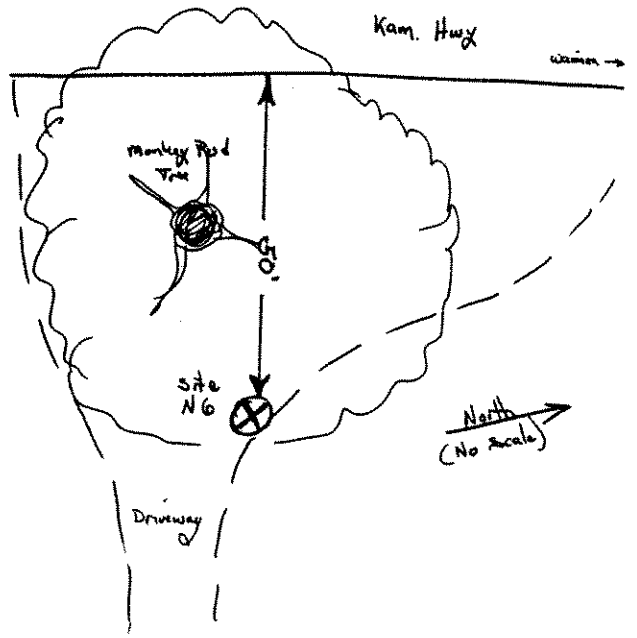
D-16

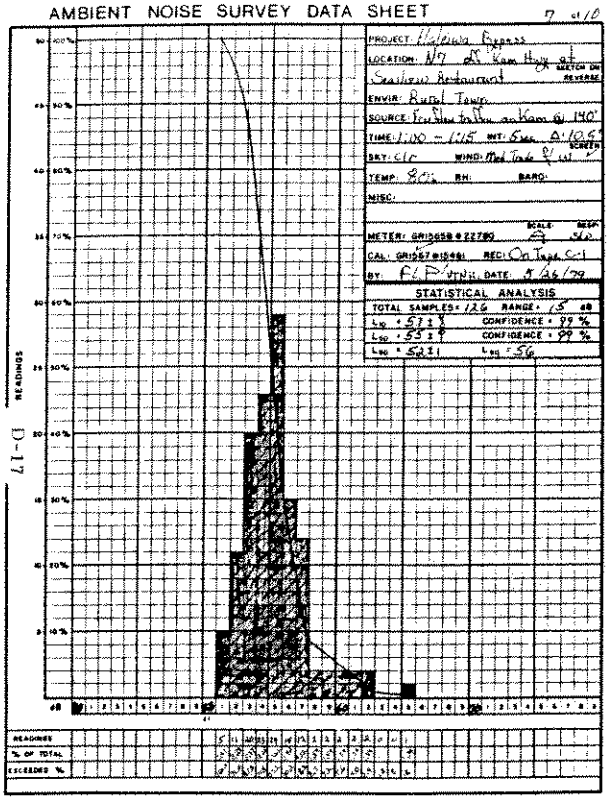
PROJECT: Halawa Bypass
LOCATION: N6 on Kam Hwy (SKETCH ON REVERSE) Across La
ENVIR: Rural Town
SOURCE: Free flow traffic on Kam @ 50'
TIME: 12:20 - 12:43 INT: 5 sec A: F (SCALE)
SKY: Partly cldy WIND: Mod Trade (NW)
TEMP: 80's RH: BARO:
MISC:
METER: GR1565B #22780 SCALE A SLOW
CAL: GR1567 #1546 REC: On Tape B2
BY: FLP VTN DATE: 5/26/09

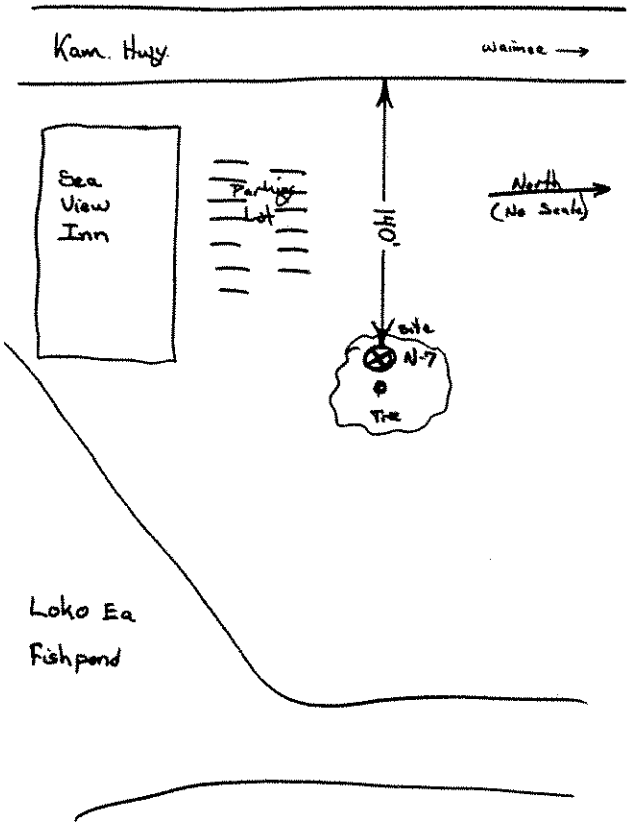
STATISTICAL ANALYSIS
TOTAL SAMPLES = 180 RANGE = 31 dB
L_{10} = 65 ± 1 CONFIDENCE = 99 %
L_{50} = 61 ± 1 CONFIDENCE = 99 %
L_{90} = 56 ± 2 (-57) L_{eq} = 64

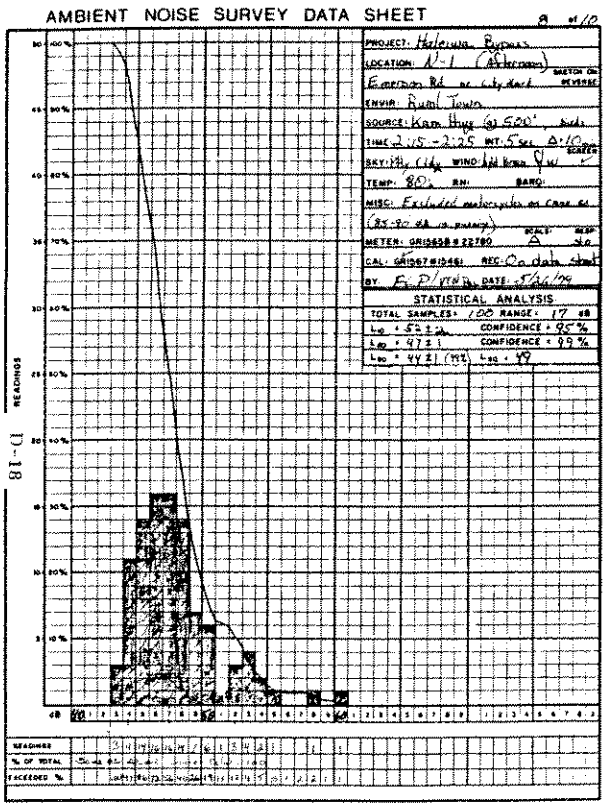
READINGS
% OF TOTAL
EXCEEDED %

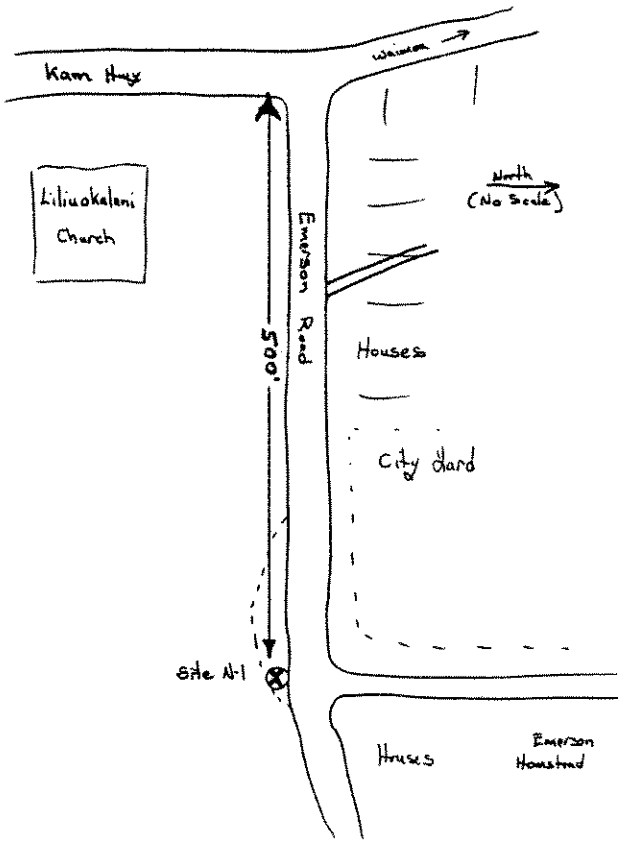




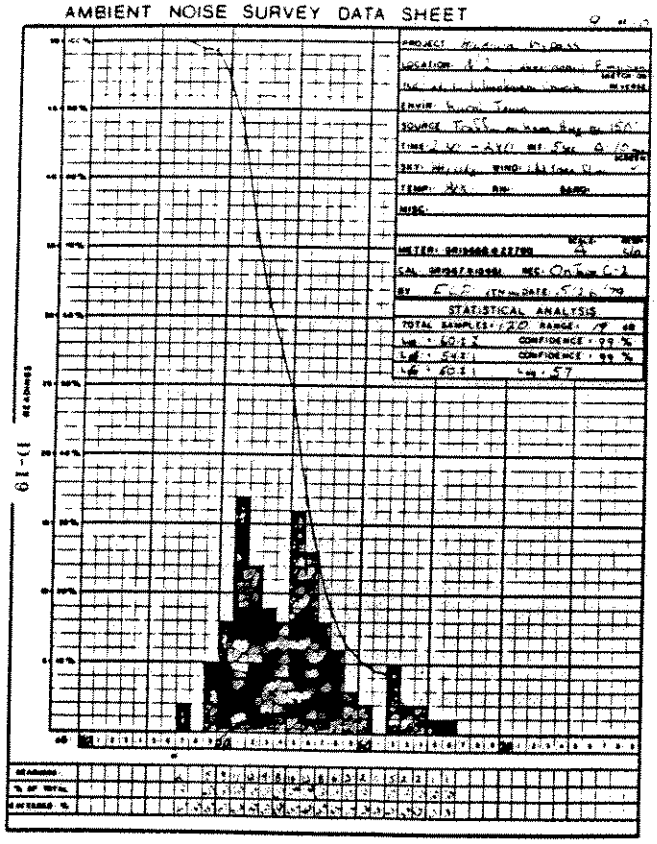

AMBIENT NOISE SURVEY DATA SHEET
PROJECT: Halawa Bypass
LOCATION: N-1 at Kam Hwy at Seafood Restaurant
ENVIR: Rural Town
SOURCE: Kam Hwy traffic on Kam @ 140'
TIME: 1:00 - 1:15 INT: 5 sec
SKY: Clr WIND: Mod Trade
TEMP: 87° RH: BARO:
MISC:
METER: GR1565B # 22780
CAL: GR1567 # 1048
BY: E. P. DATE: 8/26/79
STATISTICAL ANALYSIS
TOTAL SAMPLES: 120 RANGE: 15 dB
L10 = 57.3
L50 = 55.3
L90 = 52.1
CONFIDENCE = 99 %
CONFIDENCE = 99 %
L90 = 5.6
READINGS
% OF TOTAL
EXCEEDED %
D-17

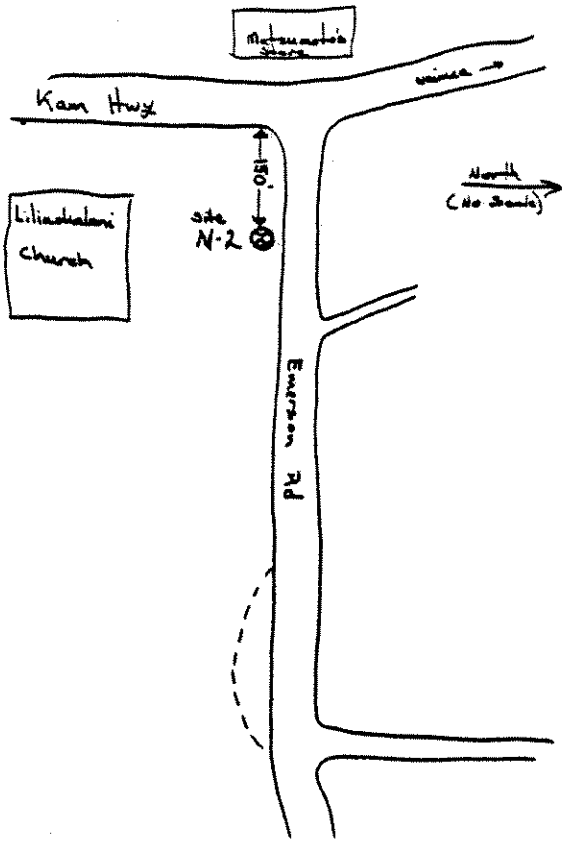

Kam. Hwy
Waimea
Sea View Inn
Parking Lot
140'
North (No Scale)
site N-7
The
Loko Ea Fishpond


AMBIENT NOISE SURVEY DATA SHEET
PROJECT: Halawa Bypass
LOCATION: N-1 (Afternoon)
Emerson Rd at city dump
ENVIR: Rural Town
SOURCE: Kam Hwy @ 500'
TIME: 2:15 - 2:25 INT: 5 sec
SKY: Hzy City WIND:
TEMP: 80's RH: BARO:
MISC: Excluded motorcycles on Case #1 (85-90 dB in range)
METER: GR1565B # 22780
CAL: GR1567 # 1048
BY: E. P. DATE: 5/26/79
STATISTICAL ANALYSIS
TOTAL SAMPLES: 100 RANGE: 17 dB
L10 = 54.1
L50 = 47.1
L90 = 44.1 (42)
CONFIDENCE = 95%
CONFIDENCE = 99 %
L90 = 4.9
READINGS
% OF TOTAL
EXCEEDED %
D-18

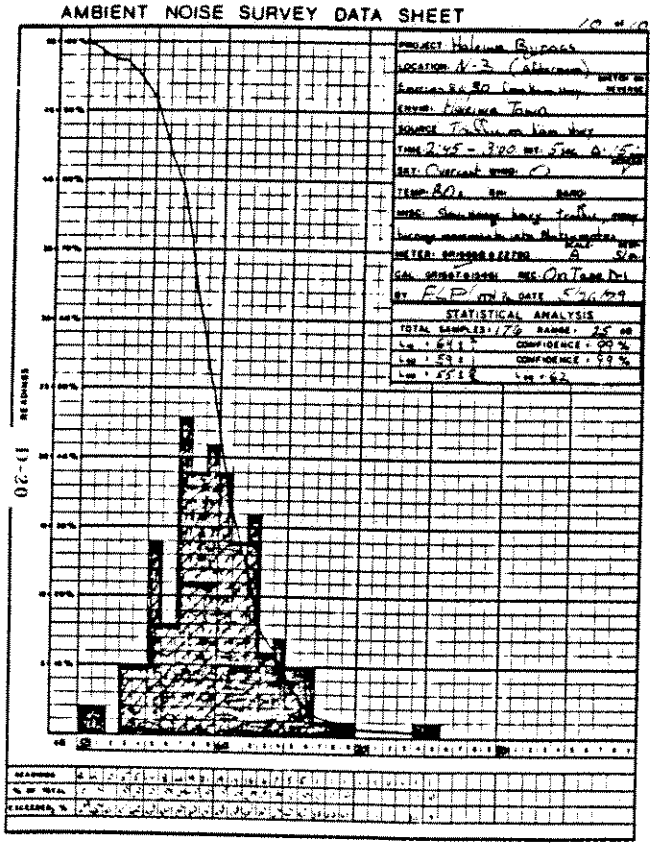

Kam Hwy
Waimea
Liliuokaleni Church
Emerson Rd
.005
North (No Scale)
Houses
City Yard
site N-1
Houses
Emerson Homestead

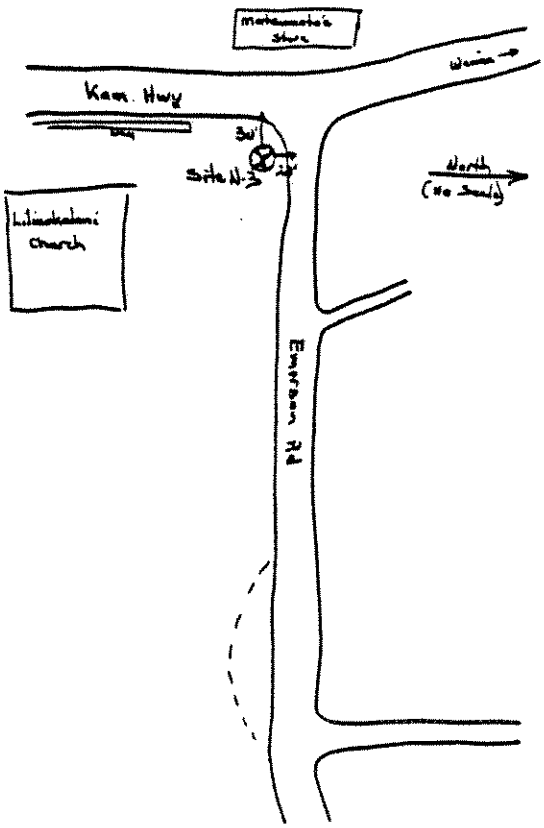
AMBIENT NOISE SURVEY DATA SHEET





AMBIENT NOISE SURVEY DATA SHEET





NAME VTN Pacific (ELP)
DATE 10/80

PROJECT DESCRIPTION Haleiwa Bypass 18-106 1/5
Reference 50' from edge of highway

			Kam Hwy									Bypass								
1	LANE NO./ROAD SEGMENT		1978 w/o			1986 w/o			1986 w/			1985			2001 4-lane					
2.	VEHICLE CLAS.		A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT
3	N(vph)		1258	272	70	1786	322	83	590	127	33	896	194	50	578	125	32			
4	S(km/h)	mph		15			10			20			40			40				
5	D(m) α=.5	FT		60*			60			60			60			60				
6.	ϕ_1 (degrees)	Fig 5		-89	•															
7.	ϕ_2 (degrees)	Fig 5		89	•															
8.	$(\bar{L}_o)_E$, (dBA)	Fig 2																		
9	10 LOG $(N_i D_o/S_i)$ (dB)	Fig 3																		
10a	10 LOG (D_o/D) (dBA)	Fig 4																		
10b.	15 LOG (D_o/D) (dBA)	Fig 4																		
11a.	10 LOG $(\psi_o(\phi_1, \phi_2)/\pi)$ (dBA)	Fig 6																		
11b.	10 LOG $(\psi_{1/2}(\phi_1, \phi_2)/\pi)$ (dBA)	Fig 7																		
12.	ϕ_L (degrees)	Fig 10																		
13.	ϕ_R (degrees)	Fig 10																		
14.	δ_o (metres)	Fig 9																		
15.	N_o	Eq. 18																		
16.	Δ_B (dBA)	Appendix B																		
17	CONSTANT (dB)		-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
18.	$L_{eq}(h)$ (dBA)		51.80	58.22	61.59	47.59	59.25	59.76	52.01	57.90	60.15	62.25	66.94	66.35	60.35	65.23	64.41			
19.	$L_{eq}(h)$ (dBA)			63.54			61.15			62.59			70.39			68.47				
20.	Δ_s (dBA)	Fig. 8													2nd in @ 116'					
21.	$L_{eq}(h)$ (dBA)			63.5			61.1			62.6			70.4			63.0				
22.	$L_{eq}(h)$ (dBA)														Total 69.6					
23.	ND/S (m/km)		953	206	53	1688	366	94	335	72	19	255	55	14	164	36	9			
24.	$(L_{10}-L_{eq})$, (dB)	Fig. 15	2.0	3.5	4.0	1.5	3.0	4.0	3.0	4.0	2.0	3.5	4.0	1.0	4.0	3.5	-2.0			
25.	$L_{10}(h)$, (dBA)		52.8	61.7	65.6	49.1	57.8	63.8	55.0	61.9	62.2	65.7	70.9	67.4	64.4	68.5	62.4			
26.	$L_{10}(h)$ (dBA)			67.2			64.9			65.5			73.3			70.6				
27.	$L_{10}(h)$ (dBA)														(w/2nd in 65.1) = 71.7					

* Equivalent lane distance for 50 feet from edge of near lane.

NAME VTN Pacific (ELP)
DATE 10/80

PROJECT DESCRIPTION Haleiwa Bypass 18-106 2/5
Emerson Rd - Anahulu Revised A1+C.

	House #1		1985 No Barrier						w/ 11' x 250' Barrier (7'm)						w/ 14' x 190 Barrier (10'm)					
1.	LANE NO./ROAD SEGMENT		1			2			1			2			1			2		
2.	VEHICLE CLAS.		A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT
3.	N(vph)		393	85	22	472	102	26												
4.	S(km/h)	mph		40	(64)		40													
5.	D(m)		α=0 32'				45													
6.	ϕ_1 (degrees)	Fig. 5	-89.5959			-89.5959														
7.	ϕ_2 (degrees)	Fig. 5	89.5959			89.5959														
8.	$(\bar{L}_o)_E$, (dBA)	Fig. 2																		
9.	10 LOG $(N_i D_o/S_i)$ (dB)	Fig. 3																		
10a.	10 LOG (D_o/D) (dBA)	Fig 4																		
10b.	15 LOG (D_o/D) (dBA)	Fig 4																		
11a.	10 LOG $(\psi_o(\phi_1, \phi_2)/\pi)$ (dBA)	Fig. 6																		
11b.	10 LOG $(\psi_{1/2}(\phi_1, \phi_2)/\pi)$ (dBA)	Fig. 7																		
12.	ϕ_L (degrees)	Fig. 10								-85.0			-85.0			-84°			-84°	
13.	ϕ_R (degrees)	Fig. 10								78.0			78.0			70°			72°	
14.	δ_o (metres)	Fig. 9																		
15.	N_o	Eq. 18																		
16.	Δ_B (dBA)	Appendix B							-12.22	-10.59	-5.87	-10.72	-9.64	-6.43	-16.16	-15.06	-11.28	-14.80	-13.94	-11.35
17.	CONSTANT (dB)		-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
18.	$L_{eq}(h)$ (dBA)		58.95	63.63	63.06	53.22	62.90	62.26	46.7	53.0	57.2	47.5	53.4	55.8	42.8	48.6	51.8	43.4	49.0	50.9
19.	$L_{eq}(h)$ (dBA)			67.63			66.33			58.9			58.2			53.9			53.5	
20	Δ_s (dBA)	Fig. 8																		
21.	$L_{eq}(h)$ (dBA)																			
22.	$L_{eq}(h)$ (dBA)					69.7						61.6						56.7		
23.	ND/S (m/km)		3.5	1.5	-4.5	3.5	2.5	-1.0												
24.	$(L_{10}-L_{eq})$, (dB)	Fig. 15	62.45	65.13	58.56	61.72	65.40	61.26	50.2	54.5	52.7	51.0	55.9	54.8	46.3	52.1	47.3	46.9	51.5	49.9
25.	$L_{10}(h)$, (dBA)																			
26.	$L_{10}(h)$ (dBA)			67.55			67.66			57.6			59.1			53.0			54.6	
27.	$L_{10}(h)$ (dBA)					70.5						61.4						56.9		

NAME VTN Pacific (ELP)
DATE 10/80

PROJECT DESCRIPTION Haleiwa Bypass 18-100 3/5
Emerson Rd - Anahulu Revised Alt C

House #1 1985 w/ 12' x 125' Barrier (8') | 2005 No Barrier

#	Item	Ref.																		
1.	LANE NO./ROAD SEGMENT		1			2			1			2			3&4					
2.	VEHICLE CLAS.		A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT
3.	N(vph)								260	56	14	260	56	14	637	138	35			
4.	S(km/h)									40			40			40				
5.	D(m)									32			45'			91.8'				
6.	ϕ_1 (degrees)	Fig. 5								-89.5959			–			–				
7.	ϕ_2 (degrees)	Fig. 5								89.5959			–			–				
8.	$(\overline{L_o})E_i$ (dBA)	Fig. 2																		
9.	10 LOG $(N_i D_o / S_i)$ (dB)	Fig. 3																		
10a.	10 LOG (D_o/D) (dBA)	Fig. 4																		
10b.	15 LOG (D_o/D) (dBA)	Fig. 4																		
11a.	10 LOG $(\psi_0(\phi_1, \phi_2)/\pi)$ (dBA)	Fig. 6																		
11b.	10 LOG $(\psi_{1/2}(\phi_1, \phi_2)/\pi)$ (dBA)	Fig. 7																		
12.	ϕ_L (degrees)	Fig. 10		-84°			-84°													
13.	ϕ_R (degrees)	Fig. 10		66°			66°													
14.	δ_o (metres)	Fig. 9																		
15.	N_o	Eq. 18																		
16.	Δ_B (dBA)	Appendix B	-13.94	-12.48	-7.67	-12.45	-11.35	-8.18												
17.	CONSTANT (dB)		-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
18.	$L_{eq}(h)$ (dBA)		45.0	51.2	56.4	45.8	51.6	54.1	57.04	61.70	60.98	55.47	60.13	58.41	56.31	61.00	60.35			
19.	$L_{eq}(h)$ (dBA)			57.1			56.4			65.11			63.53			64.43				
20.	Δ_s (dBA)	Fig. 8																		
21.	$L_{eq}(h)$ (dBA)																			
22.	$L_{eq}(h)$ (dBA)					59.8							69.2							
23.	ND/S (m/km)								39	8	2	55	12	4	277	60	15			
24.	$(L_{10} - L_{eq})_i$ (dB)	Fig. 15	48.5	52.7	50.9	49.5	54.1	53.1	3.5	0	-6.0	3.5	1.5	-2.0	3.0	3.5	2.0			
25.	$L_{10}(h)_i$ (dBA)								60.5	61.7	55.0	59.0	61.6	57.4	59.3	64.5	62.4			
26.	$L_{10}(h)$ (dBA)			55.8			57.4													
27.	$L_{10}(h)$ (dBA)					59.7							70.5							

NAME VTN Pacific (ELP)
DATE 10/80

PROJECT DESCRIPTION Haleiwa Bypass 18-100 4/5
Emerson Rd - Anahulu Revised Alt C

House #1 2001 w/ 12' x 125' Barrier (6'...)

#	Item	Ref.																		
1.	LANE NO./ROAD SEGMENT		1			2			3&4											
2.	VEHICLE CLAS.		A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT
3	N(vph)																			
4	S(km/h)																			
5.	D(m)																			
6.	ϕ_1 (degrees)	Fig. 5																		
7.	ϕ_2 (degrees)	Fig. 5																		
8.	$(\overline{L_o})E_i$ (dBA)	Fig. 2																		
9	10 LOG $(N_i D_o / S_i)$ (dB)	Fig. 3																		
10a.	10 LOG (D_o/D) (dBA)	Fig. 4																		
10b.	15 LOG (D_o/D) (dBA)	Fig. 4																		
11a.	10 LOG $(\psi_0(\phi_1, \phi_2)/\pi)$ (dBA)	Fig. 6																		
11b.	10 LOG $(\psi_{1/2}(\phi_1, \phi_2)/\pi)$ (dBA)	Fig. 7																		
12.	ϕ_L (degrees)	Fig. 10								-34°										
13.	ϕ_R (degrees)	Fig. 10								66°										
14.	δ_o (metres)	Fig. 9																		
15.	N_o	Eq. 18																		
16.	Δ_B (dBA)	Appendix B	-13.94	-12.48	-7.67	-12.48	-11.35	-8.18	-10.72	-10.17	-8.74									
17	CONSTANT (dB)		-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
18.	$L_{eq}(h)$ (dBA)		43.1	49.2	53.3	43.0	48.8	51.0	45.6	50.8	51.6									
19.	$L_{eq}(h)$ (dBA)																			
20.	Δ_s (dBA)	Fig. 8																		
21.	$L_{eq}(h)$ (dBA)																			
22.	$L_{eq}(h)$ (dBA)					59.2														
23	ND/S (m/km)																			
24	$(L_{10} - L_{eq})_i$ (dB)	Fig. 15																		
25	$L_{10}(h)_i$ (dBA)		46.6	49.2	47.5	46.5	50.3	49.0	48.6	54.3	53.6									
26	$L_{10}(h)$ (dBA)																			
27.	$L_{10}(h)$ (dBA)					59.9														

NAME [illegible]
DATE [illegible]/88

PROJECT DESCRIPTION Haleiwa Bypass 18-106 5/5
Emerson Rd - Anahulu Revised A+C

House #2 — '85 No Barrier — 14' [illegible] Barrier [illegible]

			A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT
1.	LANE NO./ROAD SEGMENT		1			2			1			2								
2.	VEHICLE CLAS.		A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT	A	MT	HT
3.	N(vph)		39?	85	22	47?	10?	26												
4.	S(km/h)	MPH		40			40													
5.	D(m)	Ft	α:0 36'			49'														
6.	ϕ_1 (degrees)	Fig. 5	-89.5959			-89.5959														
7.	ϕ_2 (degrees)	Fig. 5	89.5959			89.5959														
8.	$(\bar{L}_o)_E$, (dBA)	Fig. 2																		
9.	10 LOG $(N_i D_o/S_i)$ (dB)	Fig. 3																		
10a.	10 LOG (D_o/D) (dBA)	Fig. 4																		
10b.	15 LOG (D_o/D) (dBA)	Fig. 4																		
11a.	10 LOG $(\psi_0(\phi_1, \phi_2)/\pi)$ (dBA)	Fig. 6																		
11b.	10 LOG $(\psi_{1/2}(\phi_1, \phi_2)/\pi)$ (dBA)	Fig. 7																		
12.	ϕ_L (degrees)	Fig. 10							-60			-60								
13.	ϕ_R (degrees)	Fig. 10							82			82								
14.	δ_o (metres)	Fig. 9																		
15.	N_o	Eq. 18																		
16.	Δ_B (dBA)	Appendix B							-15.19	-13.74	-8.79	-13.91	-12.81	-9.54						
17.	CONSTANT (dB)		-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
18.	$L_{eq}(h)_i$ (dBA)		58.41	63.09	62.52	57.83	62.51	61.87	43.2	49.4	53.7	43.9	49.7	52.3						
19.	$L_{eq}(h)$ (dBA)		66.55			65.94			55.3			54.6								
20.	Δ_s (dBA)	Fig. 8																		
21.	$L_{eq}(h)$ (dBA)																			
22.	$L_{eq}(h)$ (dBA)		69.3						58.0											
23.	ND/S (m/km)		67	14	4	110	24	6												
24.	$(L_{10}-L_{eq})_i$ (dB)	Fig. 15	3.5	1.5	-3.0	3.5	3.0	-1.0												
25.	$L_{10}(h)_i$ (dBA)		61.9	64.6	59.5	61.3	65.5	60.9	46.7	50.9	50.0	47.4	52.7	51.3						
26.	$L_{10}(h)$ (dBA)		67.3			67.9			54.6			55.8								
27.	$L_{10}(h)$ (dBA)		70.6						58.2											

REFERENCES APPENDIX D.

1. Wyle Laboratories, Community Noise for EPA, 1971, page 18.

2. U.S. Department of Transportation, Federal Highway Administration, National Highway Institute, Fundamentals and Abatement of Highway Traffic Noise 3 volumes, 1973, Vol. 1, pages 1-7ff.

3. Wyle Laboratories, Op.cit. page 10.

4. Hajek, J.J. "L_{eq} Traffic Noise Prediction Method" in National Research Council, Transportation Research Board, Environmental and Conservation Concerns in Transportation: Energy, Noise and Air Quality, Transportation Research Record No. 648, 1977, page 48.

5. Barry, T.M. and J.A. Reagan. FHWA Highway Traffic Noise Prediction Model. U.S. Department of Transportation, Federal Highway Administration, Office of Environmental Policy, Report No. FHWA-RD-77-108. December, 1978.

6. U.S. Department of Transportation, Op. cit., volume 1, page 1-35.

7. Ibid.

8. Regan, J.A. and C.A. Grant. Highway Construction Noise: Measurement, Prediction and Mitigation. U.S. Department of Transportation, Federal Highway Administration, Office of Environmental Policy. Special Report FHWA-HEV-2-77, March, 1977.

CULTURAL RESOURCES SURVEY

OF THE

KAMEHAMEHA HIGHWAY RE-ALIGNMENT

[HALEIWA, OAHU]

for

VTN Pacific
1164 Bishop Street
Honolulu, Hawaii

by

CHINIAGO INC.
76 N. King St.
Honolulu, Hawaii

MARCH 1979

TABLE OF CONTENTS

ILLUSTRATIONS

I. INTRODUCTION

During December 1979 a cultural resources assessment was conducted along a series of alternative rights-of-way of the proposed Kamehameha Highway realignment at Haleiwa, Oahu. The survey covered an area between Weed Junction traffic circle and the north end of Haleiwa Beach Park [Figure 1]. The purpose of the project was fourfold:

1. To provide early input to the Department of Transportation's highway planning process so as to minimize impacts to historical and archaeological properties and sites;

2. To gather information on cultural resources for incorporation into an Environmental Impact Statement to satisfy the requirements of NEPA and other Federal and State regulations;

3. To provide the State Historic Preservation Office with accurate data that may be incorporated into the statewide historical sites inventory; and

4. To provide the documentation required for nominating any new sites discovered to the National Register of Historic Places.

In order to accomplish these general goals, the following task items were specifically included in the scope of work:

1. A field survey and inventory of cultural resources based on a comprehensive literature review and intensive on-the-ground field investigation;

2. Examination of buildings within the study area to evaluate their eligibility for the National Register of Historic Places;

3. Summarization of existing information on file at the State Historic Preservation Office concerning the Emerson Homestead; and

4. Examination of other historic features of the study area such as old taro or hasu growing areas with the aim of relating them to the cultural setting of the Haleiwa area.

5. Test excavations to delimit and determine the significance of archaeological materials and cultural areas within the study area.

The field survey, test excavations and summarization of materials on the Emerson Homestead were conducted by Chiniago Inc., and the examination of historic buildings was done by Spencer Limited. All materials generated by the research [artifacts and artifact records, photographic negatives and records, maps, descriptions, completed National Register forms, etc., are to be delivered to the State Historic Preservation Office under separate cover.

Four archaeological or historic sites were found in the project area: Site 1439, a historic deposit; Site 1440, a wall remnant; Site 1441, a series of agricultural terraces; and Site 1443, an old church. In addition, four sites were found to be located adjacent to the project area: Site 229 [Kawaipuolo Spring]; Site 233, Loko Ea fishpond; Site 236, Ukoa Pond; and Site 1442, a historic building [Figures 2 and 3]. The precise location with respect to the survey area of one site [Site 230, Moo Stones] could not be ascertained.

Information relevant to scientific studies of prehistoric land use, social stratification, agriculture, aquaculture and environmental conditions is present in these sites, and data concerning the historic period utilization of the Haleiwa area is also present.

Recommendations for further research are made for Sites 1439, 1440, 1441, and 1443, should the final choice of the highway alignment represent a threat to them.

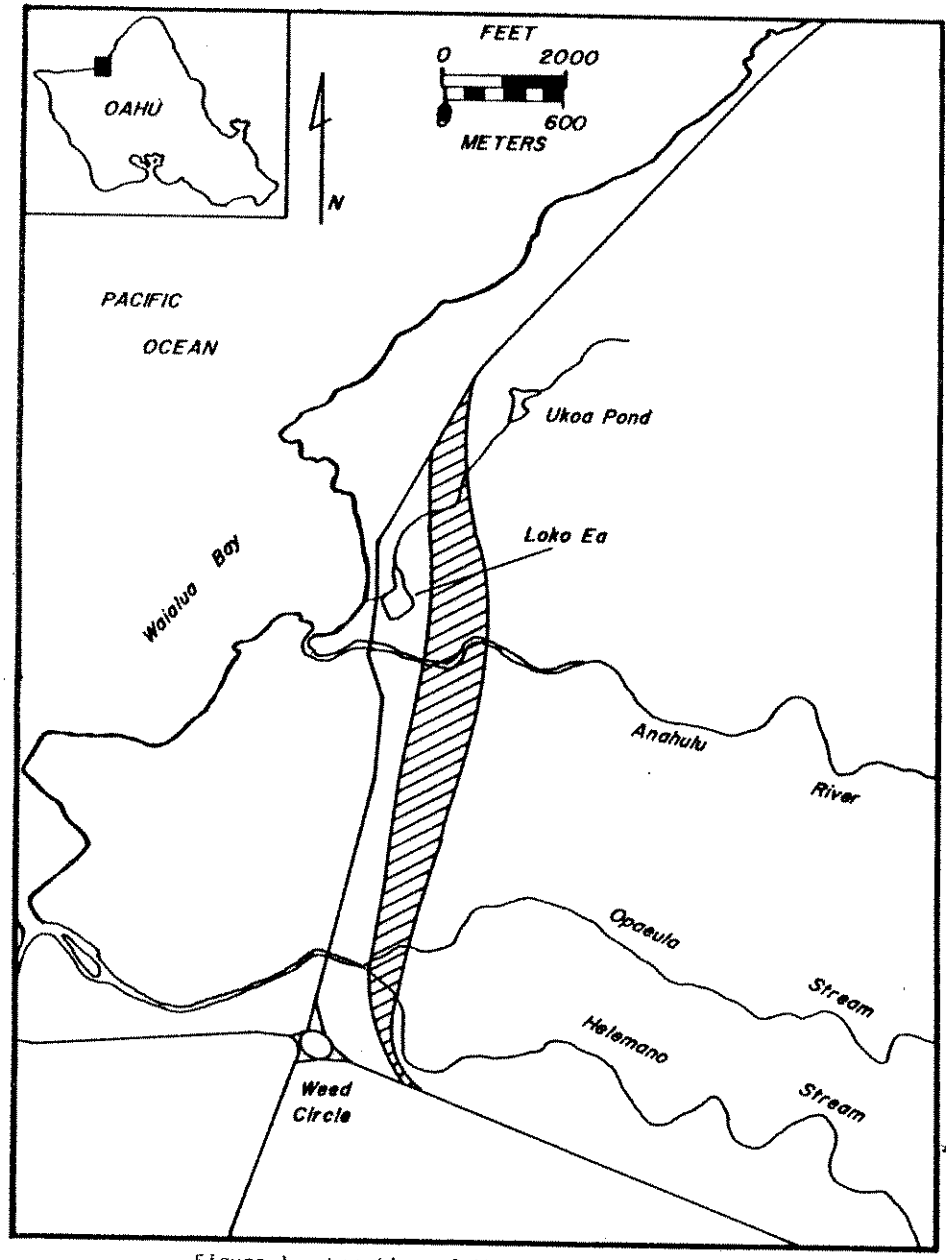


Figure 1. Location of the Survey Area.

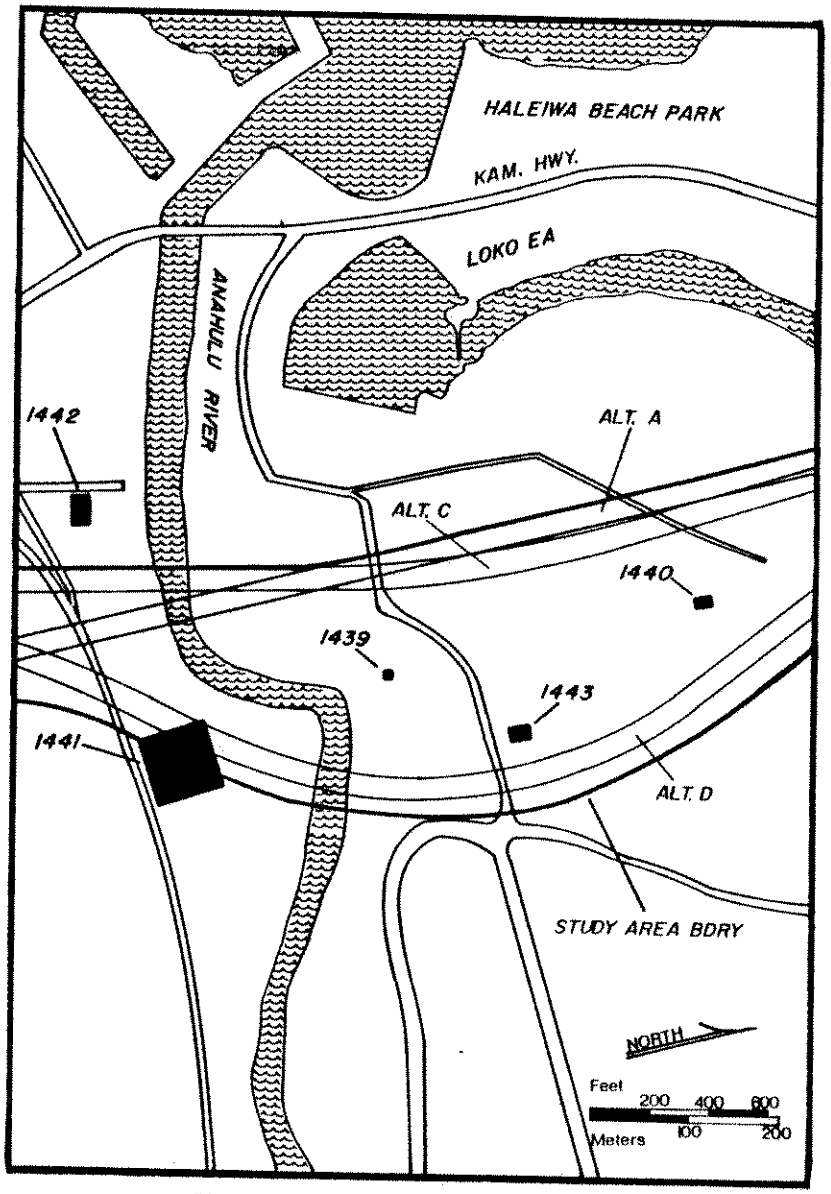


Figure 2. Site Location Map

II. PHYSICAL BACKGROUND

The survey area is located on the Waialua Plain, which consists primarily of sedimentary deposits. At the north end of the survey area, in the vicinity of Ukoa Pond, the substrate is an emerged coral reef. The major drainages in the survey area are the Anahulu River, Opaeula and Helemano Streams [which converge to form Paukauila Stream immediately west of the survey area], and an unnamed stream that drains Ukoa Pond and feeds into Loko Ea. Average annual precipitation is 30 to 40 inches. Vegetation consists primarily of kiawe [Prosopis pallida] trees and haole koa [Leucaena glauca]. Virtually the entire survey area has been subjected to intensive clearing in the past, and much of it is presently being used for sugarcane production. A large portion is used as pastureland for cattle, and the remainder is either residential or unused.

III. LITERATURE SEARCH

This section presents the results of a literature review of published historical, archaeological and legendary materials which are relevant to the cultural setting of the entire Haleiwa area. The research was not limited to sites found only within the survey area, but is intended to present those sites which are of relevance to the Haleiwa area in general. Figure 3 presents the locations only of those sites in the vicinity of the survey area.

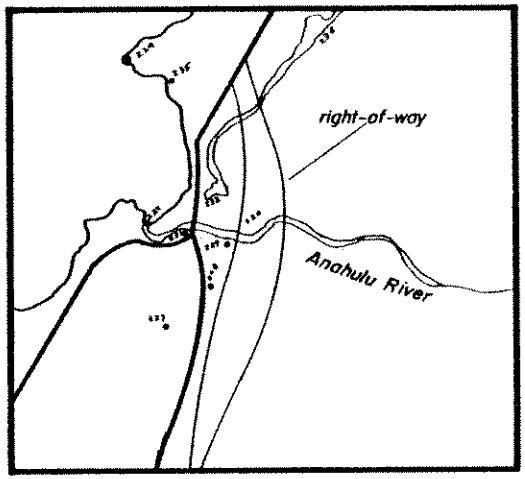


Figure 3. Literature Search Sites in the Vicinity of the Survey Area.

From "Sites of Oahu" [McAllister, 1933]

"Site 198. Burial cave, Kaumoku Gulch, Waialua.

Powdered skeletal material was noticed on the side of a cliff beneath several very small caves. Upon examination portions of two skeletons were found in a lava tube whose entrance was so cleverly sealed that the material would not have been discovered had there not been a hole into a lower cave larger than a man's head. From the inside, light was noticed through the cracks

of the rocks, and the entrance then discovered. No mortar had been used, but sharp-edged rocks had been carefully fitted together. There were no artifacts with the burial. The bones had probably been bundled together, but had evidently been disturbed by animals, as several had been recently gnawed. There was one skull but no mandible, one humerus, one radius, two ulnas, four femurs, three tibiae, and many fragments.

"Site 199. Piles of stones, near the mouth of Kaumoku Gulch, Waialua.

Near the mountain side of the siphon put in in 1930 by the Waialua Agricultural Company are many piles of stones which, as I was told by Mr. Low, who is of the opinion that they are old Hawaiian, were there 24 years ago when cane was first planted on this land. The largest pile is oval in shape, 28 by 15.5 feet by 7 feet high. There are six piles in a group averaging from 50 to 200 feet apart, evenly faced but with the top comparatively level. Just west of this group are a number of stone walls and one or two small inclosures. The whole site is in the mouth of the gulch. The stones may have been cleared away for agricultural purposes before the plantation took over the land. A large field on the mountain side and east of the Dillingham ranch which had also formerly been planted in cane has similar mounds of stone. I was also told that these stones were there in 1908 when the plantation took over the land. Hookala says they were piled in this manner to clear the land for agricultural purposes.

"Site 200. Cave in Kaumoku Gulch, Kamananui, Waialua.

At present one can squirm about 200 feet into the interior but comes in contact with large stones which obstruct the passage. It is believed that in the construction of the water tunnel just above, the blasting dislocated these stones. Water also constantly drips from the roof making shallow pools in the passageway. Twenty years or more ago the cave is said to have contained skeletal material, though there is no evidence now of such remains, which undoubtedly would have decayed with so much moisture.

"Site 201. Keauau fishing shrine [ko'a] was once located on the beach at Puuiki, at the Kaena end of a long row of ironwood trees. Nothing remains of the site.

"Site 202. Skeletal remains, near Puuiki station, Waialua.

In the sand near the present station a number of skeletons have been uncovered at a depth of approximately 4 feet by plantation workers who were removing sand. The skeletons are said to have been in good condition. One skull which I saw was well-preserved.

"Site 203. Heiau, near Kaukonahua Stream, Waialua.

It is said that a small heiau once occupied the site where the Waialua Agricultural Company has installed their Pump Number 1. This is near the mountain side of the bridge which crosses Kaukonahua Stream near the plantation settlement. The name is not known.

"Site 204. Approximate location of Oahunui, a stone whose outline is said to resemble that of Oahu, in the gulch near the division line between Ewa and Waialua.

The stone was formerly visited by the Hawaiians, for no one could say that he had been entirely around the island of Oahu, unless he had been around this stone. In the nineties it seems to have been a favorite expedition for Honoluluans to ride out to Oahunui and walk around this stone. Oahunui is also the name of one of the former chiefs of Oahu. He came under the influence of the cannibal chief, Lo Aikanaka, and learned to like human flesh. It is reported that he killed and ate his two nephews, the children of his older sister, who shared with him the royal power and prerogative. Lehuanui avenged the death of his children by killing Oahunui and his wife, Kilikililula, who had it within her power to save her children. It is said that Oahunui and Kilikililula and the attendants that participated in the killing and cooking of the children were turned into stone and are still to be seen.

"Site 205. Akua stone, Poloa grove, Kamananui

The grove, once sacred to Pele, has been left

untouched in the midst of cane, and covers an area of approximately 80 by 170 feet. On the eastern side is a stone, triangular in cross section, standing 1.7 feet high, 0.6 foot thick, surrounded by eight small stones. The plantation placed a small iron fence about this stone many years ago and it is now almost completely rusted. The stone was believed by Oscar Cox to be called Kaneaukai, but his uncle Hookala does not remember that name applied to this stone. Hawaiians have been buried in the grove within the last 50 years, though there is nothing to indicate such graves, which are shaded by breadfruit, kukui, and Pride of India trees.

"Site 206. Kahakahuna heiau, Pala-kai, was once located on the sea side of the road and north of the old mill site. The stones have been removed and the slightly elevated ground upon which it was built is used for agricultural purposes.

"Site 207. Kawai heiau was located just below the junction of Poamoho and Kaheeka gulches, on the elevation below the Waialua Plantation manager's house. It was one of the first heiaus to be destroyed.

"Site 208. Irrigation ditch, Kamananui, Waialua.

The longest irrigation ditch of which there is any memory. The intake was from the Kaukonahua Stream, just before it issues from the gulch, about 2 miles inland from the mill. According to Tom Low, the ditch could be traced as far as the intersection of the Mokuleia, Haleiwa, and Honolulu roads. The most distant land watered surrounded the site of the old mill one and one-third miles away. This ditch was for many years used by the plantation. The cemented intake and portion of the rebuilt walls are still to be seen. Along part of its course the ditch flowed along the side of a hill about 50 feet high. According to Low, the old ditch was made by piling stones on the lower side, with a rubble fill. Consequently there was much seepage and loss of water. Aside from following the old course, the plantation had practically to reconstruct the walls.

"Site 210. Indications of former habitations, Kaukonahua Gulch, Waialua.

House sites on both sides of the stream and in the south bank a small cave with the decayed remnants of skeletal material. Four piles of large stones approximately 3 feet in height are built in a perfect line, with an interval of approximately 20 feet between each pile. It was at first thought that these were supports of a former flume, but there has never been a pipeline in this section, though cane is planted in this gulch on a small plain just above these stones. No explanation has been obtained. The Hawaiians say that the stone piles were built by Europeans.

"Site 211. Burial cave, immediate vicinity of the Waialua Agricultural Company pumping plant [known as K.P.P.].

A small cave. The mouth had been walled up, but has since been broken into and the burials disturbed. Much of the skeletal material had evidently been removed. Bits of cloth and shoes indicate that it was post-European, though it may also have been used earlier. Just across the stream are indications that the narrow fertile plain was used for the cultivation of taro, and also the foundations of several frame houses. In the side of the bank is another burial cave, 10 feet wide and high and 15 feet deep, said to have been used by the Keloha family for many generations. When soldiers became troublesome the family built a doorway to the vault, which was locked. Later a party of soldiers destroyed the door, looted the coffins, scattered the remains, and took skulls and long bones for souvenirs.

"Site 223. Hakili heiau, Palaa-uka, on the sea side of the twin bridges at Waialua.

The site is said to be occupied by the Buddhist temple. Thrum was told that the heiau was of luakini class and a place of refuge. Near the heiau was a fishing shrine [ko'a] known as Kaohe, according to Hookala.

"Site 224. Punakai, Waialua.

A kahuna named Puukane lived at this place, which was known as Punakai. Whenever Puukane chanted, the poi would overflow any vessel in which it had been placed. There is also said to have been an unu here by the name of Kukuiula.

"Site 225. Kapukapuakea heiau, Palaa-kai, east end of Kaiaka Bay, on the sea side of the railroad track. The site is still remembered and pointed out, but nothing remains of the heiau. Thrum has this information: 'A medium sized heiau of traditional menehune construction of kauila wood, long since destroyed, said to have worked in connection with Lonoakeahu. Luuau its kahuna'. Nothing could be learned of Lonoakeahu. Near Kapukapuakea were formerly salt pans where sea water was allowed to evaporate.

"Site 226. Pohaku Lanai, a large balancing stone on Kalaeolupaoa Point, Waialua.

> A large oval-shaped stone 18 feet across is balanced on a smaller base, standing about 10 feet high in all. This is said to have been used as a lookout by fishermen in the region. When fish were sighted, the stone was beaten with a wooden mallet, and the resulting hollow sound was sufficient to gather together the fishermen of the village. Thrum writes: 'Hawaiians know it as pohaku Lanai, and it is said by them to have floated ashore from Kahiki, that vague foreign country of their ancient meles. It is a balancing rock on a somewhat broader base of limestone formation, with projecting top, so as to afford material shelter in its shelving structure.

"Site 227. Puupilo heiau, seaward of the Haleiwa Courthouse, Paaloa. A slight elevation of land with an old coconut palm on the side is all that remains of this heiau."

"Site 228. The cemetery beside the church in Waialua marks the site of the heiau once known as Kepuwai. It has been completely destroyed."

"Site 229. Kawaipuolo spring, south of the Anahulu stream, mountainward of Haleiwa.

> When strangers passed here and asked for water, it was given to them in a taro-leaf cup; therefore, according to Hookala, it was called 'Bundle-of-water.' Thrum notes that the spring suddenly disappeared at one time. After long search and enquiry therefor, it was discovered by the seer [kilo] at Makaula, near Kaena Point, on the hilltop now of the same name, Kawaipuolo. From here it was conveyed in one night by the menehunes in bundles of ti and taro leaves; hence the name, 'The-bundled-water.'

"Site 230. Two stones known as moo, on either side of the Anahulu Stream above the old Haleiwa Seminary. One was named Poo o Moo and the other was known as Wawae o Moo. They are in no way different from ordinary stones, and can not be distinguished from other stones in the vicinity unless pointed out by one of the Hawaiians.

"Site 231. Anahulu heiau, Kamani, at the location of the present Haleiwa Hotel.

> When the hotel was being built the heiau was destroyed. This, accordng to the Hawaiians, accounts for the failure of the hotel. According to Thrum, it was an 'Unpaved heiau of large size with lime stone walls, of luakini class.'

"Site 232. Akua stone, Anahulu river, Waialua.

> A stone which formerly blocked the entrance of the Anahulu River and was said to be sacred. This stone was just beneath the water and was said to be occasionally exposed. Some years ago when it was removed in order that the glass-bottomed boat and sampans might use the river, much anxiety was shown by the Hawaiians, for fear of evil effects.

Figure 4. Loko Ea.

Site 233: Loko Ea. [Figure 4]

"A small fresh-water pond covering 2.5 acres, still in use. The present pond is divided from a small stream, into which its outlets [makaha], open by a stone and earth embankment. Its other sides are formed by the natural contours of the land.

"Site 234. Puaena Point, Waialua.

At the death of Elani, who was greatly beloved by his people, his body was placed on a ledge of rocks near Puaena Point, where it was allowed to decompose. The place became known as Kahakakau Kanaka. As the odor came to the sands at Haleiwa they became known as Maeaea; the point on the other side became known as Kupava. Hookala tells me that at this same place, if there was no one to care for the body of a commoner after his death, the corpse was placed on these rocks. The fluids from the decaying body would seep into the sea and attract sharks, which the people killed.

"Site 235. Stone with curative powers, near Puaena Point, Waialua.

Partially covered by the sands of the beach and continually washed by the tides is a smooth oval-shaped stone about 2 feet high and 4 feet long which represents a woman known as Puaena who came in the following of Pele from Tahiti. For its curative powers the stone was famous, and Hawaiians came to visit it from all parts of Oahu. Seaweed was placed on the stone and a petition for aid addressed to it before the injured part was touched to the stone. If the ceremony was properly performed, the cure would be certain to follow. People also came to Puaena to inquire about the prosperity of the times and were answered through the medium of dreams.

"Site 236. Ukoa fishpond, Waialua. [Figure 5]

One of the two Waialua ponds; still in use. It is a long narrow fresh-water pond, approximately a mile in length. Most of it now overgrown with weeds. Laniwahine was a goddess [moo] of Ukoa and lived there with her brother Puhiula. Between the pond and the sea was a tunnel through

Figure 5. Ukoa Pond, from Kawailoa Road.

which Laniwahine passed when she wished to bathe in the ocean. Offerings were left for her on a stone, located near Pump Number 4 of the Waialua Agricultural Company. The site of this stone was marked for many years by a dead tree which was not removed because of its association with Laniwahine. Now neither stone nor tree is to be found.

This is the pond to which Lehuanui was sent by Oahunui to obtain fish. Here Lehuanui and his retainers found 'the fish packed thick at the makaha and were soon busily engaged in scooping out, cleaning and salting them.'

"Site 237. Iliilikea heiau, Kaiwailoa, Waialua.

Destroyed in 1916 by W. Harpham for the Waialua Agricultural Company. Thrum describes it as 'Of two divisions, 75 feet by 267 feet, its walls well defined, though in ruins.' Only a few large rocks indicate the former site, which is now covered with cane.

From "Hawaiian Mythology" [Beckwith 1970: 347]

Beckwith adds the following concerning McAllister's Site 225:

"Kamakau says of the dog-man Ku-ilio-loa [Ku long dog] that Lono-ka-ehu came to Oahu from Kahiki with his 'great dog' Ku-ilio-loa to seek his brother. He pierced the hill Kane-hoa-lani at Kualoa, cleft Kahuku and Kahipa apart, and broke Ka-pali-ho'oku'i at Kailua. He found his brother in the heiau at Palaa near Kuone at Waialua and took him back to Kahiki. The heiau named is the ancient heiau Kapukapu-akea said to have been built by Menehune out of kauila wood. The heiau of Lono-ake-ahu [Lono-ka-ehu?] at Keehu is said to have 'worked with' that of Kapukapu-akea and at Kane-ilio at the lighthouse point stood the heiau of Ku-ilio-loa."

From "The Hawaiian Planter [Handy 1940: 86]

"Paalaa includes Helemano Stream and extends north as far as Opaeula Gulch. There are said to have been many small terrace flats in the bottoms of the gulches, extending inland 4 or 5 miles. The map of lower Paalaa drawn by Francis Gay [dated 1874] indicates that there were terraces both above and below the 'Twin Bridges'.

"Kawailoa. This ahupua'a included the extensive terrace areas north of the Waialua River, along the level land north and south of Anahulu River, in the lower part of Anahulu Gulch, and in the swampy land east of Puena Point. [This swampy land apparently gave the district its name.] In Anahulu Gulch small flats with old mango trees, indicating kuleana, were observed several miles inland, and I am told that small areas were cultivated far up the gulch. Wild taros were seen in the side gulch at least 5 miles inland. The dry gulches between Anahulu and Waimea Streams probably never watered taro.".

From "Oahu Sites" [Sterling and Summers 1978]

Mo'o of Ukoa

"Laniwahine of Ukoa has often appeared to men in human form even in these days of learning letters. Such frequent appearances foretell some terrible event to happen in that place. It is the way these strange beings have of making manifest hidden things"

Kamakau

Mo'olelo Hawaii
Vol. II, Chap 9, p 45

"Laniwahine was the guardian of Uko'a at Waialua, and Uko'a was regarded as the long house where she lived. She was a native of Uko'a and all her deeds centered about that place. The natives of Uko'a never failed to recognize her deeds, but few of her descendants are now left or perhaps none. Uko'a was a very strange fish pond in which lived extraordinary fishes. A fish might be a kumu fish on one side and on the other side a mullet; or on one side weke pueo and on the other mullet; or one side might be silver white like a white cock; when scaled the skin might be striped and variegated inside. It was clear to all her descendants that these strange fish belonged to Laniwahine and it was not right to eat them. But the mullet of Uko'a were full of fat when, as in all such ponds, the native guardian of the pond was remembered; [at other times] the fish had thin bodies and heads like wood or sometimes disappeared altogether.

Kamakau

Mo'olelo Hawaii
Vol. II, Chap 9, p 47]

Ukoa and Laniwahine

"Ukoa--land and fish pond in Waialua, Oahu. The latter is believed to have subterranean communication with the sea, as its waters are very much disturbed during stormy weather. There are superstitions and belief in connection with this famous pond. One gives rise to the common saying, 'Pupuhi ka i'a o Ukoa', 'The fish of Ukoa is blown away or slipped off.' There is a large circular hole at the head of the pond commonly credited as the home of Laniwahine, the sister of Puhiula, children of a goddess of ancient Hawaiian Mythology.

Dictionary of Hawaiian Localities
Saturday Press
Aug. 25, 1883

Alamuki Moo

"As to Alamuki, it is situated by the big bridge that is across the river in Waialua, close to Kamo'o-loa. It was for this great procession of lizards mentioned in this legend that the place was named Ka-mo'o-loa [Long-line-of-lizards] and so was Kula-o-ka-mo'o [Lizard plain] in Waialua named to this day.

Manu, Moses
The Legend of Ke-ao-melemele [Yellow Cloud]
Hawaiian Ethnological Notes: Vol. II, p. 868

Naming of Haleiwa

"It is little wonder that Keoua, father of all Hawaiian kings, brought his tribes to live here in generations gone by; or that the authoress, high chiefess Pratt, Keoua's great-granddaughter, was inspired to write so beautifully of her birthplace; or that, later, the missionaries chose this spot in which to build their first seminary. It was the naming of this seminary that, purposely or not, constituted a name for the whole locale. The missionaries called their seminary 'Hale-Iwa', for the Iwa is a Hawaiian bird which builds a very beautiful nest and it follows that their name was to be symbolic of 'beautiful home'. And thus was Haleiwa created.

Reynolds, Douglas
Honolulu Advertiser
Nov. 17, 1935"

IV. SUMMARY OF MATERIALS ON THE EMERSON HOMESTEAD

The original structure of the Emerson Homestead, built in the early 1830s, was the home of the early missionaries John and Ursilla Emerson. As the site of the homestead is immediately adjacent to the survey area, the State Historic Preservation Office desired a summary of the historic materials which they had gathered and an architectural evaluation of the structure. In the course of the literature search concerned with the project area we were able to discover additional data, the most important of which was a comment by Thrum [1904: 102] that the original house had been destroyed in 1903. However, Spencer Leineweber's architectural study of the site revealed the presence of a different structure which dates from the middle of the nineteenth century; her results are presented in Section VI.

The biographies of Mr. and Mrs. Emerson are from the Missionary Album Sesquicentennial Edition of 1970, and the remainder of the information, unless otherwise noted, is from letters on file at the Mission Children's Society library.

"THE REVEREND JOHN S. EMERSON

Born December 28, 1800, Chester, New Hampshire
Married Ursula Sophia Newell, October 25, 1831, Nelson, New Hampshire
Died March 26, 1867, Waialua, Oahu

"Graduated, Dartmouth College, New Hampshire, 1826, member of Phi Beta Kappa; attended Theological Seminary, Andover, Massachusetts, 1827-1830; ordained at Meredith Bridge, New Hampshire, May 19, 1831; served as Headmaster of Moore's Charity School, 1827. Dartmouth College conferred on Mr. Emerson the honorary degree of Doctor of Medicine, July 27, 1860.

"Mr. and Mrs. Emerson were members of the Fifth Company; sailed from New Bedford, Massachusetts, November 26, 1831, on the whaleship 'Averick', Captain Swain, and arrived at Honolulu, May 17, 1832, a voyage of 173 days.

"They were stationed at Waialua, 1832-1842, where Mr. Emerson taught the natives agricultural methods as well as the Gospel, believing sincerely that it was necessary for them to know some of the practical knowledge that civilization had to offer. The Emersons were at Lahainaluna Seminary, 1846-1864, when he resigned his pastorate because of

ill health. However, they continued to reside in Waialua until their deaths. They visited the United States in 1860 and Mr. Emerson was a mission delegate to Micronesia in 1865.

"During 1835 and 1837 Mr. Emerson translated several books, Daily Food with notes, and First Teacher for Children. He translated letters from A through N in the English-Hawaiian Dictionary and some elementary text books.

"In no part of the Islands had the people been more in the habit of reading the Scriptures than at Waialua under Mr. Emerson. He had so arranged their reading that they were accustomed to read the entire Bible through once in three years. One old Hawaiian said he had read the Bible nine times.

"MRS. [URSULA SOPHIA NEWELL] EMERSON

Born September 27, 1806, Nelson, New Hampshire
Died November 24, 1888, Waialua

"Mrs. Emerson, writing in her journal at Waialua in 1832, said, 'A missionary here must be not only a pastor and spiritual guide to the people, but also a school-teacher, doctor, farmer and mechanic, and this not for a few hundred, but thousands'.

"She knew whereof she spoke. Strong, energetic, wise and loving, she worked among the Hawaiian people for 57 years. She walked hundreds of miles to administer medicines and delicacies to the sick, and give consolation; was a sweet singer and a skilled instructor in this and many branches of education."

On July 27, 1832, shortly after arriving in Waialua, Mrs. Emerson describes their first home:

> "My dear parents, could you now look in upon us, you would see us sitting in a native house, with only one apartment excepting what is made by curtains, with no windows and only one door, instead of the pleasant chamber in Mr. Clark's house in Honolulu, which we have been occupying for the past two months. But we are not unhappy--no, I have not enjoyed myself so well at any time since our arrival at the Islands as at present, and this is the place we expect will be our home." [Emerson 1928: 55]

About a month later, Mr. Emerson writes the following:

> "Dear father and mother Newell, this is the first evening in our new house, in which we have lived for about a week, that I have been able to sit in my study and write, for I had first to make my table.
>
> "Ursula has asked me to describe our houses. But how shall I do it? I might tell you that we have a great and splendid establishment built for us, or I might take the opposite tack and tell you that our dwellings look more like the tents of wayfaring men. In either description truth might to some extent bear me out, but avoiding the extremes I will try to give you an idea of their real appearance.
>
> "We have two new native thatched houses, one for Mr. Clark and family, which will be my study after they leave us, and one for ourselves. We have also a cook-house, one old house in which our natives live, and a study for Mr. Clark; in all five houses. The one we live in is the largest, 36 ft. by 24 ft....
>
> "The land on which our houses stand, about half an acre, is enclosed by a sort of palisade of small poles about six feet high, so fastened together with the native cord as to make quite a strong fence. This is necessary to keep the horses and goats from carrying off the houses, in other words, from eating them up, which they would do if they were very hungry. The cost of our establishment, if paid for by us in money, would not exceed one hundred and fifty or two hundred dollars, less by far than you would pay in New England for a small barn" [Ibid: 57-8].

Construction of a permanent residence for the Emersons began in 1833. The progress of the work can be traced in various letters written during 1833 and 1834: Excavation of the cellar commenced on May 8, 1833 and by the fourth of August, this work being almost complete, Emerson began looking for building materials. In September he mentions that he had children collecting sand and eight men gathering stones, and in a letter dated October 14 he notes that for the prior six months coral had been collected, apparently to be used for both mortar and plaster. On October 14, 1833 he discusses the proposed plan for the house, but

five days later he is drafting plans for an adapted version, since Brother Chamberlain did not agree with his original scheme. By October 23 he has developed a new one for a one story house measuring 30 by 33 feet, with two rooms underneath. He also puts in a request for oxen so that larger stones might be brought. He explains that this would lessen the amount of lime needed, and the work on the cellar would go that much faster. The oxen arrive on October 28.

By October 31 the floor has been dug in the cellar, and large timbers are ready to lay on it. On November 4 he notes a modification of his plan, and now decides to dispense with a closet in the cellar and to add four or five cupboards in the walls of the house. During November he orders wood , including 22-foot planks of koa timber, four planks measuring 2 1/4 inches by 5 inches thick, and also puts in a request for nails. On December 6 a mason arrived in Waialua to commence work, and by December 11 Emerson states that he expects that the walls will be completed in 3 weeks. On January 9, 1834 he mentions chimney and roof framing, roof timbers to be put on the following day, and that he needs bolts for an outer door, two cellar doors, and a study door. Additional materials are ordered during January, including a plastering trowel, wood roofing shingles 6 to 10 inches in width, a whitewash brush, sandpaper, glue, and many types of finishing hardware.

On January 20 he notes that rain and sickness have held back work, but by February 21 the carpenters are almost finished. On February 28 he orders paint, and on March 12 he states that he must plaster two rooms and paint the entire structure, even while the last kiln of coral is still on the fire. By April 2, 1834 he has become bored with the enterprise, and hopes that work on the house will soon come to an end, and on April 21st he is able to write the following:

> "I am writing this evening, dear father and mother, in the bedroom of our new house. The upper part is finished and we have moved in some of our things" [Emerson 1928: 96].

The house was apparently completed by May 13, 1834, for on that date Albert Robinson, the chief builder, received $7.10 from the Waialua Mission for his work, which had begun on December 5, 1833.

Oliver Emerson describes the house [Emerson 1928: 96]:

> "This was a one-story house with walls of stone and mortar, a cellar, four main rooms and an addition on one side for the kitchen. With its board floors, thick walls, well set doors and windows, it was a great improvement on the former dwelling. My father wished to build at this time a two-story house, but that was considered too expensive. In 1846, however, requiring more ample quarters to meet the needs of a growing family, the roof was raised to allow four upstairs rooms, the kitchen enlarged, with pantry and pump room adjoining, a brick oven built, and an ell added in the rear. This house, with a cosy gambrel roof, front and side verandahs, was the happy home of my boyhood." [Figure 6]

The ultimate fate of the structure is reported in the following quotation:

> "Adjacent to the Hotel Haleiwa, but hid away behind a grove of Pride of India trees [melia azedarach], fragrant at the time of our visit from the delicate odor of its profuse lilac flowers, is the old Emerson mission homestead, now being demolished, showing quaint features in its structure in pioneer days. Near the old house is the never-failing spring, Kawaipuolo, of legendary fame, which furnishes the purest of water to the hotel" [Thrum 1904: 102].

This last reference clearly indicates that the structure no longer exists, and Spencer Leineweber's architectural examination of the property confirms that there are no buildings on the property that resemble either the description as given by the Emersons in their letters or the photograph taken at the turn of the present century [Figure 6]. This unfortunate turn of events was discouraging, for had the original structure still been extant it would have been one of the very few examples of missionary housing from the early period.

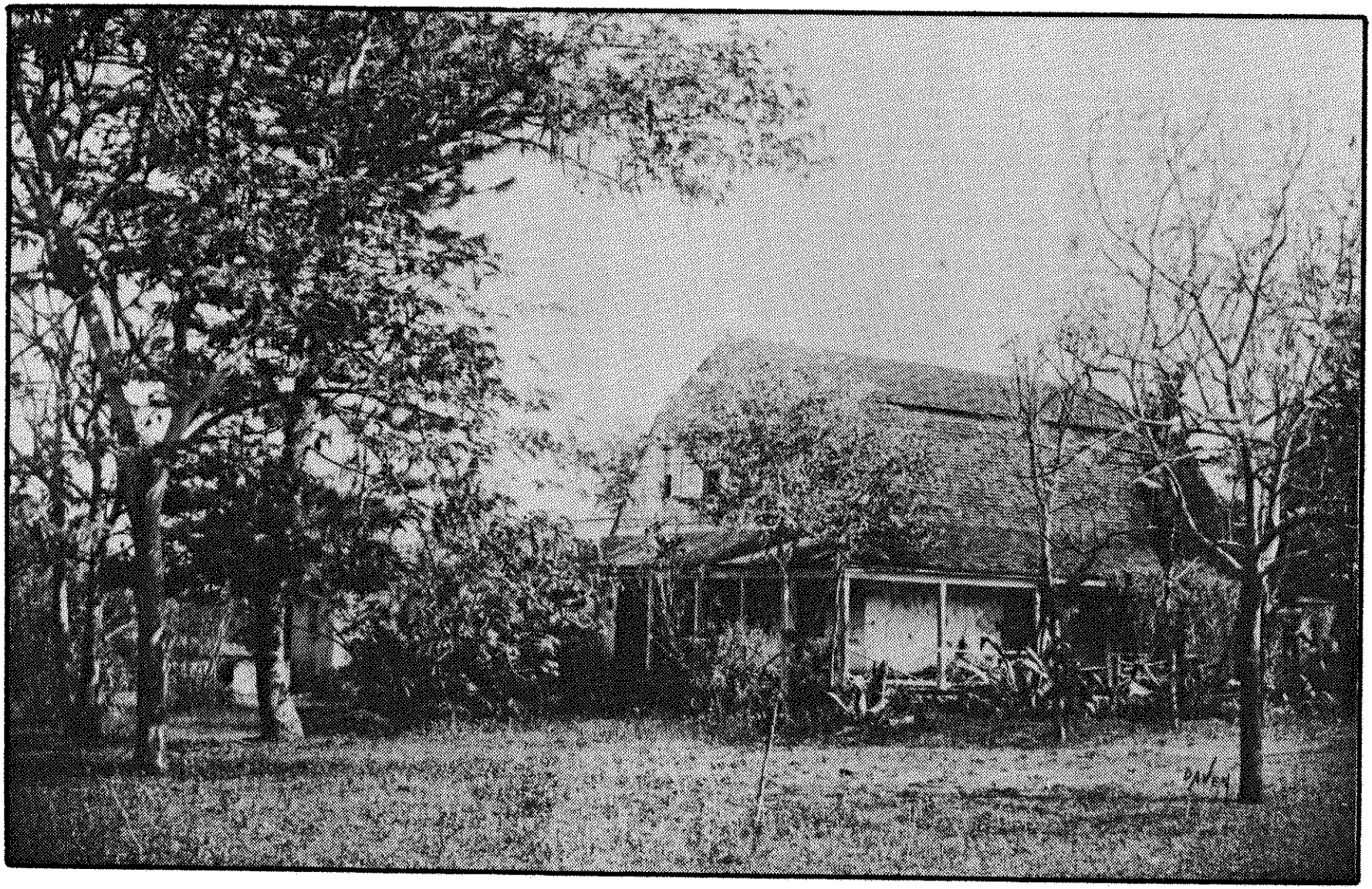


Figure 6. Emerson Homestead ca. 1900 [West end of Site 1442 is visible at left]. [Photo courtesty of Hawaiian Mission Children's Society, Honolulu]

V. ARCHITECTURAL FIELD SURVEY

Existing documentation of the study area on file at the State Historic Preservation Office plus additional resources and research material were reviewed, and a walking survey aided by an aerial map of the survey area [Figure 2] was undertaken to locate structures. A detailed examination was made of potentially significant resources, and written descriptions and discussions of those buildings likely to be eligible to the National Register of Historic Places were made.

Review of State Historic Preservation Office Documentation

Review of existing documentation at the State Historic Preservation Office revealed the following information:

1. The study area contains the site of the Emerson Homestead, the first missionary location on the North Shore, dating from the 1830s.

2. The Emerson Homestead included a house with the following characteristics:

   a. two story [wood second floor]
   b. coral and rock masonry walls
   c. 31 feet by 33 feet
   d. full basement with exterior access
   e. painted and plastered exterior wall
   f. koa planking
   g. nail construction
   h. chimney

Review of Additional Material

Additional archival research produced a photograph of the Emerson Homestead [Figure 6], showing it to be a gambrel-roofed structure with open pillared lanai. One source [Thrum 1904] indicated that the Emerson Homestead was being demolished in 1904. A local resident brought our attention to an old wooden building, possibly a church, within the study area.

Walking Survey

A walking survey of the study area on December 22, 1979, confirmed the location of all primary construction areas observed on the aerial photograph. These areas were as follows:

1. Potential Emerson Homestead.

2. Several groupings of plantation housing

3. Potential historic church.

There is a significant amount of construction in these areas that is at least fifty years old. The plantation style housing has been greatly altered or deteriorated, such that in most cases the integrity of the original structure is no longer intact. Those houses that do retain their integrity have no unusual architectural significance. Only the Emerson Homestead and the possible church required further detailed investigation.

SITE 1442 [Emerson Homestead]

The structures existing within the Emerson Homestead area are as follows:

1. Several residential structures which, because of their recent age, are not significant.

2. A large wooden "meeting hall" structure potentially dating from the late 1920s. No unusual architectural features or construction techniques were noted, and it was evaluated as not being architecturally significant.

3. A masonry and wood residence.

4. A large wooden watertank.

The masonry and wood structure is the only one which has potential for being significant. It is two story, rectilinear in plan, and measures approximately 15' by 60'. The first floor construction is 18" thick masonry walls and measures 15' by 30'. These walls are pierced on each elevation with splayed openings. The long elevations have two openings, either two doors or two windows. The end elevations have one opening each. The window and door millwork dates their construction to the turn of the century. The windows are 8 panel wood casement and the doors are 6 panel. It is this part of the structure, the masonry walls, that is potentially of architectural significance. These walls, based on their construction technique, date from 1830-1860, which would definitely make the structure contemporaneous with the Emerson mission. The walls are cut coral rock corners, rock and coral rubble walls. The masonry mortar is of the type acquired by burning coral.

The joints between the coral blocks are filled with this high lime mortar, plus small chips of lava rock. This construction technique of adding rock chips to the mortar was a variation on the earliest masonry buildings, which used no chips. Kawaiahao Church, which was constructed in 1841, uses the lava chips in the mortar, whereas Seaman's Hospital and Hale Pai, both in Lahaina, Maui, and constructed in the 1830s, do not.

The second floor and attached outbuildings are constructed of wood and date from much later than the original masonry walls. Based on the construction technique the front wooden addition, now used as a kitchen, dates from the turn of the century. The rear addition, now used as wash and toilet facilities, dates from the late 1920s.

In conclusion, it is extremely possible that the masonry structure dates from the Emerson mission period, although it is not the main structure. The location of the windows and doors in absolute symmetry would suggest that the original use may have been two bedrooms or two staff quarters. Interior access to ascertain interior dividing partitions was not permitted by the current occupant, but State Historic Preservation Office research indicates a dividing partition measuring 4 & 1/2" in thickness. Excavation below grade to determine the possibility of a former basement could aid in determining whether this structure was the original homestead. However, even if the building were not the first building constructed at the mission, it is one of the oldest standing buildings in Oahu of this construction technique.

Figure 7. Site 1443.

SITE 1443 [Figure 7]

Detailed examination of the potential "old church" was also undertaken on December 28, 1979, but unfortunately, interior access was not permitted. It is a rectilinear wood structure with gable roof facing the road. The wall is wood, single wall board and batten. The only unusual feature consists of fishscale shingles on the weather gable end. Construction dates from the turn of the century, and its condition is dilapidated. The building does not contain enough architectural significance to warrant National Register designation for architectural reasons alone.

VI. FIELD INVESTIGATONS-ARCHAEOLOGY

The survey area included the rights-of-way of all three alternate alignments of the proposed highway and the area between these alignments [Figure 1]. The specific areas investigated were as follows:

A number of rocky tree-covered knolls on the south end of the proposed route.

The sides of all streams flowing through the project area, consisting of Helemano Stream, Opaeula Stream, Ananulu River and the Ukoa Pond Outlet.

An expanse of open fields and overgrown areas between the Anahulu River and the Ukoa Pond Outlet, and

An area of coral limestone outcrops between the Ukoa Pond Outlet and the present Kamehameha Highway on the north end of the project area.

Due to the extent of clearing in the survey area, primarily the result of sugarcane production and ranching activities which have produced large areas of disturbed ground, old remains were quite rare. Only three sites of possible archaeological interest were recorded [Figure 2].

Figure 8. Site 1439.

SITE 1439 [Figure 8]

This is a deposit of bottles, ceramic vessel fragments, and other historic materials located on the top and sides of a low rocky knoll. It covers an area of 8 by 10 meters, but may have been much larger as the surrounding ground has been extensively disturbed by ground-clearing operations. No structural remains are present, and no features mark the boundaries. The bottle typology suggests a date between about A.D. 1880 and 1920.

Figure 9. Test Pit at Site 1439.

A single test pit, most of which was taken up by a single large rock, was excavated to a depth of 22 centimeters below the surface [Figure 9]. Two distinct layers were observed [Figure 10]. Layer I [0-11 centimeters below the surface], which contains the cultural materials, is a churned horizon consisting of an apedal soil with occasional B-ped inclusions. The cultural materials consisted of numerous fragments of bottle glass and ceramic vessels. Layer II [11-22 centimeters below the surface] is culturally sterile and is an undisturbed soil with a blocky B-ped structure and inclusions of small [ca. 5 millimeter] angular basalt fragments.

The evidence of the excavation suggests strongly that the only strictly *in situ* remains at this site are on the surface of the rocky knoll, and that the subsurface cultural materials were deposited during the relatively recent clearing of the surrounding area.

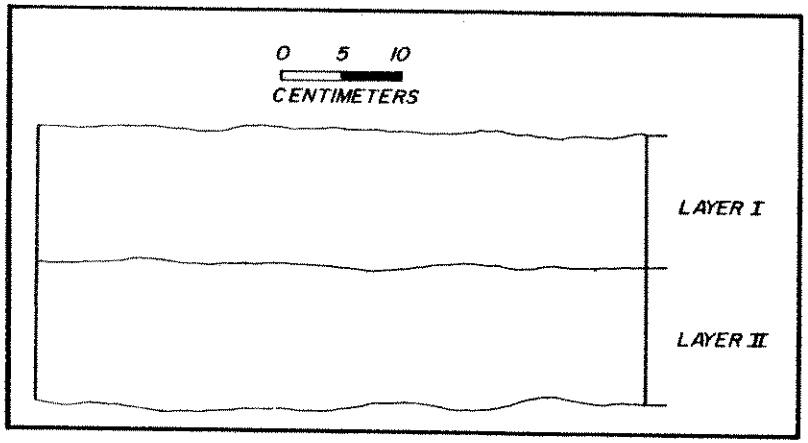


Figure 10. Cross-Section of Excavation at Site 1439.

Figure 11. Site 1440.

SITE 1440 [Figures 11 and 12]

This is a wall remnant in the middle of a large cleared and plowed field. It measures 25 meters in length, 1.2 meters in width and stands to a height of 1.3 meters, and consists of an alignment of large boulders placed on

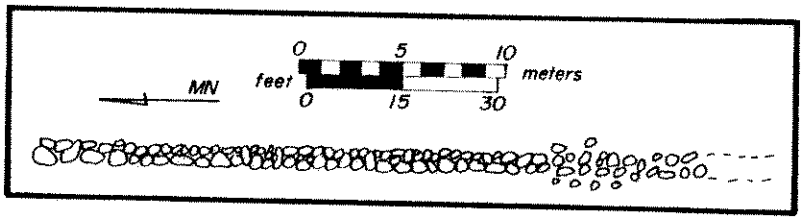


Figure 12. Plan of Site 1440.

end with a cap and fill of smaller basalt rocks. The feature continues to the west as a narrow rubble pile which is obviously the result of clearing. In its construction technique it is typically aboriginal, and probably represents the remains of a large structure that has been destroyed. However there is a notable lack of cultural materials [midden remains or artifacts] in association with the feature, the only such remains found consisting of two shells of a nerite [Nerita picea], a marine mollusc commonly used prehistorically by the Hawaiians as food. Several test probes adjacent to the feature revealed only shallow sterile deposits.

Figure 13. Site 1441.

SITE 1441 [Figure 13]

This is a large complex of wet agricultural terraces covering an area of about 100 by 100 meters. We were unable to map or investigate the site in detail because of extreme difficulty in contacting all of the owners and lessees for permission to enter the property. Our information was gathered through observations from surrounding parcels for which we did have access permission, but this investigation was hindered by the dense vegetation.

The site consists of an indeterminate number of terraces formed by earth embankment walls. Numerous basalt rocks were observed eroding from the sides of the earth embankments in the portion of the site which we were able to investigate at first hand, and it seems likely that they are stone walls that have been filled in and covered over with earth, either by natural or human agents. These walls measure up to 2 meters in width and stand to a height of 1 meter. Some of the terraces are presently under hasu [lotus root] cultivation, others are swampy and completely overgrown with a thick stand of grass.

It was impossible to excavate test pits in the area for which we could have gotten permission to do so because of the presence of standing water and the considerable depth of mud in the hasu terraces [as much as three or four feet, according to the lessee]. The only places where excavation would have been feasible were in the walls themselves, and this was not possible because they presently serve as paths for the farmer and also would have led to the draining of the terraces from which he derives his income.

Taro which is being grown for its leaf [Figure 14] was observed growing in two small patches, and the hasu farmer allowed us to photograph a black and white print which shows taro being cultivated in the pu'epu'e style in this same patch sometime during the 1920s [Figure 14]. This man has lived on the property since the early 1920s and stated that prior to that time it had been under intensive rice cultivation. When his father took over part of the land and began to raise hasu, the old rice plots were excavated to a depth of three or four feet, as this plant requires deeper water than does rice. He also says that the plots are fed by fresh water springs located along the base of the adjacent hillside.

In summary, we can say that this site is probably the remnant of an old taro terrace system, portions of which

have undergone considerable recent modification. It could not be determined just how much of the present wall system is original and how much is the result of modifications made during the more recent rice and hasu cultivations, but the likelihood is great that valuable cultural information is present in both the disturbed and undisturbed sections of the site.

Figure 14. Taro Growing at Site 1441.

Figure 15. Pu'epu'e Cultivation at Site 1441.

VII. INTERVIEWS

This section is a composite of various pieces of information elicited from the following residents of the Haleiwa area, who were personally interviewed:

Mrs. Merle Anderson
Glen and Viginia Hontz
Mrs. Kerns
Joe Leong
Mr. and Mrs. Tsuruda

Very little information relating directly to strictly prehistoric sites was forthcoming. The only information elicited concerned the presence of terrace walls on Helemano Stream and the presence of a possible heiau past Loko Ea fishpond toward Waimea, the exact location of which was not known. It may be that this person was referring to either Site 237 or 238 of McAllister [See Section III]. Our inspection of that portion of Helemano Stream in the highway alignment revealed no terrace remains, but this is not too say that they are not present further downstream. Perhaps the informant was referring to the same terraces mentioned by Handy [See Section III].

An old plantation camp was once located within the survey area but this has been completely demolished, and an old ice factory was once located on the Anahulu riverside. The much deteriorated remains of the concrete structure of the latter are still present. Rice was cultivated along the west bank of the Anahulu River prior to 1920, and a rice mill was located at the site where the remains of the old icehouse now stand. Hasu cultivation began on the old rice terraces in the 1920s and continues to the present day.

Loka Ea was once a kapu fishpond reserved only for alii. It was famous for its aholehole, which fish was restricted for the use of Liliuokalani whose house site and private swimming pond were located on the edge of the fishpond. This small pond has been filled in, and a residence is now located where it and the house once stood.

Two people are presently employed to maintain Loko Ea, and public use is restricted. It is evidently quite productive, and produces mullet, talapia, awa, awaawa, and Samoan crab. At least three underground springs feed fresh water into the pond, which supply is augmented by runoff from Ukoa Pond.

The reference to an underground tunnel connecting Ukoa

Pond to the ocean [see above, Section III, McAllister] was repeated by two of our informants, and both also stated that the swamp was once clear enough that one could paddle from Loko Ea up to the back of Ukoa.

A reference to a legend concerning a whispering voice from Ukoa Pond was elicited from one informant, who provided no further information, stating that old timers know more about this than he does. A legend having to do with the Loka Ea fishpond shark-god, who calls out to the Ukoa Swamp lizard-god to mate, was also related with only minimal detail.

None of our informants were able to identify the location of the Moo Stones [Site 230], and it is impossible to state whether these are inside or outside of the project area without firm information from a knowledgeable individual.

VIII. SIGNIFICANCE OF THE SITES, AND RECOMMENDATIONS

When attempting to determine the significance of historical or cultural remains it is necessary to look at two broad areas of interest, the scientific information which is present and the existing cultural attitudes towards the remains located. The overall significance of the area surrounding an archaeological project area is therefore an important factor to consider when determining the significance of the sites.

The published information [McAllister, Handy, etc.] and the information elicited from informants leaves no doubt as to the present-day cultural significance of Haleiwa. The presence of numerous heiau, shrines, and places of legendary and/or spiritual importance testifies to this fact, and this should be taken into account as an integral part of the planning process. As our published sources are not of very recent vintage, an effort was made to determine the feelings and attitudes of present day residents of the area concerning the impact of the project on the spiritual and cultural values which are presently held by these people. Our attempt to do this by means of interviews was necessarily a small-scale effort, and hopefully will be supplemented by information provided at the public hearings.

In order to make any definitive statements concerning the scientific value of archaeological sites, it is necessary to refer to previous work in the area so as to provide background information and a foundation for the discussion. With the exception of McAllister's publication [see Section III], previous archaeological research in the Haleiwa area consists entirely of Kirch's recent work in the interior of Anahulu Valley. The aims of this project were:

> "...to determine the physical correlates-- artifacts in the broadest sense--of the socioeconomic picture revealed through archival analysis. While the archival data are restricted to a few decades bracketing the Mahele or great land division of 1848, it was predicted that the archaeological investigations might extend this picture back in time, providing a continuous sequence through the critical prehistoric-to-historic transition" [Kirch 1979: 2].

Even though fiscal and scheduling constraints prevented the execution of the ambitious research project that had originally been envisioned, valuable information concerning

this previously almost unknown area of Oahu was nevertheless forthcoming:

> "From all indications, the settlement landscape of middle Anahulu Valley in the late-prehistoric period was a relatively uncomplicated one. For habitation, abundant overhang rockshelters provided a convenient facility, and we have no indications of terraced house platforms as found in Halawa, Moloka'i, or of C-shaped shelters as in Makaha, O'ahu. Likewise, on the admittedly narrow evidence of pondfield stratigraphy and surface configurations [and lacking absolute age determinations], it is doubtful that the larger irrigation systems were yet in existence. Rather, disturbed soil horizons and charcoal flecking stratigraphically underlying the pondfield constructions suggest that the practice of shifting cultivation involving firing was fairly widespread in the mid-to-upper valley at this time...
>
> "In general terms, then, the late-prehistoric utilization of middle Anahulu Valley was probably of a transient nature, as a resource zone or area exploited by a permanent, coastal-dwelling population" [Kirch 1979: 51].

In contrast to this pattern, the evidence from the historic period indicates that a shift to permanent habitation of small localized areas of the valley had occurred. In summation, Kirch concludes:

> "Constrained by unavoidable sampling limitations, the results of our research in Anahulu are intriguing as to their wider implications, yet necessarily inconclusive. The Anahulu data suggest a considerable disjunction between prehistoric and historic phases of the local sequence, with a rather striking modification of the settlement landscape in historic times. Responding perhaps to intrusive pressures of an incipient chiefly bureaucracy, Anahulu's traditional irrigation complex appears to have increased considerably in the historic period, only to fall into rapid decline and abandonment less than a century later under new economic pressures and the needs of the more demanding irrigation associated with plantation agriculture. Elucidation of the transitional settlement-subsistence se-

quence, only roughly sketched in the present study, requires continued application of joint ethnohistoric and archaeological approaches; the potential rewards appear worthy of the effort." Kirch 1979: 55]

The foregoing was presented in order to demonstrate the potential of historical and archaeological studies in the Haleiwa area. There can be no doubt that any project which addresses these questions would be an invaluable addition to Hawaiian archaeological research. However, the extensive ground-clearing that has occurred within the present survey area has almost certainly destroyed considerable amounts of data which would have been important to such a study, which makes the remaining sites just that much more important. Four out of the five sites that were recorded are outside of the immediate zone of impact of the highway realignments, but we are presenting recommendations for them in the unlikely event that modifications of the highway plans result in a direct impact upon them, and to make their significance a matter of public record.

Site 230 [Mo'o Stones]

The precise location of these stones is uncertain, and it will be impossible to make recommendations until someone familiar with them comes forward to make an identification. Judgement must therefore be reserved.

SITE 233

Loko Ea is one of the few fishponds still in existence on the island of Oahu and undoubtedly has the potential for producing valuable information concerning aquiculture, which was an important aspect of ancient Hawaiian society. The possibility of adverse effects to the site, which is outside of the project area, was brought up in one of our informant interviews. This person felt that the pond might be impacted adversely by excavated materials washing down from the construction area, resulting in siltation and an upset in the ecological balance within the pond. However, we have been assured by an environmental specialist that any materials in suspension will be intercepted naturally by the vegetation in the Ukoa Pond Outlet, and that the likelihood of any unintercepted materials entering the pond are slim because at that point the Ukoa Pond Outlet is separated from Loko Ea by an embankment.

SITE 1439

This site, which lies between the alternate alignments of the highway, is historic in age and represents a period about thirty years after the Mahele, which marks the transformation of Hawaiian culture from the original land tenure system to the modern. Although the need for the sorts of historical information which Kirch requires cannot be satisfied with this site, this is not to say that there would be nothing to be gained from its scientific analysis. Valuable information relevant to habitation and marine exploitation practices during a period about which little is known archaeologically is undoubtedly present. If the site is to be impacted by any construction activities, it is our recommendation that archaeological salvage excavations be conducted.

SITE 1440

The paucity of cultural materials in association with this feature and its disturbed condition would normally indicate a determination of little or no value. However, the possibility that it represents the remains of a large structure, possibly a heiau or the residence of a high-ranking individual, suggests that it has the potential for providing valuable scientific information. Little is known concerning residence patterns of higher status individuals in Hawaiian society, and further investigation of this structure may provide needed data for such studies. The site does not lie in any of the proposed rights-of-way, but if it is to be disturbed by construction activities, further archaeological investigations would be required. Because of the extreme unlikelihood of deposits being present in the adjacent cleared and plowed area, such investigations would have to consist primarily of a dismantling of the feature in the hopes that in situ materials are present within and beneath it.

SITE 1441

It could not be determined how much intact information is left in this site as a result of the use of the area for rice cultivation and damage caused by burrowing prawns which is presently occurring. The sub-surface deposits should be investigated, however, if the alternate alignment in which it lies is chosen as the final highway right-of-way. The site has the potential for producing valuable information concerning aboriginal Hawaiian agricultural techniques, and analysis of the soils can provide valuable information relevant to studies of past environmental cond-

itions. Such data as rainfall patterns could be inferred from the presence or absence of alluvial flood deposits, and data concerning shifts in the level of the water table could be forthcoming from chemical analyses of various soil horizons. This sort of information would of course also be important in terms of much broader concerns regarding the entire range of prehistoric systems of adaptation to the Hawaiian ecosystem through time. Any information which might be retrieved would also be a valuable addition to the data collected by Kirch, most especially if archival information is also present regarding the area.

SITE 1442

This structure is entirely outside of all of the proposed rights-of-way of the highway realignment and thus is in no immediate danger, but its high value requires National Register status so as to provide a measure of protection from inadvertent alteration. It is one of the few buildings of its type left in the State and should be nominated to the National Register of Historic Places on the basis of its architectural merit. It is recommended that further archival research be conducted to determine its precise date of construction and any historical information relating to it which might augment its architectural significance.

SITE 1443

Insofar as the highway realignment project is concerned this site is in no danger, as it lies immediately outside of one of the the proposed rights-of-way. Archival research should be undertaken, however, to determine whether or not it has any historical interest which might make it eligible to the National Register of Historic Places, even though it is of no architectural interest because of its condition.

Emerson Homestead

Our research unfortunately revealed that this important historic site no longer exists; therefore, the proposed highway cannot have any effect upon it and there is no need for developing a mitigation strategy for its preservation.

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GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

DIVISIONS:
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

FILE NO. _____

April 11, 1978

Mr. H. Kusumoto
Federal Highways
Engineering Coordinator and
Assistant Division Administrator
Room 4119, Box 50206
300 Ala Moana Boulevard
Honolulu, Hawaii 96850

Dear Mr. Kusumoto:

Kamehameha Highway Realignment,
Weed Junction to Haleiwa Beach Park

A letter has been received from Mr. Harano asking for a review of the Kamehameha Highway Realignment. I think that a federal review is requested since the letter is addressed to the State Historic Preservation Officer. Since the State Historic Preservation Officer can only respond to a request from a federal agency, I will address my reply to your attention.

Archaeological site remains are highly unlikely in the proposed corridor because of agricultural development of the area.

Within the corridor on TMK 6-2-04:17, 18, 19 and 20 is located the Emerson Homestead, the site of the first missionary settlement in the Waialua District, approximately 450 feet east of Kamehameha Highway and on the south bank of Anahulu River. This site appears to meet the criteria for the National Register.

Sincerely yours,

Jane L. Silverman
Historic Preservation Officer
State of Hawaii

cc: Mr. Harano

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

April 23, 1980

The Honorable Ryokichi Higashionna
Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Dr. Higashionna:

Subject: Kamehameha Highway Realignment
Haleiwa Bypass Reconnaissance Survey
TMK 6-2-02:3, 4, 5, 6, 7, 12
6-2-04:18, 19, 20

In response to your letter of April 7, 1980, requesting our review of the Chiniago Inc. reconnaissance (REV March 1979) of the Kamehameha Highway Realignment, the following is offered:

It appears from the revised reconnaissance report that four sites were located within the study area boundary: Site 1439, 1440, 1441, and 1443. Of these, only Site 1441 appears to be potentially threatened by the proposed development, and then only if alternate B or alternate D were to be chosen for the highway alignment.

If either alternate Alignment B or Alignment D are chosen for development, it will be necessary for the Department of Transportation to initiate the National Register Eligibility Determination Process (36 CFR 63) for Site 1441 in consultation with the Historic Preservation Officer as the second step of conformance with 36 CFR 800.

It is our understanding that the realignment design furnished us and included in the reconnaissance are of a preliminary nature and do not necessarily reflect actual areas of impact. We therefore request that when you finalize your design for this proposed development that you transmit these final plans to this office for our review and comment.

For your information, the contractor has contacted Patricia Beggerly of our staff and has:

1. Transmitted the artifactual data to the Historic Preservation Office.

2. Included vertical and horizontal information for Sites 1439, 1440, 1441.

3. Prepared National Register documentation sites for 1439, 1440, 1441.

4. Included photographs for excavations within Site 1439.

5. Delivered the materials generated by the research to the Historic Preservation Office, Division of State Parks.

6. Included Figure 5 on draft report as Figure 6 in the revised report.

It might be noted that on both reports, the date of 1979 should be changed to 1980.

If further information is needed, please have your staff contact Patricia Beggerly at 548-7460.

Sincerely yours,

Susumu Ono
Chairman of the Board and
State Historic Preservation
Officer

HSB 9/16/79 Sunday

For Haleiwa, the Future Is Now

By Susan Yim
Star-Bulletin Writer

A rental car drives up, stirring up red dust clouds in the noon heat, and parks in the unpaved lot in front of the Haleiwa Theater. The old building, dated 1931, looks like it should be showing John Wayne westerns rather than surfing flicks and be the backdrop for rinky-dink tourist stalls.

A tourist family gets out of the car and strolls over to Island Lady Produce fruit stand and studies the pineapple, half-ripe mangoes, starfruit, passion fruit, apples from Washington, oranges, nectarines and peaches from California. A 19-year-old, bearded, pony-tailed California transplant named Mikal says he takes in $600 on a good weekend day and $100 on a good weekday.

Between sales he doodles in a leather-bound scrapbook filled with Kodacolor snapshots of Haleiwa. He has been in Hawaii about half a year; he is crazy about Haleiwa. "It reminds me of Chico (farm country in California), except this is more country. The fruit stand reminds me of old California fruit stands."

The family buys a pineapple and moves over to look at the heishi shell jewelry at a stall advertising "Puka Shells 25 cents." They ignore the Stag of the Mountain rugs and the "Moroccan" carpets, and the miniature elephants made of oyster shells from the Philippines.

"No. I am not from Haleiwa," the bearded vendor in baseball cap reluctantly admits. "I am from the Middle East. Palestine."

* * *

Sunlight dances through Sue Hegle's blonde braided hair, highlights her blue, doe-like eyes. She moved to Haleiwa a few years ago from California and started making prints of Hawaiian scenes for tourists. They sell well at Paradise Gallery, a storefront redone in wood with airbrush paintings in the window.

"People started saying why don't you do the Haleiwa Theater, the old Haleiwa bridge, Chinaman's Hat? There's so much subject matter in Hawaii to draw and the market here is better for me. I never would have been able to do this in California. There's no market."

* * *

"We—it doesn't matter whether we were born here or moved here—all want Haleiwa to stay the same," says Janet McElheny, who moved to the North Shore 10 years ago from Long Beach, Calif. She and Sandy Spickler are real-estate agents at James Salmon Realty, headquartered in the very California-looking Haleiwa Shopping Plaza.

"I have a friend who said this area reminded her of home," McElhney adds. "She's from Long Beach and I wanted to say, 'Then why are you living here?' I remember 10 years ago sitting on Rocky Point and no one was there, there was no line for shave ice."

"I'll tell you what Haleiwa needs," says Spickler. "We need a good drug store. "One thing we do not want is any fast-food operations to open up here."

"The day we have McDonald's and Kentucky Fried is the day I move out," says a secretary, on the other side of the file cabinets.

"If we get one, that's it," agrees McElheny. "It will be boom, boom, boom, down the road. But, you know, I heard Pizza Hut is coming in."

* * *

A slight breeze floats across the ponds of hasu or lotus root plants on Juan Ballesteros farm. At first glance, the ponds look like taro fields, but the leaves are too large and round and sturdy. It could be a scene from Asia: acres of hasu, squash, string beans, cucumber vines shimmering green in the afternoon sun.

Hymie Ballesteros, 23, one of a dozen workers on his father's farm, loads boxes of cucumbers into a pickup truck. The farm borders the parking lot of the Haleiwa Shopping Plaza, its two aging farmhouses made of weathered wood

* * *

Leif Andersen calls off the two black dogs that hunt with him in the Koolaus. He is 23, born and reared in Haleiwa on a reclaimed piece of land that used to be a taro patch. The old Haleiwa bridge is in his front yard and Andersen and his buddies used to spend their summers engaged in the Haleiwa pastime of "bombing" cars that passed over the bridge. "You jump off the bridge into the water at the right time and the water will splash all over a car." The police discourage a new generation of water bombers and "about the only thing left from before is the shave ice, and even that's going," Andersen says, dryly, referring to Matsumoto's Grocery Store which operates under a six-month to six-month lease. "Haleiwa's changed."

* * *

Haleiwa could have been another Waikiki if it hadn't been on the other side of the island. Back in the days of the monarchy, Waikiki and Haleiwa were the two royal playgrounds. Then the monarchy was overthrown. Progress, in a sense, took its place, and we all know what happened to Waikiki. The verdict still isn't in on Haleiwa. But residents are determined to keep progress under control, although there are differences of opinion on how to handle change, which is spoken of as though it's the Big Bad Wolf.

"We're moving along with progress but going slowly, trying for more control. Control: that's the important word," says Meryl Andersen, Haleiwa's unofficial historian and member of the North Shore Neighborhood Board.

Haleiwa has never needed to have its consciouness raised about historic preservation. The community has been fighting off development for years and the victory they still talk about saved Haleiwa from seven-story development. The tallest building in town remains the three-story Haleiwa Surf.

THE COMMUNITY associations, neighborhood board, and just about anyone who lives or works in Haleiwa is in favor of acquiring a designation as a special design district, status comparable to Lahaina's. Councilman Toraki Matsumoto has introduced an ordinance and hearings will be held Wednesday. "He'd better support it," says one of his constituents, half-joking.

Everyone—the retired plantation worker, the small businessman, the real-estate broker, transplanted Californian, surfer—will tell you they want to preserve the Haleiwa look and way of life. What they disagree on are the definitions of "look" and "way of life."

"We're trying to keep Haleiwa as rural as possible," says Meryl Andersen. "Most people think it's been well-done. We're still rustic-looking."

"There are a lot of crafts people and arts people who would like to come to Haleiwa and see it become a focal point for tourists to look and walk around," says Fred Gross, who has been as active as Andersen in the community. "We're never going to be Lahaina, but whether we have to look like the old Haleiwa, I'm not really sure. I don't know if I want it to look like that. It looked pretty crummy."

WHAT DOES the community want to keep and what does it want to add?

It wants to preserve structures like the Anahulu Stream Bridge, which everyone calls the old Haleiwa Bridge, and the Haleiwa Theater. There is a move to turn the rundown movie house into a center for culture and education. It is a project spearheaded by Rima Short, a zealot about the project that is philosophically embraced by the established community groups. The Waialua Community Association is lending the grounds of its headquarters, across from the theater, for a two-day benefit concert, Sept. 29 and 30.

Matsumoto's Grocery Store, better known for its shave ice than groceries, is one of a handful of mom-'n'-pop stores that remain from the days when Haleiwa was a plantation town.

But most of the remodeled mile that is the heart of Haleiwa has a distinctively California look, which probably appeals and attracts the newer Haleiwa residents. There are recycled storefronts redone in wood and decorated with air-brush signs, and buildings such as the Haleiwa Town Market which used to be a homely IGA store. The almost-completed Haleiwa Shopping Plaza is a one-story, all-wood and some stained-glass-window complex with shops that sell natural foods, air-brush paintings, backpacks, silkies and discowear next to a home supply center, bank, a lawyer's office and a real estate firm. It all reinforces the theory that a town is a reflection of the people who live in it.

ACCORDING to the 1978 State Data Book, Haleiwa had grown 8.7 percent between 1960 and 1976. When you consider that the growth rate of Honolulu during that period was a comparable 9.6 percent, that's a lot of people moving to the country.

A couple of years ago, there was only one realtor in town and he worked out of a house. Today there are two realty firms in Haleiwa. Janet McElheny and Sandy Spickler are two of the brokers who work for James Salmon Realty, located in the shopping plaza.

"Between 1970 and 1973, real estate tripled out here," Spickler says. "In 1974 there was a lull, and then about a year and a half ago things took off again. We're still in that boom and who knows where we're going to go."

Outside the office, fellow realtor Tim French sits in his van—wearing a t-shirt, shorts and zoris—completing the sale of a $125,000 house to a vacationer from California who fell in love with Haleiwa.

A beachfront home sells for about $250,000, and McElheny says there isn't anything for less than $128,000 near the beach. Spickler handles the firm's rentals and says there are waiting lists for vacation homes. People are willing to pay $300 to $500 a week. Four families waited at her home one day this summer, hoping to be the first to get a house a renter was vacating that day.

"REAL-ESTATE prices are soaring," says Spickler. "People who've gone to Maui and other islands are coming back here because they want to be closer to Honolulu, most of them are retired Californians. And a lot of military want to live out here by the beach and get away from the compound."

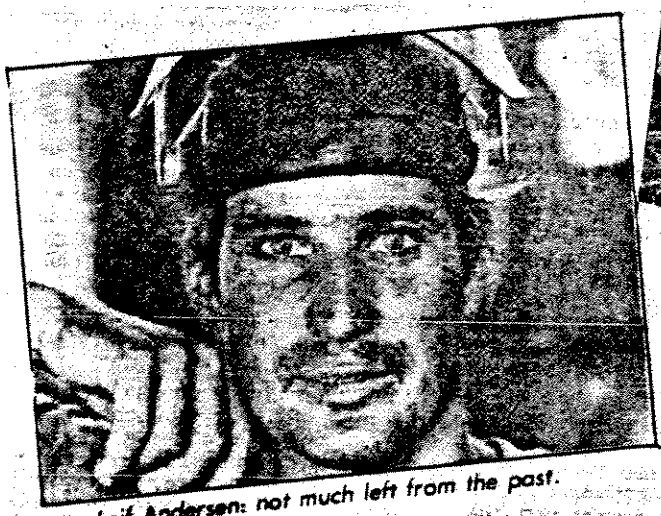
Close to 1,000 families applied for the 307 homes in a low-income housing project near the Haleiwa Theater. Half of the families selected in the lottery, required under federal law, were from the Waialua-Haleiwa area.

"We need more housing," Spickler says, emphatically. "Oh, no," McElheny protests, sighing.

"It's just one of the necessary evils that they're tearing down the shave ice store, family-run gas stations," Spickler continues. "Progress is coming and all you can do is regulate."

Haleiwa residents have always been good at keeping an eye on that and they don't plan to give up the vigil.

"Wahiawa is a mess," Fred Gross says. "Waipahu: God forgot it already. Haleiwa is special. We have an attractive harbor, beautiful beaches. The Hawaiian royalty loved it out here. We've got a reputation for being different, quiet. We've got the potential for being a nice place on the road."



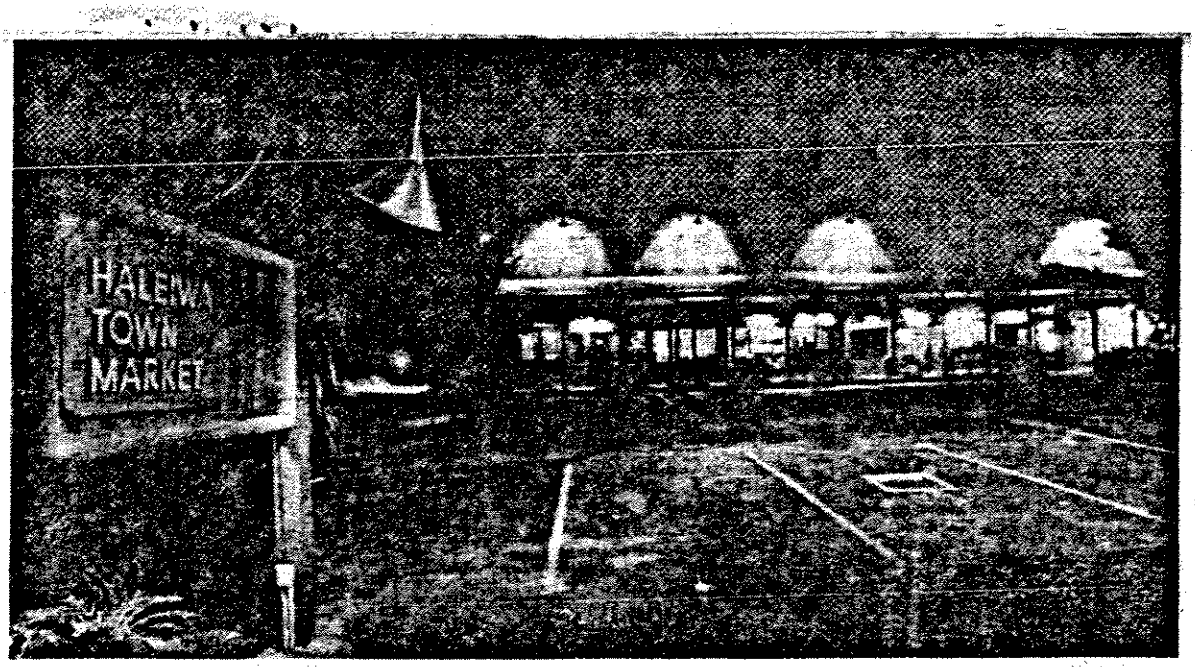
Leif Andersen: not much left from the past.

Sue Hegle: the subject matter is endless.

Hymie Ballesteros: like father, like son.

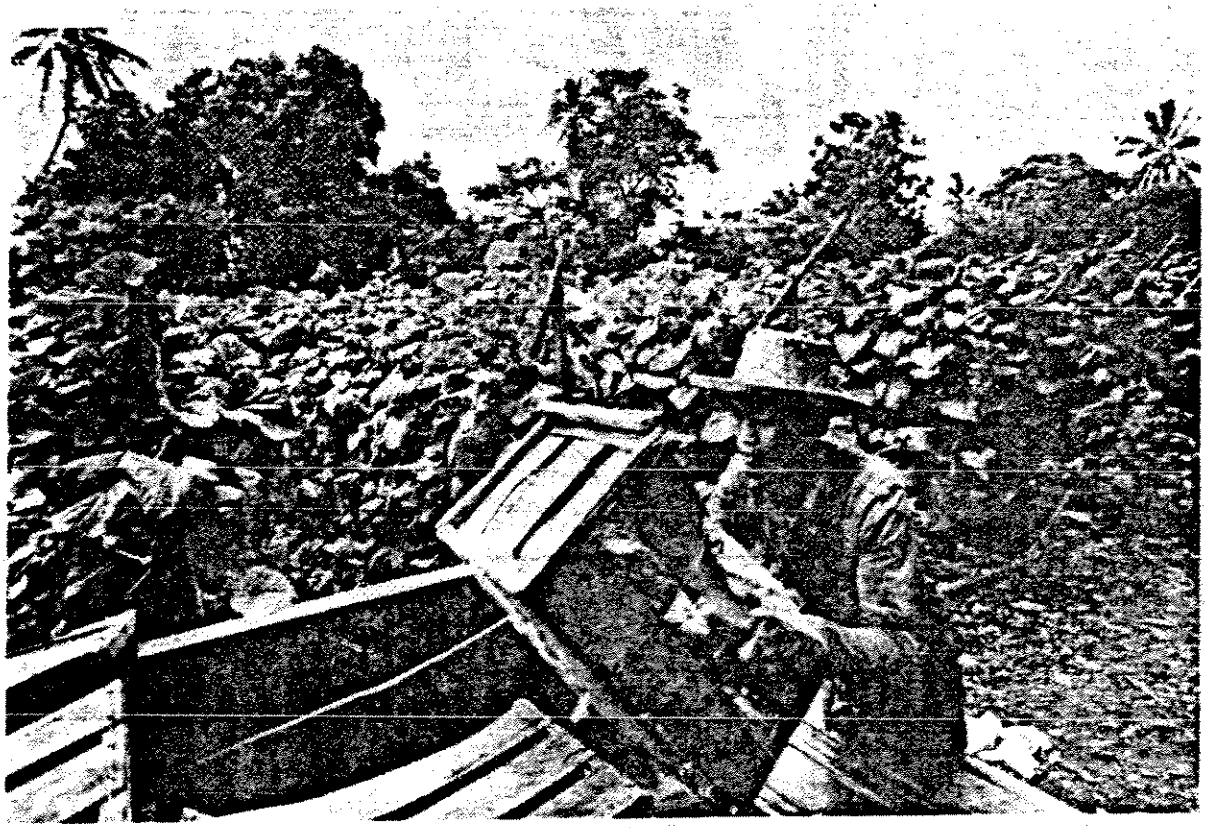
Sandy Spickler: no thanks to fast-food.

Haleiwa Theater is the backdrop for tacky tourist stalls in the unpaved parking lot.



The homely IGA Store was redone in weathered wood and renamed Haleiwa Town Market.

The face of Haleiwa's buildings may have changed, but the side views are still downhome.



Hymie Ballesteros loads cucumbers grown on farms bordering Haleiwa Shopping Center.—Star-Bulletin photos by Bob Young

HSB 12-27-78 Wednesday

Action to Save Haleiwa Flavor Called Feasible

Creation of a historic district to preserve the rural flavor of Haleiwa is "feasible," city planners said, but it would be much different than other historic districts established to protect views in urban Honolulu.

In a letter to the City Council, William Wanket, deputy director of the Department of Land Utilization, said: "A historic, cultural and scenic district is feasible for Haleiwa, but architectural controls have not been considered favorably in the past."

Architectural limitations, such as style, materials and colors, would be the key ingredient to forming a historic district for the North Shore community, but Wanket noted that similar controls for the Punchbowl and Thomas Square historic districts were either questioned or deleted.

Historic districts for Punchbowl, Thomas Square and Diamond Head have been geared to protecting various views through building height limitations and based on topography.

DURING HIS RE-ELECTION campaign this year, Councilman Toraki Matsumoto, who represents the Haleiwa area, vowed to try to set up a historic district for the area "to preserve its rustic character."

"Community concern is for preservation of architectural character and appearance," Wanket said.

Architectural design standards would have to be established through use of materials, building setbacks and landscaping, he said. Many buildings in Haleiwa are low-rise structures with wooden fronts.

But Wanket added: "Haleiwa's existing controls are largely in keeping with its desire for small-scale development."

The potential large-scale business development in Haleiwa probably would be discouraged, Wanket said.

It would take between six and eight months to draft a bill for a Haleiwa historic, cultural and scenic district, he said.

7

Haleiwa, Oahu

Haleiwa Code: build it old

By MARY COOKE
Advertiser Staff Writer

Haleiwa is the little town that wouldn't.

Wouldn't what?

Wouldn't hold still for "reckless development."

For 25 years, Haleiwa held some kind of a record: Only one new building was constructed along the main drag of the North Shore "town between two bridges."

Now half of a $4 million shopping plaza has nestled in next to the the historic Waialua Court House, with more to come.

Before any of it got off the drawing board it had to pack the Haleiwa image or no dice.

When they build, Haleiwans copy their old buildings. When they remodel something, usually it comes out looking older than the original structure.

And why not?

"It's the last community on Oahu that's still got its architectural heritage intact," said Dick Gushman of Gushman & MacNaughton, developers of the Haleiwa Shopping Plaza.

Gushman defined the look as early Hawaiian, Oriental-country store and plantation camp.

"There's the Hawaiian roof, which we've used on both buildings in the shopping plaza," he said.

"Then there's the straight up and down false-front building with a shed roof overhang and little columns to hold it up.

"In Haleiwa the old buildings are set out right next to the road because, in early plantation days, they didn't have parking.

"They had automobiles, yes. But not like two to a family. It was more like two to the community."

He said the new buildings designed by architects Anderson/Reinhardt, Ltd. and Robert M. Fox preserve the architectural features of old-time Haleiwa.

Down the road a piece, a 1953 structure which strayed slightly from the pattern was brought back into line by a renovation job.

This was the old Haleiwa IGA supermarket which, two years ago, was replaced by a Hawaiian-roofed market center in the shopping plaza.

"The Sakai family (store keepers [illegible]

When First Hawaiian Bank outgrew its old Haleiwa quarters (top), it copied the old building in an enlarged version (below).

Advertiser Photos by [illegible]

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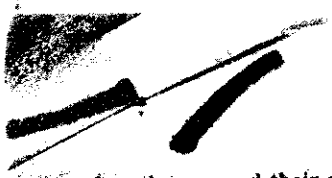


asset when they moved their market into the new building," Gushman said.

"Their old store was just a plain old concrete-block structure, but they were very judicious about how it was going to be re-used.

"We decided there was a market in 'small users' and the interior of the old Sakai market was divided into individual shops.

"The building itself was taken back in time. It was made new, but made to look old."

The concrete-block front was faced with redwood planks. Four little arched windows with horizontal slats were "appliqued" across the top of the false front.

A corrugated iron shed roof, extending over the front of the building, is supported by rough-wood pillars.

A wood-plank bench, nicked and scarred (probably over the past 50 years or more) sits in front of one of the shops, a relic of the old neighborhood.

"After the plaza buildings went up, and the 1953 Sakai market was renovated, others began to work on some of the old Haleiwa buildings," Gushman said.

"Once they saw that they could restore a building, they figured it was economically easier to do that than to start all over."

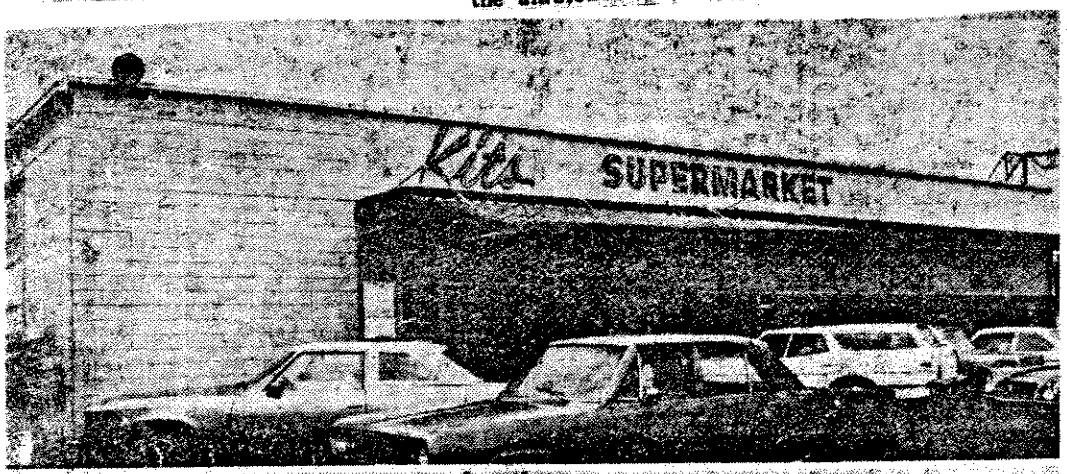
However, Gushman said until Haleiwans were convinced that his new development would conform to the ambience of their old-Hawaii town, the going was slow.

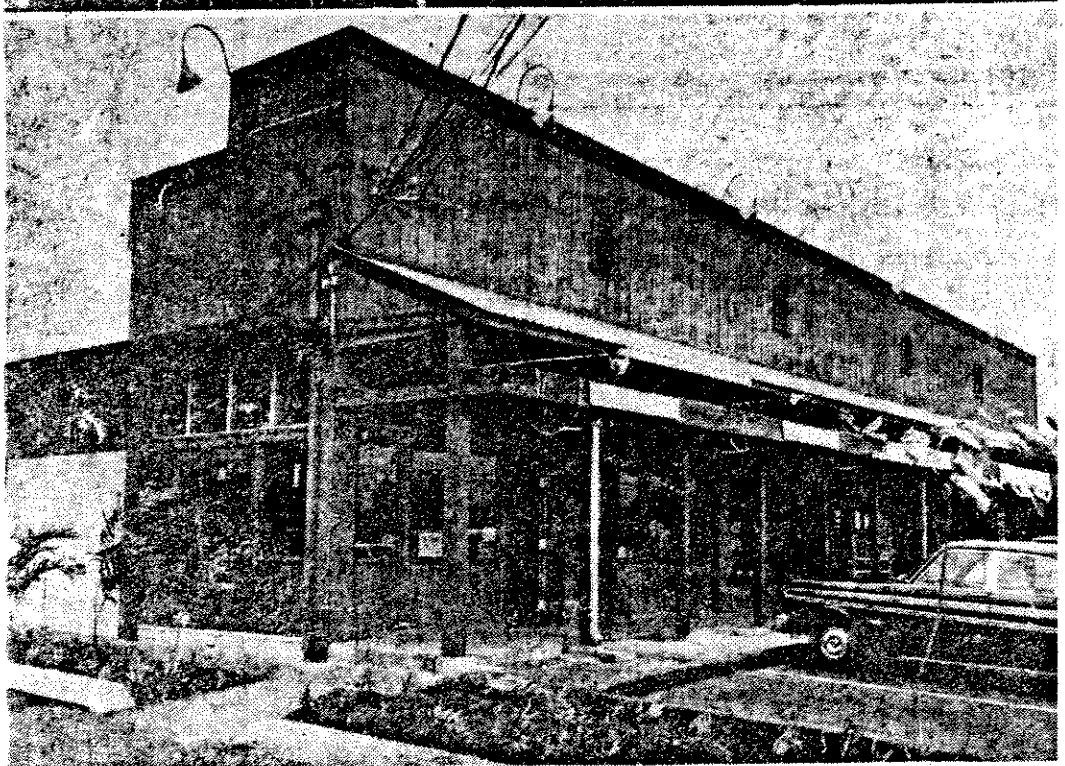
"The first Haleiwa-Waialua Community Association meeting I attended, it rained objections," he said.

"Pizza Bob" Lee, a tenant in the Haleiwa Shopping Plaza, said, "It's important to remember what makes us happy out here. It's the country lifestyle. It's a great little town.

"Most of us would rather have it retain its charm and quality of life than to go after more development, hotels, more homes, more money.

"We're very conscious of what Haleiwa has and we don't want to blow its special quality."





Vacated supermarket (below) looked like Kit's (above) until architects "took the building

Oahu

Haleiwa Protests Highway's Route

By Toni Withington
Star-Bulletin Writer

When you want historic preservation of a community, how close do you allow progress to come?

This is a question that State transportation planners must answer about the North Shore community of Haleiwa.

It was posed to them by a cross-section of Haleiwa and Waialua residents last week at a public hearing on the proposed Haleiwa bypass road.

SEVERAL COMMUNITY groups asked the Department of Transportation to move the highway even farther up Anahulu Stream than is now planned.

In its proposed location, the four-lane modern concrete bridge would be visible from the old-fashioned bridge that has become a landmark in Haleiwa.

When the town begins its historic preservation, the bridge and the stream are expected to be the focal points for the old Hawaiian atmosphere.

B-6 7/29 5

"WE DON'T WANT the State to build the highway too close to the town because it will detract from the aesthetic interest of the place," said Andrew Andersen Jr., who represented the Waialua Community Association at the hearing.

"But I am afraid we are crying over a dead horse when we talk to highway engineers."

A resident of Haleiwa, Andersen is treasurer and a trustee of the Waialua Community Association and a member of the community's historic sites task force.

THE $3 MILLION 2.4-mile section of the new Kamehameha Highway will start at Weed Junction between Waialua and Haleiwa and bypass the old fishing community to Haleiwa Beach Park.

Construction is scheduled for the fiscal year 1971-72. Eventually the highway will be continued on to Kahuku, but there are no specific plans and no funds recommended yet by the department.

Until that extension is added, the departmnet plans to build a four-lane access road from the new highway into town.

THE COMMUNITY association also objects to the four-lane road feeding back into the existing two-lane road.

"Once the State gets a four-lane highway down by the shoreline, it will probably be continued into the town and spoil all of the plans for the historic preservation of Haleiwa," Andersen said.

A highway ending in a two-lane access road would encourage the State to complete the highway in short order, Andersen added.

Also speaking at the hearing were the Lions Club, the Waialua Businessman's Association, the Waialua Sugar Plantation and Bishop Estate.

A SPOKESMAN for the Transportation Department said the hearing was an "information gathering session," and is only one part of the $650,000 job of planning and engineering the highway.

Residents and community groups still have until Aug. 6 to submit information or statements about the highway plans, the spokesman said.

The Anahulu River in Haleiwa

B-6 7/29/70

Haleiwa's Past: Best Hope for Its Future?

By HAROLD HOSTETLER
Advertiser Staff Writer

A drive to Haleiwa is like no other on Oahu, just as the town at the end of the trip is unlike any other on the Island.

Any other route one takes from Honolulu leads him through one jumble of buildings after another, through towns large and small, through chaotic commercial districts and monotonous suburban sprawl.

But a drive to Haleiwa is a chance to get away from all that. For once one gets past the urban disaster called Pearl City, he is in the country. Real country. Kamehameha Highway thrusts out through uncluttered countryside into the broad agricultural area of central Oahu.

There is a brief interruption at the town of Wahiawa, but beyond that is only pineapple field after pineapple field, stretching on in unbroken pastoral orderliness. The Waianae Range is looming and magnificent on the left, a rugged arch normally seen from Honolulu only through an obscuring haze.

The Koolau Range is far off to the right, a mere picket fence on the horizon. On both sides of the highway, the gray-green rows of pineapple stretch on and on.

The car tops the crest of the rounded hump in the central plain, and ahead lies a new Pacific—wild, blue and pure, not quite the same as the busy one seen off Honolulu. The pineapples give way to the waving fields of sugar cane, which tower on both sides of the highway.

For an urban motorist, the drive is a soothing tranquilizer.

Haleiwa has an air of serenity about it, especially during the week when there are less round-the-island motorists. "Pretty dead around here," is a recurring expression among the residents, and it is true.

The town does, in fact, seem to be in a state of suspended animation. It is an old town, with a rustic charm in its old, weatherbeaten false-front stores and its dozens of ramshackle bungalows.

'Charm of Haleiwa'

"The first time I saw Haleiwa, I knew this was where I wanted to live," said Mrs. Beverly Fettig, a pretty, slender artist who runs the Fettig Art Gallery in the middle of town.

"Now, people who stop here always remark about the charm of Haleiwa," she said. "They feel as though they've discovered something all by themselves.

"I feel the town could be as nice as Lahaina—or nicer, because we have better beaches," Mrs. Fettig said.

It is a logical assumption. Haleiwa has what it takes to become Oahu's picture of the past as Lahaina is on Maui. Mrs. Fettig has contributed toward that image. She had lived in Haleiwa for three years when she opened her art gallery two years ago. Now, a dozen other old stores have been taken over by new shops—dresses, gifts, antiques, fishing gear.

"This is a sleepy town during the week, but it's like Coney Island on weekends, with bumper-to-bumper traffic," Mrs. Fettig said. "You can see people want to get away from the city."

Most of the inhabitants of Haleiwa, however, have been slow to realize the potential drawing ability of its rustic charm if the town were fixed up a bit and a few conveniences added. The old buildings are badly in need of restoration before they fall down (as some have) or have to be razed. There isn't a good first-class restaurant in town, or a hotel room at all.

Some of Mrs. Fettig's best paintings are of the old buildings of Haleiwa, but more than once she has had to complete a painting after the building was torn down.

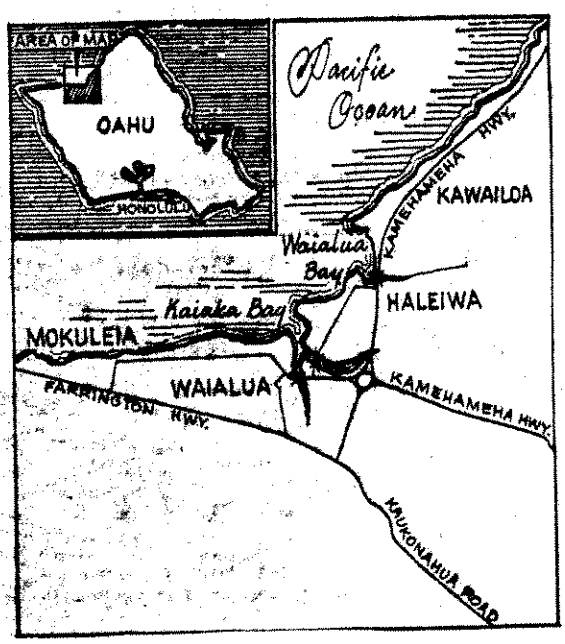
A number of residents have been trying to build up the Lahaina-type image. The Junior Chamber of Commerce, for one, has been holding a Haleiwa Sea Spree the past two years to drum up interest and to raise money to help preserve the town.

The State and Federal governments have cooperated in giving Haleiwa a brand-new boat harbor, one of the finest in the Islands. It now shelters some 40 boats, but has space to eventually accommodate about 250.

The town has a beautiful swimming beach, with a protected swimming area, and a large playground and picnic area. A second large beach is about to be developed by the City and County of Honolulu. And just beyond the boat harbor is Alii Beach, an ideal place for surfing, where in winter the waves roll in with such frequency there is sometimes almost nothing but white water.

For Country Living

"We like our area," said Mrs. Andrew Anderson, who is historian on the Beautification Committee of the Waialua Community Association. (The Waialua District includes Haleiwa, Waialua and Mokuleia.)



SB & Adv 6/16/68 P. E6

This is the ninth in a series of 16 articles by Harold Hostetler about the small towns of rural and semi-rural Oahu — that vague "out there" area that most of us glimpse only occasionally and partially on trips around the island.

The series is neither a travelogue nor a sociological report, but more nearly a traveling social commentary. It's intended to bring the "out there" land a little closer to the rest of us.

"This is strictly country living," she said. "We'd like to keep the old atmosphere and to keep the street frontage the same as it is now."

Mrs. Anderson said that Haleiwa was Queen Liliuokalani's country home, and the local Congregational Church was named after her. Haleiwa was once a Hawaiian village, later became a business and residential community for the Orientals working their way up from plantation labor. The town still has a large Oriental and Filipino population, but with a broad mixture of all races.

The Community Association is working to save all of the buildings of historical significance—but already some have deteriorated beyond hope.

One way Mrs. Anderson feels Haleiwa's preservation can be accelerated is for the State to get busy with its H-1 Freeway, which will eventually bypass the town and relieve it of traffic congestion on weekends. "Then we can really go ahead with preserving the town's character," she said.

Another who feels the way Mrs. Anderson does is Robert Jobes, a real estate man who has lived in Haleiwa for 34 years and now heads the Waialua Community Association. S.B. + Adv. 6/16/68 EG

"This is the way I feel about the Waialua District," Jobes said. "We are situated in a wide valley, protected from the harsh trade winds. The major rain is in the uplands as the wind comes over the Koolau Range. We have cooling trades and little rain.

"We have a beautiful beach from Waimea to Mokuleia, and the best surfing in the world on a daily average. The sea can be flat at Makaha, and we'll have six-foot waves. We have surfing here more days out of the year than anywhere else in Hawaii."

Still, no one has seen fit to do much in the way of resort development in the area, and the town has been bypassed a number of times when it asked for improvements.

"Our biggest problem is sewers and a sewage plant," Jobes said. "A couple of years ago, the City seemed interested and began looking for an acquisition site, but nothing ever came of it. We have only cesspools, and they are no good with our high water table."

Jobes said he feels the only way to get resort development and preserve the rustic charm of Haleiwa would be for some big resort developer to come in and do the job. He said the Bishop Estate is the largest landholder, but although much of that land is "a jungle," the Estate has taken no initiative in putting it to use.

"We need somebody with a lot of dough to come in and set up a development plan for the next 25 to 30 years," Jobes said.

So far, only one resort-type development has been started in the Haleiwa area, and that is the Mokuleia Resorts Hotel, an 83-room, seven-story hotel planned for the Mokuleia Beach area west of Haleiwa and Waialua.

Mokuleia is a secluded beachfront community stretching for miles along the shore, with the ocean on one side and cane fields on the other. There are lots of trees, some so dense they hide the houses. With few exceptions, most of the houses are old, simple frame dwellings.

For the most part, Mokuleia is a second-class beach community. It has lots of nice sand, but the swimming is poor because of the predominance of coral.

The new hotel portends to be an unimpressive addition to the community. It will be big, by Mokuleia standards, and will stand seven stories tall. But, according to the picture on the sign at the entrance to the lot, the hotel will be nothing more than a long, narrow slab, a monument to unimaginativeness.

With the hotel is a planned 440-unit condominium development of one-bedroom apartments — equally tasteless — to be built in low-rise clusters.

Adjoining the hotel site is a 20-acre subdivision of single-family dwellings and row-type apartment buildings, with more than half the lots still vacant. Those that have been developed offer a mishmash of style; many are ordinary.

Mokuleia has some high-class recreation to offer, however, with a large polo field right on the beach. At nearby Dillingham Field, glider rides are offered by the Hawaii Soaring Club.

Coral Spoils Swimming

The City and County has just finished re-landscaping the Mokuleia Beach Park, which may be fine for picnicking but impossible for swimming—again, because of the coral. The park has a new drive and parking areas, a new bathhouse and new picnic tables and barbecue stands. But the trees are only seedlings and saplings, so that for the next few years the park will have almost no shade and will continue to look more like a large football field.

Sandwiched between Haleiwa and Mokuleia, cementing the area into a more-or-less unified residential area, is the old sugar town of Waialua spread out alongside the big mill of the Waialua Agricultural Co., Ltd.

But unlike Kahuku, the town built by the Kahuku Plantation Co., Waialua does not have a company town atmosphere. There is reason. Only a small portion of the town is made up of company-owned houses rented to employes.

Genji Santoki, industrial relations director of the company, explained that "in the 1940s the plantation decided its main purpose was to produce sugar," not to manage a town. The company town had served its purpose as a place to put the indentured laborers from the Far East, but as they learned the language, they yearned for greater independence.

The company first sold the old company store, then the theater and finally the houses—or most of them.

It is easy to tell the difference between an owner-occupied and company rented house in Waialua. The people who own their own homes have given them an individuality not seen in the company-owned houses. Mostly they are well-maintained, painted in fresh colors, with a variety of landscaping.

The company houses, near the gates to the sugar mill, are dreary structures with faded, peeling paint, but often with a pretty little flower garden—the only thing the resident feels is his and in which he can take pride.

The town center has acquired an individual atmosphere, with the Fujioka Store, the Waialua Library and a small shopping center that includes the post office.

The plantation maintains one other company-town-type of housing — at Kawailoa, on the other side of Haleiwa, mauka of Kamehameha Highway and the Meadow Gold dairy farm.

A Hidden Village

Kawailoa is a little community reached by driving up a winding, rough, patchwork-quilt sort of road which might be classified as "unimproved paved." It is an out-of-the way town of small rough-board shacks with faded paint and green tar-paper roofing.

The town is dominated by the red earth of the area, which covers the roads and creeps up the stilts and even the sides of the houses.

Kawailoa is strictly a "bedroom community." There are no stores, no services of any kind.

This, then—Haleiwa, Mokuleia, Waialua and Kawailoa —is the urban unit for the Waialua District, populated by more than 9,000 persons. They are separate neighborhood identities, but for growth purposes they are almost surely one town, with one high school, one community association and an eye on a single future.

It is an area that, with a little imagination and a lot of organization, could become the Lahaina of Oahu, as people such as Mrs. Fettig, Mrs. Anderson, Jobes and others hope.

But, as Mrs. Fettig pointed out, it is difficult to work toward that goal because so much of the land is leased from Bishop Estate, which has given them no encouragement. And it is hard to get individual homeowners and businessmen to cooperate.

Already the charm of old Haleiwa has been violated—not once but many times. Directly across Kamehameha Highway from Mrs. Fettig's art gallery is a new subdivision with the ordinary "Hawaiian crackerbox" kind of houses that dominate so much of Oahu's landscape. It is hard to maintain charm in a community where these characterless houses cancerously spread across the countryside.

Jobes suggested a big developer might do the trick in keeping the rustic charm by spending a lot of money. Yet that, too, might backfire and leave a pseudo-rusticity that would destroy Haleiwa's true charm just as certainly as high-rise hotels would.

Honolulu needs a Haleiwa, but a "true" Haleiwa, a refreshingly different place where Islanders can get away from it all without flying to Lahaina or Kona. Achieving that will be a difficult effort that will require State, City and individual cooperation. It might be impossible.

(Next Sunday: Honolulu!)

Haleiwa, Oahu

Haleiwa

The old bridge channels through itself all the life around it. Spanning the Anahulu River, it pulls together the banks of Haleiwa. It remembers the old and sees the new. Its too-narrow arches funnel the tide of progress filtering through the town. "Slow down," it says, "look at me." Built in 1921 when Haleiwa was a sleepy town, the bridge tries to lessen the pace of the traffic it channels through the still sleepy town.

The bridge still hears the plop of boots through the taro patches and the lap of waves against the orange and white sampans. The shrill whistle of the cane train is gone, and the clanking rumble of the Tournahauler is fading.

The bridge heard the Big-City folk call its neighboring buildings "delapidated" but only scoffed. "Old things are good things," it said. "They allow the old to remember and the young to learn." The bridge feels the surge of the tide below and the stain of red mud on its once-white arches. It feels the weight of small boys jeering the long tour cars or quietly fishing.

As the new small boat harbor was carved into the earth at its side, the bridge watched in wonder. Man diverted its river. Man cut off a chunk of the ocean for quiet waters. Man could easily have blown up the too-narrow bridge. Fortunately he didn't.

Beautification once meant to the bridge a new coat of white paint. Now it may mean survival to the matron of Haleiwa, the guardian of the rotting buildings. Like all structures the bridge once faced destruction in the face of bigger and more modern thoroughfares. But plans were changed. The new highway that will bring new faces in search of recreation will pass through Haleiwa nearer the mountains.

The old Kamehameha Highway will become a scenic route, a roadway of the past, if the young people of Haleiwa have their way.

The rebuilding and new construction in Haleiwa will take on a theme, so have decided the young men who once fished from the bridge. The most dominant scene will be the harbor, the sampans, the fishing village. The other scene, further up the river, will be the taro patches, the small riverside vegetable farms.

The new life that grows up along the shores of the river and beaches will share the laziness and quiet of the old life. And standing as a guardian between the two scenes will be the bridge, listening, seeing, feeling.

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Haleiwa, Oahu

Haleiwa to jump alive —all for beauty's sake

By TONI WITHINGTON

The sleepy town of Haleiwa will be jumping January 26-29 as that North Shore community hosts its "first annual" Sea Spree.

The weekend spree will combine the pageantry of the Queen Liliuokalani era with the thrills of a surfing competition and giant fireworks displays—all for the sake of beauty.

Almost all the proceeds of the spree, expected to soar into the $12,000 to $15,000 category, will go towards the Haleiwa Beautification Committee's plans to restore the town's original fishing village charm.

Planned by the young people in the sleepy harbor town, the spree will boast a greater variety of events than any single event in Hawaii, including the 50th State Fair, sponsors claim.

The spree will capitalize on the town's two major resources—its history and its unusual diversity of ocean-side activities.

There will be a surfing championship under the direction of the Hawaii Surfing Association. Events will include senior and junior competition as well as a new event to Island surfing, four-man team competition.

Also on the ocean will be sailing, surfboard paddling and sand castle-building races.

Hawaiians at a replica of a fishing village will demonstrate ancient fishing techniques, and all fairgoers will participate in a community hukilau and luau in the old "everyone help" way.

Hawaiiana fans will witness a traditional torchlight pageant and coronation of a royal couple, Lieutenant Colonel Frank Dowe, and Mrs. David Kuni, to reign over the spree.

The pageant and coronation as well as nightly Hawaiian entertainment will be under the direction of the Haleiwa Hawaiian Civic Club.

RESTORED BEACH — Haleiwa's beach has been an off-and-on stretch of sand in the past. It has now been restored and will provide good sitting space for spectators at the Sea Spree events.

A free International Spectacular each night will feature the music and dances not only of Hawaii, but of Japan, Samoa, Portugal, the Philippines, Fiji, Tahiti and China.

The spectacular will be topped each night by blazing sky diving exhibitions and fireworks displays.

A carnival with rides, food, art and boat shows and commercial and military exhibits will be held on the grass of Haleiwa Beach Park.

The carnival will feature a Teen Midway with daily dances, go-go girls, mod fashion shows, a bikini contest, battle of the bands and the coronation of Miss North Shore. SB 1/9/69 P. B1

Residents of Haleiwa and visitors will join in the spirit of the Liliuokalani era in beard-growing and costume contests.

The spree is under the joint sponsorship of the North Shore Junior Jaycees, the Haleiwa Beautification Committee and the Waialua Community Association.

Domingo G. Pascual, chairman of the beautification committee, is also chairman of the spree. Helping him is Jerry Foster, special events director.

The spree started several years ago as a gleam in Pascual's eye, but final organization of the event began only three months ago.

Pascual said, "Our main aim is to get people out here to Haleiwa, to see our town and to appreciate our history.

"This is all a big part of beautification. Our committee has done a lot during the past year, but this is only the beginning."

Financing for the spree, which maintains an office in Haleiwa, comes from the pockets of its workers and from donations by community groups, merchants and industry.

"Everyone says we are raising money to plant one tree," Foster said. "That's not true, we are raising money to plant a forest."

Large parking areas will be provided for motorists and tour and taxi companies are arranging transportation to the spree. Surfers will be able to check their boards at a special security area.

Honolulu Advertiser
4/16/79

Haleiwa folks cannot bypass issue of bypass

On this page is another in The Advertiser's series on rural Oahu communities and their problems. They are run as time and space permit.

By SANFORD ZALBURG
Advertiser Senior Reporter

In Haleiwa the big news is the bypass.

For years they've been talking about it — a two-mile-long road that would peel off from near Weed Junction on the Wahiawa side of Haleiwa, cut across the cane fields mauka of town, ford three streams, and wind up near Haleiwa Beach Park.

It would go around town and thus reduce traffic on two-lane Kam Highway through Haleiwa. "On weekends," said a resident, "the traffic in town is chaotic."

Not everyone approves. "If the bypass goes through, we can kiss the North Shore goodbye," said Steven Gendel, who lives in Honolulu but is a North Shore aficionado. He means that a bypass will encourage people to drive out to the North Shore and he fears they'll come in swarms. Now there is at least one bottleneck — Haleiwa.

Some Haleiwa businessmen are concerned about a bypass. Will their business drop off? they wonder.

Others, such as Paul Swanson who lives in Haleiwa, have mixed feelings. "Bypassing won't help materially," he said. "It will only increase the amount of traffic into town. On weekends sometimes I can't get out onto my own street because of the heavy traffic."

The overriding argument, however, is that a majority (92 percent, according to one community count) favors the idea of a bypass and that seems to be that.

The idea was first broached in the late 1960s. At that time Haleiwa folk argued against a plan to build a bypass about 400 feet mauka of and parallel to Kam Highway. They didn't want a flood of "tourists" from Honolulu. They still don't.

There are four alternate routes under consideration, all of which would run mauka of Kam Highway through Waialua Sugar Co. cane fields. The higher you go, naturally, the costlier the road. The land climbs quickly — from about 35 feet above sea level to about 90 feet.

Toraki Matsumoto, the area's councilman, commented: "To me, you have to have the bypass."

Which route?

"I haven't made up my mind. I would prefer the one that would be cheapest."

Douglas Orimoto, of the state land transportation facilities division, who is project manager, said, "Right now we are open to all suggestions. The state doesn't have any preference."

Paul Swenson said: "My feeling is that no matter where a bypass goes, it's going to hurt someone."

Merl Hawthorne, chairman of the North Shore Neighborhood Association, said, "As far as consensus is concerned, I believe definitely there is a need for the bypass."

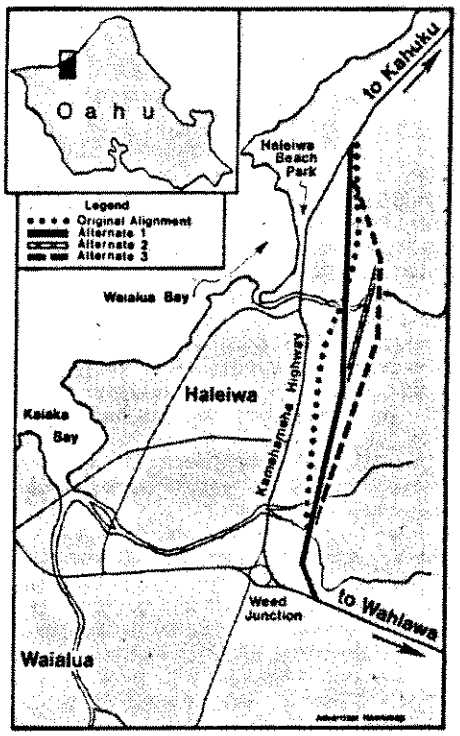
S.E. "Lucky" Cole, often a spokesman for North Shore people, said, "The majority of the people are concerned with the traffic. I think it (a bypass) should be as simple as possible in design and as close to the town as possible."

The proposed bypass — officially, Kamehameha Highway Alignment Haleiwa Bypass, F-083-1 (5) — would be a two-lane undivided road initially, and ultimately a four-lane divided road. It would be from 2.2 to 2.4 miles long, depending on which route is selected. The right-of-way would be 150 feet minimum with a designed speed of 60 miles an hour. Bridges would have to be built to cross Halemano and Opaeula Streams and the Anahulu River. No cost figures have been tabulated yet.

Two other bypass routes were considered and then discarded. One was that Kam Highway be improved; that is, widened. "The impact on the town would have been devastating," said Henry Uehara, state Department of Transportation planning engineer. It would wipe out all the old business places which snuggle close to the highway.

The other suggestion was for a makai bypass; that is, a road on the sea side of Haleiwa. Again, impossible.

Uehara believes the most logical bypass would run 400 to 500 feet mauka of Kam Highway. The route is subject to negotiation, as they say. "We won't be tied to a specific location," he said.



Frederick C. Gross, a civil engineer who has worked for Waialua Sugar for 33 years, favors a bypass about 400 feet from Kam Highway. He suggests following closely the route suggested more than 10 years ago.

Gross said that some houses on the north end of the bypass would have to be torn down. The plantation would lose some prime cane land — say, 35 to 40 acres. Also a bypass would leave behind what Gross called "remnants" — small strips of land which will have to be written off.

The plantation would also have to consolidate cane fields and canehaul roads, relocate some facilities, and provide for irrigation.

Haleiwa-Waialua has a population of about 9,500. The area is growing very slowly. People like it that way. Haleiwa has some lovely vistas: the sea in front, majestic Mt. Kaala as a backdrop.

The town has a high unemployment rate — double the rate of Honolulu's. Its isolation is one reason.

continued

In 1978, according to an Environmental Impact Statement Preparation Notice, peak hour traffic in Haleiwa ranged from 1,240 to 1,980 vehicles per hour. Kam Highway is only 20 feet wide through town. There is a lot of stop-and-go traffic. A prime contributor is the solid, old (built in 1921) doublearch bridge, which someone said "looks like McDonald arches," across the Anahulu River.

The bridge roadbed is a mere 17 feet wide. Whenever a truck or a bus goes over the bridge, it reduces the flow to one-way traffic. That does not in the least bother Haleiwa residents. They love that old yellow bridge. They like the idea of the bridge slowing down traffic. Said one man, with malice aforethought:

"The best thing we can do is to let them sit there and swelter in their cars."

The view up Anahulu River from the bridge is said to be one of the most picturesque on the island: the broad, slow stream; house boats, fishing boats, a sweep of lush greenery.

A mauka bypass will have to cross that river. Would a bridge spoil the pretty picture?

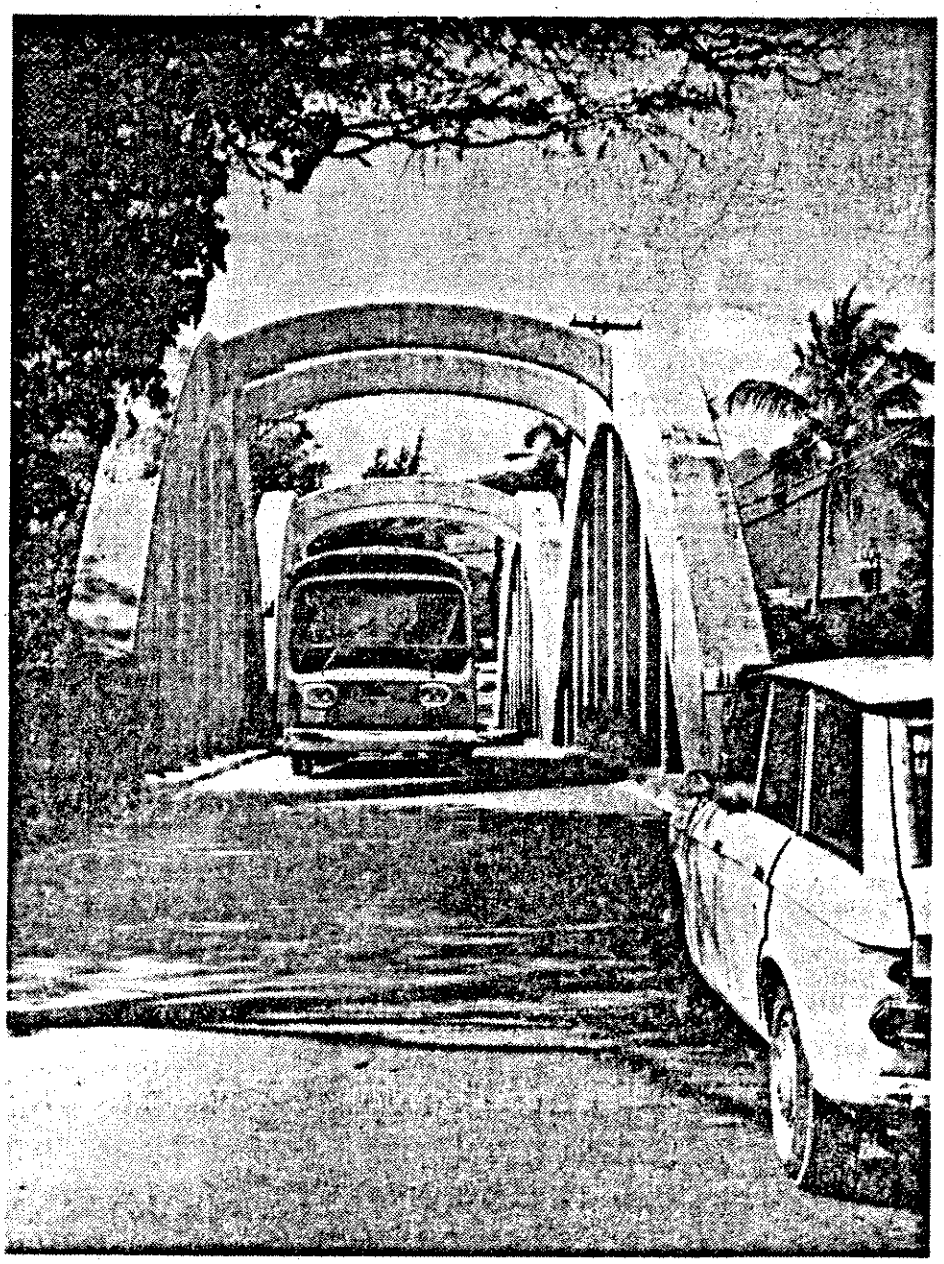
Not according to Gross and the Waialua Sugar Co.

Gross said two things bother people: that a bypass would be both unsightly and noisy. He said that as for unsightliness, you won't see much of a bypass; that an attractive bridge could be built across the Anahulu River. As for noise, an embankment can be built which would be landscaped and it would help deflect sound. "I think the noise problem has been greatly overplayed," he said.

What's the next move?

First, an Environmental Impact Statement must be drafted and analyzed. Hearings will be held. And, of course, it will take time to draw up the plans, design the road, and build it. Say, at least five or six years.

Then Haleiwa would have a road that would really swing — around the town.



A bus moves over Anahulu Bridge — thereby making it one-way traffic. The roadbed is only 17 feet wide.

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Effort to put past into new buildings

"Controlled change," developer Dick Gushman calls what's happening in Haleiwa. "It's possible."

He might have added that it takes patience and care and planning and is costly. But it's the only way a rural community can retain its character.

Haleiwa, so far at least, has been able to do that in spite of the construction of a 30-store, $5 million shopping plaza in the heart of town.

The architects are Anderson/Reinhardt, Ltd., and Robert M. Fox, who respect the old-fashioned look. The developer is Gushman & MacNaughton. Dick Gushman said: "We spent a lot of time trying to mimic the existing architecture."

There are, as a result, graceful, wood, low-rise shops, a supermarket (the renovated IGA supermarket), a medical clinic, a bank building, stores. It's all done in early Hawaiian style; straight up and down false-front buildings with shed roof overhang and columns. The impression is of warm redwood: an old-fashioned look.

"It's a fragile thing, a community like this," said Gushman. "It can be done — if you have the expertise and the patience you can make it pay off."

Gushman said his firm made a study of the area. They discovered that 80 percent of the money spent by residents went for purchases outside the area. That seemed foolish. Why not keep some of that at home? Haleiwa Shopping Plaza is the answer.

Other changes are on tap. After all, there wasn't a single commercial building built in Haleiwa in a decade. There is the city-county and Ocean Properties, Ltd. 307-home Paalakai Housing Project, for which $2½ million in federal funds has been appropriated. Off-site work is to begin soon.

There is the two-phased job on the Waialua Court House. The second phase — landscaping — is under way. Total cost is $80,000, according to City Councilman Toraki Matsumoto.

"One of my goals is to really make the area the recreation spot for the people of the island," Matsumoto said.

Shingon Mission plans a $1.25 million, 60-unit housing project for the elderly at Kam Highway and Paalaa Road. It will consist of one story below the road, and three stories of concrete above. But won't a four-story structure be sort of out of place in Haleiwa?

Sort of. "We want to keep the country look," said Merl Hawthorne, chairman of the North Shore Neighborhood Association. "But who wants to take a stand against housing for the elderly?"

There are other plans: perhaps a small shopping center across from the old Haleiwa gym; some stores near the entrance to town.

Some of the old wooden buildings in town date back to the early 1900s. They should be renovated; or torn down. There is need for a bikeway and sidewalk through town. "There is no shoulder on the highway," said Hawthorne. "It's dangerous."

Some nice things have happened, such as the nearby 52-acre Kaiaka State Park. The grounds alongside the ocean are beautifully landscaped. There is a stand of ironwood trees; the wind sings in the treetops. People go fishing, crabbing, camping.

Kaiaka was almost lost. Developer Herbert Horita, who bought the land from the Bishop Estate, planned to build 1,152 apartments in seven- and eight-story buildings on the shoreline. The townspeople protested vigorously. Citizens packed a community association meeting one night and voted against the proposed development. The site later was condemned for a park.

The town is proud of the Department of Parks and Recreation's unique Alii Beach Park Surf Center. Lee Kravitz, the ocean recreation specialist in charge, called the center "the only facility of its kind anywhere in the world."

There they teach life-saving, outrigger canoeing, surfing, sailing, skin-diving, snorkeling. "We do everything in the ocean," said Kravitz. Some 5,000 students take courses every year. It cost almost half a million dollars to put the whole thing together. But, as Kravitz, said, "there is no charge for the ocean, and no charge for maintenance on the ocean."

To keep the old-style look of Haleiwa, Councilman Matsumoto has pressed to make the town a Historic, Cultural and Scenic District. That request is making its slow way through channels and is still in a preliminary stage, according to William Wanket, deputy director of the city's Department of Land Utilization.

Something else should be mentioned. What has happened to the kids who flooded the North Shore in the late 1960s and early 1970s? The hippie types, the guys and gals with the lifestyle that rubbed many of the old-timers the wrong way?

Well, many are still there.

But now some are running shops. Some are craftsmen and women. Some work hard in the fields. An old-time resident said many are good, reliable workers. They are not ashamed to work with their hands, he said.

Some have done well indeed.

"I've got some tenants who are occupying shops in the last phase of the development of the shopping plaza who stood up and testified against us 10 years ago," said Dick Gushman. "Now they own their own homes on the beach and are successful businessmen."

— SANFORD ZALBURG

Advertiser photos

Woodframe stores and shops of the $5 million Haleiwa Shopping Plaza retain the "old-fashioned" look that villagers want.

INDEX TO THE EIS TEXT

* Also see following pages