MEMORANDUM

To:    Mr. Donald A. Bremner, Chairman
        Environmental Quality Commission

Subject: Final Environmental Impact Statement - Hanamaulu-Ahukini
        Cutoff Road, Kauai

Based upon the recommendation of the Office of Environmental
Quality Control, I am pleased to accept the subject document as satisfactory
fulfillment of the requirements of Chapter 343, Hawaii Revised Statutes, and
the Executive Order of August 23, 1971. This environmental impact state-
ment 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 you make your decision regarding the proposed action
itself, I hope you will 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 reviewers,
will provide you with a useful analysis of alternatives to the proposed action.

cc:    Mr. Richard L. O'Connell
        Hon. R. Higashionna

George R. Ariyoshi
REPORT NUMBER: FHWA-HI-EIS-78-03F

Hanamaulu-Ahukini Cutoff Road

FAP ROUTE 51, KAUAI, HAWAII

PROJECT NUMBER F-051-I(4)

FINAL

Environmental Impact Statement

U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration

and

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION
HANAMAU conf):-AHUKINI CUTOFF ROAD
FAP ROUTE 51, KAUAI, HAWAII

Project Number F-051-1(4)

ADMINISTRATIVE ACTION
FINAL
ENVIRONMENTAL IMPACT STATEMENT

U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration

and

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION
Land Transportation Facilities Division

Submitted Pursuant to
42 U.S.C. 4332(2)(C) and 23 U.S.C. 128(a)

Date

Director
Office of Environment and Design
Federal Highway Administration
Region Nine
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HANAMAUH-AHU KIN CUTOFF ROAD
Project No. 51C-01-75
Kauai, Hawaii

SUMMARY

A. Federal Highway Administration
   Administrative Action Environmental Statement

   ( ) Draft  (X) Final
   ( ) Section 4(f) Statement attached

B. The names, addresses, and telephone numbers of individuals at the Federal Highway Administration and State Land Transportation Facilities Division who can be contacted for additional information concerning this proposal and statement are:

   Mr. Ralph Segawa
   Division Administrator
   U. S. Department of Transportation
   Federal Highway Administration
   P.O. Box 50206
   300 Ala Moana Boulevard
   Honolulu, Hawaii 96850

   (Telephone Number 548-5150)

   Mr. Tetsuo Harano
   Chief, Land Transportation Facilities Division
   Hawaii Department of Transportation
   869 Punchbowl Street
   Honolulu, Hawaii 96813

   (Telephone Number 548-5711)
C. DESCRIPTION OF THE PROPOSED ACTION

The proposed project involves construction of a cutoff highway in the Lihue area on the Island of Kauai, Hawaii. The Hanamaulu-Ahukini Cutoff Road will extend Kapule Highway (FAP Route 51) northward from its present terminus at Ahukini Road, to Kuhio Highway just north of Hanamaulu. The cutoff road will be constructed in two stages, with a two-lane roadway and a single two-lane bridge constructed in the first stage. During the second stage the cutoff road will be expanded to four lanes and a second two-lane bridge added. There is no definite schedule for the second stage; it will be considered as the need arises.

D. SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

1. The highway will facilitate community growth and may influence the future form of the community. The proposed project is recommended by and in conformance with both the Lihue Development Plan and the Kauai General Plan.

2. Construction will cause increased rates of soil erosion, but this impact will be minimized through appropriate erosion control measures.

3. The proposed Hanamaulu Bridge will not create an additional flood hazard. If falsework is used during the construction of the bridge, protective embankments will create a small backwater effect which will be added to the backwater caused by the existing railroad embankment. Falsework protection will be removed upon completion of the bridge.

4. The project will temporarily remove or degrade a strip of endangered waterbird habitat roughly one hundred feet wide across Hanamaulu Stream at the proposed bridge site. This habitat will be restored when the falsework and temporary road are removed.

5. The project will have a beneficial impact by decreasing noise levels on Kuhio Highway. Impact of noise from the project on areas that are currently built up will be minimal.
6. Total air pollutant burdens will decrease due to Federal emission controls. However, with the construction of the cutoff road, the total vehicle-miles traveled in the Lihue area will increase by 0.6%. With more vehicle-miles, the total pollutant burden would be slightly higher with the cutoff road. Air quality on Kuhio Highway will be improved by reducing traffic volumes.

7. No businesses or residences will be displaced by the project.

8. The project will have both positive and negative effects on sales volumes for businesses in the affected area.

9. The project will reduce congestion on Kuhio Highway.

10. The project will take a maximum of 39.5 acres of agricultural land out of production. This will result in lost sugar yields valued at $59,500 annually, and lost tax revenues of approximately $690 annually.

11. The project will change the scenic quality of vistas from the Hanamaulu Beach Park and the Hanamaulu Valley upstream of the proposed highway crossing, but will afford the highway users vistas of high scenic quality overlooking the Hanamaulu Valley and Hanamaulu Bay.

E. MAJOR ALTERNATIVES CONSIDERED

1. Alternative Alignments of Proposed Project. Three alignments were considered in detail for the Hanamaulu-Ahukini Cutoff Road. All three alternative alignments follow the same route from Ahukini Road to Hanamaulu Stream. The alignment chosen (Alignment A, see Figure 1A, Page 1-2), intersects Kuhio Highway south of the Kauai Hardwood Store. The two alignments which were rejected (B and C), intersect the highway north of the store. The choice of alignment was made after a public hearing was held at Lihue on July, 1978.
2. **Widening Kuhio Highway Alternative.** The expansion of Kuhio Highway to four lanes to handle higher traffic loads would result in the displacement of many businesses and private homes. In addition, even with the expansion of the highway to four lanes, the desired level of service cannot be attained in terms of operating speed criteria, due to the road's restrictive alignment. Because of the high social and economic costs relative to the proposed cutoff road, widening Kuhio Highway has been rejected as an alternative to constructing a cutoff road.

3. **No Project Alternative.** Not building the cutoff road would result in the presently congested traffic condition on Kuhio Highway continuing to grow worse. The adverse environmental impacts which would result from the ensuing congestion problems include a high accident rate, increased noise and air pollution, and accompanying social and economic impacts to residents, businesses and institutions serviced by the highway. Therefore, permitting existing trends to continue without altering the present road system is not a desirable alternative.

F. **ORGANIZATIONS AND PERSONS CONSULTED**

Appendix A contains comprehensive lists of organizations and persons consulted in the preparation of the Draft EIS and a list of agencies and persons responding to the EIS Preparation Notice. Appendix F contains the mailing list for the Draft EIS.
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PROJECT DESCRIPTION
CHAPTER I
PROJECT DESCRIPTION

1.0 PROJECT LOCATION

The proposed Hanamaulu-Ahukini Cutoff Road is located in eastern Kauai County, between the communities of Lihue and Hanamaulu (Figures 1A and 1B). The project consists of extending Kapule Highway (FAP Route 51) from Ahukini Road just west of the Lihue Airport, to Kuhio Highway approximately 0.7 miles north of Hanamaulu. The proposed highway will be approximately two miles in length.

2.0 NEED FOR PROJECT

The town of Lihue is the business, government and shipping center of Kauai. Over half of Kauai's total retail and service revenue and employment is generated in Lihue (U.S. Bureau of the Census, 1974). State, Federal and County of Kauai government agencies are headquartered in Lihue. In addition, Nawiliwili Harbor handles over 80 percent of the general cargo and over 50 percent of the petroleum shipments for Kauai (University of Hawaii, 1974). Lihue Airport accommodates most of the air travelers to and from Kauai. Thus, the business and governmental activities in Lihue indicate the regional importance of this community to the Island of Kauai. The regional role of Lihue also makes it a primary source of surface traffic to and from the area.

The importance of Lihue as both an origin and destination for surface traffic is more apparent when viewed from the standpoint of vehicle registrations. Between 1965 and 1975, the resident population of Kauai increased by 13 percent, while the number of vehicles registered increased by 100 percent (County of Kauai, 1976). This represents a decrease in the ratio of residents to vehicles from 2.45 to 1.4. Although the increasing number of motor vehicles is probably due to a combination of increasing tourism
(more rental cars and tour vehicles) and more automobiles per resident family, it does indicate that there has been a substantial increase in automobiles on Kauai's roads over the last 10 years.

Presently, the existing road network offers a less than desirable system of moving residents and tourists between various points around the Lihue area. The system fails to separate through traffic in the area from local traffic. All traffic between north and south Kauai must travel through central Lihue. Traffic from the north, destined for the major employment area centered on Nawiliwili Harbor, must travel through Lihue. Therefore, most traffic—including airport, tourists, commuters, and local shoppers passes through Lihue, and contributes to the increasing congestion of this area even during off-peak hour periods (Plates 1, 2 and 3).

Between 1966 and 1974, average daily traffic on Kuhio Highway north of Lihue (segment A4 on Figure 2) increased 63.2%, compared with a growth of 29.6% in segment A1, within Lihue itself. The accident rate in the latter segment showed a significant uptrend over this time period, as can be seen by the bar graph in Figure 2.

Table 1 provides an analysis of traffic accidents that occurred during 1976 and 1977, broken down in one-mile segments of Kuhio Highway, stretching north from the intersection with Kaumualii Highway (the segments in Table 1 do not correspond to those in Figure 2). As indicated, accidents tend to occur more frequently during peak hours and near intersections, especially in the built-up area between Lihue and Hanamaulu (road segments 0-1 and 1-2). The proportion of accidents involving an injury or fatality was higher outside Lihue. (Only one fatality occurred during the two year period, however, and this was on the stretch of road north of Hanamaulu.) From Lihue to Hanamaulu, the majority of accidents involved two vehicles, while accidents involving fixed objects were much more frequent on the highway north of Hanamaulu. Most accidents involved improper driving, with failure to yield right-of-way, following too closely, and speeding being the most common causes. Drunk driving was not a major contributing factor to the overall accident rate. Also, weather and obstructions do not appear to have been a substantial cause of accidents. Night time accidents are much more common outside of Lihue.

It appears that the accident rate is related to increasingly heavy traffic flows in areas where there is a considerable amount of traffic turning on and off Kuhio Highway. The proposed road will provide traffic between northeast Kauai and either Lihue Airport or Nawiliwili Harbor with a shorter, and less time consuming route. Even if traffic between south and north Kauai continues to use the existing Kuhio Highway through Lihue, the bypass road will increase the efficiency of Kuhio Highway by lessening the overall volume, thereby benefiting local traffic in Lihue.
FIGURE 2

VEHICLE ACCIDENT TRENDS

USGS Lihue and Kapaa Quads

SCALE: 1" = 2000'

HANAMAUΛU-AHUKINI CUTOFF

Kaua'i

ACCIDENT RATE
(per million vehicle miles)

1966
1970
1971
1972
1973
1974

YEAR

AVERAGE DAILY TRAFFIC

1966
1974

Hanamauli

Hanamauli Beach Park

Hanamauli Camp
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<td><strong>Total number of accidents</strong></td>
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<td>60</td>
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<td><strong>Percent Intersection-</strong></td>
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<tr>
<td>related accidents</td>
<td>28%</td>
<td>40%</td>
<td>17%</td>
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<td><strong>Percent Peak hour</strong></td>
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<td></td>
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<tr>
<td>2</td>
<td>50%</td>
<td>13%</td>
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<tr>
<td><strong>Percent Fatal or Injury</strong></td>
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<tr>
<td></td>
<td>28%</td>
<td>57%</td>
<td>50%</td>
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<td><strong>Type of Accident</strong></td>
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<tr>
<td>Two moving vehicles</td>
<td>80%</td>
<td>78%</td>
<td>50%</td>
</tr>
<tr>
<td>Vehicle with fixed object</td>
<td>13%</td>
<td>20%</td>
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<td>5%</td>
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<td><strong>Percent Bad Weather</strong></td>
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<td></td>
<td>12%</td>
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<td><strong>Percent during daylight</strong></td>
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<tr>
<td></td>
<td>78%</td>
<td>40%</td>
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<td><strong>Percent no obscurement</strong></td>
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<tr>
<td></td>
<td>83%</td>
<td>92%</td>
<td>100%</td>
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1 In miles from intersection of Kuhio Highway (56) and Kaumualii Highway.
2 Peak period defined as between 7 and 9 o'clock in the morning and 4 and 6 o'clock in the evening.
3 A - Failed to yield right-of-way.
   B - Followed too closely.
   C - Other improper driving (includes speeding, improper passing, disregarding stop signs among others).

Source: State of Hawaii, Department of Transportation
As noted above, the segment of Kuhio Highway from Lihue to Hanamaulu is the busiest road on Kauai. In 1976, traffic counts recorded 24-hour flows on Kuhio Highway of 15,420 vehicles between the Kaumualii Highway and Kapaia Bridge, 16,875 vehicles between the bridge and Hanamaulu, and 13,965 vehicles between Hanamaulu and the proposed intersection of the existing highway with the bypass road. It is these heavy traffic volumes which contribute to the present congestion and delays in moving traffic through the community. During the peak periods of travel, traffic frequently backs up from Lihue all the way to Hanamaulu.

Future traffic flows on the existing road network for 1980 are shown in Figure 3. Although the major highways are similar in design characteristics, without the cutoff road the Kuhio Highway will continue to carry a disproportionate amount of traffic within the Lihue area. The segment between Ahukini Road and Hanamaulu will continue to have the highest traffic loads on the highway. Traffic volumes for 1990 and 2000 on the existing road network are provided in Appendix D. The traffic flow characteristics are proportionately equivalent to those for 1980, shown in Figure 3. The traffic volume by the year 2000 will increase 88% above the 1980 levels. As a result of this heavy use, the annual maintenance costs for Kuhio Highway within the project area is $4,235/lane/mile, compared to and island-wide average of $2,333/lane/mile.

The social, economic and environmental effects of allowing such high volumes of traffic to continue to use Kuhio Highway include air pollution, noise pollution, and potential loss of business. The Clean Air Act will result in a reduction in automobile exhaust emissions, but without a cutoff road, Carbon Monoxide concentrations along Kuhio Highway will continue to be high through 1980 (see Chapter III and Appendix B). Noise levels on Kuhio Highway are periodically in excess of the Federal Design Standard, and will worsen if traffic volumes are not reduced. As traffic increases on Kuhio Highway, it will become more difficult to make turns off and onto the road; as a result, some businesses may be adversely affected.
2.1 EXISTING HIGHWAY ALIGNMENT

The primary access route between Lihue and the other communities on the Island of Kauai is the Kauai Belt Highway. In Lihue, the belt highway system is represented by Kuhio Highway (56) and Kaumualii Highway (50). Kuhio Highway extends northward from its intersection with Kaumualii Highway in central Lihue, and follows the coast to Haena on the North Shore (refer to Figure 1A). Kuhio Highway, from Lihue north to Hanamaulu, carries the heaviest traffic flow on Kauai (University of Hawaii, 1973).

Secondary access roads in the project vicinity are Ahukini Road (570), Kapule Highway (51), and Rice Street-Waapa Road. Ahukini Road connects Lihue Airport with Kuhio Highway, and is the primary route for airport-related traffic. Rice Street and Kapule Highways serve as alternate routes to the airport. Kapule Highway is a completed segment of the proposed cutoff road, and extends from Rice Street-Waapa Road on the south, to Ahukini Road. Kapule Highway and Ahukini Road are presently used as an alternate route for traffic moving between the Nawiliwili Harbor area and the region north of Lihue.

2.2 DESIGN CHARACTERISTICS

For the short distance between Kaumualii Highway and Hardy Street in downtown Lihue, Kuhio Highway has four lanes. North of Lihue, it is reduced to two 12-foot lanes with 4-6 foot dirt or grass shoulders. A third lane for trucks is provided at Kapaia, where the highway has two steep grades on either side of Hanamaulu Valley.

Kapule Highway, at the southern end of the proposed cutoff road, was completed in 1975 to provide two 12-foot lanes and 10-foot paved shoulders. Ahukini Road is also a two-lane highway with 12-foot lanes and 6-foot gravel shoulders.
2.3 OPERATIONAL CHARACTERISTICS

Existing speed limits on the Kuhio Highway vary from 25 to 35 miles per hour between central Lihue and Hanamaulu, to 50 miles per hour north of Hanamaulu. Within Lihue, the large number of side streets and business driveways generate a high frequency of vehicle turns off the main highway. This contributes to traffic congestion problems on the highway and adjacent streets. The central area of Lihue has roadside parking which forces cars to back into the main highway when pulling out, creating a potentially hazardous situation for drivers. The mix of through and local traffic, and the ensuing congestion, contributing to the higher accident rate of this area. Both Ahukini Road and Kapule Highway are high speed highways (50 mph), except at the approaches to major intersections. The smaller number of uncontrolled access points and wider shoulders make these roadways less hazardous than Kuhio Highway.
2.4 PROJECT HISTORY

In 1975, Kapule Highway was completed between Rice Street and Ahukini Highway. In recognition of the need to extend the Kapule Highway from Ahukini to Hanamauu, the State Legislature through Act 218, Session Laws of Hawaii 1974, Section 7, Item III-B-6, and Act 226, Session Laws of Hawaii 1976, Section 6, Item C-47, authorized and appropriated funds for plans and construction of the Hanamauu-Ahukini Cutoff Road, Island of Kauai.

Engineering consultants were retained to develop the alternative corridors in April, 1977. In order to evaluate the environmental impacts of the alternative corridors, the Department of Transportation's Social, Economic and Environmental consultant was authorized to proceed in May, 1977. The environmental documents prepared include a study on air quality (Appendix B), a noise study (Appendix C), a socioeconomic impact evaluation and a survey of waterfowl habitat in Hanamauu Valley. These studies included field surveys and analysis of probable impacts in their respective areas of concern.

In general, the State of Hawaii (Chapter 343, Hawaii Revised Statutes) requires an evaluation of environmental impacts for each project utilizing public lands, monies, or requiring governmental action. Chapter 343, HRS, and its related regulations, Environmental Impact Statement Regulations, requires that the proposing agency (for an agency action) evaluate the environmental consequences of a proposed action as early as possible. This early review process is called an Environmental Assessment (EA). The agency then determines the significance of the environmental impacts; if an action is deemed significant, an EIS Preparation Notice is then acknowledged in the Commission's EQC Bulletin. During the 30-day period after the publication of the project in the EQC Bulletin, the EIS Preparation Notice is sent to various governmental and private agencies which may have an interest in the project.
An Environmental Assessment and EIS Preparation Notice was prepared for this project in July, 1977. The description of the project appeared in the EQC Bulletin of July 23, 1977 (Volume III, Number 14). During this period (July-August, 1977), the EIS Preparation Notice was sent to 28 agencies for consultation and preliminary review. The comments were answered (see Appendix A), and wherever possible, recommendations were incorporated into this EIS. Three informational meetings were held for this project on August 1 and December 15, 1977 at the Wilcox Elementary School in Lihue, and January 24, 1978 at the Hanamau Community Center. The Draft EIS was circulated from May 22 to June 23, 1978, and the combined highway corridor and design public hearing was held in Lihue on June 21, 1978. At this hearing, a concerted public opinion favoring alignment A was expressed, since this alignment would not divert traffic away from the Kauai Hardwood Factory, and would remove the least amount of cane land (see Appendix G for a summary of this hearing).

Since funding will be provided by both Federal and State Sources, the proposed Hanamau-Anukini Cutoff Road must be designed in accordance with the minimum standards for this type of highway. Also, the road will be a part of State Highway 51 after its completion, which will make the State Land Transportation Facilities Division responsible for its upkeep. The County of Kauai Planning Department maintains special restrictions, such as grading and signing ordinances, which are relevant to the proposed cutoff road.

3.0 DESCRIPTION OF THE PROPOSED IMPROVEMENTS

3.1 PROPOSED ALIGNMENT

The extension of the existing Kapule Highway will entail a new highway corridor, which traverses Hanamau Valley. Early in the planning process, a study corridor was established running from the intersection of Kapule Highway and Anukini Road north to Kuhio Highway. The study corridor proceeds north through the valley, swinging east to avoid the Hanamau house lots. The corridor intersects Kuhio Highway in the vicinity of the Kauai Hardwood Store.
Within this study corridor three alternative alignments were chosen for further consideration (see Figures 1A and 1B). Following a careful analysis of the three alternatives and testimony received at a public hearing held at Lihue on June 21, 1978, alternative A was chosen as the proposed alignment.

The proposed alignment proceeds from Ahukini Road to Hanamaulu Stream as shown in Figure 1B. The Hanamaulu Stream crossing will be located approximately 400 feet west (upstream) of the old railroad bridge. This alignment was chosen to avoid impacting the Hanamaulu Subdivision, the Hanamaulu Beach Park and the waterfowl habitat in the upper valley. The alignment then swings north from Hanamaulu Stream and intersects Kuhio Highway on the Lihue side of the Kauai Hardwood Store. This would maintain the store’s frontage on the primary route connecting Lihue with the communities to the north.

3.2 ROAD DESIGN CHARACTERISTICS

The proposed Hanamaulu-Ahukini Cutoff Road is being designed to accommodate the projected year 2000 traffic. The proposed road will also be designed for partial control of access, unlike the existing Kuhio Highway which has no access control. Because of the varying topography, the standards specified are based on criteria lower than those for an expressway. Following are the general criteria which are being used in the design of the cutoff road:

The design criteria being used for the roadway drainage systems, including irrigation ditches and culverts, are: for minor drainage areas (less than 100 acres), recurrence interval 10 years; for culverts handling drainage from less than 100 acres, 50 years recurrence interval; and for culverts (and bridges) handling drainage from more than 100 acres, a 100-year recurrence interval will be used.
<table>
<thead>
<tr>
<th>Highway classification:</th>
<th>Federal Aid Primary</th>
</tr>
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<tbody>
<tr>
<td>Designation:</td>
<td>Partial Control of Access</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>60 mph</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Highway:</td>
<td>Four Lanes (divided)</td>
</tr>
<tr>
<td>Pavement Width:</td>
<td>24 feet (each direction)</td>
</tr>
<tr>
<td>Shoulder Width:</td>
<td>Right 10 feet</td>
</tr>
<tr>
<td></td>
<td>Left 4 feet</td>
</tr>
<tr>
<td>Medial Strip:</td>
<td>30 feet</td>
</tr>
<tr>
<td>Minimum Row:</td>
<td>150 feet</td>
</tr>
</tbody>
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**Geometric:**

<table>
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<td>Maximum Superelevation:</td>
<td>0.06 feet/feet</td>
</tr>
<tr>
<td>Minimum Cross Slope:</td>
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</tr>
<tr>
<td>Maximum Grade:</td>
<td>6.0%</td>
</tr>
<tr>
<td>Minimum Grade:</td>
<td>0.5%</td>
</tr>
</tbody>
</table>

Figure 4 shows a typical cross section of the ultimate design of the highway. The completed cutoff road will be a four-lane highway, but due to present demand and other considerations, will be constructed in two stages. The first stage will comprise land acquisition for all four lanes. Grading will be done in stages. The exact sequence of increments will be determined in the final design, based on, among others, the following criteria:

1) drainage requirements, 2) landscaping requirements, 3) cost and 4) optimum use of the right-of-way. Full development of the four-lane highway will be completed in the second stage. There is no definite schedule for this second stage; it is anticipated that four lanes will be needed by the early 1990's.

Landscaping will be an integral part of the highway construction. In addition to short-term erosion control measures, the right-of-way will be planted with ground cover and trees, and will be provided with a sprinkler system. This will make it a part of the State Department of Transportation's "Lihue Airport Gateway Beautification Project".
Figure 4 shows a typical cross section of the ultimate design of the highway. The completed cutoff road will be a four-lane highway, but due to present demand and other consideration, will be constructed in two stages. The first stage will comprise land acquisition for all four lanes. Grading will be done in stages. The exact sequence of increments will be determined in the final design, based on, among others, the following criteria; 1) drainage requirements, 2) landscaping requirements, 3) cost and 4) optimum use of the right-of-way. Full development of the four-lane highway will be completed in the second stage. There is no definite schedule for this second stage; it is anticipated that four lanes will be needed by the early 1980's.

Landscaping will be an integral part of the highway construction. In addition to short-term erosion control measures, the right-of-way will be planted with ground cover and trees, and will be provided with a sprinkler system. This will make it a part of the State Department of Transportation's "Lihue Airport Gateway Beautification Project".
PRELIMINARY TYPICAL SECTION - CUTOFF ROAD

HANAMALU - AHUKINI
CUTOFF ROAD
Project No. 51C-01-76

ULTIMATE PHASE

Engineers, Architects, Planners

Figure 4b
3.3 BRIDGE DESIGN CHARACTERISTICS

The exact construction method for the bridge across Hanamau Valley has not yet been determined. In order to retain flexibility at this early point in the design process, a set of general bridge characteristics has been established. Various bridge construction methods which could provide these characteristics have been considered, and a post-tensioned concrete box girder type appears to be the most favorable in this situation.

The length, alignment and height of the bridge is a function of its location and its relationship to the overall highway alignment. The proposed site at the narrow end of the valley will require a bridge approximately 1,200 feet long. Since the highway alignment curves at this point (Figure 13), the bridge will be curved with a radius of roughly 2,000 feet. Considering the depth of the valley, and the desire to minimize earthwork, the optimum bridge height would be approximately 65 feet. In order to avoid increasing the potential for flooding in Hanamau Valley, no embankments will be used; the bridge will rest on piers for the full extent of the crossing. The proposed bridge site has the aesthetic advantage of not splitting the valley in two, as would occur if the bridge were placed further upstream. This site also has the advantage of favorable soil conditions.

A major bridge design consideration is its visual impact. The best way to minimize this impact is to design a structure that is aesthetically pleasing, as well as structurally sound. The bridge should be a "functional sculpture", with clean, flowing lines. The bridge should have a good span-to-height proportion, in terms of mass and space (as illustrated in Figure 11). The span length should be maximized, since a large number of piers would create the effect of a wall. In order to minimize the number of support piers, span lengths would be approximately 185 to 200 feet.

Bridge cross sections may vary, as shown in Figure 5. The first bridge will be 48 feet wide, with a 24-foot two-lane roadway and 10-foot shoulders. Cyclists will be able to use the shoulder of the bridge for crossing the valley.
HANAMAULU-AHUKINI CUTOFF

FIGURE 5

TYPICAL BRIDGE DESIGNS

SCALE: 1" = 10'

INITIAL STRUCTURE

SECOND STRUCTURE
Projected traffic flows for the road network around Lihue with the proposed cutoff road are shown in Figure 6 and in Appendix D. The effect of the proposed highway on the overall road system will be a more balanced traffic flow than is provided under the existing system. However, the degree of impact of the proposed highway on the existing road network will vary depending on the road segment. The segment of Kuhio Highway between Ahukini Road and the Kauai Hardwood Store will benefit most from the proposed road. Traffic projections for this segment of the Kuhio Highway for the year 2000 range from 47% to 65% less than those without the cutoff road. In downtown Lihue, the impact of the cutoff road is less significant, resulting in traffic reductions of 8% to 12%. The existing segment of Kapule Highway and Ahukini Road will experience net increases in traffic loads, between 13% and 72% greater than would occur without the bypass road.

Right-of-way requirements for the proposed Hanamaulu-Ahukini Cutoff Road are 39.5 acres. Acquisition of the property will be obtained from Lihue Plantation.
3.5 PROJECT COSTS

The following details the various cost and benefit elements of the proposed cutoff road:

**Project Cost (Approx.)**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>$900,000</td>
</tr>
<tr>
<td>Right-of-Way</td>
<td>$208,000</td>
</tr>
<tr>
<td>4-Lane Highway</td>
<td>$14,670,000</td>
</tr>
<tr>
<td><strong>Total Cost</strong></td>
<td><strong>$15,778,000</strong></td>
</tr>
</tbody>
</table>

**Benefit/Cost Ratio**

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction (annual)</td>
<td>$951,900</td>
</tr>
<tr>
<td>User Benefits</td>
<td>$1,772,000</td>
</tr>
<tr>
<td><strong>Benefit/Cost</strong></td>
<td><strong>1.86</strong></td>
</tr>
</tbody>
</table>

These costs are for the ultimate 4-lane roadway and bridge; the cost for the initial 2-lane phase would be approximately 8 to 9 million dollars. It is anticipated that the cost of this project will be shared between the Federal Government (70%) and the State of Hawaii (30%).
CHAPTER II
DESCRIPTION OF ENVIRONMENTAL SETTING
CHAPTER II
DESCRIPTION OF THE ENVIRONMENTAL SETTING

1.0 TOPOGRAPHY

The topography of the proposed Hanamau-lu-Ahukini Cutoff Road corridor is characterized by a relatively flat upland area, bisected by the steep-sided Hanamau-lu Stream Valley. The upland area is part of the Lihue Plain which gradually slopes towards the ocean, terminating in small seaciffs along the coast. The elevation of the upland ranges from 80 to 150 feet within the proposed corridor. The broad floor of the Hanamau-lu Valley is the result of sedimentation during submergence of the valley during a period of relatively higher sea level.

2.0 GEOLOGICAL RESOURCES

2.1 GEOLOGY

The underlying geologic structure of the project site is lava of the Koloa Volcanic series. The Koloa lavas were deposited during the Pleistocene Epoch, roughly 1.5 million years after the Waimea Canyon Volcanic Series formed the Island of Kauai (MacDonald, et al., 1970). Koloa lavas cover half of the eastern portion of Kauai. Outcrops of Koloa lava by the erosional activities of the Hanamau-lu Stream consist of very dense basaltic rocks.

The alluvial sediments underlying Hanamau-lu Stream are predominantly saturated, unconsolidated sand, clayey silt, and gravel. The depth of this sediment at the proposed highway crossing ranges from 40 feet near the valley walls to 100 feet in the valley center (Dames & Moore, 1977). Along the southern edge of the valley is a man-made embankment consisting of medium stiff to stiff clayey silt underlain by a sand layer and dense basalt gravel, and a dredged spoil site consisting of sandy and clayey silt and some boulders (Dames & Moore, 1977).
2.2 SOILS

The proposed alignment of the Hanamaulu-Ahukini Cutoff road crosses four soil types. Of these four, the Lihue silty clay, on 0-8% slopes, is the predominant soil type, occupying all of the upland areas. This soil is well-drained and is derived from weathered basic igneous rock. Lihue topsoil averages 12-inches in depth with an underlying subsoil extending to about 80 inches below the surface. This soil type is characterized by moderately rapid permeability, slow runoff, and slight erosion potential. For unprotected cultivated soil, though, the Lihue series has moderate erosion potential (Class IIe). Lihue soil has moderate shrink-swell potential and is rated favorably for road construction and good for road fill (Soil Conservation Service, 1972). However, this soil is also highly rated for topsoil and is excellent (Group I) for sugar cane production. At present, most of the affected area comprised of the Lihue soil type is used for sugar cane production.

The three remaining soil types are confined to the Hanamaulu Valley. The Mokuleia Clay Loam, poorly drained variant, occupies most of the valley floor under the proposed crossing. This soil has formed on recent alluvium, is shallow and nearly level, and is limited by a high water table for use as a highway location and cultivation. The Mokuleia Series is rated good for pasture, and is presently used for this purpose. Hanalei Silty Clay also comprises a small portion of the flood plain and is another poorly drained soil limited by a high water table. It has a moderate shrink-swell potential and is slightly erodible. The Hanalei soil is generally rated poor as a topsoil, roadfill, and for highway location. The valley slopes are characterized by rough broken land soils which have rapid runoff and active erosion. These soils range from shallow to deep, are severely limited by erosion (Class VII) and are unsuited for cultivation.

The Department of Agriculture of the State of Hawaii, in cooperation with the U.S. Soil Conservation Service and the College of Tropical Agriculture of the University of Hawaii has published a series of maps entitled "Agricultural Lands of Importance to the State of Hawaii". These maps identify areas of prime, unique and other important agricultural lands. The pertinent soil designations from this map series are shown in Figure 6A. Most of the preferred alignment for the Cutoff Road will pass through "prime agricultural land" defined as land which has the soil quality, growing season and moisture supply needed to produce sustained high yields of crops economically when treated and managed according to modern farming methods.
KEY:
- PRIME AGRICULTURAL LAND
- OTHER IMPORTANT AGRICULTURAL LAND

HANAMALU-AHUKINI CUT-OFF
FIGURE 6A
PRIME & OTHER IMPORTANT AGRICULTURAL LAND
USGS LIHUE AND KAPAAN QUADS
SCALE: 1" = 2000'

SOURCE:
DEPT. OF AGRICULTURE
STATE OF HAWAII
In addition, a strip of land adjacent to Hanamaulu Stream is classified as "other important agricultural land", which is land other than prime or unique agricultural land that is also of statewide or local importance to agricultural use.

2.3 MINERAL RESOURCES

Evidence of mineral resources in the vicinity of the project site is generally absent. Lihue Plantation, however, does maintain a small gravel pit within the Hanamaulu Stream Valley about .4 miles upstream (west) of the proposed highway crossing. This gravel pit is used by Lihue Plantation to supply material for use in construction of their cane haul roads.
3.0 HYDROLOGICAL RESOURCES

3.1 SURFACE WATER

Precipitation in the project area is approximately 50 inches per year with most rainfall coming during the months of November through April (MacDonald et al., 1960). The primary feature of surface drainage along the proposed road corridor, Hanamaulu Stream, has its headwaters near the Kilohana Crater where rainfall may reach 150 inches per year (Corps of Engineers, 1974). The stream has a drainage area of 8.0 sq. mi. The natural drainage of this area, including the area of the proposed highway, has been substantially modified by the Lihue Plantation irrigation system which crosses the region.

The 100-year frequency peak stream flow at the mouth of Hanamaulu Stream is 22,300 cfs (Wilson, Okamoto and Associates, 1977). The backwater characteristics of the existing stream valley during a 100-year storm is approximately 22 feet M.S.L. (mean sea level) at the site of the proposed highway crossing. The backwater effects during flood periods on the Hanamaulu Stream are primarily the result of the embankment of the old railroad crossing. Despite this, flooding resulting from overtopping of the stream banks within the Hanamaulu Valley has not resulted in major damage to the existing dwelling located there (Corps of Engineers, 1974). Much more significant damage has occurred as a result of sheetflow and rapidly flowing runoff during heavy rainstorms in the project area.

The proposed crossing of the Hanamaulu Valley by the cutoff road is not within the range of a tsunami of a 100-year frequency. This tsunami is calculated to be 12 feet M.S.L. at the shoreline, and would decay one foot for every 100 feet it travels inland (Corps of Engineers, 1978). Therefore, a small area just upstream of the existing railroad bridge (below the proposed bridge) is the farthest extent of the area affected by this tsunami.

3.2 GROUND WATER

Due to the relatively low permeability of the underlying Koloa basalts, ground water resources within the project area are not significant for
development purposes. Although little exploration of the basal ground-
water resources within the Koloa basalts has been undertaken, they are
estimated to extend about a mile inland (Sunn, Low, Tom & Hara, 1973).
However, the water quality studies which have been done indicate that
areas closer to the shoreline may contain brackish water (MacDonald,
et.al., 1960). Areas further inland (one-half mile or more) may contain
reserves of fresh water to depths well below sea level, but the low per-
meability of the Koloa basalts would limit the productivity of wells (Mac
Donald, et.al., 1974). Most usable ground water resources impounded
within the Koloa basalts are found in high-level reservoirs further west
of the project area, primarily on the eastern slopes of Kilohana Crater
(Peat Marwick Mitchell, 1976).

3.3 WATER QUALITY

The existing water quality characteristics of Hanamaulu Bay are presented
in Table 2. The level of certain pollutants and nutrients in Hanamaulu
Bay presently exceeds that of most other coastal areas of Kauai. The
average coliform, phosphorus and nitrogen levels in Hanamaulu Bay
all exceed the State Standards for Class A waters (Sunn, Low, Tom & Hara,
1973). Hanamaulu Stream is the major cause of the water quality problem
in the bay. The watershed contains a number of point and non-point pol-
lution sources, such as piggeries, cattle grazing, leaking cesspools, sugar
cane fields and sugar mill wash water disposal. Although the Lihue Pla-
tation Company has installed a number of desilting ponds, there are points
where silt-laden water can enter the stream. The piggeries and other
domestic livestock contribute high levels of coliform bacteria and nutrients
to the stream. The above-cited study (Sunn, Low, Tom & Hara, 1973)
reported mean nitrate-nitrogen concentrations to be higher in Hanamaulu
Stream than in any of the other major streams on Kauai (590 ug/L as
opposed to 21 ug/L for the Hanalei River). Other parameters, such as
suspended solids, are highly variable, depending on runoff and agricultural
activities.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
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<th>Minimum</th>
<th>State Standard</th>
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</thead>
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<td>28.00</td>
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<tr>
<td>NO₂ &amp; NO₃</td>
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<tr>
<td>Phosphorus</td>
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<td>Total Coliform</td>
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<td>137.75</td>
<td>1300.00</td>
<td>2.000</td>
<td>200</td>
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</tbody>
</table>

1 Sample period from January 30, 1973 to October 8, 1975.
2 Sample period from January 8, 1973 to September 19, 1977.

Source: State of Hawaii, Department of Health
4.0 BIOLOGICAL RESOURCES

4.1 FLORA

The long period of agricultural activity within the project area and the surrounding region has resulted in extensive modifications of the natural vegetation. The majority of the proposed corridor alignment (approximately 90 percent) is located on the upland area which is presently used for sugarcane production. The cultivation of sugarcane, accompanied by the introduction of exotic fauna and flora species, has resulted in the virtual elimination of natural vegetation of this area.

The Hanamau Valley slopes are forested with Java plum (Eugenia cumini), Koa haole (Leucaena leucocephala), mango (Mangifera indica) and banana (Musa spp.) along the north side, and ironwood (Casuarina equisetifolia) and coconut (Cocos nucifera) along the southern slope. For the most part, this vegetation is confined to the sides of the valley, although the ironwood along the south bank extends out along the railroad embankment and spoil dump to the Hanamau Stream.

The valley floor (in the vicinity of the proposed highway) consists of several sub-divided pastures predominantly composed of California grass (Brachiaria mutica), with various weedy species, depending on the degree of maintenance and grazing that the pasture has received. The small pasture at the site of the proposed bridge appears to be abandoned, as it is being invaded by shrubs and noxious weeds (e.g. Leucaena leucocephala, Mimosa pudica, Xanthium strumarium). From such evidence as old dikes, channels and a faint "paddy" pattern, it is apparent that portions of the valley floor were once cultivated in taro (or perhaps rice). These dike patterns are in the wide part of the valley above the proposed bridge site. Several of the pastures are poorly drained, and during wet periods, take on a marshy aspect. The banks of Hanamau Stream are vegetated with a heavy growth of California grass and a few scattered sedges (primarily Cyperus alternifolius). At the proposed bridge site, the northerly bank supports a very dense thicket of mature hau (Hibiscus tiliaceus) and Java plum. This same vegetation pattern is found at the proposed fill site across the unnamed stream near the Kauai Hardwoods Factory.
4.2 FAUNA

A field survey of the vicinity of the Lihue Airport (conducted for the Airport Master Plan EIS) identified seven mammalian species: black rat, Hawaiian rat, Norway rat, house mouse, feral cat, feral pig and feral goat (Peat, Warwick & Mitchell, 1976). The four rodents and the feral cat are most probable within the predominant sugarcane habitat of the proposed highway corridor.

Also included in the EIS for the Lihue Airport Master Plan is a list of bird species observed within a 5-mile radius of the airport. This list is reproduced here as Table 3, and amended to indicate bird species observed by VTN Pacific at the proposed bridge site in Hanamalu Valley (indicated with an asterisk). All of these birds can be expected to nest in the project area, with the exception of the pintail duck, the shorebirds (turnstone, sanderling, tattler and plover) and the marine species (tropicbird, shearwater and booby). It should be noted that three of the four endangered Hawaiian waterbirds (Koloa, coot and gallinule) have been sighted at or near the proposed bridge location where the stream is most visible, and the Hawaiian stilts has been reported by residents of the valley (Kridler, 1977). Nesting activity has been reported for all but the stilts. Although the nest locations are not known, the sightings of juveniles have all been made in the vicinity of the gravel quarry where there is less road traffic and disturbance than at the proposed bridge site. The hau thickets along the stream (such as occurs at the proposed bridge location) provide feeding and nesting habitat for the Koloa, and the dense streamside grasses are used by coots and gallinules. It may be that the wet pastures above the bridge location are used by nesting stilts, but this has not been confirmed. Hanamalu Valley has not been included in the bi-annual waterbird count, so there is no data on the number of waterbirds that may be resident. The maximum number observed by VTN at one time were six Koloa and three coots (2/21/78). Formal consultation with the Fish and Wildlife Service has been concluded with regard to these endangered species (Appendix E).

A survey of Hanamalu Stream was conducted to identify the resident fish, crustaceans, and other aquatic macrofauna. The detailed results of this investigation are reported in Appendix H. There are at least fifteen species of aquatic animals in Hanamalu Stream, the majority of which inhabit the brackish lower reaches of the stream. However, seven native species typically found in the freshwater portions of Kauai streams are absent, suggesting serious stream degradation.

The unnamed stream near the Kauai Hardwoods Factory appears to carry only cane field runoff, and is highly turbid; it is highly doubtful that this stream supports any native aquatic macrofauna.
Table 3  
**BIRD SPECIES FOUND IN THE LIHUE AIRPORT VICINITY**

<table>
<thead>
<tr>
<th><strong>ENDEMIC SPECIES</strong></th>
<th><strong>Common Name</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scientific Name</strong></td>
<td><strong>Common Name</strong></td>
</tr>
<tr>
<td>Anas acuta</td>
<td>Pintail</td>
</tr>
<tr>
<td>Anas clypeata</td>
<td>Shoveler</td>
</tr>
<tr>
<td><strong>Anas platyrhynchos wyv.</strong></td>
<td><strong>Ko'ola Duck (e)</strong></td>
</tr>
<tr>
<td>Arenaria interpres</td>
<td>Ruddy Trunstone</td>
</tr>
<tr>
<td>Asio flammeus</td>
<td>Pueo</td>
</tr>
<tr>
<td>Crocethia alba</td>
<td>Sanderling</td>
</tr>
<tr>
<td><strong>Fulica americana haw.</strong></td>
<td><strong>Hawaiian Coot (e)</strong></td>
</tr>
<tr>
<td>Gallinula chloropus haw.</td>
<td>Hawaiian Gallinule (e)</td>
</tr>
<tr>
<td>Heteroscelus incanum</td>
<td>Wandering Tattler</td>
</tr>
<tr>
<td>Himantopus mexicanus haw.</td>
<td>Hawaiian Stilt (e)</td>
</tr>
<tr>
<td><strong>Nycticorax nycticorax</strong></td>
<td><strong>Black Crowned Heron</strong></td>
</tr>
<tr>
<td>Phaethon lepturus</td>
<td>White Tail Tropicbird</td>
</tr>
<tr>
<td><strong>Pluvialis dominica</strong></td>
<td><strong>American Golden Plover</strong></td>
</tr>
<tr>
<td>Puffinus pacificus</td>
<td>Wedge-tailed Shearwater</td>
</tr>
<tr>
<td>Sula sula</td>
<td>Red-footed Booby</td>
</tr>
</tbody>
</table>

(e) Denotes endangered status.

<table>
<thead>
<tr>
<th><strong>EXOTIC SPECIES</strong></th>
<th><strong>Common Name</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scientific Name</strong></td>
<td><strong>Common Name</strong></td>
</tr>
<tr>
<td><strong>Acridotheres tristis</strong></td>
<td><strong>Mynah</strong></td>
</tr>
<tr>
<td>Alectoris graeca</td>
<td>Chukar Partridge</td>
</tr>
<tr>
<td><strong>Bubulcus ibis</strong></td>
<td><strong>Cattle Egret</strong></td>
</tr>
<tr>
<td><strong>Carpodacus mexicanus fron.</strong></td>
<td><strong>House Finch</strong></td>
</tr>
<tr>
<td>Copsychus malabaricus</td>
<td>Shama Thrush</td>
</tr>
</tbody>
</table>

II-8
### BIRD SPECIES FOUND IN THE LIHUE AIRPORT VICINITY

#### EXOTIC SPECIES (cont.)

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coturnix coturnix</td>
<td>Japanese Quail</td>
</tr>
<tr>
<td>Garrulax canorus</td>
<td>Chinese Thrush</td>
</tr>
<tr>
<td>** Geopelia striata striata **</td>
<td>Barred Dove</td>
</tr>
<tr>
<td>** Lophura punctulata **</td>
<td>** Ricebird</td>
</tr>
<tr>
<td>Meleagris gallopavo int.</td>
<td>Turkey</td>
</tr>
<tr>
<td>Pnorhinus polyglottos</td>
<td>Mockingbird</td>
</tr>
<tr>
<td>Paroaria coronata</td>
<td>Brazilian Cardinal</td>
</tr>
<tr>
<td>Passer domesticus</td>
<td>House Sparrow</td>
</tr>
<tr>
<td>** Phasianus colchicus **</td>
<td>** Ring-neck Pheasant</td>
</tr>
<tr>
<td>Cardinalis cardinalis</td>
<td>Cardinal</td>
</tr>
<tr>
<td>Sturnella neglecta</td>
<td>Western Meadowlark</td>
</tr>
<tr>
<td>Tyto alba</td>
<td>Barn Owl</td>
</tr>
</tbody>
</table>

Source: Environmental Communications, Inc., Inventory and Initial Analysis of Environmental Conditions and Concerns—Lihue Airport Master Plan Study (Honolulu, Hawaii: April 1975).

Reproduced from:
Peat, Marwick, Mitchell & Co.,
Environmental Impact Statement
Lihue Airport Master Plan Study.
(Honolulu, Hawaii - July, 1976)

** Species confirmed in Project area by VTN
5.0 NOISE ENVIRONMENT

Six sound level measurements were made at five locations in the project area in order to characterize the existing noise environment. These locations were: Kuhio Highway at Wilcox Hospital (late morning and early afternoon), Kuhio Highway at Laukona Road (Hanamaulu), Hanamaulu residential area (two locations on Amo Street) and in Hanamaulu Valley near the proposed bridge site. Each measurement consisted of approximately 180 readings of a sound level meter (General Radio Model 1565 B), taken at 5-second intervals over a 15-minute period. This data is plotted and analysed in Appendix C, which also contains a map showing the noise study locations.

At the present time, the major sources of noise in the project area are traffic on Kuhio Highway and aircraft operations at Lihue Airport. Along Kuhio Highway, vehicular traffic produced peak noise levels (L_{10}, the sound level exceeded by 10% of the readings) of 69 dBA and 72 dBA, at 11 A.M. and 3 P.M. respectively at Wilcox Hospital. A computation of noise level on the basis of peak (5P.M.) traffic volume yielded an L_{10} of 80 dBA, due to a greater traffic volume than was present during the actual noise measurements (see Appendix C). Readings at Laukona Road produced an L_{10} of 75 dBA. Residual noise levels (L_{90}) along the highway were 58 dBA, 62 dBA and 65 dBA, respectively, for the three measurements.

Away from Kuhio Highway, local street traffic, neighborhood activity and aircraft operations are the significant noise sources. In the residential area closest to the proposed highway (approximately 1,000 feet), peak afternoon noise levels (L_{10}) were 64 dBA and 56 dBA at two locations. The difference is attributable to more traffic at the first site, since the residual noise levels (L_{90}) was almost identical at 46 dBA and 45 dBA, respectively. In Hanamaulu Valley, the major noise sources are wind, birds, autos and aircraft. The latter two are infrequent enough to have little effect on the noise environment. Too many of the readings were below the 40 dBA limit of the sound level meter, to allow a statistical analysis.
6.0 AIR QUALITY

Air quality within the Lihue area is generally good with pollutant concentrations remaining below State Standards. Figure 7 presents a graphic portrayal of the relationship between measured levels of pollutant concentrations in the Lihue area and State of Hawaii Department of Health Standards. As indicated, of sampled pollutants, particulates are the most significant. For the most part, Lihue particulate counts range between 20 and 40 ug/m$^3$ (approximately ± 10 ug/m$^3$ around the annual average of 31.9 ug/m$^3$). Occasionally, the particulate counts would peak at much higher levels. These peaks are probably due to burning of the sugarcane fields at harvest time, adverse weather conditions, or a combination of the two. Therefore, the values between 20 and 40 ug/m$^3$ are reflective of the more typical conditions resulting from ground vehicle traffic and Lihue Airport operations. Lihue's concentrations of sulfur dioxide were too low (less than 5 ug/m$^3$) to be recorded. Although nitrogen dioxide levels were not sampled in 1977, these values had never exceeded the minimum measurable level of 10 ug/m$^3$ during previous periods (Bauckham, 1973). Carbon Monoxide has not been monitored in the Lihue area.
HANAMALU-AHUKI CUTOFF
EXISTING AMBIENT
AIR QUALITY
CHARACTERISTICS
JANUARY THRU SEPTEMBER 1977
(24 HOUR AVERAGE CONCENTRATIONS)
7.0   SOCIOECONOMIC RESOURCES

7.1   POPULATION

Since 1960, the population of the island of Kauai has been increasing, reversing a downward trend which characterized the island since the 1930's. The increase, gradual at first (annual average of 0.6% between 1960 and 1970), has accelerated to an average annual rate of 1.5% for the period between 1970 and 1976 (DPED, 1977). Accompanying the increase in the number of residents on Kauai has been a gradual redistribution of population within the island. In 1960, 50% of the population of Kauai lived in the southern and western parts of the island (Waimea and Koloa), 22.3% lived around Lihue, and 27.8% lived in the northern districts of Hanalei and Kawuihau (Table 4). By 1976, the proportionate breakdown for these three major areas was 46.6%, 20.7%, and 32.7% respectively. In other words, the North Shore area of Kauai has been gaining population at a rate much faster than the other areas of the island. Between 1970 and 1975 the two districts of northern Kauai accounted for 90% of the island's population growth.

An updated survey of the characteristics of the population of Kauai was provided by the special 1974 census. These characteristics varied considerably between sub-areas in the project area (Table 5). The area around Lihue has a median family income level 33% higher than that for Kauai as a whole. Also, the Lihue area has an above-average proportion of residents native to Kauai. The median age of Lihue residents (28.5) and the ratio of males to females (1.11:1.0) is above average for Kauai. The median household size in Lihue is below that for Kauai.
<table>
<thead>
<tr>
<th>District</th>
<th>April 1, 1960</th>
<th>April 1, 1970</th>
<th>July 1, 1975</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kauai</td>
<td>28,176</td>
<td>29,761</td>
<td>31,800</td>
</tr>
<tr>
<td>Waimea</td>
<td>7,057</td>
<td>7,569</td>
<td>7,400</td>
</tr>
<tr>
<td>Koloa</td>
<td>7,012</td>
<td>6,851</td>
<td>7,400</td>
</tr>
<tr>
<td>Lihue</td>
<td>6,297</td>
<td>6,766</td>
<td>6,600</td>
</tr>
<tr>
<td>Kawaihau</td>
<td>6,498</td>
<td>7,393</td>
<td>8,500</td>
</tr>
<tr>
<td>Hanalei</td>
<td>1,312</td>
<td>1,182</td>
<td>1,900</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>District</th>
<th>1960</th>
<th>1970</th>
<th>1975</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kauai</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Waimea</td>
<td>25.0</td>
<td>25.4</td>
<td>23.3</td>
</tr>
<tr>
<td>Koloa</td>
<td>24.9</td>
<td>23.1</td>
<td>23.3</td>
</tr>
<tr>
<td>Lihue</td>
<td>22.3</td>
<td>22.7</td>
<td>20.7</td>
</tr>
<tr>
<td>Kawaihau</td>
<td>23.1</td>
<td>24.8</td>
<td>26.7</td>
</tr>
<tr>
<td>Hanalei</td>
<td>4.7</td>
<td>4.0</td>
<td>6.0</td>
</tr>
</tbody>
</table>

1 Preliminary estimates, later revisions of the data estimated the population of Kauai at 32,700 for July 1, 1975

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Puhi-Hanamaulu Census Tract 404</th>
<th>Lihue Census Tract 405</th>
<th>County of Kauai</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Households</td>
<td>800</td>
<td>990</td>
<td>8,550</td>
</tr>
<tr>
<td>Percentage</td>
<td>9.4%</td>
<td>11.6%</td>
<td>100%</td>
</tr>
<tr>
<td>Median Household Size</td>
<td>3.75</td>
<td>2.85</td>
<td>3.02</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>$10,330</td>
<td>$14,280</td>
<td>$10,750</td>
</tr>
<tr>
<td>Median Number of Years Adults in the Community</td>
<td>27.0</td>
<td>32.5</td>
<td>27.7</td>
</tr>
<tr>
<td>Percentage of Adults Born on Kauai</td>
<td>43.5</td>
<td>63.9</td>
<td>53.6</td>
</tr>
<tr>
<td>Sex:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>55.7</td>
<td>52.8</td>
<td>51.8</td>
</tr>
<tr>
<td>Female</td>
<td>44.3</td>
<td>47.2</td>
<td>48.2</td>
</tr>
<tr>
<td>Median Age</td>
<td>23.9</td>
<td>28.5</td>
<td>27.1</td>
</tr>
<tr>
<td>Adults Living Whole Life on Kauai</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>43.5</td>
<td>63.9</td>
<td>52.8</td>
</tr>
<tr>
<td>No</td>
<td>56.5</td>
<td>36.1</td>
<td>47.2</td>
</tr>
</tbody>
</table>

Source: University of Hawaii, Hawaii Agricultural Experiment Station Kauai Socioeconomic Profile, 1975
The data for the Puhí-Hanamau'lu census tract which surrounds the Lihue tract, differs considerably. The median family income for the Puhí-Hanamau'lu tract is 30% less than that for Lihue. In addition, less than half of the adult population are native to Kaua'i, well below the average for both Lihue and Kaua'i. However, the Puhí-Hanamau'lu region has a lower median age, and a larger median household size, indicative of a large number of households with children. The ratio of males to females is the highest for any sub-area of Kaua'i (1.26:1).

7.2 HOUSING CHARACTERISTICS

Housing ownership patterns of the Lihue and Puhí-Hanamau'lu regions are similar. Of the total number of dwelling units in 1974, 59.5% of the Puhí-Hanamau'lu tract and 61.8% of the Lihue tract were owned (fee-simple) as compared to 46.3% for Kaua'i as a whole. Leasehold ownership ranged from 6.3% for Puhí-Hanamau'lu to 10.1% for Lihue. The Puhí-Hanamau'lu tract had a much higher proportion of plantation rented housing than the Lihue tract (17.7% to 2.0%) but other rented housing in Lihue exceeded that of the Puhí-Hanamau'lu region (26.2% to 16.5%). Median monthly housing costs, excluding plantation housing, was $68.00 in Puhí-Hanamau'lu compared to $118.00 in Lihue (1973 dollars). Postal vacancy surveys in Kapaa and Lihue between February 1967 and February 1976 declined from 3.4% to 0.8% indicating the tight housing market which exists on the island at present.

7.3 COMMUNITY ATTITUDES

An attitudinal survey of Kaua'i residents in the summer of 1974 indicated that Lihue area residents were most concerned about the necessity of land for housing and lack of job opportunities as major community problems (University of Hawai'i, 1975). Lihue residents listed education, job opportunities, health, law and order and economic growth as the areas in which public policy should be concentrated. In recent public meetings, the need for a cutoff road between Hanamau'lu and Lihue as a means of relieving congestion on the existing Kuhio Highway has received much support from the public (Honolulu Advertiser, December 16, 1977; The Garden Island, December 16, 1977).
7.4 EMPLOYMENT

The changing employment characteristics of the County of Kauai reflect the changing economic structure of the area. In 1960, agriculture (31.8%), manufacturing (28.0%) and government (13.7%) industries were the three primary sources of employment in Kauai, together accounting for 71.5% of the non-military, non-self-employed work force. (University of Hawaii, 1975). Since manufacturing employment was predominantly the production of non-durable goods such as sugar and pineapple, these two products accounted for 38% and 14.5% respectively of the total workforce in 1960. Services (8.5%), trade (12.1%), transportation and utilities (5.1%), construction (12.7%) and finance and real estate (1.1%) made up the remainder of the workforce. The retail and hotel industries accounted for 10.0% and 3.4% of the workforce, respectively.

Between 1960 and 1976, the non-military, non-self-employed workforce on Kauai increased by 30%. Services (19.6%), government (19.5%) and trade (18.8%) industries had become the three major sources of employment of Kauai (County of Kauai, Office of Employment Development, 1977). The hotel and retail industries alone employed 9.4% and 17.2% respectively of the total labor force in 1976. The construction (5.5%), transportation and utilities (9.4%) and finance/real estate (3.1%) industries all experienced substantial increases in relative importance within the neighborhood. Agricultural employment had dropped to 13.2% of the workforce and manufacturing employment to 10.2%. By 1976, employment related to pineapple production was virtually non-existent, while sugar production employment (both agriculture and manufacturing industries) had declined to 21.1% of the total workforce. Self-employed workers maintained a fairly stable proportion of the total civilian workforce 9.0% in 1960 and 9.3% in 1976.

In 1976, unemployment in Kauai averaged 9.8% of the total labor force, its highest level during the 1970's (County of Kauai, Department of Employment Development, 1977). The rate of unemployment fluctuated during the year as a result of the changing size of both the labor force and employment. In 1976, the size of the labor force was highest in June and July (16,900) and lowest in December (16,000). Employment was also highest in August (15,300) and lowest in March (14,500). The month of December had the lowest unemployment rate (3.5%). The seasonal characteristics of employment sources on the island (tourism and agriculture) and their secondary effects on other activities (i.e., retail, services), in part account for part of the annual differences. The increased demand for employment during the summer months generated by students, would also contribute to the annual changes in the labor force.
7.5 BUSINESS AND INDUSTRY

The Lihue-Nawiliwili region serves as the political, transportation and service center of the County of Kauai. Most federal, state and county government offices, which include social, planning, and regulatory agencies, are headquartered in Lihue. At the time of the last business census (1972), Lihue had only 30% of all the retail establishments on Kauai, but accounted for 50% of total annual sales and employment (Bureau of Census, 1974b). Both Lihue and Kapaa, a secondary service center 7 miles to the north, account for 55% of all retail and service establishments on Kauai, 18.4% of total revenue for these industries, and 66% of the employment in these industries.

7.6 COMMUNITY INFRASTRUCTURE

Presently most facilities in the project area are centered in the established communities. Lihue and the Nawiliwili Resort Area are the only areas served by a central sewage system. All communities are served by water facilities. Police, fire, health, and educational facilities are centered in Lihue. Hanamaulu has an elementary school. Within the corridor of the proposed Hanamaulu-Ahukini Cutoff Road are a 2-inch water line, telephone line, and several power lines. Portions of Lihue Plantation's private cane haul road network and irrigation system also cross the proposed corridor.

8.0 LAND USE RESOURCES AND PLANS

8.1 EXISTING LAND USES

Land use activities in the Lihue area are predominantly agricultural and undeveloped open space. Together, these two uses comprise 95% of the total land area encompassed by the Lihue Development Plan (Table 8). Urban land use activities comprise the remaining 5% of the area. Of urban activities, residential uses, public uses (including the Lihue Airport and the Lihue Stadium), and urban recreational activities (parks and golf courses), are the major uses of available urban land.

Residential, commercial, and industrial uses are concentrated in the three communities of Nawiliwili, Lihue, and Hanamaulu (Figure 8). Land uses
### TABLE 6
HANA MAULU CUT-OFF ROAD
EXISTING LAND USE

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Acres</th>
<th>Percent of Total Area</th>
<th>Percent of Urban Area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>URBAN:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td>670</td>
<td>1.5%</td>
<td>29.2%</td>
</tr>
<tr>
<td>Commercial</td>
<td>90</td>
<td>0.2</td>
<td>3.9</td>
</tr>
<tr>
<td>Public</td>
<td>450</td>
<td>1.0</td>
<td>19.6</td>
</tr>
<tr>
<td>Parks</td>
<td>450</td>
<td>1.0</td>
<td>19.6</td>
</tr>
<tr>
<td>Golf Course</td>
<td>385</td>
<td>0.9</td>
<td>15.8</td>
</tr>
<tr>
<td>Resort</td>
<td>46</td>
<td>0.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Industrial</td>
<td>200</td>
<td>0.5</td>
<td>8.7</td>
</tr>
<tr>
<td><strong>SUB-TOTAL</strong></td>
<td>2,291</td>
<td>5.1%</td>
<td>100.0%</td>
</tr>
<tr>
<td><strong>NON-URBAN:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>14,500</td>
<td>32.4%</td>
<td>n/a</td>
</tr>
<tr>
<td>Undeveloped Open</td>
<td>28,000</td>
<td>62.5</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>SUB-TOTAL</strong></td>
<td>42,500</td>
<td>94.9%</td>
<td>n/a</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>44,791</td>
<td>100.0%</td>
<td>n/a</td>
</tr>
</tbody>
</table>

1 Public: includes Lihue Airport, Lihue Stadium, government offices, educational and medical facilities.

2 Percent of total urban land divided among urban uses.

3 n/a: Not applicable.

within the proposed corridor of the cutoff road are primarily agricultural or undeveloped open space. Agricultural uses, predominantly sugarcane cultivation, occupy the upland areas of the corridor (approximately 90% of the total), while the sides and floor of the Hanamau Valley are either undeveloped open space or pasture (10%). However, within the valley and east of the proposed road are a County beach park and an abandoned railroad bridge and embankment. The valley floor west of the proposed crossing contains scattered residences and wet pasture. Lihue Plantation also maintains a gravel pit in the valley. Two small family burial plots are situated adjacent to the proposed corridor on the north side of the Hanamau Valley, one on the uplands and the other within the valley.

The closest residential community to the proposed road corridor is Hanamau Valley, which is located on the uplands north of the Hanamau Valley and north of the proposed highway. A commercial establishment (a hardwood factory and store) is located within the proposed corridor at its junction with the Kuhio Highway, north of Hanamau.

8.2 LAND USE PLANS

The County of Kauai has two planning documents that affect the project area; the Kauai General Plan (March, 1970), supplemented by the more specific Lihue Development Plan (1976). The Lihue Development Plan projected a doubling of the urbanized area of the Lihue area, from 5% to 10% of the total area. The increase in urban area would be compensated by a proportionately equal decline in agricultural and undeveloped land. Figure 9 shows the distribution of planned land use activities relative to the proposed cutoff road.

The Lihue Development Plan projects the largest proportionate increases for residential, public and resort activities. Residential uses were estimated to increase from 670 acres to over 1100 (more than 106%). Public uses, primarily as a result of the expansion of Lihue Airport, are expected to increase by 138%. Resort land uses are predicted to increase from 46 acres to 137 acres, an increase of almost 200%. The substantial increases in urban land use activities will be accompanied by a reduction of both agricultural lands and undeveloped open space. Although the proportionate reduction is small, actual acreage lost to agricultural uses and undeveloped open space may exceed 1000 acres.
FIGURE 9
LIHUE DEVELOPMENT PLAN
PROPOSED LAND USE
SCALE: 1" = 2000'

HANAMAU-CUTOFF

KAULAI

RESIDENTIAL

RESORT

PUBLIC (parks, buildings, airport, stadium)

INDUSTRIAL

COMMERCIAL

PROJECT DISTRICT (planned mixed uses)

Vacant, Agricultural
The Hanamaulu-Ahukini Cutoff Road is a basic component of both the Kauai General Plan and the Lihue Development Plan. In the County General Plan, it was stated:

"In Lihue, the present road system within the urban center is inadequate. It is vital that a bypass road be constructed from Puhie to Hanamaulu to the east of the town.... It is essential that this cutoff road from Rice Street toward Puhie and from Ahukini Road to Hanamaulu be given a high construction priority."

the General Plan continues:

"The cutoff road will allow all through traffic to bypass the urban center, thus greatly relieving congestion and the requirements for extensive widening and improvements of existing roads...."

The Lihue Development Plan also acknowledged the problem of increasing traffic congestion in and around Lihue, and proposed concentrating on completion of the Lihue Bypass Road to Hanamaulu. Although construction of the bypass was encouraged "as soon as practical", the plan added that it should avoid the existing residential areas of Hanamaulu. The alignment of the Hanamaulu cutoff road is also indicated for a future bike lane in the State's Bike Plan Hawaii Master Plan.

8.3 LAND USE CONTROLS

Land use controls within the project are imposed by both the County of Kauai and the State. County Zoning for the proposed Hanamaulu-Ahukini Cutoff Road is Agricultural (A) on the uplands and Open (O) within the Hanamaulu Stream Valley. Permitted uses within the Agricultural District Range from crop production, grazing, and farm-related structures to open space recreational activities. The Open (O) District permits land uses similar to that of the Agricultural District, with the exception that manufacturing or warehouse activities associated with agricultural uses are prohibited.

The State of Hawaii exerts control over land use through the Land Use Commission. The Land Use Commission has classified all areas within the State as one of four categories: Urban, Rural, Agricultural or Conservation. In 1972, the two census tracts comprising the project area had 2,307 acres (4.2%) classified Urban, 2,285 acres (4.1%) Rural, 43,596
acres (73.8%) Agricultural and 7,240 acres (13.1%) classified Conservation. The distribution of these land use categories relative to the project site is shown on Figure 10. The majority of the proposed highway alignment is classified Agricultural. Portions of the corridor (primarily that within the Hanamaulu Valley and adjacent to the town of Hanamaulu) are either Conservation or Urban.

8.4 LAND TENURE

Land area in Kauai, as in all of Hawaii, is concentrated in relatively few hands. Three land owners control approximately 90% of the land area in the two census tracts comprising the Lihue-Hanamaulu Area. These three land owners are Amfac, Inc. (38% of total), Grove Farm Company (26% of total), and the State of Hawaii (24% of total). The proposed corridor is entirely within land owned by Amfac, Inc.

9.0 AESTHETIC RESOURCES

The aesthetic environment of the project area is dominated by the Lihue-Nawiliwili urban setting and its surrounding rural/agricultural hinterland. The relatively flat upland topography of the project site affords vistas of a generally rural nature against a rugged backdrop of volcanic ridges (Plate 5). Scenic vistas from the existing Kuhio Highway, however, are obstructed by urban structures and ornamental vegetation (Plates 1, 2 and 3), depressed roadways (Plate 4) and sugarcane (Plate 6). Sugar cane obstructs the view of the proposed highway corridor from existing road and residences. Although views into the Hanamaulu Valley are very restricted, the view from Hanamaulu Beach Park upstream towards the site of the proposed highway stream crossing is high in terms of aesthetic quality (Plate 9). The view downstream toward the park has a high aesthetic quality as well.
In the Lihue region, two places are listed on the National Registry of Historic Places. These sites are the Menhune Fish Pond and Grove Farm Homestead. Both of these sites are well-removed from the project site. The first one being located within the Huleia Valley west of Nawiliwili, and the second south of central Lihue (Lihue Development Plan, 1976). There is one recorded site of archaeological significance within one mile of the proposed corridor. This is site 102, Kalauokamanu Heiau, which was in Hanamaulu, but is now destroyed. There is no indication that the traces of taro paddies in Hanamaulu are of archaeological significance. The abandoned narrow gauge cane haul railroad bridge may potentially be eligible for nomination to the National Registry of Historic Places, since it is believed to be roughly 50 years old, is an example of early concrete construction methods and is linked to the development of the sugar industry on Kauai. However, the State Historic Preservation Officer has verified that the proposed cutoff road will not affect this or any other known historic or archaeological sites (see Appendix E).
CHAPTER III
ENVIRONMENTAL IMPACTS
AND MITIGATION MEASURES
CHAPTER III

ENVIRONMENTAL IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

1.0 GROWTH INDUCING CHARACTERISTICS OF THE PROPOSED PROJECT

Transportation facilities, by their very nature, are major factors in inducing growth (used here to mean urban development) in a particular area. Improving a major transportation arterial reduces the amount of time it takes to travel from one point to another, thus increasing their accessibility. This also means that a greater distance can be covered by travelers within the same span of time, which expands the overall area that is accessible to a certain node or point of auto-trip attraction (Zimmer 1975; Sinclair 1965; Mayer 1967, Boyce 1963). Transportation improvements both respond to growth by relieving congestion on existing roadways and influence it by making areas more accessible (Clawson, 1971). In the case of the Hanamaulu Cutoff Road, the growth inducing characteristics of the project will occur in the town of Hanamaulu and the communities to the north.

The Hanamaulu Cutoff Road will increase the accessibility of the industrial area around Nawiliwili Harbor and the Lihue Airport to the communities north of the proposed road. This may help to increase the marketability and rate of absorption of existing vacant industrial land within the harbor area as well as encouraging the residential subdivision of land tracts to the north. Since the employment and shopping centers in Nawiliwili, and to a lesser extent Lihue, will become more accessible to a larger area north of Hanamaulu, increased pressures by residents to relocate in this area can be expected. Also, the improved accessibility of the northeastern region of Kauai can increase its potential as a point of destination for tourists. The extent of the growth-inducing characteristics of the proposed highway bypass cannot be quantified, however, because of the effect of other factors which also play a role in the potential for growth on Kauai.
The cutoff road by itself does not guarantee that growth or development will occur in the communities north of Lihue. Government regulations such as the County of Kauai Zoning and General Plan classifications, and the State of Hawaii land use law also are important in determining the specific location of new development. Therefore, the Hanamaulu Cutoff Road is only one of several growth inducing factors that will ultimately determine the location of new development in the northeastern region of Kauai.

As a final note, the potential growth inducing characteristics of the Hanamaulu-Ahukini Cutoff Road can be considered a beneficial secondary impact of the project. It has been pointed out that both the Lihue Development Plan and the County of Kauai General Plan include the cutoff road as a necessary component of their plans for accommodating future development in these areas. Since the pressures for urban development will not change one way or another, failure to construct the bypass road may cause potential development to occur in localities where it is neither planned for nor where services or other facilities are adequate to meet demand. Therefore, since the cutoff road is a tool being used to accommodate the planned growth of the northeastern region of Kauai, its secondary growth-inducing impacts present a beneficial impact.
2.0 SOIL EROSION

2.1 IMPACTS

An analysis of soil erosion potential was conducted for a proposed highway on the North Shore of Kauai ("Draft EIS for the Kauai Belt Road, Kalihiwai to Haena Section" FHWA/Hawaii DOT/VTN Pacific, February 23, 1977), which yielded soil loss data applicable to the proposed project. Using a soil loss rate of approximately 350 tons/acre/year on unprotected cuts and 230 tons/acre/year on unprotected fills, the proposed cutoff road could result in up to 1,015 tons of soil loss per year. By comparison, the existing cane field, with a soil loss rate estimated at 7 tons/acre/year, is losing roughly 300 tons of soil per year on the 44 acres of the proposed alignment.

2.2 MITIGATION MEASURES

Appropriate erosion control measures, planned and contracted as a part of the total job and applied immediately following grading, would significantly reduce soil loss. The State Department of Transportation is obligated to implement erosion control measures as specified in Section 639 of the 1978 State of Hawaii "Standard Specification for Road and Bridge Construction, Temporary Project Water Pollution Control (Soil Erosion).

During grading and other construction activities, the temporary measures that will be applied include: mulching with bagasse, hay, netting, etc.; installation of temporary berms and slope drains; sediment traps and siltation ponds; seeding with fast growing grasses; and other measures appropriate to the situation. At the end of each working day, the Contractor will shape and berm exposed earthwork in such a manner as to control and direct runoff. Failure to conform to these and other requirements spelled out in the Specifications will be cause for suspension of all operations.

Permanent erosion control will primarily rely on slope plantings. Species that have been recommended by the Soil Conservation Service are dwarf pangola grass (Digitaria decumbens), bermuda grass (Cynodon dactylon), St. Augustine grass (Stenotaphrum secundatum), centipede grass (Eremochloa ophiuroides), metallic plant (Hemigraphis colorata), money wort (Lysimachia nummularia), and lypia (Lippia canescens). Most of the
Grasses are presently common in the project area. The area receives approximately 50 inches of rainfall per year, which is adequate for many landscaping plants. However, to insure good establishment, some watering will be necessary, so a permanent sprinkler system will be installed. To provide additional erosion control, long cuts and fills will have slope serrations, drains and terraces where possible.

Special erosion control consideration will be given to the stream crossings. Where possible, berms and sediment traps will be employed. All locations exposed to flowing water will be protected with netting or rock and will be planted with fast-growing stream-bank species (e.g. California grass, Brachiaria mutica). Cuts and fills in the vicinity of Hanamaulu Stream and the un-named stream near the Kauai Hardwoods Factory will be given extra protection with mulching or netting and immediate planting. Maintenance, including fertilizing and replanting, will be carried out as needed to insure the efficacy of the erosion control treatments.

Since grading will be done for two lanes (except near the bridge and intersections), the initial area to be graded will be kept to a minimum. Grading for the additional two lanes is not contemplated until the 1990's, when the expected growth of traffic volume on the cutoff road can justify its full development.

If grading is carried out during the period of least intensive rainfall, potential erosion would be further reduced. Only 29% of the erosive rainfall falls between April 1 and November 1. If the majority of the grading is completed and slopes are stabilized during this period, much of the erosion hazard would be avoided. It is planned that the grading will be done in relatively short segments, with construction following close behind. This will keep the area of soil exposed to erosion to a minimum.

Implementation of these erosion control measures would reduce soil loss from exposed cuts and fill by a factor of 100. ("Erosion and Sediment Control Guide for Urbanizing Areas in Hawaii. USDA Soil Conservation Service. January, 1976") Immediate application of straw mulch would reduce total potential soil loss by a factor of 50, or from 230 to 360 tons per acre per year to 4.6 to 7.2 tons per acre per year. (1.3 to 2.1 tons per acre if slopes are stabilized before November 1.) Once grass is well established, soil loss from cuts and fills would be roughly 2.3 to 3.6 tons per acre per year. The estimated average natural soil loss from the present cane field is at least 7 tons per acre (ranging from 5 to 10 tons per acre). Given the relatively small area to be exposed by cuts and fills (approximately 3 acres at the most), it can be concluded that with the proposed erosion control measures, overall soil loss from the project area would not be significant.
3.0 HYDROLOGICAL RESOURCES

The hundred-year flood for Hanamaulu Stream has a discharge of 22,800 cfs. At this discharge the railroad embankment which now exists in the Hanamaulu Stream bed would create a backwater height of 22 feet M.S.L. In consideration of this existing condition, the bridge used for the stream crossing will be designed so as to create negligible additional backwater effect. No bridge piers will be constructed within the normal bed of Hanamaulu Stream.

However, at least one of the construction methods being considered would require the construction of false work (see Table 2). To avoid possible aggravation of the backwater effect during construction, the contractor will be required to provide an ample minimum flow width opening in the falsework. Preliminary evaluations indicate that such provisions are feasible. The criteria to be used will be established during the design of the bridge. The bridge construction will undoubtedly require a Department of the Army Permit ("Section 404" permit).
4.0 BIOLOGICAL RESOURCES

4.1 IMPACTS

The only loss of wildlife habitat will occur at the two stream crossings. At Hanamaulu Stream, it is estimated that bridge construction activities will directly impact a 100-foot wide strip across the valley. However, the majority of this area will only be temporarily disturbed during construction of an access road and movement of equipment. Within this strip, the area immediately adjacent to the stream (10 feet on the north side and roughly 200 feet on the south side) is utilized by endangered waterbirds (Plates 7 and 8). The hau thicket on the south side of the stream is a feeding and resting habitat for the Koloa duck, but it is doubtful that any nests would be located in this area. If water birds do nest at this site, it is expected that the bridge construction would interrupt at least one breeding season. After completion of the bridge, it is probable that the birds would return to the general area, since the wetland habitat will not be permanently filled, and the hau thicket will quickly grow back. The more extensive seasonally-wet areas farther up the valley (Plates 11 and 12) would not be disturbed.

At the crossing of the unnamed stream near the Kauai Hardwoods Factory (Alignments B or C), the highway would pass through a thicket of Java plum and hau growing on the slope of the valley and extending down to the stream. However, due to the steep topography of the stream gully, there are no "wetlands". Furthermore, it is highly unlikely that this site is utilized by waterbirds. The only impact, therefore, would be removal of a portion of this forested strip.

4.2 MITIGATION MEASURES

Disturbing the habitat and nesting activity of an endangered species is a significant adverse impact. However, in this case, the bridge alignment and design (piers rather than fill) have been selected to create the least possible disturbance to wetland areas. It is therefore felt that this impact has been reduced to an acceptable level. The different types of bridge construction will differ in the degree of ground disturbance; if falsework and a protective embankment are constructed, the disturbance will be greater than for methods using precast or steel girders. However, the amount of vegetation removal within the construction zone will be essentially the same, and will be mitigated after the bridge is completed by removing all fills (e.g. temporary road and embankment) and creating potholes at least 4 feet deep where water can collect and provide waterbird habitat. Native wetland plants will be planted around the potholes to provide food and cover. The construction procedures will follow the recommendations of the U.S. Fish and Wildlife Service (See below).
This project has followed both the letter and spirit of the Endangered Species Act of 1973 and Executive Order 11990, "Protection of Wetlands" (May 24, 1977). Throughout the planning process, primary consideration has been given to selecting an alignment that would minimize impact on the wetlands in Hanamaulu Valley which provide habitat for several endangered waterbirds. It has been established that there is no practicable alternative to crossing Hanamaulu Valley with the proposed cutoff road. However, the proposed bridge site presents the least possible impact to wetlands. Furthermore, the decision to use no permanent embankments, and the application of mitigating measures such as removing all temporary fills and creating potholes, will minimize harm to wetland areas within the construction corridor. In accordance with section 7 of the Endangered Species Act, formal consultation with the Fish and Wildlife Service has been completed. In a letter dated January 22, 1979 to the Division Administrator of the Federal Highway Administration, the Acting Regional Director of the Fish and Wildlife Service concluded (also see Appendix E):

It is our biological opinion that the proposed bridge and highway will likely promote the conservation of the Hawaiian coot, duck and gallinule provided the following conditions are met:

1. Construct Alignment "A";

2. Construct the bridge on piers as described on Page 1-16 of the DEIS. The height should be that stated as the preferred one--about 65 feet above the valley floor;

3. Remove immediately after construction all temporary fills and embankments needed for construction and create potholes at least 4 feet deep in their stead;

4. Plant native wetland grasses around these potholes for cover;

5. Place and construct fills and embankments only where necessary and only during periods of seasonally low stream flow to prevent backwater which might flood nests elsewhere in the valley. Such fills and embankments are to be removed prior to the next nesting season;

6. Insure that no debris, chemicals (including petrochemicals) and other deleterious materials enter the water; and

7. Limit construction activities in the valley to the immediate project site.

III-7
5.0 NOISE

Noise levels will increase in the project area with or without the proposed cutoff highway, as a result of increasing development and associated traffic. Without the proposed highway, the street noise in front of Wilcox Hospital can be expected to increase from the present peak hour L10 of 76.5 dBA to 83 dBA by the year 2000 (Table 7). The same can be expected along the present highway through Hanamaulu Town. These noise levels were calculated for a receptor 75 feet from the edge of the highway. Although the hospital is set back much farther than this, many homes are as close as 30-50 feet from the highway and would be adversely affected by increasing traffic noise.

With the proposed cutoff road diverting traffic from Kuhio Highway, L10 noise levels would be reduced to 74.5 dBA at the hospital and 73.5 dBA in Hanamaulu. Traffic noise would eventually increase again, but it would not reach its present level until 1990 or 2000 (Table 7). Peak noise level along the proposed highway is expected to remain around 75 dBA until 2000, when it would drop to 73.5 dBA if two more lanes were added. (The decrease is due to the source being spread out over the divided highway.)

It can be seen on Table 7 that none of the existing or predicted noise levels (with the exception of the proposed alignment at present) fall within the Federal Design Standard of 70 dBA for a highway corridor through a residential area. However, the proposed cutoff road would improve the present undesirable noise environment along Kuhio Highway. If future development is planned along either Kuhio Highway or the cutoff road (assuming it is built), any homes or other sensitive receptors should be placed at least 160 to 200 feet away from the edge of the highway, or be provided with some type of noise barrier.

The only receptors of concern along the cutoff alignment are the Hanamaulu Beach Park and several residences in the valley. The sound environment of the beach park is dominated by surf and wind; the proposed highway is too far away to have any impact above these sources. Depending on the alignment selected, one house in Hanamaulu Valley would be within 50-100 feet from the bridge. The elevation of the highway will preclude any significant vehicular noises from reaching this house; however, bridge noises (primarily from vehicles hitting expansion joints) may be disturbing. The magnitude of these noises cannot be predicted at this stage.
<table>
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<tr>
<td></td>
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<tr>
<td>1977</td>
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</tr>
<tr>
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<td>With</td>
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<tr>
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</table>

1. Noise level 75 feet from the edge of roadway, for comparison with Federal Standard.
2. Estimate based on noise readings in Hanamaulu Valley.
3. Noise levels at the nearest opening would be 5 dBA less.

6.0 AIR QUALITY

During construction of the proposed cutoff road, dust and exhaust from equipment would be emitted. This would last approximately two years. Dust will be controlled with watering or other appropriate methods.

An analysis of automobile emissions was performed to determine the effect of the cutoff road on ambient air quality; this analysis is presented in Appendix B. Three variables interact to produce the projected air quality impacts: increasing traffic, decreasing vehicular emissions due to Federal controls and a redistribution of traffic in the Lihue area if the cutoff road is constructed. These variables are incorporated in the computation of carbon monoxide concentrations to the year 2000, presented in Table 8.

It can be seen from Table 8 that present traffic congestion on Kuhio Highway in front of the Wilcox Hospital may be resulting in CO concentrations that exceed the State 1-hour and 8-hour Standards. (The values obtained from the EPA screening process described in Appendix B are only order-of-magnitude approximations for "worst case" conditions at a point of congestion and minimum air movement; under normal traffic and trade wind conditions, CO concentrations would be much less.) As a result of emission controls, the CO concentrations will decrease in 1980 and 1990, but by 2000 they will level off due to high traffic volumes on Kuhio Highway without the cutoff road.

With construction of the cutoff, air quality on Kuhio Highway would be significantly improved, bringing the CO concentration below the stringent State Standards in 1990. However, increasing traffic would offset emission controls in 2000. The CO concentration along the cutoff road would be minimal due to free-flowing traffic, as opposed to the congestion of Kuhio Highway. If, as now foreseen, the cutoff road is expanded to four lanes during the 1990's, CO concentrations along the road will drop even further by the year 2000.

Total pollutant burdens (Table 5 in Appendix D) will decrease due to Federal emission controls. However, with the construction of the cutoff road, the total vehicle-miles traveled in the Lihue area will increase by approximately 0.6%. (This is due simply to a redistribution of traffic over a longer total road system, rather than an increase in traffic volume.) With more vehicle-miles, the total pollutant burden would be slightly higher with the cutoff road.
# Table 8

**Estimated Maximum CO Concentrations**

*With and Without the Proposed Cutoff Road*<sup>1</sup>

(Expressed as mg/m<sup>3</sup>)

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</table>

**Notes:**

1. Values include background CO level which is assumed to be no more than 1 ppm (1.14 mg/m<sup>3</sup>).
2. Two lanes and four lanes, respectively.
7.0 SOCIOECONOMIC IMPACTS

7.1 IMPACTS

Socioeconomic impacts will occur both during construction of the project and afterwards. Construction related impacts will, for the most part, be short-term. However, after completion of the cutoff road, long-term social and economic impacts will accrue to the community.

The income entering the County of Kauai as a result of road construction will generate short-term beneficial economic impacts. Sources of income to County residents that will occur as a result of the project include local expenditures for materials for use in construction, expenditures by non-resident workers during their stay in Kauai, and income for resident workers. These impacts will take place in the initial construction of the cutoff road and when the expansion to four lanes is undertaken in the 1980's. At this time, details of project expenditures are not known, so these benefits cannot be quantified.

The principal long-term impact on the community is a beneficial one. Motorists using both the cutoff and Kuhio Highway will save time and generally find driving more pleasant due to the reduction of traffic congestion provided by the cutoff road. This benefit will be enjoyed by both residents and visitors to Kauai. The Benefit/Cost ratio of 1.9 indicates that substantial savings will accrue to the users of the highway. Institutions and commercial establishments close to the highway will enjoy greater accessibility as a lower level of traffic will facilitate turns on and off Kuhio Highway.

The amount of productive sugarcane land which will be lost, should the proposed project be implemented, is 35.4 acres. Since 35.4 acres is only 0.2% of the 17,000 acres of Lihue Plantation cane land, the relative importance of the land used for the cutoff road is not great. Labor averages for the Lihue Plantation are 90 man hours/acre/year. The loss of 35.4 acres for the cutoff road represents a reduction of 3288 man days/year or approximately 2 workers. The acreage in question produces an average of 193 tons of sugar per year, which is a relatively high yield. At current prices of $260 a ton for sugar and $30 a ton for molasses, the displaced cane land would gross $81,970 per year for the two year growth cycle.

The proposed road will intersect three cane haul roads. This will be mitigated by constructing a workable system coordinated with the Lihue Plantation Company. Also, access to the gravel pit in Hanamalu Valley will be affected; provisions to mitigate this impact are being studied.
Another permanent monetary loss is the tax revenue generated for the County of Kauai from the assessed value of land in its present use. The acquisition of this property by the State will remove it from the County's tax rolls with an accompanying loss of property tax income. At present tax rates this would result in a tax loss of $615 annually.

Project construction may necessitate the relocation of overhead utilities along the alignment, but this would be a relatively minor impact. Provisions will be incorporated in the design of the road to maintain the flow of irrigation water within Lihue Plantation's system.

In the past, the Lihue Plantation discharged wash water from its sugar mill into the ocean, but this practice has been stopped in compliance with water quality laws. The Plantation now disposes of its mill wash water by over-irrigating the cane fields below Lihue and Hanamaulu. Approximately 600 acres of this caneland will be taken for the proposed expansion of the Lihue Airport, and approximately 35 acres will be used for the proposed cutoff road. The Plantation has contended that the State should take responsibility for disposing of the wash water displaced by these projects. Solutions that have been suggested include deep well injection, treatment or pumping to other fields; each has problems of cost, technical feasibility and effectiveness. The situation is presently being negotiated between the State and the Plantation; whatever solution is reached will be applied to both the airport and the proposed cutoff road.

The construction of the Hanamaulu-Ahukini Cutoff Road will affect local commercial establishments in both positive and negative ways. In the short-term, expenditures on construction will increase the sales volume of local merchants through sources previously mentioned. However, this beneficial impact is short-term and limited to the construction period.

As the purpose of the project is to reduce the volume of traffic on Kuhio Highway, businesses fronting the highway will be affected. Re-routing through traffic will have a negative effect on the amount of "impulse" purchases by motorists passing on the road. However, the effect may not be very great. An informal windshield survey of businesses along this stretch of highway was conducted in January, 1978 to determine how many businesses may potentially be affected by the cutoff road. The survey identified 10 establishments, most of them concentrated in either Kapaia or Hanamaulu. The shops were classified as to their dependence on the highway for business by type of activity (Table 9). The survey identified two stores, a leather craft shop and a hardware store, which are closely oriented to a highway-tourist trade. Additionally, two gasoline stations and four restaurants probably depend to a certain extent on the high-
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<td>Gasoline Stations</td>
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1 From the intersection of Kuhio Highway and Ahukini Road to the proposed intersection of the cutoff road and the highway.
2 Kauai Hardwoods, Leather Craft
3 Three sit-down restaurants, one fast-food.
4 Grocery, bakery, and natural foods shop.
way for their sale, although these shops may also attract much of their business from local residents. The remainder of the businesses are oriented to a local resident market rather than to passing motorists on the road. Conversely, a reduction in traffic volume may have a very positive effect on sales to local residents as a lower level of traffic may make it more convenient to turn off the road.

Though the Hanamaulu-Ahu'ukini Cutoff will reduce traffic volume on the affected section of Kuhio Highway, traffic will again begin to increase if present trends in automobile travel continue. Thus over time, the magnitude of the impacts to business that occur as a result of reducing traffic volumes will lessen.

The project will affect different aspects of sales in both positive and negative ways. How it will affect aggregate sales cannot be determined at this time. Of special concern regarding the potential adverse effects of the cutoff road is the Kauai Hardwoods Store. Although this shop conducts both wholesale and retail activity, the shop owners have stated that most (99%) of their business comes from sales to tourists off the highway and that, should the originally considered alignments B and C be implemented, most of their business would be lost (Smith, 1978).

The possible economic impact of the highway alignment on the Kauai Hardwood Store weighed heavily in the decision to choose alignment A for the cutoff road. The chosen alignment intersects the existing highway on the Lihue side of the Hardwood Store. thus maintaining traffic flow past the store.
The proposed cutoff road has been designed to bypass existing residential areas to avoid the social and economic problems of relocation. Therefore, for the most part, the highway does not affect residential structures. Along the alignment, the closest structure to the proposed cutoff road is west of the bridge site in the Hanamaulu Valley. The horizontal distance from the highway centerline to the house is 50 feet. A second house is 180 feet from the centerline.

7.2 MITIGATIONS

Many mitigation measures for potential socioeconomic impacts have been incorporated into the design of the alignment. Avoidance of existing residential structures, and the alignment proposed to avoid the impact of by-passing the Hardwood Store are examples.
8.0 LAND USE PLANS AND CONTROLS

8.1 IMPACTS

8.1.1 EXISTING LAND USE

The construction of the proposed project will eliminate 35.4 acres of sugarcane land. As shown in Figure 7, this acreage is classified as "prime agricultural land" in the map series "Agricultural Lands of Importance to the State of Hawaii", prepared by the State Agriculture Department. In addition, the project will remove approximately one acre of grazing land in the Hanamaulu Valley and 3.1 acres of undeveloped vacant land along the valley's slopes. These uses will be replaced by 39.5 acres of public facilities (street and highway) use.

A small cemetery adjacent to the proposed corridor may be affected by grading operations during the bridge construction. The cemetery is 50 feet makai of the right-of-way. Should the cemetery be impacted by construction actions, the Land Transportation Facilities Division of the State Department of Transportation will initiate disinterment procedures with the Department of Health.

8.1.2 LAND USE PLANS

Construction of the proposed project will have a beneficial impact on the County of Kauai General Plan and Development Plan for the Lihue area. As noted in the previous chapter, the proposed Hanamaulu-Ahukini Cutoff Road is an integral part of both of these plans. Therefore, the project can be viewed as in conformance with the County's future development plan. The construction of the road is one step in implementing these plans and providing a tool by which the area's planned growth can be accommodated.

Preservation of prime agricultural land is an important goal of both the Kauai General Plan and the Lihue Development Plan. The benefits stemming from construction of the cutoff road were examined in both plans, and deemed to outweigh the disadvantages of taking this land out of agricultural production for the highway right-of-way.
8.1.3 LAND USE CONTROLS

County of Kauai land use controls which are affected by the proposed project are the constraint districts. The districts of concern are the Slope District (S-SL); the Flood District (S-FL) and Drainage District (S-DR). All three of these districts apply to the Hanamaulu Stream and Valley. The Slope District applies to all slopes exceeding 20% (Hanamaulu Valley walls). Likewise, the Flood District applies to all areas of the Hanamaulu Valley which are affected by the 100-year floodplain. The Drainage District applies to the entire watershed of Hanamaulu where construction activities involving cut and fill grading on slopes greater than 20% must comply with the Department of Public Works regulations for slope design, erosion and siltation control, and revegetation (County of Kauai, 1972). The Flood District has similar restrictions for grading activities within the 100-year flood-plain. The Drainage District is principally concerned with regulating the discharge of pollutants, silt and other materials into the stream channel by construction activities. In implementing the construction of the proposed cutoff road, County approval of contractor grading and erosion controls will be necessary.

8.2 MITIGATIONS

The loss of agricultural land is, in essence, unmitigatable, since it represents a permanent loss of land resources. The problem is even more severe on Kauai where there is a very apparent limit to land resources, especially productive agricultural soils. No mitigations are necessary for the impact of the project on land use plans. However, just as the cutoff road is one part of the overall Development Plan for Lihue, the County should take measures to plan more specifically for future development that may be influenced in this respect. For instance, after completion of the project, the County may consider rezoning for urban use areas that are designated for the purpose in the Lihue Development Plan. Since the project may increase development pressures, removing development restrictions on parcels planned for future urban uses will relieve prime agricultural lands of these pressures.
9.0 AESTHETIC RESOURCES

9.1 IMPACTS

The aesthetic impacts of the proposed project will occur principally in the Hanamaulu Valley and in areas of extensive cut and fill grading. The construction of the proposed bridge across the Hanamaulu Valley will reduce the visual quality of this area both from vantage points within Hanamaulu County Beach Park and from upstream of the crossing, especially from the residential area of Hanamaulu.

Although the abandoned railroad trestle will remain, the 65 foot height of the proposed bridge will make it visible to people using the County Park (refer to Plate 9). Also, the removal of vegetative cover during construction at the crossing will further reduce the "rustic" scenic character of the site. The extensive cut and fill grading activities will further decrease the visual character of various localities along the proposed alignments by removing the existing vegetative cover and altering the existing physical structure of these areas.

On the positive side, construction of the proposed cutoff road will afford the highway users vistas of high scenic quality overlooking the Hanamaulu Valley and Hanamaulu Bay (Plates 11 and 12). Those vistas do not presently exist for any other road of the existing highway network. Also, the cutoff road on the highland portions of the proposed alignments will not be readily visible from the existing Kuhio Highway since sugarcane along the road acts to obstruct views.

9.2 MITIGATIONS.

The impact of cut and fill activities will be mitigated through revegetating and landscaping cut and fill slopes, which will lessen their visual impact on potential viewers.
No matter what is done, a manmade structure such as a bridge will be an intrusion in the rural valley setting. The visual impact of the bridge can be partially mitigated by selecting a structural system that presents a more appealing appearance to the viewer. An aesthetically designed bridge will reduce its spatial and visual intrusion in the valley. Though the exact construction method for the Hanamalu Stream Bridge characteristics has not been established, the goal is an aesthetically pleasing and structurally sound bridge. The important characteristics for high aesthetic quality as outlined in Chapter One are: good height to span proportion in terms of mass and space (as illustrated in Figure 11), maximized span length in order to reduce the number of piers and clean structural lines so as to appear smooth and flowing from above and below. For the most part, the design methods being considered can produce the aesthetic characteristics desired. However, a few of these methods would not fully attain the bridge design characteristics in all respects. If spans shorter than 150 feet are constructed, the increased number of piers and reduced space between them would give the effect of a forest of piers or a wall across the valley, with precast concrete girders, it may be difficult to attain the smooth flowing appearance possible with other methods, as the required pier caps tend to disrupt the horizontal lines of the superstructure. Cross bracing, as required in some types of steel bridges, would give the structure a cluttered appearance. In order to retain flexibility, the exact construction method will not be determined until later in the design process. Aesthetics will be of primary consideration when the final construction plans are drawn up.
The diagram illustrates three different scenarios regarding the open space and the column mass in relation to the bridge structure:

1. **Open Space Too Small**: The open space is insufficient, and the column mass is poor, resulting in a proportion of 1:1.6, which is deemed poor.

2. **Open Space - Okay**: The open space is acceptable, and the column mass in relation to the bridge structure is okay, with a proportion of 1:2.7, which is considered okay.

3. **Open Space - Better**: The open space is better, and the column mass is better, with a proportion of 1:3.3, which is considered better.

**Figure II**

**Bridge Aesthetic Analysis**

**Height: Span Ratio**

Source: Wilson Okamoto and Associates
Although a small part of the railroad embankment may be affected by construction of the proposed highway bridge, the remaining embankment and trestle will not be impacted by the cutoff road. This would not limit potential recreational uses of the railroad grade. There are no known historical or archaeological sites along any of the alternate alignments, but, as in any construction project, the possibility exists that buried archaeological artifacts untouched by past activities may be disturbed. It is part of the State's Standard Specifications that in such a case, the contractor must immediately notify appropriate authorities so that the value of the find can be determined and, if necessary, salvage work be carried out. (See letter from the State Historic Preservation Officer, Page E-2.)
CHAPTER IV
ALTERNATIVES TO
THE PROPOSED PROJECT
CHAPTER IV

ALTERNATIVES TO THE PROPOSED PROJECT

Several alternatives were viewed to determine their ability to satisfy the existing and projected transportation needs of the Lihue region. These alternatives have been evaluated according to their relationship to existing plans for the region, economic constraints, and human and physical environment limitations. This information is based on preliminary engineering design studies and public input obtained through hearings and other sources. The alternatives considered included alternatives to a cutoff road (no project or widening Kuhio Highway), rejected alignments of the cutoff road and the proposed alternative alignment.

1.0 NO PROJECT

If the No Project alternative (not building the cutoff road) is chosen, Hanamaulu Valley will remain undisturbed, and no agricultural land will be taken out of production. The waterbird habitat will not be impacted and business conditions will not be affected. However, existing congested traffic conditions and poor circulation system will remain, with traffic continuing to back up from Lihue all the way to Hanamaulu during peak periods. Congestion will worsen as traffic loads on the existing highway network increase an average of 88% from 1980 to the year 2000. The presently high accident rate will probably rise with the increasing volume and congestion. The preliminary engineering studies for the proposed cutoff road indicate that peak hour traffic on the Kuhio Highway between Lihue and Hanamaulu varies from 2,265 to 3,610 vehicles in the year 2000 without the project. However, the lane capacity near Kapaia Bridge is only 1,475 vehicles per hour. Allowing the capacity of Kuhio Highway to be thus exceeded will result in adverse impacts such as high accident rates, noise and air pollution, with accompanying social and economic impacts on residents, businesses and institutions along the highway and dependent upon it for access. Permitting existing trends to continue without altering the present road system is not a desirable alternative.
2.0 WIDENING KUHIO HIGHWAY (Alternate Corridor)

As noted in Chapter I, the capacity of the existing Kuhio Highway will probably be exceeded by 1980. The existing road could conceivably be upgraded to accommodate these flows. However, because of the constrained right-of-way of the existing road, adjacent properties would have to be acquired. The anticipated social costs of widening the road are as follows (Wilson, Okamoto & Associates, 1977):

- Number of private parcels affected: 58
- Area of private parcels (acres): 8.8
- Number of business establishments affected: 3
- Number of business establishments anticipated to be displaced: 3
- Number of residences affected: 42
- Number of residences anticipated to be displaced: 8
- Other establishments affected:
  - Lihue Hongwanji
  - G. N. Wilcox Memorial
  - Hanamaulu Park
  - Electric Sub-station

Cost for construction of the expanded highway would be 12.712 million dollars. This is broken down to $1.1 million for preliminary engineering, $1.135 million for right-of-way acquisition, and $10.476 million for construction. Even with the expansion of the highway to four lanes, the desired level of service D cannot be attained (in terms of operating speed criteria) because of the restrictive alignment. Therefore, considering the high social and economic cost relative to the proposed cutoff road, the expansion of Kuhio Highway is not a feasible alternative to the proposed cutoff road.
3.0 ALIGNMENTS REJECTED EARLY IN THE PLANNING PROCESS

In the first stages of planning, a study corridor was established between Ahukini Road and the approximate Kuio Highway terminus. The boundaries of the corridor were selected so as to avoid the Hanamaulu Subdivision and Hanamaulu Beach Park. Within this study corridor, six alternate highway alignments were developed (Figure 12), then evaluated with respect to the following major considerations: minimizing bridge and/or embankment length; bridge height limitations; soil conditions in Hanamaulu Valley; endangered waterbird habitat; minimizing noise impacts on the Hanamaulu Subdivision and Beach park; visual impact on the valley; conflicts with cane haul roads, cane irrigation systems and access to the quarry; grade height limitations at the Ahukini Road and Kuio Highway intersections; and access to the Kauai Hardwood Store. The width of the upper valley, and the poor soil conditions and waterbird habitat found there, led to selecting a crossing site in the lower part of the valley near the existing railroad bridge. This alignment was then refined into three alternatives, which differ primarily in their relationship to the Kauai Hardwood Store.
4.0 THE ALIGNMENTS CONSIDERED IN DETAIL
AND THEIR IMPACTS

The proposed alignment (Alignment A) runs west of the other routes considered and intersects Kuhio Highway on the Hanamaulu (south) side of the Kauai Hardwoods Factory. Alignment B lies between the other two routes and intersects the existing highway just north of the Hardwoods Factory. The third route, Alignment C lies east of the other routes and intersects the existing Kuhio Highway approximately 1,800 feet north of the Hardwoods Factory. Following is a comparison of the major impacts of these alternate alignments:

Alignment: The three alignments differ only because of consideration for access to the Kauai Hardwoods Factory. Alignment A would maintain traffic flow past the Hardwoods Factory. Alignment B would bypass the Factory, but it would remain visible from the main highway. Alignment C would bypass the Hardwoods Factory by the greatest distance, and it would not be visible from the highway. It has been made clear that the economic viability of this business is of great importance to the community, partly because it is one of the few businesses with a policy of hiring the handicapped.

Land Use. The proposed alignment will take 36.4 acres of agricultural land, Alignment B would use 36.7 acres and Alignment C would use 39.5 acres. The Lihue Development Plan indicates that the Cutoff Road will be the Eastern boundary of residential expansion from Hanamaulu (Figure 9). The alignment of the highway will therefore affect the amount of caneland that is ultimately converted. Alignment A would allow approximately 70 acres for future residential development, while Alignments B and C would allow 90 and 101 acres, respectively.

Excavation. The Kauai Hardwoods Factory is situated in a small valley with a bluff between the store and the proposed cutoff road. This topography results in significant differences in the amount of excavation required for the three alternates. Alignments A and B, which are closest to the store, require relatively deep cuts in order to meet the existing grade of Kuhio Highway. These alignments would require total excavations of 335,700 cubic yards (cy) and 354,800 cy, respectively. However, Alignment C avoids the steep part of the bluff behind the Hardwoods Factory, and can meet the grade of Kuhio Highway with only 240,000 cy of excavation, all of which can be balanced with fills.

Engineering Considerations. All three alignments will provide for a safe and efficient highway. However, because Alignments B and C are straighter and have longer sight distances that Alignment A, they would allow for higher design speeds.

IV-5
Wetlands and Endangered Species. Hanamaulu Valley has permanent and seasonal wet areas that are utilized by several species of endangered waterbirds. This factor has been taken into consideration in locating the valley crossing at the narrowest point, rather than farther upstream, where more wetland would be affected. Alignments A, B and C have the same effect of disturbing approximately 1/2 acre of wetland during construction. This is the least possible acreage of disturbance. The second stream in the project area is a minor (though probably perennial) unnamed stream that carries canefield runoff near the Kauai Hardwoods Factory. Alignments B and C would require new crossings on fill, while Alignment A would utilize the existing culvert locations (with some improvement) under Kuhio Highway.

Floodplains. Crossing Hanamaulu Valley will unavoidably involve construction in a flood plain. All three alignments cross at essentially the same point. The bridge will be designed so as to cause no increase in the level of floodwaters. As noted above, Alignments B and C would involve new crossings of the unnamed stream near the Kauai Hardwoods Factory, while Alignment A would not.

Cost. The preferred alignment will have a total cost of $15,778,000, which compares with a cost of $15,915,000 for Alignment B and $15,373,000 for Alignment C.
CHAPTER V
UNAVOIDABLE ADVERSE IMPACTS
CHAPTER V

UNAVOIDABLE ADVERSE IMPACTS

The following is a list of adverse impacts resulting from the proposed project which cannot be mitigated:

1. The project will involve an irretrievable loss of 35.4 acres of prime agricultural land.

2. The project will result in permanent alteration of the physical structure of the land due to cut and fill grading activities.

3. The project will decrease the scenic quality of vistas from the Hanamaulu Beach Park and the Hanamaulu Valley upstream of the proposed highway crossing.

4. The project will temporarily remove or degrade a strip of endangered waterbird habitat across Hanamaulu Stream at the proposed bridge site. Although this area is presently used by waterbirds, there is better nesting habitat further upstream, where vehicular activity is less.
CHAPTER VI
SHORT TERM USES VS LONG-TERM PRODUCTIVITY
CHAPTER VI

RELATIONSHIP BETWEEN SHORT-TERM USES
OF
MANS ENVIRONMENT
AND THE
MAINTENANCE AND ENHANCEMENT
OF
LONG TERM PRODUCTIVITY

The "productivity" of the Lihue region is a combination of two principal activities: urban and agricultural. Measures of the urban productivity of Lihue include the role of the area as the transportation and governmental hub of Kauai County, the development of manufacturing, commercial and service industries, and the provision of housing and public facilities to accommodate the people who work there. In addition, the continuing importance of the sugarcane industry is a second measure of productivity. The location of highly productive agricultural soils in the Lihue region make it well suited for agricultural activities. Therefore, the maintenance and growth of urban and agricultural activities in this region is of primary importance in evaluating the areas productivity. However, these two activities also conflict with one another in terms of needs and objectives.

The adverse environmental effects of project construction, such as noise, dust, and air pollution from construction activities, represent short-term uses of man's environment. However, the project will also result in a permanent loss of productive agricultural soils. Offsetting this impact are the long-term benefits that will accrue from the efficient movement of goods and people through the Lihue region. This will promote the growth and development of urban activities in and around Lihue. Although the construction of the cutoff road is, in essence, a conflict between urban and agricultural activities, its "productivity" is the fact that it is part of the goals of the Lihue Development Plan. Since this plan outlines the desired course of development for Lihue, including the accommodation of both urban and agricultural uses and activities, the cutoff road is a tool for implementing the long-term planned growth of the region.
CHAPTER VII

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed project represents an irreversible and irrevocable commitment of materials, labor, energy and land. A total of 35.4 acres of sugarcane land will be used. This represents an irretrievable loss of productive agricultural land in general, and for sugarcane production in particular. The loss of this land for agricultural uses would also result in a loss of income from sugarcane production and the possible loss of employment opportunities due to decreased production.

The commitment of construction materials to build the proposed project represents an irretrievable loss of this material for similar uses elsewhere. Also, the use of labor and fossil fuel energy (for operating) during project construction is an irretrievable loss of these resources.
BIBLIOGRAPHY


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Center for Non-Metropolitan Planning and Development, Agricultural Experiment Station 1975. "Kauai Socioeconomic Profile" University of Hawaii


State of Hawaii, Department of Planning and Economic Development 1972 "Kauai County Land Inventory Report"


Wilson Okamoto & Associates, 1977
"A Status Report on the Planning of the Hanamauulu-Ahukini Cutoff Road"


Consultants to the State of Hawaii, Department of Transportation:
Engineering - Wilson, Okamoto and Associates
Social, Economic and Environmental - VTN Pacific (Authors of this EIS)
Plate 1  View Northbound along Kuhio Highway at Wilcox Memorial Hospital at approximately 10:30 A.M. Note heavy highway traffic and vehicles attempting to exit from hospital.

Plate 2  View Southbound along Kuhio Highway from the Ahukini Road intersection towards the central business area of Lihue. Note heavy off-peak hour traffic (approx. 10:30 A.M.) on highway and also the parking situation which forces vehicles to back up onto the main highway.
Plate 3  View from Ahukini Road and Kuhio Highway intersection west towards the airport. Traffic beginning to back up on the Ahukini Road to turn left onto Kuhio Highway towards central Lihue.

Plate 4  View of Kuhio Highway from Kauai Hardwood Store looking towards Lihue. Note that the road at the proposed intersection with alignment A is depressed.
Plate 5  View of the intersection of Ahukini Road and Kapule Highway, looking towards Nawiliwili. The Southern end of the proposed cutoff road will begin here.

Plate 6  View of canefield access road along the proposed cutoff road alignment. Note the overhead utilities and irrigation ditch adjacent to the road.
Plate 7  View upstream of the Hanamaulu Valley from the railroad bridge. The proposed highway bridge will cross on the foreground.

Plate 8  View of the proposed highway bridge site and the existing vegetation cover.
Plate 9 View from Hanamaulu County Park of the Valley crossing of the proposed highway

Plate 10 View of the existing railroad bridge and Hanamaulu County Park from the bridge site.
Plate 11 View of the Hanamau Valley and Hanamau Town from the proposed cutoff alignment. Vistas overlooking the valley will be enhanced by the road.

Plate 12 Another view of the Hanamau Valley and the proposed bridge site.
APPENDIX A
ORGANIZATIONS AND
PERSONS CONSULTED
Appendix A  Organizations and Persons Consulted For the Draft EIS

Comments and Responses to the EIS Preparation Notice

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* Denotes "no comment"
August 29, 1977

Mr. E. Alvey Wright
Director, Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Wright:

This is in response to your notice of intent dated July 11, 1977, to prepare an environmental impact statement for the proposed Hanamalu-Ahokini Cut-Off Road, Project No. 51C-01-76, Island of Kauai, Hawaii.

Pursuant to Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f, as amended, 90 Stat. 1320) the Council is charged with the responsibility of providing Federal agencies with comments on their undertakings which affect cultural resources. Until the Council has been notified by a Federal agency that it has determined an undertaking will affect a property included in or eligible for inclusion in the National Register of Historic Places, the Council is unable to comment.

The Council on Environmental Quality's guidelines for compliance with the National Environmental Policy Act of 1969 direct Federal agencies to forward copies of environmental statements prepared for undertakings which will have an impact on cultural resources to the Council for review and comment. Therefore, because the Council has no legislative or administrative authority to comment to state or private agencies, the following remarks are directed to the Federal Highway Administration who will be assisting in the construction of the undertaking.

As part of its planning process the FHWA should arrange to have the areas to be impacted by the undertaking surveyed to identify cultural properties eligible for inclusion in the National Register of Historic Places. After the survey is complete, if FHWA determines, in consultation with the Hawaii State Historic Preservation Officer, that the undertaking will result in an effect on any property included in or eligible for inclusion in the National Register it is required to afford the Council an opportunity to comment on the undertaking pursuant to Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. 470f).

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.

Subsequently, the environmental statement prepared for the undertaking should assess its impact on historic and cultural resources. If any of these properties are included in or eligible for inclusion in the National Register the environmental documentation should demonstrate contact with the Council and include a copy of its comments. Should you have questions or require assistance in this matter, please contact Michael H. Bureman of the Council's staff at P. O. Box 25085, Denver, Colorado 80225, telephone number (303) 234-4946, an FTS number.

Sincerely yours,

[Signature]
Louis S. Wall
Assistant Director, Office of Review and Compliance
October 13, 1977

Mr. Louis S. Wall
Advisory Council on
Historic Preservation
1522 K Street NW
Washington, D.C. 20005

Dear Mr. Wall:

Subject: EIS Preparation Notice for the Hanamalu-Ahukini Cutoff Road

Thank you for your letter of August 29, 1977. The Environmental Impact Statement will address the cultural and historic resources of the proposed corridor. For your information, our State Historic Preservation Officer has indicated that there are no known historic or archaeological sites within the project area likely to be eligible for inclusion to the Hawaii and/or National Register of Historic Places.

Sincerely,

E. Alvex Wright
Director
Dear Mr. Wright:

Subject: EIS Preparation Notice – Hanamaulu-Ahukini Cut-off Road
Project No. 51G-01-76, Island of Kauai

We reviewed the subject preparation notice and offer the following comments for your consideration when preparing the environmental impact statement:

The EIS should mention the amount of agricultural land that will be taken out of production and the acres of prime agricultural land that will be affected. Also, the impact on the loss of jobs, if any, and loss of sugar yields should be discussed.

The following soils located in the project area are classified as prime:

LhB – Lihue silty clay, 0 to 8 percent slopes
LhC – Lihue silty clay, 8 to 15 percent slopes
LhG – Lihue gravelly silty clay, 0 to 8 percent slopes
LcC – Lihue gravelly silty clay, 8 to 15 percent slopes
LuA – Lualualei clay, 0 to 8 percent slopes
Mr – Mokuleia fine sandy loam

If you have any questions on prime agricultural classification, please contact Mr. Bill Forrest, District Conservationist, Lihue Field Office, phone: 245-3914.

We appreciate the opportunity to review this preparation notice.

Sincerely,

[Signature]

Jack P. Kanaz
State Conservationist

cc: Bill Forrest, Lihue
October 14, 1977

Mr. Jack P. Kanalz
State Conservationist
U.S. Department of Agriculture
Soil Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Kanalz:

Subject: EIS Preparation Notice for the Hanamalu-Ahuikini Cutoff Road

Thank you for your letter of August 2, 1977. We appreciate the information on the soils in the project area, and will incorporate it into the Environmental Impact Statement. We will also assess the impact of the proposed highway on agricultural activities.

Sincerely,

[Signature]

E. Alvey Wright
Director
Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Gentlemen:

We received the Environmental Impact Statement Preparation Notice for the Hanamaulu-Ahukini Cut-off Road, Project No. 5IC-01-76, Island of Kauai, on 14 July 1977. At this time we offer the following comments:

a. If filling portions of the lower Hanamaulu Stream wetland is necessary, a Department of the Army Permit under Section 404, Federal Water Pollution Control Act Amendments of 1972, may be required.

b. For your information and assistance in planning, we have enclosed a map (FP-23) of the Hanamaulu Flood Hazard Area prepared by the State of Hawaii, Department of Land and Natural Resources (DOWALD) in cooperation with the Department of the Army.

We appreciate the opportunity to review this notice.

Sincerely yours,

J. S. Cheung
Chief, Engineering Division

1 Incl
Hanamaulu Flood Hazard Area Map
October 14, 1977

Mr. Kisuk Cheung, Chief
Engineering Division
Department of the Army
Building 230, Fort Shafter
AFO San Francisco 96558

Dear Mr. Cheung:

Subject: EIS Preparation Notice for the Hanamauu-Ahukini Cutoff Road

Thank you for your letter of August 5, 1977. We are aware of the Department of the Army permit requirements and will submit an application at the appropriate time. We appreciate the Hanamauu flood hazard map you provided. The map will render valuable assistance in our hydrologic studies.

Sincerely,

[Signature]
E. Alvey Wright
Director
Mr. Ralph T. Segawa
Division Administrator
Federal Highway Administration
300 Ala Moana Blvd., Suite 4119
Post Office Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

This responds to your request for comments on the Environmental Impact Statement Preparation Notice for the Hanamalu-Ahukini Cut-off Road, Island of Kauai.

The Notice mentions that the Hanamalu Beach Park is located in the vicinity of the proposed project. From the map provided with the Notice, it appears that this park is outside of the study corridor. However, if it appears that this park could be impacted, please be advised that development of the park has been funded with a Land and Water Conservation Fund (LWCF) grant. If the park is impacted, the provisions of Section 6(f) of the LWCF Act may be applicable in that the taking of land from funded parks would require the approval of the Secretary of the Interior and replacement land of equal value and utility. If the Hanamalu Beach Park is to be affected by the project, we recommend you notify us of this fact and that you also consult with Mr. Hideto Kono, Director, Department of Planning and Economic Development, who is the liaison officer in Hawaii for LWCF matters.

We appreciate the opportunity to comment on your preparation notice.

Sincerely yours,

Frank E. Sylvester
Regional Director
United States Department of the Interior
FISH AND WILDLIFE SERVICE
Division of Ecological Services
300 Ala Moana Blvd., Rm. 5302
P. O. Box 50167
Honolulu, Hawaii 96850

Reference: ES

September 27, 1977

Mr. Ralph Segawa
Division Administrator
U. S. Department of Transportation
P. O. Box 50205
Honolulu, Hawaii 96850

Re: Hanamaulu-Ahukini Cutoff Road, Proj.
No. 51C-01-76,
Island of Kauai
Environmental Impact Statement
Preparation Notice

Dear Mr. Segawa:

We have reviewed the referenced notice, dated 8 August 1977,
concerning construction of a cut-off road which could impact
endangered waterbird and stream habitat. We noted that
field studies will be conducted to assess the quality of
existing endangered waterbird habitat in the project
vicinity. In addition, research is proposed to evaluate
the potential increase in turbidity in Hanamaulu Stream
because of bridge and road construction and the possible
redirection of sugar mill wash water.

Because this project could adversely affect endangered
species, we recommend you contact Mr. Eugene Kridler, the
Service's Hawaii Endangered Species Coordinator, to
determine if formal coordination is required as mandated by
Section 7 of the Endangered Species Act of 1973. Mr.
Kridler will also be able to assist in establishing adequate
criteria to evaluate the quality of the existing endangered
aterbird habitat within the sphere of project influence. He can be contacted at 300 Ala Moana Blvd., Room 5302, P. O. Box 50167, Honolulu, Hawaii 96850, Telephone Number 546-5615.

Since the terrestrial biota largely consists of introduced species, its loss is not expected to be significant. However, road construction could result in adverse impacts to both stream and marine biota. These impacts would generally be caused by increased turbidity resulting from erosion, associated with road construction and clearing, redirection of sugar mill wash water, and instream work. In addition, aquatic habitat disruption will occur during construction of the stream crossing. Little data is available to assess the magnitude of these impacts. Therefore, we recommend a biological survey of Hanamaulu Stream be conducted to determine its species composition. The potential impacts on the species should be included in the Environmental Impact Statement.

Please keep us informed of any action taken on this project.

Sincerely yours,

[Signature]

Maurice H. Taylor
Field Supervisor

cc: HA
ARD(AE)
NHFS
HDF&G
Hawaii Endangered Species Coordinator
Rear Admiral E. Alvey Wright, USN (Ret.)
Director, Department of Transportation
State of Hawaii
859 Punchbowl Street
Honolulu, Hawaii 96813

Dear Admiral Wright:

We have reviewed the Hanamalu-Ahukini Cut-off Road Environmental Impact Statement Preparation Notice.

The Federal Aviation Administration does not have any facilities within or adjacent to the highway corridor being studied. We foresee no impact to FAA operational activities.

We would like to point out, however, that the State of Hawaii, Air Transportation Facilities Division will be proceeding on a project to construct a new runway at Lihue Airport in the near future, with FAA participation under the Airport Development Aid Program (ADAP). This project requires the acquisition of 600 acres of cane land and will result in surplus sugar mill wash water which cannot be utilized for irrigating the cane land. This problem is now being studied by the State of Hawaii and Lihue Plantation. Acquisition of cane land for the Hanamalu-Ahukini Cut-off Road will further add to the surplus sugar mill wash water, as indicated in par. VI H Water Resources. A coordinated study will be required to resolve this problem.

We thank you for the opportunity to review and comment on the Environmental Impact Statement Notice of Preparation for the Hanamalu-Ahukini Cut-off Road.

Sincerely,

James N. Cox
Chief, Airports Division, APC-600
October 14, 1977

Mr. James M. Cox  
Chief, Airports Division  
U.S. Department of Transportation  
Federal Aviation Administration  
Pacific - Asia Region  
P.O. Box 4009  
Honolulu, Hawaii 96813

Dear Mr. Cox:

Subject: EIS Preparation Notice for the Hanamalu-Ahukini Cutoff Road

Thank you for your comments of July 19, 1977. The problem of surplus sugar mill wash water will be addressed in the EIS.

Sincerely,

[Signature]

E. ALVEY WRIGHT  
Director
July 28, 1977

MEMORANDUM

To: Mr. E. Alvey Wright, Director
   State Department of Transportation

Subject: Hamamaulu-Ahukini Cut-off Road
         Project No. 51C-01-76, Island of Kauai
         EIS Preparation Notice

The Department of Agriculture has reviewed the subject EIS Preparation Notice, and comments as follows:

The area is currently in agricultural use and designated as State Land Use Agricultural District. The Kauai General Plan has identified the area as having medium to high agricultural potential. The Land Study Bureau land classification system rates most of the affected lands as "B" (overall productivity rating).

Because of these considerations, we ask that the assessment process adequately address the agricultural impacts and mitigation measures, including alternative actions.

Thank you for the opportunity to comment.

John Farias, Jr.
Chairman, Board of Agriculture

--signature--
MEMORANDUM

TO: THE HONORABLE JOHN FARIAS, JR., CHAIRMAN
BOARD OF AGRICULTURE

FROM: E. ALVEY WRIGHT, DIRECTOR
DEPARTMENT OF TRANSPORTATION

SUBJECT: EIS PREPARATION NOTICE FOR THE HAMAMULU-AHUKIN_CI
Cutoff Road
Reference: Your memorandum dated July 28, 1977

Your comments on the impact to agricultural lands and
activities will be considered and addressed in our Environmental
Impact Statement. Thank you for your continued cooperation.

E. ALVEY WRIGHT

A-14
July 26, 1977

TO:  Admiral E. Alvey Wright
     Director, Department of Transportation

THROUGH: Koichi H. Tokushige
         Assistant Superintendent
         Office of Business Services, DOE

FROM: Barton H. Nagata
      District Superintendent

SUBJECT: Environmental Assessment
         Hanamalu-Ahukini Cut-off Road

We feel that the proposed Hanamalu-Ahukini Cut-off Road is desirable because it would lessen the amount of traffic on Kuhio Highway between Hanamalu and Lihue.

The school buses will have less traffic to contend with in the morning when they transport school children from Hanamalu to Wilcox Elementary School in Lihue and to Kauai High & Intermediate School in Nawiliwili. The same beneficial effect will be felt when the school buses return the children from the two schools to Hanamalu in the afternoon. The parents who drive their children to and from school will also have less traffic to deal with. (There is no school in Hanamalu; therefore, all of the school age children must be transported to public or private schools in Lihue or Nawiliwili.)
October 14, 1977

Mr. Barton H. Nagata
District Superintendent
Department of Education
Kauai Schools
P.O. Box 1307
Lihue, Hawaii 96766

Dear Mr. Nagata:

Subject: EIS Preparation Notice for the Hanalei-Ahukini Cutoff Road

Thank you for your expression of support for this project. Providing a safer highway with less congestion is our primary objective.

Sincerely,

E. Alvey Wright
Director
MEMORANDUM

TO: E. Alvey Wright, Director
   Department of Transportation

FROM: (Mrs.) Billie Beamer, Chairman

SUBJECT: Hanamalu-Ahukini Cut-off Road
          Project No. 51C-01-76, Island of Kauai
          Environmental Impact Statement
          Preparation Notice

Since the subject project does not affect our lands, we have
no comments to offer.

Thank you for the opportunity to review.

\[(Mrs.) BILLIE BEAMER, CHAIRMAN\]
MEMORANDUM

To: Admiral E. Alvey Wright, Director
   Department of Transportation

From: Chief, Environmental Protection & Health Services Division

Subject: Hanamulu-Ahuini Cut-Off Road Environmental Impact
         Statement, Project No. 510-01-76, Island of Kauai

Thank you for notifying us of the proposed cut-off road.

Our concerns were noted in our June 6, 1977 letter. The
following comments are offered again for your consideration.

Vehicular noise would be a problem to the residential or
recreational areas, depending on where the road is built.

Dust, soil erosion and pollution of Hanamulu Stream would
be a problem during construction and from activities resulting
from the proposed cut-off road unless proper control measures are taken.

We will appreciate coordinating with your staff in reviewing
the schematic detailed plans as they are made available.

SHINJI SONEDA

August 11, 1977
Mr. Shinji Soneda, Chief
Environmental Protection and
Health Services Division
Department of Health
1250 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Soneda:

Subject: EIS Preparation Notice for the Hanamalu-Ahukini Cutoff Road

Thank you for your comments on the subject EIS Preparation Notice. We are weighing a number of constraints in our selection of the optimum alignment for the proposed highway, and noise impact is one of these.

Mitigating measures for the impacts of dust, soil erosion and pollution of Hanamalu Stream will be addressed in the Environmental Impact Statement.

You can be assured that you will be given an opportunity to review our plans at the appropriate time.

Sincerely,

[Signature]
E. ALVEY WRIGHT
Director
Honorable E. Alvey Wright  
Director  
Department of Transportation  
869 Punchbowl Street  
Honolulu, HI 96813

Dear Sir:

Subject: Hanamaulu-Ahukini Cut-Off Road

The EIS preparation notice for this project states intent to address impact on wildlife. During construction of the bridge over Hanamaulu Stream, fisheries resources may be affected. With proper precaution, adverse effects can be minimized.

Also, please refer to our August 1974 Map FP-23 prepared by our Division of Water and Land Development.

Very truly yours,

W. Y. THOMPSON  
Chairman of the Board

cc: Fish & Game  
DONALD

A-20
October 14, 1977

The Honorable William Thompson  
Chairman and Member  
Board of Land and Natural Resources  
P.O. Box 621  
Honolulu, Hawaii  96809

Dear Mr. Thompson:

Subject: EIS Preparation Notice for the Hanamaulu-Ahukini Cutoff Road

Thank you for your letter of August 17, 1977. The Environmental Impact Statement will evaluate mitigating measures for the potential impact to aquatic life. Your flood hazard map and other hydraulic data are presently being used in our corridor selection studies.

Sincerely,

E. ALVEY WRIGHT  
Director
The Honorable E. Alvey Wright  
Director  
Department of Transportation  
State of Hawaii  
849 Punchbowl Street  
Honolulu, Hawaii 96813  

Dear Mr. Wright:

Subject: Environmental Impact Statement Preparation Notice  
Hanamaulu-Ahukini Cut-off Road, Project No. 51C-01-76  
Island of Kauai

We have reviewed the subject E.I.S. Preparation Notice and wish to offer the following comments for your consideration:

1) In general, major environmental impacts which should receive thorough assessment in the E.I.S. document have been adequately identified in the preparation notice.

2) As visual impact will be an important consideration in a project of this size, may we suggest that the E.I.S. document provide an adequate graphic description of the proposed facility as it relates to surrounding areas, landscapes, and vistas.

3) A determination should be made as to whether the proposed bikeway facility will be constructed along the roadway or railroad rights-of-way. In this regard, may we suggest that you contact the Mayor's Bikeway Advisory Committee and the Kauai Outdoor Circle, Parks and Bikeway Committee to solicit public input.

4) An effort should be made to determine the impact of the proposed facility on motor vehicle and bicycle movement along Kapule Highway (Hanamaulu Road), Kuhio Highway, Rice Street and Ahukini Road.

Thank you for the opportunity to review and comment upon the subject E.I.S. preparation notice. We look forward to reviewing the final E.I.S. document upon its completion.

Sincerely,

[Signature]

cc: Governor George R. Ariyoshi
The Honorable Hideto Kono  
Director  
Department of Planning  
and Economic Development  
P.O. Box 2359  
Honolulu, Hawaii  96804

Dear Mr. Kono:

Subject: EIS Preparation Notice for the  
Hanauma-Ahukini Cutoff Road

Thank you for your comments and suggestions expressed in  
your letter of August 3, 1977. They will be helpful in our  
efforts to design this highway.

We fully agree that the visual impact is an important  
consideration of this project. The Environmental Impact  
Statement will address this issue in detail.

We are currently studying the alternative bikeway  
locations, although our preference is to include it in the  
highway right-of-way.

We will address the traffic circulation impacts of the  
proposed highway in the EIS.

Sincerely,

E. Alvey Wright  
Director
MEMORANDUM

TO: Honorable B. Alvey Wright, Director
    Department of Transportation
    869 Punchbowl Street
    Honolulu, Hawaii 96813

FROM: Andrew L. T. Chang, Director
      Department of Social Services and Housing

SUBJECT: Hanamaulu-Ahukai Cut-off Road
          Project No. 510-01-76, Island of Kauai
          Environmental Impact Statement
          Preparation Notice

Subject EIS preparation notice has been reviewed for affect on departmental
programs. We are of the opinion that relief offered by the proposed bypass
route will benefit our Kauai operation by reducing the present and predicted
traffic flow in Lihue in the vicinity of the State building.

Thank you for the opportunity to review and comment.

[Signature]

cc: Governor, State of Hawaii

A-24
MEMORANDUM

TO:       THE HONORABLE ANDREW I. T. CHANG, DIRECTOR
            DEPARTMENT OF SOCIAL SERVICES AND HOUSING

FROM:     E. ALVEY WRIGHT, DIRECTOR
            DEPARTMENT OF TRANSPORTATION

SUBJECT:  EIS PREPARATION NOTICE FOR THE HANAULU-AHUKINI
            CUTOFF ROAD
            Reference: Your memorandum dated July 29, 1977

Thank you for your review of the subject EIS Preparation Notice, and for the expression of support of this project.

E. ALVEY WRIGHT
July 19, 1977

Mr. E. Alvey Wright
State of Hawaii
Department of Transportation
889 Punchbowl St.
Honolulu, HI 96813

Dear Mr. Wright:

Subject: Hanamaulu-Ahukini Cut-off Road

In my opinion, the majority of the people on Kauai will definitely profit by the Hanamaulu-Ahukini cut-off road.

In addition to alleviating 25% to 30% of the flow of traffic, the major benefit is the safety factor. The combination of students going to school and the people who are going to work from the Kawaihau and Hanamaulu area causes so much congestion between the vicinity of Kapaa and the Lihue proper that traffic has become hazardous. Since January 1, 1977 to July 5, 1977, we have had 13 reported automobile accidents in this vicinity (Kapaa & Lihue proper). These accidents occurred between the hours of 7 to 11 A.M. and 3 to 7 P.M.

The Hanamaulu-Ahukini cut-off road will definitely cut down these accidents; this alone should be a strong justification for it.

Sincerely,

[Signature]

Mr. Maboru Yamane
Transportation Commissioner
Department of Transportation
October 13, 1977

Mr. Noboru Yamane
Transportation Commissioner
311 Hookipa Road
Kapaa, Hawaii 96746

Dear Mr. Yamane:

Subject: EIS Preparation Notice for the Hanamaulu-Ahukini Cutoff Road

Thank you for your letter of July 19, 1977 expressing support for this project. We also appreciate the traffic accident statistics, and will include this information in the Environmental Impact Statement.

Sincerely,

E. Alvey Wright
Director
July 20, 1977

Mr. E. Alvey Wright, Director
Department of Transportation
869 Punchbowl Street,
Honolulu, Hawaii 96813

Dear Mr. Wright:

SUBJECT: KANAMULLU-ARAKI CUT-OFF ROAD
PROJECT NO. 516-01-76
ENVIRONMENTAL IMPACT STATEMENT
PREPARATION NOTICE

Reference is made to your letter dated July 11, 1977 with the
Environmental Impact Statement, Notice of Preparation for the subject
project.

We feel that the subject project will be beneficial from the
standpoint of relieving the congested Kuhio Highway which goes through
Kanamulu, Kapaa, and Lihue business and residential areas. The
improvement will provide an alternate route to Lihue-Kamali'i and
the airport and thereby ease the present traffic congestion along Kuhio
Highway.

Thank you for the opportunity to comment on the environmental
Notice of Preparation.

Very truly yours,

[Signature]

[Title]
County Engineer

[Signature]

[Title]
County Engineer
Mr. Henry Morita
County Engineer
County of Kauai
Department of Public Works
4396 Rice Street
Lihue, Hawaii 96766

Dear Mr. Morita:

Subject: EIS Preparation Notice for the Hanamaulu-Ahukini Cutoff Road

Thank you for your letter of July 20, 1977 expressing support of this project. We will continue to coordinate our planning with you. We appreciate your continued cooperation and assistance.

Sincerely,

[Signature]
E. ALVEY WRIGHT
Director
August 8, 1977

Mr. E. Alvey Wright
State of Hawaii
Department of Transportation
505 Punchbowl St.
Honolulu, HI 96813

Ref: LT-PA, 2.39424

Re: Hanamaulu-Ahukini Cut-off Road Project No. 51C-01-76,
Island of Kauai, Environmental Impact Statement
Preparation Notice

I have reviewed the subject preparation notice and have no comments.

Walter L. Briant, Jr.
Manager & Chief Engineer

RS/st
August 15, 1977

Mr. E. Alvey Wright
Director
Dept. of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Sir:

Subject: Hanamaulu-Ahukind Cut-off Road
Project No. 51C-01-76, Kauai
Environmental Impact Statement
Preparation Notice

The Council of the County of Kauai acknowledges receipt of your letter of July 11, 1977, relative to the above subject.

Very sincerely,

Tad T. Miura
County Clerk
County of Kauai
August 10, 1977

Mr. E. Alvey Wright, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, HI  96813

Dear Mr. Wright:

SUBJECT: Hanamaulu-Ahukini Cut-off Road
Project No. STC-01-76, Island of Kauai
Environmental Impact Statement
Preparation Notice

The proposed Hanamaulu-Ahukini Cut-off Road will create a major
economic impact for Kauai County, especially those communities east
of Lihue.

While serving as the hub of the island's government and business
activities, Lihue is also the main transportation network for incoming
goods and services. The principal roadway between Lihue and Wailua
is currently congested with heavy industrial and tourist related
traffic.

The Kauai General Plan indicates that the Kapaa-Wailua area is
designated as one of the primary resort destination areas on the island.
Currently, there are about 1,711 visitor units in this area. Within
five years, we can anticipate an additional 700 visitor units for
Wailua-Kapaa, a 40% rise in visitor units for this area. As visitor
facilities expand, the volume of visitor traffic will also increase
significantly and cause further traffic congestion within the existing
traffic route. Support services and related activities can be expected
to expand in proportion to the increase in visitor units, thereby fur-
ther increasing traffic congestion. We can reasonably expect also that
communities beyond Wailua-Kapaa, especially Kilauea-Hanalei, to generate
significant growth in the years ahead and will also influence and add
to the congestion existing.
Mr. E. Alvey Wright  
Page 2  
August 10, 1977

The north bound through traffic coming from the Lihue Airport and Nawiliwili Harbor would bypass the Lihue business district thus relieving congestion and improve driving conditions for local traffic. Greater efficiency of time and lower costs would probably be realized by commercial and other users of the proposed cut-off.

While greater consideration must be given to the merits of the proposal in comparison with alternative recommendations, we support the concept of the Hanamaulu-Ahukini cut-off and request that you begin as soon as possible in the preparation of the Environmental Impact Statement.

Sincerely,

[Signature]
JAMES N. KURITA  
Director

/bu
October 14, 1977

Mr. James N. Kurita, Director
Office of Economic Development
County of Kauai
4396 Rice Street
Lihue, Hawaii  96766

Dear Mr. Kurita:

Subject: EIS Preparation Notice for the Hanamulu-Ahu Kini Cutoff Road

Thank you for your letter of August 10, 1977. The information on visitor units will be incorporated in the Environmental Impact Statement. We appreciate your support of this project.

Sincerely,

E. Alvey Wright
Director
August 2, 1977

Mr. E. Alvey Wright
Director
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Subject: Hanamaulu-Ahukini Cut-Off Road
Project No. 51C-01-75, Island of Kauai
Environmental Impact Statement
Preparation Notice

The subject proposal has been reviewed. Please be informed that we concur and highly support the concept of the cut-off highway. The study corridor is consistent with the recommendation of the Lihue Development Plan relative to the circulation system in and around Lihue.

The present highway system forces all traffic through the Lihue and Hanamaulu urban corridors causing greater traffic congestions each year and adding to the traffic problems and inconveniences experienced by users of the highway.

We feel that the proposed cut-off highway should definitely relieve much of the peak period congestion on Kuhio Highway from Lihue to Hanamaulu and would also aid in directing industrial traffic passing through Lihue around the town core.
Thank you for affording us the opportunity to comment on the subject matter.

Brian Nishimoto
Planning Director

cc: Mayor
Commission
Ed Nakano
August 2, 1977

Mr. E. Alvey Wright
Director
Department of Transportation
859 Punchbowl Street
Honolulu, Hawaii 96813

Subject: Hanamalu-Ahukini Cut-Off Road
         Project No. 51C-01-75, Island of Kauai
         Environmental Impact Statement
         Preparation Notice

Please find attached a copy of the Planning Department's comments on the subject project.

I concur with the Planning Director's statements and fully support the proposed Cut-Off Highway.

Eduardo E. Malapit
Mayor
October 13, 1977

The Honorable Eduardo E. Malapit
Mayor, County of Kauai
4396 Rice Street
Lihue, Hawaii 96766

Dear Mayor Malapit:

Subject: EIS Preparation Notice for the Hanamaulu-Ahukini Cutoff Road

Thank you for your letter of August 2, 1977 forwarding the Planning Department's comments. We especially appreciate your support of this project.

Sincerely,

E. Alvey Wright
Director
August 5, 1977

Honorable E. Alvey Wright, Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Wright:

Subject: Hanamaulu-Ohukini Cut-off Road
Project No. 51C-01-76, Island of Kauai
And Traffic Lights - Kuhio Highway

I transmit herewith copies of a petition bearing 322 signatures requesting that measures be taken aimed at relieving traffic congestion on State Highway 50 (Kuhio Highway) from the town of Hanamaulu to Lihue.

The recent announcement that $150,000 has been released by the Governor to conduct a study on the Hanamaulu-Ohukini Cut-off Road, Project No. 51C-01-76, is a welcome step. The August 1, 1977 meeting by your Kauai District office proved to be very informing.

For many years, the problem of traffic congestion in Lihue-Hanamaulu section of Kuhio Highway has been a growing one. Kauai County's Vehicle Registration records reveal that around 1958, 11,000 vehicles were on the county's rolls. In 1977, more than 25,000 vehicles are registered.

The existing traffic counts displayed by Wilson, Okamoto & Associates support the fact that the traffic flow in the subject route corridor between Lihue and Hanamaulu is badly congested and will continue to worsen.

To help relieve the traffic congestion, the Hanamaulu-Ohukini Cut-off Road is urgently needed. However, I recognize that even if the processing, funding and construction were to proceed smoothly, a minimum of 5 years would be required before the cut-off would be ready to carry traffic. With this in mind, on behalf of the many petitioners, I respectfully request that your Department consider the installation of traffic lights at the intersections described as follows:

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Honorables E. Alvey Wright, Director
August 5, 1977
Page 2

1. Hanamaulu Beach Road & Kuhio Highway - Hanamaulu
2. Laukona & Kuhio Highway - Hanamaulu
3. Eono Street, Wilcox Hospital & Kuhio Highway - Lihue
4. Ehiku Street & Kuhio Highway - Lihue
5. Ahukini Road & Kuhio Highway - Lihue
6. Hardy Street & Kuhio Highway - Lihue

Although traffic lights will not relieve the congestion problem, I firmly believe that they will help to better regulate traffic flow. This can serve hopefully until the construction of the Cut-off Road is completed.

Your kind consideration and cooperation is requested. I am sure that your efforts will be recognized.

Thank you.

Sincerely yours,

Eddie Saito
Councilman - Kauai

cc: Mr. Ed Nakano
Mr. Kenneth O. Nagai
Miss Betty Bell

A-40
State of Hawaii  
Department of Transportation  
869 Punchbowl Street  
Honolulu, HI 96813

ATTENTION: Mr. E. Alvey Wright, Director

SUBJECT: HANAMAULU-AHUKINI CUT-OFF ROAD  
LT-PA 2.38424 - YOUR PROJECT NO. 51C-01-76

Dear Mr. Wright:

We have reviewed your Environmental Impact Statement Preparation Notice and have the following comments:

1. Kauai Electric presently has a 12,470 Volt distribution circuit located within the study corridor.
2. The distribution circuit may have to be relocated depending upon your final alignment.
3. The total cost of such relocation will have to be borne by the State.

We appreciate having the opportunity to review the Environmental Impact Statement Preparation Notice and ask that we be kept informed of the status of this project so that we may properly schedule our work load.

Very truly yours,

BOYD T. TOWNSLEY  
Manager

BTT:kk
October 14, 1977

Mr. Boyd T. Townsley
Manager, Kauai Electric
Citizens Utilities Company
P.O. Box 278
Eleele, Hawaii 96705

Dear Mr. Townsley:

Subject: EIS Preparation Notice for the Hanamaulu-Ahukini Cutoff Road

Thank you for the information on your distribution circuit provided in your letter of July 18, 1977. Please be assured that we will coordinate our plans with you.

Sincerely,

E. Alvey Wright
Director
August 21, 1977

Gentlemen:

In reply to your letter of July 11, 1977 on the above subject, I would like to reserve comments at this time due to the fact that I have just returned to Hawaii after two months on the mainland.

I note that the cut-off date for replies to the E. I. S. Notice of Preparation on the project in the E. Q. C. Bulletin is August 22, 1977; therefore I am sending a copy of this letter to that office.

Thank you for your letter and I would appreciate any further information that will become available on the proposed project.

Sincerely,

[Signature]

For:  LIFE OF THE LAND
      HAWAII CHAPTER,
      SIERRA CLUB

CC. E.Q.C.

Hellen C. Hopkins
P. O. Box 266
Hanalei, Hawaii 96714
Mr. R. Alvey-Wright, Director
State of Hawaii, Department of Transportation
367 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Wright,

The Environmental Impact Statement Notice of Preparation for the Waimea-Kealakekua Bay Road (Kamilo Extension) was indeed of interest to us. Thank you for informing us of it.

We were notified by Mr. Edwin Nakano of a public discussion to be held August 1st in Hilo, concerning this matter. We plan to submit our views at that time.

Attached is the statement which The Kauai Outdoor Circle has prepared outlining our concerns. We trust that the state will thoughtfully consider the requests and opinions which it has solicited.

Sincerely,

Mrs. Thelma Marum
Mrs. Jean Williams
Landscaping Chairman
President

Duplicate letter to Mr. Edwin Nakano
Statement attached

A-44
THE KAULI OUTDOOR CIRCLE

August 1, 1977

The Kauai Outdoor Circle has several objectives, three of which are:

1. To assist in planning the planting of streets, highways and other areas dedicated to public use.

2. To stimulate a love of nature and a sense of ordered beauty.

3. To conserve and develop the natural beauties of the landscape by encouraging the growth of native trees and shrubs, and the introduction of such new ones as belong to tropical life.

Accordingly we support the following goals in respect to the proposed improvement of Kapaia Highway or the extension of Kapuli Road:

1. For assistance in planning, we strongly urge you to have landscaping included in the master plan. This is the stage in which it should be done, and it should be done by experts, just as surely as every other aspect of the project will properly be in the hands of those most qualified.

2. To stimulate a love of nature; the many benefits proper landscaping provides, including shade and erosion control as the most obvious ones, will bring that about. If this area is not relegated to the bottom of the priority list and funded with a depleted budget.

3. For conservation and developments, we hope the engineers will attempt the least possible disturbance of the valley floor, in consideration of rare and endangered species of plant and animal life.

Finally, we call your attention to the February 3, 1972, document of the Highway Division of the Department of Transportation, detailing its "Policy on Landscaping of State Highways." We request that the proposed bypass be a Class I Road as defined in the section on classification of planted areas.

Under policy and purposes for planting, fourteen items are listed. They are important and clearly stated. If these are carried out by the state within guidelines they are, we feel that outstanding results will be achieved.

Thank you for considering the viewpoint of The Kauai Outdoor circle. It would be pleased to help in any way we can.

[Signature]

Mrs. Patsy H. Kagawa
Landscaping Chairman
The Kauai Outdoor Circle
October 14, 1977

Mrs. Thatcher Magoun
The Kauai Outdoor Circle
P.O. Box 921
Lihue, Hawaii 96766

Dear Mrs. Magoun:

Subject: EIS Preparation Notice for the Hanamaulu-Ahukini Cutoff Road.

Thank you for your letter of August 1, 1977 regarding landscaping for the proposed highway. Our typical section includes a landscaped strip along both sides of the highway. Any further suggestions you might have will be appreciated.

Sincerely,

E. Alvey Wright
Director
Planning Branch
Land Transportation Facilities Division
600 Kapiolani Blvd., Room 301
Honolulu, Hawaii 96813

Attention: Mr. Douglas Orimoto

Please be informed that we represent Mr. Malcolm S. Smith, who operates The Hardwood Factory on Kauai, within an area designated as a study corridor in the proposed Hanamaulu-Ahu-kini Cutoff project. We were informed that August 22, 1977 is the deadline for comments on the Environmental Impact Statement Preparation Notice. In view of that, we would like to make some comments on the Socioeconomic impact of the anticipated reduction of vehicles on Kuhio Highway.

Mr. Smith's business is located on the Northern tip of the study corridor. His business manufactures and retails wood products. His customers are mostly tourists who are driving through Hanamaulu and tourists who are on tours in tour busses. His shop is a regular stop for many of the tour companies. It is his feeling that if the proposed cutoff road was to pass makai of his business, that he would be denied the easy accessibility of his shop to the visitors who comprise the bulk of his customers at the present time.

Mr. Smith's hardwood factory is one of the few on this island using natural materials found on this island. However, the economic loss he anticipates if the cutoff road is constructed makai of his business location, can be alleviated if the proposed road was to join Kuhio Highway mauka of his business so the flow of traffic would continue to pass his place as it presently does.

Thank you for your consideration. If you require more information please do not hesitate to call on me.

ac

cc: Mr. Malcolm Smith

DENNIS R. YAMADA
A-47
October 14, 1977

Mr. Dennis R. Yamada
Shiraishi & Yamada
Attorneys at Law
P.O. Box 1246
Lihue, Hawaii 96766

Dear Mr. Yamada:

Subject: EIS Preparation Notice for the Hanamsulu-Ahukini Cutoff Road

Thank you for your letter of August 19, 1977 expressing Mr. Smith's concerns.

You can be assured that the socio-economic impact to Kauai Hardwoods will be considered in determining the location of the Cutoff Road.

Sincerely,

[Signature]

E. Alvey Wright
Director
Mr. E. Alvey Wright, Director  
Department of Transportation  
869 Punchbowl Street  
Honolulu, Hawaii 96813  

Dear Mr. Wright:  

Thank you for the opportunity to comment on the Environmental Impact Statement Preparation Notice for the Hanamaulu-Ahukini Cut-Off Road Project No. 51C-04-76, Island of Kauai (LT PA, 2.3924).  

Although we do not have specific knowledge of the project area, our general familiarity leads us to make the following observations:  

1. As the cut-off will become a major traffic carrier its effect on adjacent land use should be carefully considered. Development of this road will create attractive new access to hitherto agriculturally developed lands whose potential for conversion to other uses should be studied.  

2. The cut-off should take into consideration the established general plan for the study area and compliment its future goals and directions for development.  

3. Consideration should be given to the impact of traffic on those roads at either end of the cut-off. The traffic volume and its related impacts on the Kuhio Highway may be substantially the same with or without the proposed road. However, the effects of increased traffic on Ahukini Road and Kapule Highway and adjacent land uses should be made a part of the EIS's consideration.  

4. We assume that due consideration will be given to identifying any historical or archaeological resources within the project study area and appropriate mechanisms developed for their preservation or treatment.  

We hope these comments will be useful in the preparation of your EIS. If further contact is necessary please do not hesitate to call upon me.  

Sincerely,  

[Signature]  

cc: Kauai Historical Soc.  
Historic Hawaii Foundation  
National Trust Advisors  
Charles Black; S.H.P.O.  

Hisashi Bill Sugaya  
Assistant Director  

Headquarters Office: 740-74 Jackson Place, N.W., Washington, D.C. 20004 (202) 385-3594  
Midwest Office: 1500 South Prairie Avenue, Chicago, Illinois 60616 (312) 842-0179
October 14, 1977

Mr. Hisashi Bill Sugaya
Assistant Director
National Trust for Historic Preservation
740-748 Jackson Place, N.W.
Washington, D. C. 20006

Dear Mr. Sugaya:

Subject: EIS Preparation Notice for the Hanamalu-Ahukini Cutoff Road

Thank you for your comments and suggestions in your letter of August 5, 1977. They will be helpful in our planning efforts.

The Environmental Impact Statement will evaluate the impacts of the proposed highway on land use. The planned facility is consistent with the General Plan for the area.

We are currently evaluating traffic circulation in the area and will include this data in the EIS. The proposed project will alleviate the present congestion on Kuhio Highway.

The EIS will also address the archaeological and historical resources of the study corridor.

Sincerely,

E. Alvey Wright
Director

A-50
August 5, 1977

Mr. E. Alvey Wright, Director
State Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Wright:

I would like to thank you for the privilege of commenting on the Environmental Impact Statement Preparation Notice for the Hanamalu-Ahukini Cut-off Road.

The notice is well researched and composed. I would only like to comment that the general economic and social welfare of the Kauai community is being continually and devastatingly eroded by the daily increasing traffic congestion and noise along Kuolo Highway. The prompt construction of the proposed Ahukini-Hanamalu by-pass is the only reasonable solution to insuring access by the members and visitors of the community to the lifesaving emergency facilities available at our hospital.

Any projected population growth requiring access to the numerous public facilities and businesses along Kuolo Highway in Lihue would gain those services only under very hazardous conditions. Kauai already has more accidents per road mile than any island in the Hawaiian chain.

We presently have some 2500 signatures from Kauai citizens utilizing our facilities requesting congestion relief through the by-pass model.

The application of your considerable knowledge to expedite the construction of this Hanamalu-Ahukini Cut-off Road will be gratefully appreciated by all the people of Kauai.

Very truly yours,

Betty J. Bell
Chief Executive Officer
October 14, 1977

Ms. Betty J. Bell
Chief Executive Officer
G.N. Wilcox Memorial Hospital
3420 Kuhio Highway
Lihue, Hawaii  96766

Dear Ms. Bell:

Subject: ETS Preparation Notice for the Hanamaulu-Ahukini Cutoff Road

Thank you for your letter of August 5, 1977. We especially appreciate your expression of support for this project.

Sincerely,

E. ALVEY WRIGHT
Director
SUMMARY OF PUBLIC MEETINGS
MAJOR CONCERNS EXPRESSED

August 1, 1977: Wilcox Elementary School

The Hanamaulu-Ahukini Cutoff Road is very much needed; however, the alignment should not go through the Hanamaulu house lots.

Landscape provisions should be made in the plans for the extension of Kapule Road (cutoff road).

Kuhio Highway is presently very congested.

Hanamaulu-Ahukini Cutoff Road is in accord with the Lihue Development Plan.

December 15, 1977: Wilcox Elementary School, Lihue

The 5 year span to completing the project is too long. Something needs to be done to alleviate the present problem.

Kauai Hardwood Store employs approximately 20 persons, many of them handicapped. Since most of their business comes from the highway, the cutoff road should intersect Kuhio Highway mauka of the store.

The traffic situation on the existing Kuhio Highway is heavily congested especially at Wilcox Hospital.

The existing highway between Lihue and Hanamaulu has one of the highest accident rates in the State.
January 24, 1978: Hanamaulu Community Center

Four-lane highway may have trouble getting public acceptance. It would make sense to go with two lanes now and two lanes later if needed.

The proposed bridge across Hanamaulu Valley may contribute to additional pollution in the Bay.

Drivers cannot at present turn onto Kuhio Highway from the Hanamaulu subdivision. Project time frame should be pushed up.

Will a connection between the subdivision and the cutoff road be provided.

---

January 24, 1978: Meeting with the Smiths, Owners of Kauai Hardwood Store.

We have just started to make progress in this business, and here we have a captive market. If the makai alignment is selected, we would no longer have a captive market.

Tour buses may not stop if they have to turn back, as the makai alignment would require.

We want the connection to take place on the Lihue side of the store, with left turns allowed for cars heading toward Lihue.

Mr. Smith stated that besides handicapped people, they also employ ex-convicts who are normally regarded as unemployables.

To the question, "are there other outlets for sale of your goods", Mr. Smith replied that they retail to Sears and Penny's. It seems that in reality, approximately 50% (unconfirmed although not contested) of their sales occur at the store rather than the 99% figure given earlier.

The Smiths' were made aware that design considerations may not allow left turn movements in front of their store. They replied that they must have the movement.
PERSONS AND ORGANIZATIONS CONSULTED
DURING
PREPARATION OF THE DRAFT EIS

E. Akazawa  Department of Health
Arthur Bauckham  Department of Health
Greg Kamm  Kauai Planning Department
Eugene Kridler  U.S. Fish and Wildlife Service
Bob Schleck  Kauai Historical Society
Jane Smith  Kauai Hardwoods Store
Tom Telfer  Department of Fish and Game, Kauai
Ron Walker  Department of Fish and Game, Honolulu
Mr. Wilson  Controller, Lihue Plantation
Fred Zeillemaker  U.S. Fish and Wildlife Service
APPENDIX B  AIR QUALITY REPORT

A. INTRODUCTION

In this Appendix are presented the various elements of the air quality study conducted by VTN Pacifc for the proposed Hanamaulu Cut-off Road from Lihue to Hanamaulu, Kauai.

To determine the air quality impact of the proposed improvements, all available background air quality and meteorological data were examined and air quality levels were estimated for the base year 1977 and projected for the years 1980, 1990 and 2000. The air quality effects were then related to the applicable Federal and State standards to determine whether the proposed highway improvements will meet these criteria.

Two alternative actions were considered:

1. Construction of a highway from Ahukini Road to the vicinity of the Kauai Hardwoods Factory. A detailed discussion of the proposed project is included in Chapter I.

2. No Project alternative, in which the existing Kuhio Highway through Hanamaulu would continue to carry all traffic north of Lihue.

The microscale carbon monoxide effect associated with each alternative was determined, using the HIWAY Model developed by EPA for motor vehicle pollutant emissions along highways. In addition to CO impacts, a regional pollutant burden analysis was performed for motor vehicle-generated hydrocarbons (HC) and nitrogen oxides (NOx).

The various objectives of the air resources study are as follows:

1. Estimate background CO concentrations at the proposed site using the existing data base.
2. Convert motor vehicle traffic data to CO emissions and ambient air impact concentrations for the years 1977, 1980, 1990 and 2000 through highway diffusion modeling techniques.

3. Calculate pollutant (CO, HC, NOx, SOx, Particulates and Lead) emission burdens expressed in tons/day, on a regional basis.

These objectives were designed to meet the requirements of the National Environmental Policy Act of 1969. The air pollution effects for each alternative were assessed in terms of the National Ambient Air Quality Standards (NAAQS).

B. ASSUMPTIONS

1. Background Meteorology and Air Quality

The project area is located on the east coast of the island of Kauai, 1,000-6,000 feet from the shoreline. The wind is from the northeast quadrant at least 2/3 of the time, reflecting the persistent trade wind circulation of sub-tropical latitudes. Wind speeds in the project area average from 8 to 13 mph with 18.4% calm, as measured at the nearby Lihue Airport (Table 1).

The transport and dispersion of pollutants are influenced by both wind speed and atmospheric stability. The methodology applied in this study assumes a stability Class E which represents adverse dispersion conditions. The application of this stability category and the selection of maximum traffic flow volumes represent worst-case conditions which yield maximum estimated air quality impact concentrations.

A steady wind speed of 1 m/s (2.2 mi./hr.) is assumed in the dispersion model. Wind speed and direction data at the Lihue Airport indicate that this wind speed represents a moderate worst-case condition.

There has been only sporadic air quality monitoring in the Lihue area, and no data on carbon monoxide concentrations. A large portion of the area is used for sugarcane cultivation, and the only pollutant-generating industry in the area is the sugar mill, which emits mostly particulates. Therefore, a natural CO background level of 1 ppm has been assumed.
<table>
<thead>
<tr>
<th>Direction</th>
<th>0-7</th>
<th>8-11</th>
<th>12-17</th>
<th>18-22</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>1.5</td>
<td>0.8</td>
<td>0.1</td>
<td>0.0</td>
<td>2.4</td>
</tr>
<tr>
<td>NNE</td>
<td>3.5</td>
<td>4.2</td>
<td>0.5</td>
<td>0.0</td>
<td>8.2</td>
</tr>
<tr>
<td>NE</td>
<td>13.0</td>
<td>20.4</td>
<td>1.8</td>
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<td>35.3</td>
</tr>
<tr>
<td>ENE</td>
<td>8.7</td>
<td>11.6</td>
<td>0.9</td>
<td>0.0</td>
<td>21.2</td>
</tr>
<tr>
<td>E</td>
<td>2.1</td>
<td>1.7</td>
<td>0.1</td>
<td>0.0</td>
<td>3.9</td>
</tr>
<tr>
<td>ESE</td>
<td>0.6</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.8</td>
</tr>
<tr>
<td>SE</td>
<td>0.4</td>
<td>0.1</td>
<td>0.0</td>
<td>0.0</td>
<td>0.5</td>
</tr>
<tr>
<td>SSE</td>
<td>0.6</td>
<td>0.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.9</td>
</tr>
<tr>
<td>S</td>
<td>0.8</td>
<td>0.6</td>
<td>0.1</td>
<td>0.0</td>
<td>1.5</td>
</tr>
<tr>
<td>SSW</td>
<td>0.5</td>
<td>0.3</td>
<td>0.0</td>
<td>0.0</td>
<td>0.8</td>
</tr>
<tr>
<td>SW</td>
<td>0.7</td>
<td>0.4</td>
<td>0.1</td>
<td>0.0</td>
<td>1.2</td>
</tr>
<tr>
<td>WSW</td>
<td>0.7</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.9</td>
</tr>
<tr>
<td>W</td>
<td>2.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.0</td>
</tr>
<tr>
<td>WNW</td>
<td>0.7</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.7</td>
</tr>
<tr>
<td>NW</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.2</td>
</tr>
<tr>
<td>NNW</td>
<td>0.7</td>
<td>0.2</td>
<td>0.0</td>
<td>0.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Calm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18.4</td>
</tr>
</tbody>
</table>

TOTAL %  36.7  41.0  3.6  0.1  99.8

To estimate the total CO levels caused by the 1977, 1980, 1990 and 2000 year traffic flows, it is necessary to estimate the background CO one-hour and eight-hour concentrations in ambient air for these years. Although increasing vehicle miles traveled (VMT) values tend to increase the total exhaust emissions, more stringent emission standards will cause the CO pollutant burden to be reduced.

Based on the influence of both the VMT and emission standard variations, a pollutant burden analysis for all four years has been prepared and is summarized in Table 5. These values indicate that the effect of increasingly stringent motor vehicle exhaust controls generally outweighs the projected VMT yielding decreasing emissions from 1980 to 1990. Because the background CO concentration of 1 ppm is assumed to be the level naturally occurring in the free atmosphere, the background level of 1 ppm was also used for these years.

2. Air Quality Variables and Corresponding Receptors

The four major factors affecting air quality in this study are highway location and configuration, vehicle emissions, background meteorology and ambient air quality.

The highway location influences the air pollution effects of those sites located in proximity to the road. Such sensitive receptors as schools, public facilities or residences, where persons might be subjected to one-hour or eight-hour exposures to motor vehicle exhaust emissions, must be considered, and CO concentrations in ambient air computed at these locations. The proposed project consists of constructing a bypass highway that would reduce traffic on Kuhio Highway from Lihue to Hanamaulu. Other adjustments in current traffic patterns would also occur, but would be of lesser magnitude (see Appendix D).

Two receptor locations were chosen to represent air pollution conditions on the present highway and on the proposed highway. For present conditions, and future conditions under the No Project alternative, the highway segment in front of Wilcox Hospital was selected (Figure 1). The volume demand (750 vehicles/hour/lane) on this segment presently approaches the roadway capacity (835 vph/lane). As a result, queuing can be observed in response to turning movements at the hospital, and as Lihue-bound vehicles merge
from two lanes to one lane. The second receptor will be a hypothetical point on the proposed cut-off road north of Hana-maulu Valley, where there is a potential for future residential land use. The distance from the edge of the roadway to the receptor was taken as 10 meters, since the majority of the homes along Kuhio Highway are 30-50 feet away from the roadway.

3. Pollutant Emissions

Emission factors (Table 4) were taken as an average from the typical national mix of vehicle model years. These factors include the effects of the most recent amendments to the Clean Air Act as included in the latest update on motor vehicle emission factors (U.S. Environmental Protection Agency, Mobile Source Emission Factors for Low Attitude Areas Only (Final Document), March, 1978. EPA-400/9-78-006). However, this Act may be amended again in the future, in which case the emission factors used here will be obsolete. The most likely change will be a slight increase in the projected pollutant burden for each year, as the auto manufacturers are given additional time to comply with the Act. Due to these and other uncertainties, the pollutant burdens and concentrations calculated here are, at best, order-of-magnitude approximations. CO emission factors for the year 1975 (on which the dispersion model is based), were for a national average mix of 88% automobiles and 12% light duty trucks. The emission factor for this mix is 55 grams/mile.

By the year 2,000, the effects of the Clean Air Act will level off, so that no further improvement in emissions will occur unless the standards are revised; the adjustment factor for 2000 is therefore the same as for 1993.

The National average emission factors assume an average route speed of approximately 20 mph. Although the speeds on the existing and proposed road are generally higher, the emission factors used were not adjusted for these increased speeds. Since this factor was not applied, the estimates represent the "worst case" conditions of heavy traffic congestion. This is a very conservative assumption since CO emissions tend to decrease with increased vehicle speed.
## TABLE 2
SUMMARY OF
STATE OF HAWAI`I AND FEDERAL
AMBIENT AIR QUALITY STANDARDS

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Sampling Period</th>
<th>Federal Standards</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Primary&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Secondary&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>1. Suspended Particulate Matter</td>
<td>Annual Geometric Mean</td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Annual Arithmetic Mean</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Maximum Average in Any 24 Hours</td>
<td>260</td>
<td>150</td>
</tr>
<tr>
<td>2. Sulfur Dioxide</td>
<td>Annual Arithmetic Mean</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Maximum Average in Any 24 Hours</td>
<td>385</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>Maximum Average in Any 3 Hours</td>
<td>1300</td>
<td></td>
</tr>
<tr>
<td>3. Carbon Monoxide</td>
<td>Maximum Average in Any 8 Hours</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Maximum Average in Any 1 Hour</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>4. Hydrocarbons: Non-methane</td>
<td>Maximum Average in Any 3 Hours</td>
<td></td>
<td>160</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Photochemical Oxidants</td>
<td>Maximum Average in Any 1 Hour</td>
<td></td>
<td>160</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Nitrogen Dioxide</td>
<td>Annual Arithmetic Mean</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maximum Average in Any 24 Hours</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>Designed to prevent against adverse effects on public health.
<sup>b</sup>Designed to prevent against adverse effects on public welfare including effects on comfort, visibility, vegetation, animals, aesthetic values, and soiling and deterioration of materials.
C. METHODOLOGY

1. Pollutant Burden Analysis

Given the average daily traffic on the various highway segments in the Lihue-Banamanu area (Appendix D), and the length of these segments, the total daily vehicle-miles traveled (VMT) in the area is a matter of simple multiplication (Table 3). This value is then multiplied by the rate of pollutant emission from the vehicles (Table 4) to yield a total weight of each pollutant dispersed into the atmosphere (Table 5). However, this information can not be compared with air quality standards expressed as a concentration, so some form of dispersion modeling must be employed, as described below.

2. Carbon Monoxide Dispersion Modeling

The HIWAY model, which was adapted for estimating traffic-generated CO effects, is a steady state Gaussian computation method. It is based on considering each lane of traffic for an at-grade highway as though it were a finite, uniformly emitting line source of pollution. Once at-grade (or cut-section) line sources have been specified, the air pollution concentration representing hourly averaging times at a downwind receptor location, can determined by trapezoidal integration of the values of air pollution concentration produced by a number of point sources placed at equal intervals along the line source. This model is applicable for any highway directional orientation, any wind direction and any receptor location at ground level or at some specified elevation.

The step-wise methodology applied for the microscale air pollution assessment is as follows:

a. Traffic flows were obtained for the year 1977 and projected for 1980, 1990 and 2000. (The year 1977, rather than 1978, was chosen as the baseline period due to the availability of traffic data.)
### TABLE 3

**EXISTING AND PREDICTED VEHICLE-MILES OF TRAVEL (VMT) per Day**

**IN THE LIHUE-HANAMAU L AREA**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahukini-Hanamalu on 56</td>
<td>2.4</td>
<td>37896</td>
<td>47849</td>
<td>21740</td>
<td>68772</td>
</tr>
<tr>
<td>Ahukini-Hanamalu on Cutoff</td>
<td>2.0</td>
<td>-----</td>
<td>-----</td>
<td>23015</td>
<td>-----</td>
</tr>
<tr>
<td>Rice-Ahukini on 56</td>
<td>0.4</td>
<td>5232</td>
<td>6606</td>
<td>5947</td>
<td>9494</td>
</tr>
<tr>
<td>Rice</td>
<td>1.0</td>
<td>9035</td>
<td>11408</td>
<td>10725</td>
<td>16400</td>
</tr>
<tr>
<td>Rice-Ahukini on 51</td>
<td>1.1</td>
<td>2432</td>
<td>3071</td>
<td>4882</td>
<td>4415</td>
</tr>
<tr>
<td>Ahukini</td>
<td>1.1</td>
<td>7172</td>
<td>9056</td>
<td>12178</td>
<td>13016</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>61767</strong></td>
<td><strong>77990</strong></td>
<td><strong>78497</strong></td>
<td><strong>112097</strong></td>
<td><strong>112833</strong></td>
</tr>
</tbody>
</table>

**Notes:**

1. Average Daily Traffic from Schematics in Appendix D.

2. The Total VMT is 0.6% greater each year with the proposed cut-off road than without it. This is due simply to a redistribution of traffic over a longer total road surface, rather than an increase in traffic volume.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Monoxide</td>
<td>60.0</td>
<td>48.4</td>
<td>16.2</td>
<td>16.2</td>
</tr>
<tr>
<td>Hydrocarbons</td>
<td>5.0</td>
<td>3.9</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td>Nitrogen Oxides</td>
<td>3.3</td>
<td>2.7</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>Sulfur Oxides</td>
<td>0.22</td>
<td>0.20</td>
<td>0.19</td>
<td>0.19</td>
</tr>
<tr>
<td>Particulates</td>
<td>0.54</td>
<td>0.47</td>
<td>0.40</td>
<td>0.40</td>
</tr>
</tbody>
</table>

**Lead**

- Stop & Go: $3.868 \times 10^{-3}, 3.183 \times 10^{-3}, 2.509 \times 10^{-4}, 2.345 \times 10^{-4}$
- Free Flow: $8.954 \times 10^{-5}, 2.944 \times 10^{-3}, 1.765 \times 10^{-4}, 1.658 \times 10^{-4}$
- Average: $& 411 \times 10^{-2}, 3.56 \times 10^{-3}, 2.13 \times 10^{-4}, 1.98 \times 10^{-4}$

**Notes:**


2. Unless the standards are lowered, emission reductions under the Clean Air Act will level off between 1990 and 2000 due to attrition of older vehicles.

3. Lead EF's were calculated using the methodology proposed by the EPA's "Draft Supplementary Guidelines for Lead Implementation Plans". Average speed used was 16 mph, which results in higher EF's than would occur in the project area.
TABLE 5
POLLUTANT EMISSION BURDENS (Tons/Day)
WITH AND WITHOUT THE PROPOSED CUT-OFF ROAD

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>4.08</td>
<td>4.16</td>
<td>4.18</td>
<td>2.00</td>
<td>2.01</td>
<td>2.61</td>
</tr>
<tr>
<td>HC</td>
<td>0.34</td>
<td>0.34</td>
<td>0.34</td>
<td>0.20</td>
<td>0.20</td>
<td>0.24</td>
</tr>
<tr>
<td>NOx</td>
<td>0.22</td>
<td>0.23</td>
<td>0.23</td>
<td>0.20</td>
<td>0.20</td>
<td>0.26</td>
</tr>
<tr>
<td>SOx</td>
<td>0.015</td>
<td>0.017</td>
<td>0.017</td>
<td>0.023</td>
<td>0.024</td>
<td>0.03</td>
</tr>
<tr>
<td>Part.</td>
<td>0.037</td>
<td>0.040</td>
<td>0.041</td>
<td>0.049</td>
<td>0.050</td>
<td>0.06</td>
</tr>
<tr>
<td>Lead</td>
<td>6.7x10^-4</td>
<td>3.6x10^-4</td>
<td>2.5x10^-4</td>
<td>3.1x10^-4</td>
<td>2.7x10^-5</td>
<td>3.8x10^-5</td>
</tr>
</tbody>
</table>

Notes:
For lead burdens, traffic flow was assumed to be "stop and go" for all years without the proposed cutoff road. With the cutoff, 1980 was taken as "free flow" and 1990 and 2000 were taken as a 50-50 mix of "free flow" and "stop and go" traffic. This assumption is justified by the increasing V/C ratio in the Lihue area in 1990 and 2000 (Tables 6 and 7).
b. EPA-based motor vehicle pollutant emission factors were determined for the years 1977, 1980, 1990 and 2000 (See Assumptions, above).

c. CO concentrations were estimated in ambient air at the project site, for both alternatives for 1977, 1980, 1990 and 2000.

d. Based on traffic flow data for the morning peak hour and the roadway configurations, and assuming adverse meteorological conditions, CO concentrations were estimated for both alternatives at two critical receptors using the HIWAY model.

e. The CO concentrations determined in the previous tasks were added to the background concentrations to obtain total CO levels.

f. The total CO impact values were compared with the ambient air quality standards for this pollutant (See Table 2).

3. Carbon Monoxide Concentration Calculations.

At the present time, congestion occurs in both traffic directions in front of Wilcox Hospital as a result of turning movements into the hospital parking lot onto Eha Street, and from Lihue-bound traffic merging from two lanes into one lane. During peak periods a traffic policeman is assigned to direct traffic at this intersection. Therefore, the HIWAY is used for estimating CO concentrations at a signalized intersection, and a green cycle ratio of 0.7 is be assumed for Kuhio Highway.

Input to the HIWAY model requires an estimate of the line source emission rates resulting from free-flowing traffic as well as from traffic queuing up at intersections. Morning peak hour traffic figures were available for 1977 for both directions of Kuhio Highway, and were projected for the other three years (assuming the same percentage of ADT holds). These figures are shown in Table 6.

The morning peak hour figures in Figure 6 were used to calculate the average length of traffic queues building up at the Wilcox Hospital entrance. Line source emission factors for both the free-flowing traffic and the queues were then calculated and used as input for the HIWAY model. Meteorological conditions assumed were: stability Class E, SW wind at 1 meter/second (making an angle of 22° with the roads), and height of the dispersion layer of 500 meters. In estimating emissions from the proposed cutoff road, it was assumed that traffic would be free-flowing, as on an expressway.
### TABLE 6

**MORNING PEAK HOUR TRAFFIC VOLUMES**

<table>
<thead>
<tr>
<th></th>
<th>WILCOX HOSPITAL</th>
<th>CUTOFF ROAD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hanamaulu Bound</td>
<td>Lihue Bound</td>
</tr>
<tr>
<td>1977 Without</td>
<td>522</td>
<td>1,121</td>
</tr>
<tr>
<td>1980* Without</td>
<td>601</td>
<td>1,291</td>
</tr>
<tr>
<td>With</td>
<td>328</td>
<td>700</td>
</tr>
<tr>
<td>1990* Without</td>
<td>863</td>
<td>1,856</td>
</tr>
<tr>
<td>With</td>
<td>471</td>
<td>1,007</td>
</tr>
<tr>
<td>2000* Without</td>
<td>1,127</td>
<td>2,421</td>
</tr>
<tr>
<td>With</td>
<td>615</td>
<td>1,313</td>
</tr>
</tbody>
</table>

*Estimated morning peak hour traffic distribution for these years, is the same percentage of the average daily traffic recorded for 1977: 5% of ADT in Hanamaulu-bound direction and 10.75% in Lihue-bound direction*
After the peak traffic 1-hour concentrations were calculated using the HIWAY model, 8-hour concentrations were conservatively estimated by multiplying by a factor of 0.6, as outlined in page 32 of EPA's Guidelines for Air Quality Maintenance Planning and Analysis, Volume 9.

D. SUMMARY OF RESULTS

1. Pollutant Burdens

As a result of the emission standards, and the attrition of older vehicles which do not meet the standards, pollutant burdens will decrease through 1990 (Table 5). However, between 1990 and 2000, the older cars will have ceased to offset the effect of the standards, and the average emission factor will level off (Table 4). Increasing traffic will then cause a rise in the total pollutant burden by 2000.

2. Carbon Monoxide Dispersion Modeling

The CO concentrations reported in Table 7 must be understood as estimates of worst-case conditions. Different values might have been obtained by using actual speeds rather than the 19.6 mph built into the EF calculations. At Wilcox this might have increased the concentrations, but would have decreased them on the cutoff road where speeds would be much higher. With these limitations in mind, the results of the dispersion modeling can be discussed.

The effect on air quality from decreasing emission factors and increasing traffic is demonstrated in Table 7, which presents estimated Carbon Monoxide concentrations along Kuhio Highway and the proposed cutoff road. On the basis of the HIWAY model...
TABLE 7

ESTIMATED MAXIMUM CO CONCENTRATIONS
WITH AND WITHOUT THE PROPOSED CUTOFF ROAD
(Expressed as mg/m³)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wilcox Hospital Without</td>
<td>17.1</td>
<td>10.3</td>
<td>15.8</td>
<td>9.5</td>
<td>7.9</td>
<td>4.7</td>
<td>8.9</td>
<td>5.3</td>
<td>---</td>
</tr>
<tr>
<td>Wilcox Hospital With</td>
<td>--</td>
<td>--</td>
<td>9.2</td>
<td>5.5</td>
<td>5.1</td>
<td>3.1</td>
<td>5.1</td>
<td>3.1</td>
<td>---</td>
</tr>
<tr>
<td>On Cutoff Road Without</td>
<td>--</td>
<td>--</td>
<td>5.8</td>
<td>3.5</td>
<td>3.5</td>
<td>2.1</td>
<td>4.2</td>
<td>2.5</td>
<td>3.9</td>
</tr>
<tr>
<td>Federal Standard</td>
<td>40</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State Standard</td>
<td>10</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1 Values include background CO level which is assumed to be no more than 1 ppm (1.14 mg/m³).
2 Two lanes and four lanes, respectively.
calculations described above, it is evident that the existing condition on Kuhio Highway is undesirable from an air quality viewpoint. The calculated values significantly exceed the stringent State Standards for CO through 1980 and slightly exceed the more lenient Federal Standards for 8-hour concentrations in 1977. However, this is only a temporary situation, since decreasing emission factors will bring the concentrations into line with the State Standards by 1990. With traffic diverted to the cutoff road, the air quality along Kuhio Highway is improved at a faster pace. Because of a more efficient operating mode, traffic along the cutoff road would not cause the standards to be exceeded.
APPENDIX C

SOUND LEVEL DATA
APPENDIX C  NOISE LEVEL CALCULATIONS

This Appendix contains the basic data and calculations supporting the discussion in Chapters II and III of the noise environment of the project area. The "Ambient Noise Survey Data Steets" present the field records of the noise level monitoring, and basic statistical analysis. The "Traffic Noise Computation Tally's" present the basic assumptions and calculation methodology used to predict existing and future traffic noise at selected points in the project area. The source for this methodology is the Federal Highways Administration publication "Fundamentals and Abatement of Highway Traffic Noise" (3 volumes), June 1973.
AMBIENT NOISE SURVEY DATA SHEET

PROJECT: Haranaulu  12-10

LOCATION: Wilcox Hospital  Site #1

 ENVIR: Busy 2-lane Highway

 SOURCE: Traffic

 TIME: 3:10 - 3:25 INT: 5 min  Δ: 15 sec

 SKY: Partly Cloudy  Wind: 15-25

 TEMP: 75°  RH: 50%

 NISG: Some tree, wind noise, but
tone is dominant

 METER: GRIS55B #22780  SCALE: RESP:

 CAL: GRIS67 #15461  REC: 1968.4

 BY: PCL  DATE: 4/21/77

<table>
<thead>
<tr>
<th>READINGS</th>
<th>3</th>
<th>1</th>
<th>0</th>
<th>0</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>1</th>
<th>1</th>
<th>0</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>% OF TOTAL</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>EXCEEDED %</td>
<td>15</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>15</td>
<td>3</td>
<td>10</td>
<td>6</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

Legend:
- B = Busy
- D = Dump truck
- P = Jet landing
- T = Snow truck
- C-2
# Ambient Noise Survey Data Sheet

**Project:** Homestead  
**Location:** Wilson Hospital  
**Source:** Traffic  
**Time:** 1000 - 1055  
**Sky:** C  
**Wind:** < 5 mph  
**Temp:** 72°  
**RH:** 52%  
**Baro:**  

**Meter:** GR1565B #22780  
**Cal:** GR1567 #15461  
**Rec:** 1/20 am  
**By:** CPD  
**Date:** 3/24/72

## Readings

<table>
<thead>
<tr>
<th>Readings</th>
<th>% of Total</th>
<th>Exceeded %</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>62</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>25</td>
<td>0</td>
</tr>
</tbody>
</table>

C-3
### AMBIENT NOISE SURVEY DATA SHEET

**Project:** Hanamaulu 17-077

**Location:** S-43 Hanamaulu Town

**Area:** 4th Hanamaulu Rd

**Sketch On Reverse:**

**Environment:** Quiet neighborhood

**Source:** Actors, Site, etc.

**Time:** 4:50 - 4:55 INT: 5

**Sky:** Difficult wind: 5 - 20 mph

**Screen:**

**Temperature:** 85

**Humidity:** 85

**Barometer:**

**Misc:**

**Meter:** GR5656b #22780

**Scale:** 52

**Calibration:** GR5667 #15461

**Reg:** Country 37 S1A

**By:** PD

**Date:** 7/27/77

---

**Readings:**

<table>
<thead>
<tr>
<th>dB</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Total</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
<td>15%</td>
</tr>
</tbody>
</table>

**Exceeded %**

- 15% 2
- 15% 2
- 15% 2
- 15% 2
- 15% 2
- 15% 2
- 15% 2
- 15% 2
- 15% 2
- 15% 2

---

$v = \frac{V_{avg}}{n}$

**Result:** $v = 64$ ft/s

---

**Graph:**

- Bar graph showing frequency distribution of readings.
Sheet of

TRAFFIC NOISE COMPUTATION TALLY
NOISE LEVEL, dBA

Project Hanamaulu Cutoff Road  Engineer FLP
Segment Lihue, Kuhio Highway @ Wilcox Hospital  Date
Auto/hr. 1350  Trucks/hr. 34  Miles/hr. 30
Highway Width 50 feet.  Observer 30' from edge

Comments Calculated existing noise level from 3 P.M. traffic corresponding to time of measurement (2 hours before peak).

<table>
<thead>
<tr>
<th>Item</th>
<th>1977</th>
</tr>
</thead>
<tbody>
<tr>
<td>I50 reference at 100 feet</td>
<td>58</td>
</tr>
<tr>
<td>Distance, width adjustment 35'</td>
<td>7</td>
</tr>
<tr>
<td>L10 - L50 adjustment</td>
<td>5.7</td>
</tr>
<tr>
<td>L10 reference at observer</td>
<td>71.7</td>
</tr>
<tr>
<td>Segment adjustment</td>
<td>-1</td>
</tr>
<tr>
<td>Barrier adjustment</td>
<td>-1</td>
</tr>
<tr>
<td>Gradient</td>
<td>2</td>
</tr>
<tr>
<td>Road surface</td>
<td></td>
</tr>
<tr>
<td>Foliage</td>
<td></td>
</tr>
<tr>
<td>Rows of houses</td>
<td></td>
</tr>
<tr>
<td>Acceleration</td>
<td></td>
</tr>
<tr>
<td>L10 at observer, by veh. type</td>
<td>70.7</td>
</tr>
<tr>
<td>L10 at observer, summed</td>
<td>79</td>
</tr>
<tr>
<td>Measured L10</td>
<td>72</td>
</tr>
</tbody>
</table>

C-7  DOT/FHWA
**TRAFFIC NOISE COMPUTATION TALLY**

**NOISE LEVEL, dBA**

**Project**: Hanamalu Cutoff Road  
**Engineer**: FLP

**Segment**: Libue, Kuhio Highway @ Wilcox Hospital  
**Date**: 

**Peak Autos/hr.**: 8% of ADT  
**Trucks/hr.**: 2.5% of  
**Miles/hr.**: 30

**Highway Width**: 50 feet  
**Observer**: 75' from edge

**Comments**: Predicted peak noise levels - present, 1980, 1990, 2000 - WITHOUT CUT-OFF ROAD (see Appendix D for ADT's.)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
<td>ATATATATAT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L50 reference at 100 feet</td>
<td>61</td>
<td>64</td>
<td>65</td>
<td>67</td>
</tr>
<tr>
<td>Distance, width adjustment</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>L10 - L50 adjustment</td>
<td>3.8</td>
<td>3.4</td>
<td>3.2</td>
<td>3.0</td>
</tr>
<tr>
<td>L10 reference at observer</td>
<td>88.8</td>
<td>71.4</td>
<td>72.7</td>
<td>73.7</td>
</tr>
<tr>
<td>Segment adjustment</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>Barrier adjustment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous Adjustments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gradient</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Road surface</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foliage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rows of houses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceleration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L10 at observer, by veh. type</td>
<td>87.8</td>
<td>70.4</td>
<td>78.8</td>
<td>80.5</td>
</tr>
<tr>
<td>L10 at observer, summed</td>
<td>76.5</td>
<td>79.3</td>
<td>81.0</td>
<td>82.7</td>
</tr>
</tbody>
</table>

C-8

DOT/FHWA
# Traffic Noise Computation Tally

## Noise Level, dBA

**Project:** Hanamaulu Cutoff Road  
**Engineer:** FLP

**Segment:** Kuhio Highway at Wixcox Hospital  
**Date:**

**Autos/hr.** 8% of ADT  
**Trucks/hr.** 2.5% of Peak  
**Miles/hr.** 30

**Highway Width:** 50 feet  
**Observer:** 75' from edge

**Comments:** Predicted peak noise levels - 1980, 1990 and 2000  
WITH CUT-OFF ROAD. (see Appendix D for ADT;)

<table>
<thead>
<tr>
<th>Item</th>
<th>1980</th>
<th>1990</th>
<th>2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>I50 reference at 100 feet</td>
<td>58</td>
<td>56</td>
<td>60</td>
</tr>
<tr>
<td>Distance, width adjustment</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>L10 - L50 adjustment</td>
<td>4.5</td>
<td>13</td>
<td>3.9</td>
</tr>
<tr>
<td>L10 reference at observer</td>
<td>86.5</td>
<td>73</td>
<td>57.9</td>
</tr>
<tr>
<td>Segment adjustment</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>Barrier adjustment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gradient</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Road surface</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foliage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rows of houses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceleration</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**L10 at observer, by veh. type:**  
- 85.5  
- 74.5  
- 66.9  
- 76   
- 88.4  
- 77.8

**L10 at observer, summed:**  
- 74.5  
- 76.5  
- 78.3

---

C-9  
DOT/FHWA
TRAFFIC NOISE COMPUTATION TALLY
NOISE LEVEL, dBA

Project: Hanamau Road
Engineer: FLP

Segment: Hanamau, Kibio Highway @ Laukona Rd.
Date: 

Autos/hr. 1162 Trails/hr. 29 Miles/hr. 30

Highway Width 50 feet. Observer 30' from edge

Comments: Calculated existing noise level from 3 P.M. traffic corresponding to time of measurement (2 hours before peak).

<table>
<thead>
<tr>
<th>Item</th>
<th>1977</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{50}$ reference at 100 feet</td>
<td>57</td>
</tr>
<tr>
<td>Distance, width adjustment 35'</td>
<td>7</td>
</tr>
<tr>
<td>$L_{10} - L_{50}$ adjustment</td>
<td>5.9</td>
</tr>
<tr>
<td>$L_{10}$ reference at observer</td>
<td>69.9</td>
</tr>
<tr>
<td>Segment adjustment</td>
<td></td>
</tr>
<tr>
<td>Barrier adjustment</td>
<td></td>
</tr>
<tr>
<td>Gradient</td>
<td>3</td>
</tr>
<tr>
<td>Road surface</td>
<td></td>
</tr>
<tr>
<td>Foliage</td>
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<td>Rows of houses</td>
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<td>Acceleration</td>
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<td>$L_{10}$ at observer, by veh. type</td>
<td>69.9</td>
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<td>Measured $L_{10}$</td>
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TRAFFIC NOISE COMPUTATION TALLY
NOISE LEVEL, dBA

Project: Hanamalu Cutoff Road
Engineer: FLP

Segment: Hanamalu, Kuhio Highway @ Laukona Rd
Date: 

Peak
Autos/hr. 8% of ADT
Trucks/hr. 2.5% of
Miles/hr. 30

Peak
Observer 75' from edge

Highway Width 50 feet

Comments: Predicted peak noise levels - Present, 1980, 1990 and 2000 WITHOUT CUT-OFF ROAD (See Appendix D for ADT's).

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<td>$L_{50}$ reference at 100 feet</td>
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<td>57</td>
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<td>66.8</td>
<td>74.8</td>
<td>74.8</td>
<td>69</td>
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Segment adjustment
Barrier adjustment

Miscellaneous Adjustments

Gradient | 3 | 3 | 3 | 3
Road surface
Foliage
Rows of houses
Acceleration

$L_{10}$ at observer, by veh. type | 66.8 | 77 | 77.4 | 77.8 | 69 | 81.5 | 69.7 | 83.2 |

$L_{10}$ at observer, summed | 77.5 | 78.3 | 82 | 83.2 |

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DOT/FHWA
TRAFFIC NOISE COMPUTATION TALLY
NOISE LEVEL, dBA

Project: Hanamaulu Cutoff Road
Engineer: FLP
Segment: Hanamaulu, Kuhio Highway @ Laukona Rd.
Date: 
Peak Autos/hr. 8% of ADT
Peak Trucks/hr. 2.5% of
Miles/hr. 30
Highway Width 50 feet.
Observer 75' from edge

Comments: Predicted peak noise levels - 1980, 1990 and 2000
WITH CUT-OFF ROAD (See Appendix D for ADT's).

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Segment adjustment
Barrier adjustment

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</tr>
<tr>
<td>Rows of houses</td>
</tr>
<tr>
<td>Acceleration</td>
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L_{10} at observer, by veh. type | 65.5 | 73 | 66.2 | 75 | 67.8 | 77 |

L_{10} at observer, summed | 73.5 | 75.5 | 77.5 |
**TRAFFIC NOISE COMPUTATION TALLY**

**NOISE LEVEL, dBA**

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<td>Miles/hr. 50</td>
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<td>75.3</td>
<td>73.5</td>
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C-13

DOT/TFWA
APPENDIX D  TRAFFIC DATA

Projected Traffic Without Cutoff Road.

Projected Traffic With Cutoff Road.

Kuhio Highway-Ahukini Road Intersection With and Without Cutoff Road.

Kuhio Highway-Kaumaulii Highway-Rice Street Intersection With and Without Cutoff Road.
APPENDIX E
CLEARANCES
APPENDIX E  CLEARANCES

The proposed highway improvements require the following clearances and permits:

1. Clearance from the Department of Land and Natural Resources that environmental impacts will be either avoided or mitigated by the proposed project.

2. Clearance from the State Historic Preservation Officer that the project would have no adverse impacts on features of historical or archaeological significance.

3. Clearance from the U.S. Fish and Wildlife Service that the project would have no unacceptable adverse effect on Hanamaulu Stream or on endangered waterbirds.

4. Bridge permits from the U.S. Coast Guard for the construction of the Hanamaulu Valley bridge, since it is over navigable tidewaters.

5. Permits from the U.S. Army Corps of Engineers for the two stream crossings.

6. Clearance from the Federal Aviation Administration that the Lihue Airport would not be affected.

7. The Areawide Review Agency Clearance, an intergovernmental agency review clearinghouse to insure coordination of Federally funded projects.

8. Conservation District Use application for Conservation lands on south bluff of Hanamaulu Valley (See Figure 10, Page II-25).

9. Wetlands Finding in accordance with Executive Order 11980.

Obtained:
Referred to
(Pages E-2)
(Pages E-3)
(Pages E-5 -11)
(Pages E-4)
(Pages E-12)
Mr. T. Hirano  
Chief, Highways Division  
Department of Transportation

October 12, 1976

Subject: Hanamaulu-Ahukini Cut-off Road, Project  
No. 51C-01-76, Kauai, Hanamaulu Vicinity

The proposed undertaking will have no effect upon any  
known historic or archaeological site on or likely to be eligible  
for inclusion to the Hawaii and/or National Registers of Historic  
Places. Therefore, this office has no reservations for the  
Highways Division to proceed with further stages of the corridor  
location study for the above project. In the event that any  
unanticipated sites or remains are encountered, please contact  
this office immediately.

Sincerely yours,

[Signature]

Jane L. Silverman  
Historic Preservation Officer  
State of Hawaii
May 30, 1978

Mr. Ralph Segawa
Division Administrator
U. S. Department of Transportation
Federal Highway Administration
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement for the Proposed FHWA-EIS-7-03-D, Hanamaulu-Ahukini Cutoff Road, Project No. 51C-01-76, May 12, 1978.

The proposed undertaking will have no effect upon any known historic or archaeological site on or likely to be eligible for inclusion on the Hawaii Register and/or National Register of Historic Places. This office has no reservations for the project to proceed.

In the event that any unanticipated sites or remains are encountered, please inform the applicant to contact this office immediately.

Sincerely yours,

Jane L. Silverman
Historic Preservation Officer
State of Hawaii
SKETCH MAP SUPPORTING
FINDING OF PUBLIC INTEREST AT

LIHUE AIRPORT
LIHUE, ISLAND OF KAUAI

In compliance with Section 318, Title 23 U. S. C., we concur that the location of this airport and the consequent construction of Project No. 51C-01-78, Hanamaulu-Ahukini Cutoff Road, are in the public interest.

[Signatures]

Department of Transportation
Air Transportation
Facilities Division

Date: 7/31/78

Franklin D. Benson
Supervisory Airports Engineer, APC-620
Federal Aviation Agency
Airports Division

Date: AUG 24 1978

[Signatures]

Department of Transportation
Land Transportation
Facilities Division

Date: 8/10/78

[Signatures]

Federal Highway Administration

Date: 8/28/78
United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
300 Ala Moana Blvd., Rm. 5302
P. O. Box 50167
Honolulu, Hawaii 96850

Reference: ES

September 27, 1977

Mr. Ralph Segawa
Division Administrator
U. S. Department of Transportation
P. O. Box 50206
Honolulu, Hawaii 96850

Re: Hanamaulu-Ahukini
Cutoff Road, Proj.
No. 51C-01-76,
Island of Kauai
Environmental Impact
Statement
Preparation Notice

Dear Mr. Segawa:

We have reviewed the referenced notice, dated 8 August 1977, concerning construction of a cut-off road which could impact endangered waterbird and stream habitat. We noted that field studies will be conducted to assess the quality of existing endangered waterbird habitat in the project vicinity. In addition, research is proposed to evaluate the potential increase in turbidity in Hanamaula Stream because of bridge and road construction and the possible redirection of sugar mill wash water.

Because this project could adversely affect endangered species, we recommend you contact Mr. Eugene Kridler, the Service's Hawaii Endangered Species Coordinator, to determine if formal coordination is required as mandated by Section 7 of the Endangered Species Act of 1973. Mr. Kridler will also be able to assist in establishing adequate criteria to evaluate the quality of the existing endangered

E-5
aterbird habitat within the sphere of project influence. He can be contacted at 300 Ala Moana Blvd., Room 5302, P. O. Box 50167, Honolulu, Hawaii 96850, Telephone Number 546-5615.

Since the terrestrial biota largely consists of introduced species, its loss is not expected to be significant. However, road construction could result in adverse impacts to both stream and marine biota. These impacts would generally be caused by increased turbidity resulting from erosion, associated with road construction and clearing, redirection of sugar mill wash water, and instream work. In addition, aquatic habitat disruption will occur during construction of the stream crossing. Little data is available to assess the magnitude of these impacts. Therefore, we recommend a biological survey of Nanamaulu Stream be conducted to determine its species composition. The potential impacts on the species should be included in the Environmental Impact Statement.

Please keep us informed of any action taken on this project.

Sincerely yours,

Maurice H. Taylor
Field Supervisor

CC: HA
ARD(AE)
NMFS
HDFG
Hawaii Endangered Species Coordinator
Mr. R. Kahler Martinson  
Regional Director  
U. S. Fish and Wildlife Service  
P. O. Box 3757  
Portland, Oregon 97208  

Dear Mr. Martinson:  

Subject: Hawaii Project F-051-1( ),  
Hanamalu - Ahukini Cutoff Road, 50 USC 402  

As provided in Title 50, Part 402, of the Endangered Species  
Act of 1973, we request the initiation of formal consultation  
between the Federal Highway Administration and the U. S. Fish  
and Wildlife Service for the proposed Hanamalu - Ahukini  
Cutoff Road, Federal-aid Primary Route 51, Island of Kauai.  

Attached is a report, including maps, which describes the  
known biological resources in the project area.  

Mr. Maurice H. Taylor, Field Supervisor, Division of Ecological  
Services, of your Honolulu Office was previously contacted  
regarding the proposed project. For your ready reference,  
we are also attaching his letter to us dated September 27, 1977.  

Your attention to this request is appreciated.  

Sincerely yours,  

Ralph T. Segawa  
Division Administrator  

By:  

H. Kubamoto  
Asst. Division Administrator  

Enclosure
July 11, 1978

Mr. Masami Murakami
Acting District Engineer
Land Transportation Facilities Division
Department of Transportation
P. O. Box 1950
Lihue, Kauai, HI

SUBJECT: Hanamaulu-Ahukini Cutoff Road, Project No. 51C-01-76 (LT-KE 3.4471)

Dear Mr. Murakami:

This is in response to your July 7, 1978 letter requesting information on fish and wildlife in the proposed Hanamaulu-Ahukini cutoff road project area.

I have conducted field trips in the vicinity of the proposed road route at Hanamaulu Valley on several occasions during waterfowl censuses and surveys. The only endangered wildlife species I have encountered in the whole of Hanamaulu Valley was the Hawaiian gallinule, Gallinula chloropus sandvicensis. Though only one gallinule was observed, it was well upstream of the proposed roadway. Perhaps the Hawaiian duck, Anas wvilliana, occasionally uses the flooded stream, but I have not observed it there.

In my opinion, the wildlife habitat that exists along the proposed Hanamaulu Cutoff Road is insignificant to endangered wildlife.

I do not have expertise in the field of fish and aquatic organisms, so cannot advise you on that matter. However, to my knowledge there are no species of fish officially listed as endangered at the present time in the State of Hawaii.

I hope that this sufficiently answers your concerns.

Sincerely yours,

Thomas C. Telfer
Wildlife Biologist, Kauai

cc: R. Walker, Wildlife Br., Chief
Mr. Ralph T. Segawa  
Division Administrator  
Federal Highway Administration  
Hawaii Division  
Box 50206  
Honolulu, Hawaii 96850

Dear Mr. Segawa:

This is in response to your request of May 12, 1978, for formal consultation under Section 7 of the Endangered Species Act of 1973, as amended, regarding the proposed Hanamaulu-Ahu`ikini Cutoff Road, Federal-aid Primary Route 51, Island of Kauai, Hawaii. Of concern is the potential effect your proposal may have on three endangered waterbirds; the Hawaiian coot, Fulica americana alai, the Hawaiian duck, Amau wyvilliana, and the Hawaiian gallinule, Gallinula chloropus sandvicensis.

Your original request for consultation did not provide the necessary information needed to adequately evaluate the impacts. The additional information was requested during the July 26, 1978, meeting between Messrs. Kridler and Taylor of our Hawaii staff and Messrs. Kusumoto and Yosui of your staff. Subsequent information was furnished by you to Mr. Kridler in your letter of September 6, 1978. Further information was supplied by Mr. H. Kusumoto, dated January 10, 1979, in which he assured that Alignment "A" for the road has been selected and will be used. A copy of the draft EIS prepared by your agency and the State of Hawaii Department of Transportation was also provided with this letter. The purpose of the proposed road and bridge is to reduce congestion on Kuhio Highway.

The project includes a two-lane highway and bridge, the latter spanning the Hanamaulu Valley. The proposed bridge site is at the narrower seaward end of the valley.

Parts of the Hanamaulu Valley provide known habitat for three species of endangered waterbirds, although population numbers at the project site are considered to be low. Low numbers are a reflection of limited preferred habitat for the three birds. Hanamaulu Valley was inspected by Biologists Kridler and Sincoc of our Service late in 1977 and again by Kridler in early 1978.
January 22, 1979
Page Two

The DEIS states on Page I-16, Bridge Design Characteristics, that the bridge will rest on piers for the full extent of the crossing and that optimum height over the valley is 65 feet. At this height, road noise and activities would most likely not affect the birds.

Pages III-6 and III-7, Mitigative Measures, state that all fills (e.g. temporary road and embankment) necessary for construction of the bridge will be removed after construction, and resulting potholes created by removal would enhance habitat for waterbirds. This measure would further enhance the habitat if native wetland grasses were planted for cover.

It is our biological opinion that the proposed bridge and highway will likely promote the conservation of the Hawaiian coot, duck and gallinule provided the following conditions are met:

1. Construct Alignment "A";

2. Construct the bridge on piers as described on Page I-16 of the DEIS. The height should be that stated as the preferred one---about 65 feet above the valley floor;

3. Remove immediately after construction all temporary fills and embankments needed for construction and create potholes at least 4 feet deep in their stead;

4. Plant native wetland grasses around these potholes for cover;

5. Place and construct fills and embankments only where necessary and only during periods of seasonally low stream flow to prevent backwater which might flood nests elsewhere in the valley. Such fills and embankments are to be removed prior to the next nesting season;

6. Insure that no debris, chemicals (including petrochemicals) and other deleterious materials enter the water; and

7. Limit construction activities in the valley to the immediate project site.
January 22, 1979
Page Three

This concludes formal Section 7 consultation on this project. Should any modifications, other than those discussed above, be considered, or if new information becomes available on listed species, FHWA should reinitiate consultation.

We appreciated the opportunity to consult with you on this matter.

Sincerely yours,

William H. Meyer
Acting Regional Director
Hanamauu-Ahukini Cutoff Road (FAP Route 51, Kauai, Hawaii)
Project Number F-051-1(4)

This statement sets forth the finding that there is no practicable alternative to construction in the wetland located near the mouth of Hanamauu Stream, Kauai, Hawaii, 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 cutoff highway in the Lihue area on the Island of Kauai, Hawaii. The Hanamauu-Ahukini Cutoff Road will extend Kapule Highway (FAP Route 51) approximately two miles northward from its present terminus at Ahukini Road, to Kuhio Highway just north of Hanamauu. The cutoff road will be constructed in two stages, with a two-lane roadway and a single two-lane bridge across Hanamauu Stream constructed in the first stage. When demand increases, the cutoff road will be expanded to four lanes and a second two-lane bridge added.

DESCRIPTION OF THE WETLAND

The valley floor in the vicinity of the proposed highway consists of several sub-divided pastures predominantly vegetated with California grass (Bracharia mutica), with various weedy species, depending on the degree of maintenance and grazing that the pasture has received. The small pasture at the site of the proposed bridge appears to be abandoned, as it is being invaded by shrubs and noxious weeds (e.g. Leucaena leucocephala, Mimosa pudica, Xanthium strumarium). From such evidence as old dikes, channels and a faint "paddy" pattern, it is apparent that portions of the valley floor were once cultivated in taro (or perhaps rice). These dike patterns are in the wide part of the valley above the proposed bridge site. Several of the pastures are poorly drained, and during wet periods, take
on a marshy aspect. The banks of Hanamulu Stream are vegetated with a heavy growth of California grass and a few scattered sedges (primarily Cyperus alternifolius). At the proposed bridge site, the northerly bank supports a very dense thicket of mature hau (Hibiscus tiliaceus) and Java plum. The wetland is permanent immediately adjacent to Hanamulu Stream, but only seasonal a short distance away.

**WETLANDS AFFECTED**

Construction of the bridge across Hanamulu Valley will affect a strip of wetland approximately 100 feet wide by 200 feet long (0.5 acres). The major disturbance will occur from the erection of falsework and the construction of a temporary access road.

**ALTERNATIVES CONSIDERED**

Do-Nothing. Not building the cutoff road would result in the presently congested traffic condition on Kuhio Highway continuing to grow worse. The adverse environmental impacts which would result from the ensuing congestion problems include a high accident rate, increased noise and air pollution, and accompanying social and economic impacts to residents, businesses and institutions serviced by the highway. Therefore, permitting existing trends to continue without altering the present road system is not a desirable alternative.

Widening Kuhio Highway Alternative. The expansion of Kuhio Highway to four lanes to handle higher traffic loads would result in the displacement of many businesses and private homes. In addition, even with the expansion of the highway to four lanes, the desired level of service cannot be attained in terms of operating speed criteria, due to the road's restrictive alignment. This would miss the wetland, but because of the high social and economic costs relative to the proposed cutoff road, widening Kuhio Highway has been rejected as an alternative to constructing a cutoff road.

Alternative to Do Least Harm to the Wetland. Crossing Hanamulu Valley at various points farther inland was considered, but rejected due to the greater width of the valley and the larger amount of wetland which would be affected. Three alignments which cross the valley at its narrowest point were studied in detail for the Hanamulu-Ahukini Cutoff Road. All three alternative alignments follow the same route from Ahukini Road to Hanamulu Stream. The alignment chosen intersects Kuhio Highway south
of the Kauai Hardwood Factory, and will utilize the existing crossing of the unnamed stream adjacent to the Factory. The two alignments which were rejected intersect the highway north of the Factory, and would have required the construction of new crossings on the unnamed stream.

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 the permanent filling of the wetland. Upon completion of the bridge, all fill material will be removed, and "pot holes" will be created where water can collect and provide waterbird habitat.

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 made the recommendation that "pot holes" be created, and this has been incorporated into the project. Opportunity for early public review was provided at information meetings on Kauai on August 1 and December 15, 1977 and January 24, 1978, through the review procedure for the Draft EIS (May 23 - June 22, 1978) and at a highway corridor and design public hearing on June 21, 1978.

CONCLUSION

The above factors and considerations establish that there is no practicable alternative to construction in the wetland located in Hanamaulu Valley, Kauai, Hawaii, and that the highway proposal includes all practical measures to minimize harm to the wetland which may result from such use.
APPENDIX F
COMMENTS AND RESPONSES
TO DRAFT EIS
APPENDIX F       COMMENTS AND RESPONSES TO THE DRAFT EIS

I.  DRAFT EIS MAILING LIST

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<tr>
<td>Department of Housing and Urban Development</td>
<td>450 Golden Gate Avenue P.O. Box 36003 San Francisco, CA 94102</td>
<td>No comment Received</td>
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<tr>
<td>Department of Health, Education and Welfare</td>
<td>Federal Office Building 50 Fulton Street San Francisco, CA 94102</td>
<td>No comment Received</td>
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* ENR: Evaluation Not Required (no substantial comment)
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<th>Name</th>
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<td>Director, Office of Federal Activities (Mail Code A-104) Environmental Protection Agency</td>
<td>Room 337 West Tower Waterside Mall, SW Washington, D.C. 20460</td>
<td>No comment</td>
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<tr>
<td>U.S. Department of Commerce National Marine Fisheries Service</td>
<td>2570 Dole Street Honolulu, Hawaii 96822</td>
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<tr>
<td>EIS Coordinator, Region 9 Environmental Protection Agency</td>
<td>215 Fremont Street San Francisco, CA 94108</td>
<td>8/1/78</td>
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<tr>
<td>Advisory Council on Historic Preservation Attn: Mr. Robert Garvey Executive Director</td>
<td>801 19th Street, NW Suite 618 Washington, D.C. 20006</td>
<td>8/28/78 ENR</td>
<td></td>
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<tr>
<td>Department of Commerce Attn: Dr. Sydney R. Galler Deputy Assistant</td>
<td>Secretary for Environmental Affairs Washington, D.C. 20230</td>
<td>No comment</td>
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</tr>
<tr>
<td>Mr. Ernest E. Sligh, Director Environmental Impact Division Office of Environmental Programs Federal Energy Administration</td>
<td>New Post Office Building 12th &amp; Pennsylvania Ave. NW Washington, D.C. 20461</td>
<td>No comment</td>
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<tr>
<td>U.S. Army - Corps of Engineers Honolulu District</td>
<td>Building 230, Fort Shafter APO San Francisco 96558</td>
<td>6/20/78</td>
<td></td>
</tr>
<tr>
<td>Base Commander Department of the Air Force</td>
<td>15th Airbase Wing (cc) Hickam Airbase Honolulu, Hawaii 96853</td>
<td>6/6/78 ENR*</td>
<td></td>
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<td>State Agencies</td>
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| Department of Accounting and General Services  
  Attn: Hideo Murakami | 6/2/78 ENR        |
| Department of Agriculture 
  Attn: John Farias Jr. | 6/8/78 ENR        |
| Department of Defense 
| Department of Education 
  Attn: Charles G. Clark | 5/24/78 ENR        |
| Department of Health 
  Attn: Dr. James S. Kumagai | 6/20/78 ENR        |
| Department of Land and Natural Resources 
  Attn: Christopher Cobb | 5/22/78 ENR        |
| Department of Land and Natural Resources 
  State Historic Preservation Officer 
  Attn: Jane Silverman | 5/30/78           |
| Department of Planning and Economic Development 
  Attn: Hideto Kono | 5/22/78 ENR        |
| Department of Social Services and Housing 
  Attn: Ronald Lin | 5/23/78 ENR        |
| Office of Environmental Quality Control 
  Attn: Richard L. O’Connell | 7/11/78           |

<table>
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<tr>
<th>University of Hawaii</th>
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| Environmental Center 
  Attn: Dr. Doak Cox 
  2550 Campus Road 
  Honolulu 96822 | 6/22/78 |
| Water Resources Research Center 
  Attn: Dr. Stephen Lau 
  2540 Dole Street 
  Honolulu 96822 | 5/24/78 ENR |
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<td>605 Kapiolani Blvd, Honolulu 96813</td>
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<td>Honolulu Advertiser</td>
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<td>3137 Kuhio Highway, Lihue, Kauai, Hawaii 96766</td>
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<tr>
<td>State Representatives - 27th District</td>
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<tr>
<td>The Honorable Richard A. Kawakami</td>
<td>P.O. Box 398, Waimea, Kauai 96796</td>
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<tr>
<td>The Honorable Tony T. Kunimura</td>
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<td>The Honorable Eduardo Malapit</td>
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<td>Mayor, County of Kauai</td>
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<tr>
<td>Kauai County Council</td>
<td>Attn: Louis Gonsolves, Jr. 4396 Rice Street</td>
<td>No comment</td>
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<tr>
<td>Chairman</td>
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<tr>
<td>Planning Department Director</td>
<td>Attn: Brian Nishimoto 4280 Rice Street</td>
<td>5/23/78</td>
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<td>Department of Public Works</td>
<td>Attn: Henry Morita</td>
<td>6/2/78 ENR</td>
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<td>Chief Engineer</td>
<td>Lihue, Kauai 96766</td>
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<td>Board of Water Supply Manager</td>
<td>Attn: Walter Bryant</td>
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<td>Department of Economic Development</td>
<td>Attn: James Kurita</td>
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<td>Attn: Roy Hiram</td>
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<td>3060 Umi Street</td>
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<td>(Kauai Electric)</td>
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<td>American Lung Association</td>
<td>Attn: James W. Morrow</td>
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<tr>
<td>Director, Environmental Health</td>
<td>245 N. Kukui Street</td>
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<tr>
<td>President</td>
<td>Attn: Paul Shinseki</td>
<td>No comment</td>
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<tr>
<td>Molokoa Community Association I</td>
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<tr>
<td>President</td>
<td>Attn: Raymond Fujikado</td>
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<td>Molokoa Community Association II</td>
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<td>President</td>
<td>Attn: Wayne R. Ellis, Jr.</td>
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<td>Kauai Chamber of Commerce</td>
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<td>Lihue, Hawaii 96766</td>
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<tr>
<td>President</td>
<td>Attn: Edward Sarita</td>
<td>No comment</td>
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<tr>
<td>Hanamalu Community Association</td>
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<td>President</td>
<td>Attn: Kiyoto Okimoto</td>
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<tr>
<td>Lihue Businessmen's Association</td>
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</table>
President
Pua Loke Community
Association

Chairperson
Lihue Development Plan
Advisory Committee

The Kauai Outdoor Circle

Comment
Date

Attn: Haruo Sato
3036 Kupu Lane
Lihue, Hawaii 96766
No comment
Received

Attn: Yuriko N. Tasaka (Mrs.)
2801 Pikake Street
Lihue, Hawaii 96766
No comment
Received

6/21/78

Individuals

H. Hamilton
6/78 ENR

Helen Hopkins
5/24/78 ENR

F-7
June 6, 1978

Mr. Ralph T. Segawa
Division Administrator
Federal Highway Administration
Region Nine
P. O. Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Subject: Draft EIS for the Hanamaulu-Ahukini Cutoff Road
(FAP Route 51, Kauai, HI), Project No. 51C-01-76

We reviewed the subject environmental impact statement and have no
comments to offer.

Thank you for the opportunity to review this document.

Sincerely,

Jack P. Kanatz
State Conservationist
JUL 14 1978

Federal Highway Administration
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Gentlemen:

The Draft Environmental Impact Statement for the Hanamaulu-Ahukini Cutoff Road in Lihue, Kauai, transmitted with your letter HEC-HI of May 17, 1978, has been reviewed.

We note that during a review of the Environmental Impact Preparation Notice, we commented on the problems associated with the acquisition of 600 acres of sugar cane land presently used for disposing of surplus sugar mill wash water. The land is needed for construction of a new runway at Lihue Airport. If a similar situation exists for this highway project, it appears that the problem and its resolution should be addressed.

Thank you for the opportunity to review this document.

Sincerely,

[Signature]

JAMES M. COX
Chief, Airports Division, APC-600

F-9
EVALUATION
FEDERAL AVIATION ADMINISTRATION

As the FAA is aware, the State is currently studying this situation (See Page III-13). Various alternatives have been considered, but pumping the water to other areas appears to be the most reasonable solution. However, these studies have not been completed, so any recommendation would be premature. In any case, disposal of the excess wastewater will be in compliance with all State and Federal laws.
Mr. Ralph T. Segawa  
Division Administrator  
Federal Highway Administration  
Hawaii Division  
Box 50208  
Honolulu, Hawaii 96850

June 30, 1978

Dear Mr. Segawa:

The Department of the Interior has reviewed the subject draft environmental impact statement concerning Hanamaulu-Ahukini Cutoff Road, Kauai, Hawaii. This document generally satisfies our concerns with regard to project-associated impacts, and addresses specific erosion control measures to be applied during construction of the proposed cutoff road.

Most of the impacted lands are agricultural in usage and are of little present value to native fish and wildlife. Terrestrial biota in the project area consists largely of introduced species, and its loss is not expected to be significant. However, the wetlands of Hanamaulu Valley provide habitat for several endangered species of native waterbirds, and great care should be taken to avoid adverse impacts to this fragile ecosystem.

The DEIS states that a bridge will be constructed on piers across the narrow, seaward end of the valley. This design and alignment of the stream crossing should minimize its impact on resident waterbirds.

A. Although no permanent embankments will be used, a temporary road, falsework, and protective embankments may be required during construction of the bridge. However, no mention is made in the statement concerning the need for a permit from the U.S. Army Corps of Engineers to conduct dredging and fill activities in a wetland area. The backwater created by these fills could result in the destruction of nests by flooding. We recommend that these fills be made only during periods of seasonally low stream flow and be removed prior to the onset of the following rainy season in order to minimize the backwater effect, as well as control erosion and reduce turbidity. Temporary culverts could be installed to provide drainage. Extreme care should be taken to insure that no debris, petrochemicals, or other deleterious materials enter the water.

F-11
After temporary fills have been removed, potholes will be created to provide additional waterbird habitat. In this regard, we are pleased to note that the replacement habitat, that is the creation of "potholes" in the wetland corridor, will enhance the marsh for endangered waterbirds. We recommend that the potholes be excavated to a depth of 2 to 4 feet and that local wetland grasses be planted around them for cover.

Three highway alignments are being considered for further study. Alignments B and C intersect Kuhio Highway north of the Kauai Hardwoods Factory and would require an additional stream crossing. The details of this crossing are not clearly stated in the DEIS; the Final EIS should be more specific with this regard. If an embankment is used, it should not create a backwater or otherwise restrict stream flow. The culvert should be designed to accommodate flood discharges. Alignment A intersects Kuhio Highway south of the Hardwoods Factory and would not require an additional stream crossing. For this reason, we recommend that Alignment A be selected.

Lihue Plantation presently disposes of sugar mill wash water at a rate of 12,000 gallons per acre per day in the cane fields below Lihue and Hanamaulu. Since this project will take 35 to 40 acres out of sugar cane production, a surplus of wash water is expected to result. We recommend that this potential surplus be diverted to a municipal sewage treatment system or continue to be used for irrigation.

We appreciate the opportunity to review and comment on this document.

Sincerely yours,

Patricia Sanderson Port
Regional Environmental Officer

cc: Director, OEPR (w/incoming)
    Director, Fish and Wildlife Service
    Director, Heritage Conservation and Recreation Service
    Director, National Park Service
    Director, Geological Survey
    Reg. Dir., FWS
    Reg. Dir., HCRS
    Reg. Dir., NPS
    Reg. Dir., USGS

F-12
EVALUATION
DEPARTMENT OF THE INTERIOR

A: Appendix E, "Clearances", identifies the need for permits from the Corps of Engineers for crossing Hanamaulu Stream and the unnamed stream near the Kauai Hardwoods Factory. These permits will be sought after this EIS is approved.

B: It is true that nests could be so affected, though high backwater is a naturally-occurring hazard in Hanamaulu Valley due to the constriction at the railroad bridge. A recommendation for this project is that the embankments be constructed so that the backwater effect from the embankments is no more than one-half foot greater than that which occurs normally for floods having recurrence intervals of less than 5 years. To avoid possible aggravation of the backwater effect during construction, the contractor will be required to provide an ample minimum flow width opening in the falsework. Preliminary evaluations indicate that such provisions are feasible. The criteria to be used will be established during the design of the bridge. Adequate measures will be taken to insure that no debris or deleterious materials enter the water.

C: Your recommendation that potholes be excavated to a depth of 2 to 4 feet, will be included in the final EIS.

D: Alignment A has been chosen for development, thus, the additional stream crossing will not be required.

E: The quantity and character of the wash water would have an adverse effect on the Lihue Sewage Treatment Plant. Furthermore, this plant currently disposes of its wastes through Lihue Plantation's irrigation system, so ultimate disposal would still be needed. The State is currently studying various alternative solutions, and pumping the water to other areas appears to be the most reasonable. However, these studies have not been completed, so any recommendation would be premature.
Ralph T. Segawa  
Division Administrator  
U.S. Department of Transportation  
Federal Highway Administration  
Box 50206  
Honolulu, Hawaii 96850

Subject: Hawaii F-051-1, Draft Environmental Impact Statement  
FHWA-EIS-7-03-D, Nanakuli-Ahukini  
Cutoff Road, State Project 51C-01-76

Dear Mr. Segawa:

The subject Draft EIS was reviewed and found that it does not impact on any HUD project along the proposed alignment.

We appreciate the opportunity to comment and look forward to receiving a copy of the Final EIS.

Sincerely,

Alvin K. H. Pang  
Area Manager

July 5, 1978
The Environmental Protection Agency has received and reviewed the draft environmental statement for the Hanamaulu-Ahukini Cutoff Road.

EPA's comments on the draft environmental statement have been classified as Category LO-2. Definitions of the categories are provided on the enclosure. The classification and the date 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 both the environmental consequence of the proposed action and the adequacy of the environmental statement.

EPA appreciates the opportunity to comment on this draft environmental statement and requests three copies of the final environmental statement when available.

If you have any questions regarding our comments, please contact Betty Jankus, EIS Coordinator, at (415) 555-6695.

Sincerely,

Paul De Falco, Jr.
Regional Administrator

Enclosure

cc: Council on Environmental Quality
**General Comments**

(DEIS, Section II.7)

This section states that formal consultation with the U.S. Fish and Wildlife Service has been initiated with regard to endangered species. In accordance with Section 404(b) guidelines (FWPCA, 1972), the FEIS should include the results of consultations with U.S. Fish and Wildlife Service, and their determination regarding the effect of the project on any endangered species.

**Water Comments**

(DEIS, Section III.13)

This section indicates that the land that may be condemned for the proposed cutoff road right-of-way, and the land that may be used for the proposed Lihue Airport expansion, is now used to dispose of mill wash water for the Lihue Plantation. The alternative disposition of this mill wash water, now spread on 640 acres, may have water quality impacts. The FEIS should address this issue.
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.

F-17
EVALUATION
ENVIRONMENTAL PROTECTION AGENCY

A  Formal consultation with the U.S. Fish and Wildlife Service has been concluded, and is documented in Appendix E.

B  The FEIS will have more background information on the mill wash water problem and will identify the most feasible solutions. However, the volume of water, the cost to dispose of it elsewhere and the responsibility for disposing of it, are major points of contention that will probably have to be resolved in the courts. In any event the water will be disposed of in accordance with all applicable State and Federal laws.
August 28, 1978

Mr. Ralph T. Segawa
Division Administrator, Region 9
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96830

Dear Mr. Segawa:

The Council has received your request for comments on the draft environmental statement (DES) for the proposed Manamauku-Ahwukini Cut-Off Road, Project No. 510-01-76, Island of Kauai, Hawaii. Pursuant to Section 102(2)(C) of the National Environmental Policy Act of 1969 and the Council's "Procedures for the Protection of Historic and Cultural Properties" (36 CFR Part 800), we have determined that your DES appears adequate concerning our area of expertise, and we have no further comment to make at this time.

Sincerely yours,

Louis S. Wall
Assistant Director, Office of Review and Compliance, Denver

The Council is an independent unit of the Executive Branch of the Federal Government charged by the Act of October 15, 1966 to advise the President and Congress in the field of Historic Preservation.
DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858

FEDED-FV 20 June 1973

Mr. Ralph T. Sagawa
Division Administrator
US Department of Transportation
Federal Highway Administration
20 Cox 50296
Honolulu, HI 96850

Dear Mr. Sagawa:

We have reviewed the Draft Environmental Impact Statement for the Hanamalu-Ahukini cut-off road which was forwarded to us by your office on 17 May 1973. The proposed project does not affect any US Army Corps of Engineers projects in the Hanamalu District.

We note that the proposed bridge across lower Hanamalu Valley lies within the 100-year flood inundation zone shown on the Hanamalu Flood Hazard Area map prepared by the Department of Land and Natural Resources in cooperation with the Corps. Flood elevation at the proposed stream crossing is 13 feet above Mean Sea Level. However, the proposed bridge does not appear to lie within the 100-year tsunami inundation. Through the execution of the Flood Insurance Study for the island of Kauai authorized by the US Department of Housing and Urban Development, Federal Insurance Administration under the National Flood Insurance Program, the Corps has revised the maximum tsunami runup elevation at Hanamalu Stream to 12 feet above Mean Sea Level.

Project planning for the stream crossing should include measures to protect the bridge abutments from flood damage, measures to prevent the aggravation of flood hazards and damages and losses to adjacent lands and structures by construction of the bridge. These considerations should be reflected in the Final Environmental Impact Statement (FEIS).

Our regulations indicate that fill material placed incidental to the construction of bridges across non-tidal rivers and streams, including all attendant features both temporary and permanent that are part of single and complete crossing of the waterbody, does not require a

F-20
Mr. Ralph T. Sagawa

Department of the Army permit if the following conditions are met:

1. The fill material will not restrict expected high flows of the waterbody.

2. Discharges of fill material into wetlands adjacent to the waterbody will not extend beyond 100 feet on either side of the ordinary high water mark of the waterbody.

3. The discharge is less than 200 cubic yards of fill material below the plane of ordinary high water.

4. The discharge will not destroy a threatened or endangered species as identified under the Endangered Species Act, or endanger the critical habitat of such species.

5. The discharge will consist of suitable material free from toxic pollutants in other than trace quantities.

6. The fill created by the discharge will be properly maintained to prevent erosion and other non-point sources of pollution.

7. The discharge will not occur in a component of the National Wild and Scenic River System or in a component of the State Wild and Scenic River System.

As the Draft Environmental Impact Statement (DEIS) does not provide specific bridge details, we request that plans, including design drawings, be submitted for our review to determine conformance with the above conditions and for a formal determination of the need for a Department of the Army permit. In addition, information which identifies the work to be performed in the stream, 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 wetlands, and the measures being taken to prevent the disruption of the natural migratory movements of indigenous aquatic fauna in the streams, should be provided.

Attached are specific comments concerning the DEIS for the proposed project for your consideration and use. We hope that you find our comments useful in your preparation of the Final Environmental Impact Statement and appreciate the opportunity to review the Draft EIS.

Sincerely yours,

[Signature]

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

3 Incl
1. Flood Hazard Area Map
2. Comments
3. Memorandum
SPECIFIC COMMENTS
ON THE
ENVIRONMENTAL IMPACT STATEMENT
FOR THE
HANAMAULU-AHUKINI CUT-OFF ROAD, KAUAI

a. page 1-16. The Final Environmental Impact Statement (FEIS) should include detailed design drawings of the proposed bridge, bridge abutments and piers, and a discussion of construction methods, equipment, cost and work schedule.

b. page II-5. The section concerning water quality lacks information concerning ambient water quality of Hanamaulu Stream. As the construction of the bridge across Hanamaulu Valley is expected to cause adverse impacts to physical-chemical parameters and biological resources in the lower stream and estuary, the FEIS should consider including baseline water quality data for the stream and determining whether State Department of Health Water Quality Standards for freshwaters are currently being met.

c. page II-6. The correct spelling for the generic name of Java plum is Susuena cumini, for ironwood Casuarina equisetifolia, and for coconut Cocos nucifera. Also, Hibiscus tiliaceus should be underlined.

d. pages II-8,9 (Table 3). There are numerous misspellings in this table which should be corrected in the FEIS. We suggest that you consult the reference guide "Hawaii's Birds" published in 1975 by the Hawaii Audubon Society in Honolulu, for the correct scientific names of these birds.

e. page II-7. It may be valuable to perform a survey of Hanamaulu Stream in order to assess the presence or absence of indigenous aquatic fauna. Due to the estuarine nature of the river mouth and the continuous stream flow, it is highly likely that several endemic fishes (principally o'opu makes Awaous stamineus, and o'opu akupa Esox sandwichensis) and crustaceans (opa) inhabit the lower and middle reaches of the stream system. These species are obligately diadromous: that is, they must have unrestricted access to the ocean after birth and as juveniles in order to successfully complete their life cycle and repopulate the stream. Additional information may be available from the Hawaii Cooperative Fishery Research Unit at the University of Hawaii (2538 The Mall, Honolulu, Hawaii 96822, 948-8350), and the US Fish and Wildlife Service, Office of Ecological Services (Room 501, 300 Ala Moana Blvd., P.O. Box 50167, Honolulu, Hawaii 96850). Knowledge of the biotic community structure of Hanamaulu Stream, both above and below the project site, will be important for evaluating the application for a Department of the Army permit for the bridge construction, if one is required.

F-22
f. page III-6,7. We feel that the FEIS should explain the concept of mitigation for endangered species as stated in the attached correspondence from the Acting Associate Solicitor of the US Fish and Wildlife. In paragraph 4.2 (Mitigation Measures) on page III-6 of the DEIS, it is stated that the destruction of habitat for an endangered species cannot be mitigated. However, on both pages III-6 and III-7, the narrative suggests that this impact can be mitigated after the completion of construction by removing temporary fills and creating "pot holes" where endangered birds may find standing water. This apparent discrepancy needs to be clarified. Furthermore, the FEIS should demonstrate how the input from the US Fish and Wildlife Service has been incorporated into the planning of the proposed bridge design and roadway project as required by the Fish and Wildlife Coordination Act.

8. The results of a cultural/archaeological reconnaissance survey within the project corridor (reference letter on page A-1 of the DEIS), and coordination with the State Historic Preservation Officer concerning the impact of the proposed project on historic resources should be included in the FEIS.
A: During construction of the bridge, temporary embankments may be used to protect falsework (if required) from flooding. The bridge will be approximately 65 feet high and supported by piers designed to withstand maximum flood or tsunami forces. Using piers, rather than partial fill across the valley, will avoid any flood hazard aggravation by the bridge.

B: It is anticipated that a permit will be required; all necessary information will be submitted when this EIS is approved and the bridge design is more complete. Enough details of the bridge will be provided in the EIS to determine the resulting impacts. Design plans of the bridge are not available in the planning phase.

C: Design plans will be submitted to the Corps of Engineers with the application for a Department of the Army permit.

D: The discussion of Page II-4 has been expanded to include a summary of Hanamaulu Stream water quality. The study cited in this paragraph contains the most up-to-date water quality data for the stream.

E: These have been revised in the test and Table 3.

F: Construction of the bridge will not block the stream, and measures will be incorporated to control siltation. An aquatic faunal survey has been conducted by Dr. Amadeo Timbol of the University of Hawaii. There are no native stream animals in the upper reaches of the stream, indicating serious degradation of the habitat. The detailed results of this survey are reported in Appendix H.
G: The referenced correspondence from the Acting Associate Solicitor of the U.S. Fish and Wildlife Service deals with the "critical habitat" of an endangered species, and is therefore not directly applicable to Hanamaulu Valley. According to the Department of Land and Natural Resources, Hanamaulu Valley is of insignificant importance with regard to endangered wildlife (See Appendix E). However, because several endangered waterbirds have been cited there, the Federal Highways Administration and the State Department of Transportation have made an effort to design the valley crossing in such a manner as to "insure that (the) actions will not jeopardize the continued existence of a listed species" (quoted from the last paragraph of the cited letter). As a part of this effort, consultation with the USFWS has been carried out from the early stages of the project, as stated in the last sentence of Page III-7. "Formal consultation" was not initiated with the USFWS until the bridge location and conceptual plans were developed (i.e., maps drawn), and a preliminary draft EIS was available. Formal consultation has now been concluded, and is documented in Appendix E.

The results of this coordination include the "mitigation measures" outlined on Page III-6, as suggested by the USGS. To clear up the inconsistency in this paragraph, "non-mitigative" has been changed to "adverse" in the first sentence. Since Hanamaulu Valley is not critical habitat, it is felt that the concept of mitigation is applicable in this case.

H: The State Historic Preservation Officer has not indicated that this would be necessary for the subject project (Page E-2). Due to the long history of cane cultivation, it is highly unlikely that a reconnaissance would reveal any archaeological sites. In the event that any unanticipated sites or remains are encountered, work will be halted and the State Historic Preservation Office notified immediately.
DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 15TH AIR BASE WING (PACAF)
HICKAM AIR FORCE BASE, HAWAII 96851

DEEV (Mr. H. Nakashima, 4491331)  JUN 1978

SUBJECT: Hawaii F-051-1, Draft Environmental Impact Statement (EIS), FHWA-HI-
EIS-7-03-D, HNHNAMULU-AHUKINI CUTOFF ROAD, STATE PROJECT 51C-01-76

To: U.S. Department of Transportation
Federal Highway Administration
Region Nine
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

1. Reference is made to your letter, HEC-HI, dated 17 May 1978, same subject.

2. This office has reviewed the subject draft EIS and has no comment to render relative to the proposed project.

3. We greatly appreciate your cooperative efforts in keeping the Air Force apprised of your projects and thank you for the opportunity to review the document.

4. Transmittal of your finalized EIS to this office will not be necessary.

ROBERT Q. K. CHING
Chief, Engineering, Construction
and Environmental Planning Div
Directorate of Civil Engineering
Mr. Ralph Segawa  
Division Administrator  
U. S. Department of Transportation  
Federal Highway Administration  
Region Nine  
Hawaii Division  
Box 50295  
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Subject: Draft EIS - FHWA-HI-EIS-7-03-D, Hanamaulu-Ahukini Cutoff Road, State Project 51C-01-76

We have reviewed the subject statement and determined that the project will not have any adverse environmental effects on any existing or planned facilities serviced by our Department.

Thank you for this opportunity to comment.

Very truly yours,

HIDEO MURAKAMI  
State Comptroller
June 2, 1978

Mr. Ralph T. Segawa
Division Administrator, Region Nine
Federal Highway Administration
U. S. Department of Transportation
P. O. Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

The Department of Agriculture has reviewed the subject document and finds that those areas of concern to this agency have been adequately examined.

We appreciate the opportunity to comment.

Sincerely,

JOHN FARIAS, JR.
Chairman, Board of Agriculture
Mr. Ralph T. Segawa  
Division Administrator  
U.S. Department of Transportation  
Federal Highway Administration  
Box 50206  
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Hawaii F-051-1( ), Draft Environmental Impact Statement, FHWA-HI-EIS-7-03-D, Hanamaulu-Ahukini Cutoff Road, State Project 51C-01-76

Thank you for your undated letter transmitting the Draft Environmental Impact Statement for the above subject project. We have no comments to offer on this project at this time, and the Draft Statement is returned herewith.

Yours truly,

Valentine A. Siefermann  
Major General, HANG  
Adjutant General

Enclosure

F-29
STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2200
HONOLULU, HAWAII 96808

OFFICE OF THE SUPERINTENDENT

May 24, 1978

Mr. Ralph T. Segawa
Division Administrator
U. S. Department of Transportation
Federal Highway Administration
P.O. Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

SUBJECT: Hawaii F-651-1 ( ), Draft Environmental Impact Statement, FHWA-HI-EIS-7-03-D, Hanamalu-Ahukini Cutoff Road, State Project 516-01-76

Thank you for your letter of May 17, 1978 on the subject matter.

The Department of Education will not be affected by the project.

Sincerely,

CHARLES G. CLARK
Superintendent

CGC: WC: j1

cc: Kauai District Office
    Mr. Koichi H. Tokushige

AN EQUAL OPPORTUNITY EMPLOYER
F-30
MEMORANDUM

To: Mr. Ralph T. Segawa, Division Administrator
   Federal Highway Administration, U.S. Department of Transportation

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Hanamau-Ahukini
        Cutoff Road, State Project 51C-01-76


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 have no objections to this project.

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.

FYI JAMES S. KUMAGAI, Ph.D.

cc: Environmental Quality Commission
    Land Transportation Facilities Division, State DOT
May 22, 1978

YOUR: HEC - HI

Mr. Ralph T. Segawa
Federal Highway
Administration
P. O. Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

SUBJECT: Hawaii F - 051 - 1( ), Draft Environmental Impact Statement, FHWA-HI-EIS-7-03-D, Hanamalu-Ahukini Cutoff Road, State Project 51C-01-76.

We have no comments to add to our letters of October 16, 1976 and August 17, 1977.

Very truly yours,

W. Y. THOMPSON
Chairman of the Board

F-32
May 30, 1978

Mr. Ralph Segawa
Division Administrator
U. S. Department of Transportation
Federal Highway Administration
Hawaii Division
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Thank you for the opportunity to review and comment on the Draft Environmental Impact Statement for the Proposed FHWA-EIS-7-03-D, Hanamaua-Ahukini Cutoff Road, Project No. 51C-01-76, May 12, 1978.

The proposed undertaking will have no effect upon any known historic or archaeological site or likely to be eligible for inclusion on the Hawaii Register and/or National Register of Historic Places. This office has no reservations for the project to proceed.

In the event that any unanticipated sites or remains are encountered, please inform the applicant to contact this office immediately.

Sincerely yours,

Jane L. Silverman
Historic Preservation Officer
State of Hawaii
EVALUATION

DEPARTMENT OF LAND AND NATURAL RESOURCES
HISTORIC PRESERVATION OFFICER

A: In the event any unanticipated sites or remains are uncovered during construction, the State Historic Preservation Officer will be contacted immediately.
May 22, 1978

Ref. No. 6454

Mr. Ralph T. Segawa
Hawaii Division Administrator
U.S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Subject: Draft EIS - Hanamalu-Ahukini Cutoff Road

We have reviewed the above document and can find no substantive comment to offer on the proposed project. We will not require a copy of the Final EIS document.

Thank you for the opportunity to review the project proposal.

Sincerely,

HIDETO KONO
MEMORANDUM

TO: Environmental Quality Commission

FROM: Andrew I. T. Chang, Director

SUBJECT: Environmental Impact Statement Review
Title: Hanamaulu - Ahualoa Culvert Project
Location: Hanamaulu, Kauai
Classification: Agency Action

The Department of Social Services and Housing has reviewed the subject E.I.S. and could offer no comments relative to the proposed action.

Thank you for allowing us to comment on this matter.

[Signature]

cc: Department of Transportation
MEMORANDUM

TO: R. Higashionna, Director
   Department of Transportation

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

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT FOR HANAMALU-AHUKINI
   CUTOFF ROAD, KAUA'I

July 11, 1978

We have reviewed the above document and offer the
following comments for your consideration:

Page I-7

What does the annual maintenance cost of $4,285/lane/mile for Kuhio Highway include?

Page I-13

The draft EIS states, "The proposed Hanamalu-Ahukini Cutoff Road is being designed to accommodate the projected
year 2000 traffic at level C service." Level C service should be explained.

Page I-14

A sprinkler system will be used for landscaping. Has any consideration been given to use of sewage effluent from the
Lihue Sewage Treatment Plant? We recommend a discussion of this possibility.

F-37
There is discussion concerning the backwater characteristics of the existing stream valley. It states, "The backwater effects during flood periods on Hanamaulu Stream are primarily the result of the embankment of the old railroad crossing." The problem of dense population of water hyacinth at the mouth of the stream also contributes to the flooding of the area. Although the plants are periodically removed, this is not done routinely. Eventually, the plants become a nuisance. There should be discussion of this problem and how it relates to the flooding of the stream area. Will the proposed bridge be subject to flooding because of the dense aquatic vegetation at the mouth?

The EIS states, "The average coliform, phosphorus and nitrogen levels in Hanamaulu Bay all exceed the State Standards for Class A waters (County of Kauai 1973)." The poor water quality is due to surface runoff from cane fields and pastures. Runoff from pavement will also contribute to the water quality problem. Thus, there should be discussion on the effect of surface runoff from the asphalt, what effect it will have on the endangered water habitat, and what mitigation measures will be used to reduce this impact.

The Hawaiian Coot, Koloa Duck, and Hawaiian Gallinule are also classified as endangered on the State of Hawaii's endangered specie list. We recommend coordination with the Department of Land and Natural Resources.

Pluvialis dominica on Table 3 should be listed as Pacific Golden Plover.

What is the average flow rate for Hanamaulu Stream?

The south side of the stream is the feeding and resting habitat for the Koloa Duck. What is the distance from the proposed alignments?
Mr. R. Nigashionna
Page 3
July 11, 1978

Page III-8

The EIS indicates that the proposed alignment would not meet the Federal Design Standards of 70 dBA for a highway corridor through a residential area. Would the noise effect the endangered species nearby? What mitigating measures are proposed for the residents that will be affected?

Cost of Wildlife Habitat

In estimating the cost-benefit ratio, what is the value placed on the endangered species? What is the criteria used to determine the value of the endangered species and loss of their habitat?

Effect on the Endangered Species

The discussion of endangered species should be expanded. The final document should include a summary of the consultation with the U.S. Fish and Wildlife Service and how the Department of Transportation will comply to the Fish and Wildlife Coordination Act. If possible, the proposal for mitigating measures should be included.

Alternatives

Since highway projects tend to promote the use of the automobile, it is important to recognize the state and national goal to reduce our energy dependence. Emphasis should be placed on the conservation of energy and the use of transportation alternatives such as carpools and mass transit. Thus, we strongly recommend a discussion be presented on alternatives which emphasize energy conservation. For example, carpooling or a bus system may reduce the need for another alignment, therefore, no action may be a feasible alternative.

The EIS Regulations state that responses to comments should be made within fourteen days after the end of the comment period. However, we will exercise the discretion provided by the regulations and will consider responses made after the prescribed fourteen day response period. We thank you for the opportunity to review this document.

We trust that these comments will be helpful to you in preparing the final EIS.

Attachment

F-39
LIST OF COMMENTORS

*Helen Hopkins
Department of Social Services and Housing
May 24, 1978

American Lung Association
May 23, 1978

Department of Health
June 21, 1978

Environmental Center
June 20, 1978

June 22, 1978

*comment is attached
EVALUATION

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

A: Annual maintenance costs include resurfacing, restriping, replacing damaged signs and guardrails, cleaning culverts, cutting grass, caring for landscaping and other miscellaneous items.

B: Level of service is a classification of highway driving conditions and is a function of roadway width, horizontal and vertical alignment, traffic volume, driving speeds and other factors. Since level of service is basically a technical term used by highway engineers, the term will be deleted. The design characteristics will be explained in terms more understandable to the layman.

C: The source of water for landscaping has not been determined at this time. One source that will be considered is the water from Lihue Planatation's irrigation system, which in part consists of the effluent from Lihue Sewage Treatment Plant.

D: Compared to the constriction in the floodplain caused by the railroad embankment, the effect of the water hyacinths on backwater is minor. The bridge will be 65 feet above the valley floor, and its pilings will be constructed to withstand maximum flood or tsunami forces.

E: The proposed cutoff road will contribute oil, fuel residues and rubber particles to the runoff into Hanamaulu Stream. At full four-lane development there will be roughly 7 additional acres of impervious highway surface contributing approximately 30-acre-feet of runoff per year. This small volume of runoff does not justify treatment, especially when there are much more significant sources of pollution in the watershed that must be dealt with (eg. piggeries and other livestock). During construction, siltation ponds or other measures will be employed to reduce the sediment load reaching the stream.
F: We are aware that the species noted are endangered, as stated in the fourth sentence of the second paragraph on Page II-7. The Department of Land and Natural Resources has indicated to us that in several waterfowl censuses and surveys conducted by the Department in the area, the only endangered wildlife species encountered was the Hawaiian gallinule Gallinula chloropus sandvicensis. Only one gallinule was observed, well upstream of the proposed roadway. In the opinion of the Kauai wildlife biologist for the Department of Land and Natural Resources, the wildlife habitat that exists along the proposed Hanamaulu Cutoff Road is insignificant to endangered wildlife.

G: These names have been corrected.

H: There is no gauge on Hanamaulu Stream at the proposed bridge location, so this data is not available. The only time that the flow of Hanamaulu Stream was monitored was 1912-1914 at the Kapaa Bridge. The mean flow for that period was 13.7 cfs.

I: The proposed crossing would temporarily disturb a strip, roughly 100 feet wide, through the area where several Koloa were observed.

J: Since there are no residential areas in the proposed highway corridor (with the exception of one home), the Federal Design Standard does not apply; it is only given here for comparison. It is our opinion that noise from the highway would not affect the endangered waterbirds. This is based on observations of endangered waterbirds close to Kuhio Highway at numerous points between Kaliihiwai and Lumahai Streams. No mitigating measures are proposed to reduce the noise from the bridge other than using properly designed expansion joints.
K: The cost-benefit analysis is based solely on construction and maintenance costs, versus user benefits in the form of reduced accidents and reduced driving time and maintenance costs. Wildlife values are considered separately in the Environmental Impact Statement.

L: These suggestions have been incorporated in the Final Environmental Impact Statement. Consultation with the U.S. Fish and Wildlife Service is documented in Appendix E.

M: The need for a more efficient transportation corridor between Lihue and Hanamaulu is immediate. Without imposing totalitarian measures (which would not be accepted), encouraging the use of mass transit or similar solutions would not reduce traffic enough to alleviate the existing problems. Furthermore, the adverse impacts of the "no action" alternative - increased congestion and attendant increases in air pollution, noise and fuel consumption - make this alternative unacceptable (See Page IV-1).
Office of the Director

Mr. Richard O'Connell  
Office of Environmental Quality Control  
550 Halekauwila Street, Room 301  
Honolulu, Hawaii 96813

Dear Mr. O'Connell:

Review of Draft Environmental Statement for Hamamaulu-Ahukini Cutoff Road, Kauai, Hawaii

The Environmental Center’s review of the above cited EIS has been prepared with the assistance of Marshall Mock, Kauai Community College; John Walters, Oceanography; Paul Bartram, Pacific Urban Studies Planning Program; Doak Cox, Jacqueline Miller, and Barbara Vogt, Environmental Center.

In general, the document covers most of the known and potentially significant socio-economic impacts that can be expected to occur as a result of this project. The areas in which our reviewers suggest further clarification are as follows:

The major reason for choice of alignment between the Hamamaulu-Ahukini Cutoff Road and Kuhio Highway seems to center around the Kauai Hardwoods Store and the ability of tour buses to gain easy access to the Kauai Hardwood’s parking lot. We are in agreement with the project’s statement (IV-6) that an “isolated business on a high speed highway is generally undesirable from a traffic safety standpoint” and would like to see the traffic safety aspect be of prime importance in the final decision on alignment. An alternative cutting mauka of Kuhio Highway should be investigated. There also seems to be some question about the destination of traffic, whether it goes to the airport and the industrial area, or more toward the westside of the island.

Page I-16: We are pleased to note that consideration of aesthetics will be included in the final bridge design. Will the final plans for bridge construction be circulated for public review prior to approval?

The following corrections should be made to the flora and fauna lists:

Page II-6:  
Eugenia cuminii  
Casuarina equisetifolia  
underline Hibiscus tiliaceus

AN EQUAL OPPORTUNITY EMPLOYER  
F-44
Page II-8: Anas acuta
Gallinula chloropus haw.
Heteroscelus incanum
Anas (not Spatula) clypeata
Copsychus malabaricus

Page II-9: Garrulax canorus
Lonchura punctulata
Melagraps gallopard int.
Mimus polyglottos
Paroaria coronata (not cucullata)
Cardinalis (not Richmondia cardinalis)

The EIS does not adequately assess the impact of the proposed highway on the wildlife. The list of bird species appears to have been taken not from any scientific study but from the files of VTN Pac-ic. Why is there no reference to the source used by VTN Pacific? Why is VTN Pacific not listed in the bibliography? Furthermore, in page III-6, that statement is made that "it is highly unlikely that this site would be utilized by waterbirds." Such unsupported references and statements leave these portions of the EIS uncompleted. Has a scientific and comprehensive survey been taken of the birds and freshwater fauna in the project area?

Page II-6: What is meant by the "spoil dump" along Hanamalu Stream?

Page III-4: The "unnamed stream" needs clarification. Is the stream seasonal or the result of irrigation runoff?

Pages III-6, III-12: With regard to mitigating measures, there are several references to steps that "can" be taken to alleviate or reduce certain environmental impacts. The wording should be rephrased to steps that "will" be taken otherwise the suggested mitigating measures statements are meaningless.

Page III-13: Mention is made of excess water resulting from condemnation of cane lands for the highway. What are the State plans for the disposal of this excess mill wash water?

Page IV: Mention is also made of "relocating overhead utilities along the alignment". Does this indicate that utilities will be placed underground?

Pages A-44 and A-45 are extremely difficult to read. All pages in the EIS should be clearly legible.

Page E 3-5: Concern with the impacts of the project on the endangered waterbirds was expressed by the Fish and Wildlife Service in September 1977 with the recommendation that the plans be coordinated with Mr. Eugene Kridler, the Service's Hawaii Endangered Species Coordinator. We note however, that action on this recommendation for consultation with U.S. Fish and Wildlife Service as provided
in Title 50, part 402 of the Endangered Species Act of 1973, was
delayed for some 8 months until May 12, 1978, the same date the
draft EIS was released. Therefore we conclude that all plans in
the draft EIS document have been derived without benefit of the
expertise and consultation of the designated Federal advisor on
endangered waterbirds,

We strongly recommend that acceptance of this DEIS be deferred until
the plans are revised as necessary after a full review by the Fish
and Wildlife Endangered Species coordinator.

Thank you for the opportunity to review this EIS.

Yours very truly,

Doak C. Cox
Director

DCC/1mk

cc: Ralph Segawa
Marshall Mock
John Walters
Paul Bartram
Jacquelin Miller
Barbara Vogt

F-46
EVALUATION

ENVIRONMENTAL CENTER - UNIVERSITY OF HAWAII

A: Traffic safety has always been one of the primary concerns. Alignment A will be designed to provide safe egress and ingress for Kauai Hardwoods Store.

B: Such an alignment has been discussed a number of times since a bypass road was first conceived. It was considered in the formulation of the Lihue Development Plan, but dropped due to high costs and to serious impacts to the operations of Lihue plantation.

C: The primary purpose of the Cutoff Road is to serve traffic to Lihue Town, the harbor area and the airport, and to relieve traffic congestion on Kuhio Highway between Lihue and Hanamaulu.

D: The final bridge plans will be available for public inspection. The plans, however, will not be circulated for public review.

E: These spellings have been corrected.

F: The source of the bird species list for the vicinity of the airport (Table 3) is clearly cited on Page II-9. VTN Pacific's field studies were concentrated in Hanamaulu Valley and the unnamed stream near the Kauai Hardwoods Factory; the bird species observed in these localities are indicated with asterisks on the list (which applies to the general project area). The area of the unnamed stream was investigated on February 24, 1978 by VTN Pacific, and was found to be an inconsequential cane field drainage course, with a dense growth of hau and Java plum along the south bank and sugar cane up to the north bank. There is no waterbird habitat in the vicinity of the potential crossings, though the area near the mouth of the stream has several drainage canals that may be utilized by Koloc. These observations led to the conclusion that the crossing site was not likely to be utilized by waterbirds. They will be added to the bibliography.
G: The spoil dump is on the upper edge of the valley wall, and does not extend to the stream. A fairly large volume of fill was apparently dumped down the south valley wall where the quarry access road and the upper cane road intersect. It is now thickly vegetated, but shows evidence of shallow creep and minor sliding.

H: Field investigations indicate that the stream carries mostly surplus irrigation water.

I: The suggested rewording has been incorporated.

J: The State is currently studying various alternatives, but pumping the water to other areas seems to be the most reasonable solution. However, these studies have not been completed, so any recommendation would be premature. In any case, the recommended solution will be in conformity with all State and Federal laws.

K: Overhead utilities will not be placed underground; the reference is to moving utility poles that fall within the proposed alignment.

L: We apologize for the poor legibility, but the carbon copy "originals" were not very good. The legibility will be improved in the Final EIS.

M: This project was discussed with the staff of the U. S. Fish and Wildlife Service (USFWS)(including the Endangered Species Coordinator), and the Division of Fish and Game on numerous occasions between June 1977 and March 1978. "Formal Consultation" was not initiated, until maps of the bridge crossing and the draft EIS were available. The mitigating measures described on Page III-6 were suggested by the USFWS during the informal consultation period. Results of the formal consultation with the USFWS has been included in the Final EIS.
Ralph T. Segawa  
U.S. Department of Transportation  
Hawaii Division  
Box 50206  
Honolulu, Hawaii 96850

Dear Mr. Segawa,

Re: Hawaii F-011-1(  ), Draft EIS, Hanamaua-Ahukini  
Cutoff Road

We have reviewed the Draft EIS and have no critical comment.  
We do not need to receive the Final EIS.

Thank you for the opportunity to participate in the review  
process for this project.

Sincerely,

[Signature]

Reginald H. F. Young  
Asst. Director, WRRC

RHFY: jm
May 23, 1978

Mr. Ralph T. Segawa
Division Administrator
U. S. Department of Transportation
Hawaii Division
Box 50206
Honolulu, Hawaii 96805

Subject: Draft Environmental Impact Statement, FHWA-HI-EIS-7-03-D,
Nanakuli-Ahuiki Cutoff Road, State Project 51C-01-76

Our comments on the subject matter indicating our support of the proposed
Cutoff Road are contained in our letter to Mr. E. Alvey Wright, then the
Director of Transportation, dated August 2, 1977. We, therefore, have no
additional comments to make on the contents of the Draft EIS.

We note, however, that neither this Draft nor the EIS Preparation Notice
were sent to the owners of the land for comment. Since the Cutoff Road
affects them directly, we believe it would be logical to request comments
from them.

Thank you for affording us to comment on the subject matter.

[Signature]
Planning Director

cc: Mayor E. Malapit
Ed Nakano
Public Works (writ)

P.S. Under Appendix A (List of Organizations contacted for Draft EIS) the asterisk
(*) should be deleted from the Planning Department. We commented as noted
on page A-35 & 36.
EVALUATION

PLANNING DEPARTMENT, COUNTY OF KAUAI

A: Only lands owned by Lihue Plantation will be directly impacted by the proposed Cutoff Road. No homes in the valley will be directly impacted. The homeowners in the valley were given the opportunity to comment on the proposal at the public hearing held on June 21, 1978.
June 2, 1978

Mr. Ralph T. Segawa
Division Administrator
Federal Highway Administration
Box 50286
Honolulu, Hawaii 96806

Dear Mr. Segawa:

RE: DRAFT ENVIRONMENTAL IMPACT STATEMENT
HANAAWALU - AHUKNI CUT-OFF ROAD
STATE PROJECT 510-01-76

Reference is made to your letter dated May 17, 1978 with the draft environmental impact statement for the subject project.

We believe the subject project is required to relieve the traffic congestion along Kuhio Highway. A one roadway system as is the case with Kuhio Highway, concentrates all residential and tourist traffic through Hanaaawal, Kapaia and Lihue. As a result, Kuhio Highway is congested especially during peak traffic hours. The project to develop an alternative route to the Lihue - Nawiliwili and airport will separate local and through traffic and will ease the traffic congestion problem.

Very truly yours,

HENRY MORITA
County Engineer

/c

F-32
August 23, 1978

Mr. Ralph T. Segawa  
Division Administrator  
U.S. Department of Transportation  
Federal Highway Administration  
Box 50206  
Honolulu, Hawaii 96850

Dear Mr. Segawa:

Subject: Comments on the EIS for the Hanamaulu-Ahukini Cutoff Road, State Project 51C-01-76

Attached for your consideration are the views and concerns of my staff regarding the proposed Hanamaulu-Ahukini Cutoff Road. This is in response to your letter dated May 17, 1978.

The date by which these comments were requested has passed. However, I do hope they will help you in your evaluation of the impacts of this proposed project.

Sincerely yours,

JAMES N. KURITA  
Director

F-53
With the forecasts of continued growth in communities to the north of the project area, measures will have to be taken to mitigate traffic congestion on Kuhio Highway between Hanamaulu and Lihue. The Hanamaulu-Ahukini Cutoff Road is the most practical alternative for alleviating this traffic problem.

From an economic point of view, issues or factors that will have to be further investigated and decided upon include the following:

1. Choice of alignments A, B or C
2. Hardships placed on Lihue Plantation's sugar operations around the project area
3. Number of lanes for the proposed Cutoff Road

**Alignment A, B or C**

If alignment A is chosen, then future traffic increases will make turning into or exiting from the Kauai Hardwood Store very difficult and dangerous and would hamper the free flow of traffic.

Alignment B and C would be better from a traffic safety point of view. Although alignment B would provide a view of the Kauai Hardwood Store, there would still be no access to it. Consequently, alignment C, which provides for increased safety and free flow of traffic, is the best option.

Furthermore, tourists traveling towards the communities or areas to the south of Lihue will continue to utilize Kuhio Highway when coming from the north.

However, the Kauai Hardwoods Store is a unique feature of the
island of Kauai and should be given assistance if there is any reason to relocate due to the construction of the Cutoff Road.

Hardships placed on Lihue Plantation's operations around the project area

The Hanamaulu-Ahukini Cutoff Road will impact the efficiency of L.P.'s sugar operations at the following areas:

1. Sugar lands makai of the proposed road on the northern side of Hanamaulu Town
2. Sugar lands makai of the proposed road on the southern side of Hanamaulu Stream
3. Sugar lands makai of Kapule Highway

It is important that provisions are made to allow for the continued irrigation of these lands and the least hindrance possible of the movement of the cane haul trucks. The acreage in the above three areas total more than 11% of L.P.'s sugar lands, a very sizeable amount.

A possible solution is building under or overpasses for the cane haul trucks at strategic locations. If these lands are later urbanized, the under/overpasses could be utilized for automobile traffic.

Number of lanes for the proposed Cutoff Road

The Kapule Highway ends at Rice Street with nowhere to go due to the construction of the Lihue Town Estates. Through traffic should not be diverted to Nawiliwili due to the industrial nature of the area. Furthermore, the traffic on Rice Street is quite heavy presently and will not handle too much additional traffic. For these reasons, this Cutoff Road cannot serve as a major Lihue Bypass Road.

However, if the agriculture, aquaculture and tourist industries continue to grow, traffic will deem that this Cutoff Road be ex-
panded to a 4-lane road due to the traffic to the airport and dock facilities.

Purchasing of land for the 4 lanes at this time is recommended, especially on the north side of the Hanamaulu Stream due to the possibility of urbanization of this area.

Other positive impacts of the proposed Cutoff Road

1. Saving of gasoline due to shorter route to Lihue and elimination of traffic tie-ups at peak traffic hours.

2. Will encourage the use of bicycles and other energy efficient modes of transportation, especially from Hanamaulu due to the elimination of having to climb the Kapaa Hill between Hanamaulu and Lihue.

3. Will give more "depth" to Lihue and encourage expansion along Kapule Highway, Ahukini Road and other connecting roads, rather than strip development along Rice Street and Kuhio Highway.

Conclusion

Your EIS thoroughly covers the impacts that will be attributable to the Hanamaulu-Ahukini Cutoff Road, with the exception of its impacts on Lihue Plantation's sugar operations. However, this is understandable due to the fact that negotiations are still continuing with Lihue Plantation. Please note the importance of L.P. to Kauai's economy, more so with its plans for their new bagasse-burning plant for producing electricity for the island.
July 5, 1978

Mr. Ralph T. Segawa  
Division Administrator  
Department of Transportation  
Box 50206  
Honolulu, Hawaii 96850

Dear Mr. Segawa:

We are in favor of the Hanamaulu-Ahukini Cutoff Road because it will alleviate the traffic congestion.

Anything which can be done which would expedite the construction of this project will be much appreciated.

Very truly yours,

Roy K. Hiram  
Chief of Police
U.S. Department of Transportation  
Federal Highway Administration  
Hawaii Division  
P.O. Box 50206  
Honolulu, HI  96850

ATTENTION: Mr. Ralph T. Segawa

SUBJECT: HANAMAUU-AHUKINI CUTOFF ROAD - ENVIRONMENTAL IMPACT STATEMENT

Dear Mr. Segawa:

We have reviewed your draft copy of the Environmental Impact Statement for the subject project and have no additional comments to those made in our letter dated July 18, 1977.

We would like to suggest that a statement regarding energy conservation be added to the statement inasmuch as the Cutoff Road will reduce the gasoline consumption for all vehicles traveling in that area in two ways:

1) People living in the Kapaa area and working in the Nawiliwili area will have a shorter distance to travel.

2) Traffic congestion will decrease on Kuhio Highway and, therefore, reduce gasoline consumption.

Since Kauai Electric is interested in energy self-sufficiency for Kauai, energy conservation is the first and immediate step in striving toward this goal.

Very truly yours,

BOYD T. TOWNSLEY  
Manager  

KAUAI ELECTRIC  
A DIVISION OF CITIZENS UTILITIES COMPANY
ELECTRIC, TELEPHONE, WATER AND GAS SERVICE TO CUSTOMERS IN OVER 550 COMMUNITIES IN MANY STATES ACROSS THE NATION
EVALUATION

CITIZENS UTILITIES COMPANY (Kauai Electric)

The cutoff road will, in fact, increase total vehicle-miles driven in the Lihue area by 0.6%. This is due to the traffic being re-distributed over a longer total road system. However, since traffic will flow more efficiently, there should be some savings in fuel consumption, but this is not quantifiable with the available data.
June 7, 1978

Ralph T. Segawa, Division Administrator
Federal Highway Administration
P. O. Box 50206
Honolulu, Hawaii 96820

In Reply to: HBC-HI, Hanamaulu-Ahukini Cutoff Road

Dear Mr. Segawa:

Thank you for the draft of the Environmental Impact Statement and the opportunity to comment on this subject.

We estimate that a total of three telephone poles may be affected by this project at either Hehi Road and/or the proposed alignment with Kuhio Highway. On this basis Hawaiian Telephone will absorb the cost of such pole-line relocations and rearrangements.

We look forward to this roadway as a means of alleviating an increasingly serious traffic problem on Kauai and shall provide any assistance in expediting this project to completion.

Sincerely,

[Signature]

Erna R. Kanoho
Island Manager

ERK/1
AMERICAN LUNG ASSOCIATION of Hawaii

June 21, 1978

U.S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, Hawaii 96890

Gentlemen:

Subject: Draft Environmental Impact Statement
Manoa-Ahu Rai Cutoff Road
State Project 51G-01-76

We have reviewed those portions of the subject EIS pertaining to traffic and air quality impact and our technical comments are attached. In general, we found the methodologies employed satisfactory; however, several of our comments suggest that for various reasons the overall impact may have been underestimated, particularly during the years through the early 1990's.

Since the analysis was primarily "worst case" oriented, it would have been more informative had some discussion of frequencies of occurrence of CO concentrations been included. This is particularly important when the screening analysis indicates the possibility of standards violations.

Sincerely yours,

James W. Morrow, Director
Environmental Health

JMM:ct
Att.

cc: Oahu
VTD Pacific

F-61

Christian, Sickle Cell Disease, Asthma, Emphysema, Air Pollution
AMERICAN LUNG ASSOCIATION
OF HAWAII

ENVIRONMENTAL IMPACT STATEMENT REVIEW
...an air quality assurance program

Project: HANAMAU-NAUKINI CUTOFF ROAD
Date: June 21, 1978

1. Page B-2. It is stated that stability Class D represents "adverse" dispersion conditions.

This statement is not quite correct in that Class D normally indicates neutral stability as described by Pasquill and Gifford. Class D stability was selected as representative of adverse meteorology in the EPA screening method because a previous study by McIlroy and Poiler in St. Louis found that in an urban area plume dispersion under conditions indicative of Class E and F stability corresponded most closely with estimates made using Class D stability curves. Since Lihue is more nearly a rural area, Class E and F stability curves would be more representative of "worst case" or "adverse" dispersion conditions. The point is "D" stability is not necessarily "adverse" for Lihue.

2. Page B-2. It is stated that "the national CO background level of 1 ppm has been assumed."

This is probably a typographical error since there is no national background level. The sentence probably should have read: "A natural CO background level of 1 ppm was assumed." See page 33 of the EPA screening method (EPA 450/4-75-001).


The assumption of a 0.8 G/Cy ratio for the police-controlled intersection fronting Wilcox Hospital seems a bit unrealistic. If, as stated in the EIS, there is already a congestion problem at this point on Kuhio Highway due to turning movements into the hospital and converging traffic from one to two lanes, it would seem that the flow along that segment was not in fact getting the benefit of 80% of the "green" time, but something less. It would seem that vehicles waiting to turn into the hospital would be getting a disproportionate share of the "green" time as they held up Kuhio traffic while waiting to turn. This deserves some reevaluation. The high G/Cy ratio for Kuhio Highway may result in an underestimation of CO concentrations at nearby receptor locations.
4. Page B-12. It is stated that "The measure of congestion used in the
HIWAY model is the demand/capacity ratio, or peak traffic volume (V)
divided by the capacity of the individual lane (C)."

This is a minor technical comment intended to clear up an apparent
miscalculation. Input to HIWAY does not include any "measure of
congestion" such as the V/C ratio. However, the screening method
which was the principal analytical tool used in this study does use
V/C ratios in its various curves for estimating CO concentrations.
The HIWAY model itself was only one part of the procedure necessary
to generate the curves in the screening method (EPA 450/4-75-001).

5. Page B-15. Table 6. Note 1 states "V/C values for each lane are the
same, since the projected ADT's for the in-bound and out-bound
directions are identical (Appendix D)..."

The note does not seem quite correct since Table 6 depicts peak hour
V/C ratios and the peak hour in-bound and out-bound traffic volumes
are not the same in Appendix D (pp. D-3 and D-4).

6. Page B-15. "... but using an atmospheric stability class typical of
a rural location (as opposed to urban, as built into the HIWAY model)
would decrease the calculated concentrations."

There are two errors in this sentence. First of all, there is no
urban or rural location or stability "built in" to HIWAY. As
mentioned in Comment 4, HIWAY is simply the line source model that
was used to generate the curves found in the screening method, not
HIWAY.

Secondly, if the screening method incorporated an "E" or "F" stability
which would be more likely to occur in a rural area, then the CO
estimates would increase, not decrease.

7. Page B-17. "... it is evident that the existing condition on Kuhio
Highway is undesirable from an air quality viewpoint. The calculated
values greatly exceed the stringent State Standards for CO and
approach the more lenient Federal Standards."

This statement is inconsistent with the results reported in Table 8
(p. B-16) and with the assessment made in the third paragraph on
page III-10.

8. Finally, we would comment that since this EIS was prepared the
Environmental Protection Agency has issued its latest update on
motor vehicle emission factors.* The EP's in that document are
of significantly greater magnitude than those presented in
Supplement S to AP-42 (the reference cited in this EIS). Thus,
the CO estimates in the EIS (at least through 1990) have been
underevaluated.

*U.S. Environmental Protection Agency
Mobile Source Emission Factors, For Low-altitude Areas Only
(Final Document), March, 1978. EPA-400/9-78-006
F-63
EVALUATION
AMERICAN LUNG ASSOCIATION

The Air Quality calculations were performed again for the Final EIS, using the HIWAY computer model, and not the screening method outlined in the Draft EIS. The new results obtained are shown in Appendix C of the Final EIS.

The evaluation of specific points follows:

1. To represent adverse dispersion conditions in a rural environment, stability Class E was assumed in the revised calculations.

2. The typographical error was corrected to read "natural".

3. The G/Cy ratio for the police-controlled intersection fronting Wilcox Hospital was lowered to 0.7 to more realistically represent peak hour traffic conditions.

4. The misconception has been cleared up. It is understood that the V/C ratio is used in the screening method and not in the HIWAY program. Calculations performed for the Final EIS followed the procedures necessary for input to the HIWAY program.

5. The Final EIS calculations were corrected to reflect the morning peak hour traffic volumes shown in Appendix D. During the morning peak hour, traffic is much heavier in the Lihue-bound direction than in the Hanamaulu-bound direction.

6. The two errors in this sentence have been deleted. It is understood that there is no stability condition "built in" to HIWAY, since stability is one of the parameters used as input to the program. In addition, it is recognized that CO concentrations would tend to increase with the higher stability conditions found in rural areas.
7. Table 8 in Appendix B of the Draft EIS has been re-labeled Table 7 in the Final EIS. The revised figures in this table, and the assessment made in the third paragraph of page III-10 are now consistent with the revised statement: ",...it is evident that the existing condition on Kuhio Highway is undesirable from an air quality viewpoint. The calculated values significantly exceed the stringent State Standards for CO through 1980 and slightly exceed the more lenient Federal Standards for 8-hour concentrations, in 1977".

8. The calculations in the Final EIS were performed using the EF's shown in the latest update to Supplement 5 to AP-42: U.S. Environmental Protection Agency, Mobile Source Emission Factors, For Low-Altitude Areas Only (Final Document), March 1978. EPA-400/9-78-006
THE KAUA’I OUTDOOR CIRCLE

June 21, 1978

Mr. R. Higashionna, Director
Department of Transportation
569 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Higashionna:

The Kauai Outdoor Circle has reviewed the final draft of the Environmental Impact Statement for the Hanamaulu-Ahukini Cutoff Road, Project No. 50-01-76, Kauai, Hawaii. The statement from the viewpoint of the Circle is excellent. Your inclusion of landscaping as an integral part of highway construction, your inclusion of erosion control measures with temporary and later permanent plantings, and the indication that there will be bike lanes as shown in your typical roadway section on page 1-15 all agree with the goals and purposes of our organization. In addition, The Kauai Outdoor Circle is pleased to see that this effort is part of the "Lihue Airport Gateway Beautification Project".

We would like to make three additional comments:

1. Planning for planting of the 30’ medial strip should be included as part of the landscaping plan.
2. If the Land Transportation Facilities Division provides scenic turnout along the cutoff adequate litter containers should be provided at each stop, and landscaping should also be an integral part of these areas.
3. Adequate litter containers should also be placed along the highway where it is safe to do so.

Thank you for considering the viewpoint of the Kauai Outdoor Circle through the statement we are making this evening as well as through the statement we made August 1, 1977.

Sincerely,

THE KAUA’I OUTDOOR CIRCLE

Heidi E. Williams
Hanamaulu-Ahukini Cutoff Road Committee

Clare Miller
President

cc: Mr. Edwin Nakano, Mr. Douglas Sakamoto

F-65

100% Recycled Bond
EVALUATION
THE KAUAI OUTDOOR CIRCLE

1. The 30-foot median will be landscaped. It should be noted that the type of plantings for the median strip will be determined by traffic safety criteria.

2. Provisions for scenic turn-outs are not being considered at this time. However, if scenic turn-outs are added at a later date, litter containers will be installed.

3. Litter containers on the highway will be considered, based on need and safety.

F-66
To: Director of Transportation
769 Pennsylvania St

June 19, 1978

From: [Signature]

This is to confirm that an
appointment with the Honorable City Council
is a very good idea and (copied to)
(24th St). I am a property owner in Honolulu
and welcome the opportunity to attend tonight
in order to give testimony. Thank you.

Yours truly,

[Signature]
May 24, 1973

U. S. Dept. of Transportation
Federal Highway Admin.
Region Nine
Hawai'i Division
Box 52206
Honolulu, Hawai'i 96820

Attention: Mr. Ralph J. Sagawa, Division Admin.

Gentlemen:

Thank you for sending me a copy of the EIS on the HANA-MUULU-AHUWINI CUTOFF ROAD. Because I will be leaving Kaua'i shortly and will not be back in time to reply, I will not be making comments on the statement.

However, since some areas of Kaua'i are not near a library it is difficult for members of the public to find time to study such statements and make an adequate comment on them. Therefore, I am going to make this statement available to other people who might wish to comment.

I would like to add, that though I have not had time to study the statement, I agree thoroughly that a by-pass of Lihue Town from the airport is badly needed.

Yours truly,

[Signature]

Feil: C. Hopkins
P. O. Box 263
Kaua'i, Hawai'i 96744

F-68
**APPENDIX G**

**SUMMARY OF PUBLIC HEARING**

A public hearing on the Cutoff Road was held on June 21, 1978 at the Wilcox Elementary School Cafetorium in Lihue, Kauai.

The following person spoke at the hearing:

<table>
<thead>
<tr>
<th>SPEAKERS</th>
<th>REPRESENTING</th>
</tr>
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<tbody>
<tr>
<td>Chuck Swanson, Moderator</td>
<td>Department of Transportation, State of Hawaii</td>
</tr>
<tr>
<td>Kenneth Nagai, Consultant</td>
<td>Land Transportation Facilities Division</td>
</tr>
<tr>
<td>John Rego</td>
<td>Self</td>
</tr>
<tr>
<td>Malcom Smith</td>
<td>Kauai Hardwoods Factory</td>
</tr>
<tr>
<td>John Loomis</td>
<td>Lihue Plantation Company</td>
</tr>
<tr>
<td>Betty J. Bell</td>
<td>Wilcox Memorial Hospital and Health Center</td>
</tr>
<tr>
<td>Chris Mills</td>
<td>Self</td>
</tr>
<tr>
<td>Clare Miller</td>
<td>Kauai Outdoor Circle</td>
</tr>
<tr>
<td>John Schroeder</td>
<td>Self</td>
</tr>
<tr>
<td>James Tehada</td>
<td>Self</td>
</tr>
<tr>
<td>Eddie Sarita, Councilman</td>
<td>County</td>
</tr>
<tr>
<td>Tony Kunimura, Representative</td>
<td>State</td>
</tr>
</tbody>
</table>
Mr. Swanson, from the State Department of Transportation, opened the meeting and introduced the public officials. Mr. Swanson explained that this was a combined corridor-and-highway-design public hearing, and discussed the agenda for the rest of the hearing, which included a presentation by Mr. Kenneth Nagai of Wilson Okamoto and Associates, followed by a short recess and testimony by the persons wishing to speak at the hearing.

Mr. Nagai gave a brief background on the traffic situation in the area and the need for the project. He described the different alternatives available for relieving the present situation, including the possible development of Kuhio Highway as a major highway route and the development of the cutoff road.

Mr. Nagai went on to discuss the major design features of the project and the social, economic and environmental impacts anticipated from the project's development. The three alignments considered (A, B and C) were covered in detail, together with their relative advantages and disadvantages.

Mr. Nagai explained that evaluation of data up to that time had made Alignment C the preferred alignment. He reiterated the fact that the preference for this alignment was only a tentative decision, and that a final decision would be made only after the testimony at the public hearing was evaluated.

After the recess the following testimony was received:

1. Mr. John Rego stated a preference for Alignment C, and expressed concern for the impact of the proposed cutoff road on a family graveyard located near the proposed right-of-way.

2. Mr. Malcom Smith, owner of the Hardwood Factory stated a preference for Alignment A. (Reason: economic impact on factory).

3. Mr. John Loomis, of the Lihue Plantation, the only landowner affected by the project, stated a preference for Alignment A. (Reason: acquisition of least amount of sugarcane land).

4. Ms. Bell, of the Wilcox Memorial Hospital and Health Center expressed support of the proposed cutoff road and urged the State to proceed with the project with all dispatch.
5. Mr. Mills spoke in favor of the proposed Cutoff Road, without registering a preference for a particular alignment.

6. Ms. Miller, of the Kauai Outdoor Circle praised the provisions for landscaping and erosion control measures. In addition, Ms. Miller made recommendations for planting the medial strip and provision of scenic turnouts with adequate litter containers.

7. Mr. Schroeder expressed concern that the cutoff road would lead to congestion in the lower part of Lihue toward the harbor, and suggested that an alignment for the cutoff road mauka of Kuhio Highway should be considered.

8. Mr. Tehada agreed with the remarks made by Mr. Schroeder.

9. Mr. Edward Sarita, President of the Hanamaulu Association (also County Councilman) stated a preference for an alignment which was essentially Alignment A. (Reason: economic impact on factory).

10. Mr. Kunimura, State Representative spoke in favor of Alternative A.
Dr. R. Higashionna, Director  
Department of Transportation  
869 Punchbowl Street  
Honolulu, Hawaii 96813

Re: Hanamaulu-Ahukini Cut Off Road-Project No. 510-01-76

Dear Dr. Higashionna:

We would like to offer a few comments on the above mentioned project.

First, we would encourage the final plan to provide for non-signalized ingress and egress configurations on the Kapaa or north entrance onto Kuhio Highway.

This would result in less intrasit delay time for our trucks and contribute to a safer intersection.

Second, we would encourage the final plan to eliminate the unsafe valley and highway turn at Kauai Hardwoods.

While we sympathize with Kauai Hardwoods, the combination downhill turn on Kuhio Highway along with customer ingress and egress at Kauai Hardwoods has created an extreme safety hazard for our trucks.

Therefore, in the event that this unsafe situation at Kauai Hardwoods cannot be alleviated, we would endorse Alignment "B" and encourage the elimination of traffic signals at the north intersection. Alignment "B" was chosen or "C" in order to minimize the amount of cane acreage required.

Very truly yours,

Geoffrey H. Miller  
Manager
July 3, 1978

Mr. Tetsuo Harano  
Chief, Land Transportation  
Facilities Division  
Department of Transportation  
State of Hawaii  
869 Punchbowl Street  
Honolulu, Hawaii 96813  

Re: Hanamaulu-Ahukini Cutoff Road  

This letter is a follow up to the statement of The Lihue Plantation Company, Limited made at the Corridor-Design Public Hearing on June 21, 1978.

The Company favors alignment A in that the least amount of agricultural land is required for the right-of-way. It has been stated that the initial phase of the project will be a two-lane highway and that the final phase will be a four-lane divided highway. The date for the final phase is not definite. It is further proposed that the right-of-way necessary to accommodate the final phase be acquired at this time. We have reason to believe that the acquisition of land now to be needed at some undetermined future date may not be legally permissible.

Other concerns are related to the effect on the Company's operations as brought about by the new highway.

- Access to and from the L-29 Quarry on the south side of Hanamaulu Valley must be maintained.
- Irrigation facilities must be maintained.
- A new junction to allow a safe entry of empty cane haul units headed north must be provided if the proposed cutoff road is to become a four-lane divided highway.
Mr. Tetsuo Harano

July 3, 1978

Two cane haul road crossings must be provided for Fields L-29 and Hm-1.

Since the highway may ultimately be a high-speed four-lane-divided highway, safe truck crossings without unreasonable delays are imperative. This applies to the empty haul cane units traveling north as well as the loaded and empty units used in harvesting operations in Fields L-29 and Hm-1.

The Lihue Plantation Company, Limited would be pleased to discuss these points in further detail.

Very truly yours,

AMFAC, INC.

E. Loomis
Director, Real Estate
c
Agriculture Group

JEL: vk

cc: Lihue Plantation Co.
D. W. Bailie

G-6
APPENDIX H  STREAM SURVEY

Aquatic Macrofauna in Hanamaulu Stream, Kauai  DEC 20 1978

by

Amadeo S. Timbol, Ph. D.
Aquatic Biologist
(Submitted to VTN, Honolulu)

Introduction

This is a biological reconnaissance of Hanamaulu Stream to compile a list and to determine relative abundances of resident fish, shrimp, prawn and other aquatic macrofauna. Special attention was given to native animals, e.g. gobies such as Lentipes concolor (o'opu alamao). The significance of the native animals is discussed and on the basis of these natives, an assessment of the stream's ecological quality status is made.

The aquatic macrofauna in Hanamaulu Stream are briefly discussed by the Division of Fish and Game (State of Hawaii 1965).

Methods

Eight stations were selected; four in the estuarine section of the stream in the vicinity of the proposed Hanamaulu-Ahukini Cutoff Bridge and four in the freshwater section (See Appendixes A and B for station parameters and locations).

A stretch of 20 by 1 m of stream channel was pre-measured and animals which could be seen with the naked eye recorded, enumerated and identified. Observations were sometimes made with the aid of a face mask and snorkel. When needed for positive identification, specimens were caught with a hand net and released live in the same area. Boulders, rocks and stones in the freshwater section were examined for the endemic freshwater mollusk, Heritina granosa (hi-hiwa).
Terms used in this report designating the origin of animals are: (1) endemic, means occurring naturally in Hawaii only; (2) indigenous, means occurring naturally in Hawaii and also elsewhere; (3) introduced, means that the animal was brought to Hawaii either intentionally or accidentally; and (4) native, includes both endemic and indigenous animals. Terms and signs used to indicate relative abundances are: absent (0) which means it was neither collected nor seen in the 20 x 1 m site; uncommon (+) where only one was sighted or collected; common (++) between 2 and 5 individuals; and abundant (+++) means more than 5, sometimes up to a hundred or more.

Results

At least 15 species of aquatic animals were found in Hanamalu Stream (Table 1). Of these, 9 are fish, 3 crustaceae, 2 mollusk, and 1 amphibia. Nine species are native to Hawaii, 5 are introduced while the origin of 1 has not been determined. The important native animals are:

Fishes

1. *Awaous generittatus* (o'opu maniha)

   This small (up to 15 cm) indigenous goby is characterized by a broad, slaty blotch extending from below the eye downward and backward across the cheek. It lives in brackish water and in the lower reaches of streams. It was found only in the estuarine portion of Hanamalu Stream.

2. *Awaous stamineus* (o'opu nakea)

   This endemic goby reaches a maximum of 35 cm and on Kauai, it is the basis of a seasonal, ethnic fishery. It is an obligately diadromous animal and must have access to salt water when young before finally migrating far upstream to live. The juveniles and adults do not have a slaty blotch on the cheek. At Hanamalu, it was found only in the estuary.
Table 1. List of Macrofauna in Hanamalu Stream, Kauai (December 1978).

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Local Name</th>
<th>Origin</th>
<th>Listing†</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. FISH</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. <em>Awaous genevittatus</em></td>
<td>o'opu nanha</td>
<td>indigenous</td>
<td>none</td>
</tr>
<tr>
<td>2. <em>Awaous stamineus</em></td>
<td>o'opu nakea</td>
<td>endemic</td>
<td>depleted on Cahu²</td>
</tr>
<tr>
<td>3. Caranx sp.</td>
<td>papio</td>
<td>indigenous</td>
<td>none</td>
</tr>
<tr>
<td>4. <em>Eliotris sandwicensis</em></td>
<td>o'opu okuhe</td>
<td>endemic</td>
<td>none</td>
</tr>
<tr>
<td>5. Gambusia affinis</td>
<td>mosquitofish</td>
<td>introduced</td>
<td>none</td>
</tr>
<tr>
<td>6. Kuhlia sandwicensis</td>
<td>aholehole</td>
<td>endemic</td>
<td>none</td>
</tr>
<tr>
<td>7. Mugil cephalus</td>
<td>mullet², amaama</td>
<td>indigenous</td>
<td>none</td>
</tr>
<tr>
<td>8. Poecilia reticulata</td>
<td>guppy</td>
<td>introduced</td>
<td>none</td>
</tr>
<tr>
<td>9. <em>Tilapia (=Barotherodon)</em></td>
<td>tilapia</td>
<td>introduced</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td><em>moseambica</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B. CRUSTACEA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. <em>Macrobrachium granimanus</em></td>
<td>ope oehaa</td>
<td>indigenous</td>
<td>none</td>
</tr>
<tr>
<td>2. <em>Macrobrachium lac</em></td>
<td>Tahitian prawn</td>
<td>introduced</td>
<td>none</td>
</tr>
<tr>
<td>3. Procambarus claridi</td>
<td>crayfish</td>
<td>introduced</td>
<td>none</td>
</tr>
<tr>
<td><strong>C. MOLLUSK</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. <em>Melania sp.</em></td>
<td>pond snail</td>
<td>indigenous</td>
<td>none</td>
</tr>
<tr>
<td>2. <em>Theodoxus vespertinus</em></td>
<td>brown wd</td>
<td>endemic</td>
<td>none</td>
</tr>
<tr>
<td><strong>D. AMPHIBIA</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. <em>Rana</em> sp.</td>
<td>frog⁴</td>
<td>undetermined</td>
<td>none</td>
</tr>
</tbody>
</table>

¹Considered as endangered or threatened in official register or scientific publications. Depleted means the species still occurs in numbers adequate for survival but heavily reduced in numbers and continues to decline at a rate substantially greater than can be sustained (Miller 1972).

²Miller 1972

³Two additional mullet species, *Neomyrus chantali* (uouca) and *Chelon engeli* may be present.

⁴Possibly two species, *Rana rugosa* and *Rana cascaviana*. 

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3. *Electria sandwichensis* (o'opu okuhe)

This goby-like endemic fish is characterized by separate pelvic fins (true gobies have fused pelvic fins). It attains a length of 25 cm and lives in brackish water and in the lower reaches of streams. At Hanamau, it was found only in the estuary.

Neither the *Lentipes concolor* (o'opu alamoo) nor the *Sicydium tinsmanii* (o'opu noplili), two endemic gobies, were found in Hanamau Stream. There are possibly three reasons why both of these species are absent. Firstly, with regards to *Lentipes*, the longitudinal gradient of the stream is low. From the stream mouth, the stream goes through a flat area, gradually rises up the slopes of Kilohana Crater. This type of stream gradient is not *Lentipes* habitat. *Lentipes* inhabits pristine, steep-gradient streams (Maceiok 1978). Maceiok (personal communication) has not found the *Lentipes* in Hanamau Stream and does not expect to.

Secondly, the o'opu noplili is widely distributed in high grade (nearly pristine to pristine) streams regardless of stream gradient. Because of this requirement, the noplili is designated as an "indicator" species for high grade streams (Timbol and Maciolek 1978). Its absence in Hanamau suggests stream degradation (e.g. pollution).

Thirdly, both of these gobies are obligately diadromous and must have a suitable continuous pathway from the estuary up to the headwaters. That they are absent in the freshwater section of the stream could be due to some physical barrier (e.g. dry stream channel for most part of the year).

Crustacea

1. *Macrobrachium grandimanus* (opae oehaa)

This small (up to 15 cm total length) native prawn is characterized
by a straight rostrum with a 15/4 rostral formula and the second chelae unequal in size. It inhabits mixohaline waters and lower reaches of streams. In Hanamaulu, it was found only in the estuary section of the stream.

Missing is a second native crustacea, *Atya bisulcata* (opae kalaole)

Most Kauai stream harbor these atyids.

Mollusk

1. *Melania* sp.

This small (ca 5 cm), ubiquitous pond snail used to be known as *Thiarca granifera*. It was found in both brackish and freshwater in Hanamaulu.

Absent, is another endemic freshwater mollusk, *Neritina granosa* (hihiwai) which is usually found in Kauai streams.

Other animals previously recorded in Hanamaulu Stream but not found in this reconnaissance are the endemic polychaete, *Nemolycaeis hawaiensis*, which was common among roots of water hyacinth (Maciolek, unpublished data). The small-mouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*) and the bluegill (*Lepomis macrochirus*) were also previously listed (State of Hawaii 1965). We did not found these three game fishes in the stream but it is possible that they are in the reservoirs, flumes and irrigation ditches in the Hanamaulu basin.

During this field trip, a 68-year old resident whose residence is immediately upstream of the proposed cut-off bridge, was interviewed. He claimed that he had lived all his years in the vicinity. The last time he saw hinana (goby fry) in large quantities in Hanamaulu was 40 years ago, when the reservoirs in the Hanamaulu basin were not yet built. He remembers that he last saw o'opu noplili some 20 years ago. Likewise, Chinese catfish (*Clarias fuscus*)
and dojo (Mangurus anguillicaudatus) used to be found in the rice paddies. These paddies are now sugar cane areas. It is highly possible that dojo and Chinese catfish are still in the marshy areas of Hanamalu.

Occurrence and relative abundances of macrofauna in Hanamalu Stream are given in Table 2. Roughly, there are about twice (13 versus 7) more species in brackish water than in freshwater. Of the 15 species in the list, three species; the mosquitofish (Gambusia affinis), the pond snail (Melania sp.) and the frog (Rana sp.) are ubiquitous and abundant. Most of the other animals are limited to either brackish or freshwater. Three of the 15 animals are marine visitors (Caranx sp., Muril cephalus and Kuhlia sandvicensis) and are found in abundance. The native gobies, o'opu manha and makea ranged from uncommon to common. In addition, both of these gobies are not found beyond the estuarine section of the stream. The poeciliids (mosquitofish and guppy) are abundant in the freshwater section. These are mentioned as possible forage for exotic game fishes by the Division of Fish and Game.

At elevations higher than Stations 6 through 8, only native damselfly (Meglyacion vagabundus), native pond snail and exotic poeciliids are present (Maciolek, unpublished data).

Conclusions

At least 15 species of aquatic animals are in Hanamalu stream.

Amonus staminus, a goby that lives in the headwaters of streams, is found only in brackish water suggesting absence of a suitable migratory pathway.

Lentipes concolor, a goby recommended for endangered status, was not found and the physiography of the stream suggests that it is not there.
Table 2. Distribution and Relative Abundances of Aquatic Macrofauna in Hanamaulu Stream, Kauai. (December 1978).

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Sampling Station</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Brackish</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>A. FISH</td>
<td></td>
</tr>
<tr>
<td>1. Amaus genovittatus</td>
<td>++</td>
</tr>
<tr>
<td>2. Amaus stamineus</td>
<td>0</td>
</tr>
<tr>
<td>3. Caranx sp.</td>
<td>+++</td>
</tr>
<tr>
<td>4. Electra sandvicensis</td>
<td>+</td>
</tr>
<tr>
<td>5. Cwmbsia affinis</td>
<td>0</td>
</tr>
<tr>
<td>6. Kuhlia sandvicensis</td>
<td>+++</td>
</tr>
<tr>
<td>7. Mugil cephalus</td>
<td>+++</td>
</tr>
<tr>
<td>8. Poecilia reticulata</td>
<td>0</td>
</tr>
<tr>
<td>9. Tilapia mossambica</td>
<td>+++</td>
</tr>
<tr>
<td>B. CRUSTACEA</td>
<td></td>
</tr>
<tr>
<td>1. Macrobrachium grandimanus</td>
<td>++</td>
</tr>
<tr>
<td>2. Macrobrachium lar</td>
<td>0</td>
</tr>
<tr>
<td>3. Procambarus clarkii</td>
<td>0</td>
</tr>
<tr>
<td>C. MOLLUSK</td>
<td></td>
</tr>
<tr>
<td>1. Melania sp.</td>
<td>0</td>
</tr>
<tr>
<td>2. Theodoxus vestpertinus</td>
<td>0</td>
</tr>
<tr>
<td>D. ANEMIESIA</td>
<td></td>
</tr>
<tr>
<td>1. Rana sp.</td>
<td>0</td>
</tr>
</tbody>
</table>

Legend: +++ = abundant
       ++  = common
       +   = uncommon
       0    = absent or not seen

See also Methods and Appendix B
Sicydium stimpsoni, a goby sensitive to stream degradation, was not found. This suggests stream degradation.

Other native animals that are usually found in Kauai streams but absent in Hanamau are: the crustacean Atym bisulcata and the mollusk Neritina granosa. Their absence also suggests stream degradation.

The absence of the four native gobies, the two native crustaceans and the endemic freshwater mollusk in the freshwater section of Hanamau indicates serious stream degradation. This finding reinforces the ecological quality grade III (exploitative consumptive, moderate to low quality and well exploited) given to Hanamau Stream in a previous study (Timbol and Maciolek 1978).

Literature Cited


## Appendix A

Some Physicochemical Parameters of Sampling Stations in Hanamaulu Stream, Kauai
(December 1978)

<table>
<thead>
<tr>
<th>Sampling Station</th>
<th>Nature of Stream Flow</th>
<th>Nature of Bottom</th>
<th>Water Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No perceptible ocean-ward flow, subject to wave action</td>
<td>Sandy</td>
<td>Brackish</td>
</tr>
<tr>
<td>2</td>
<td>No perceptible ocean-ward flow, not subject to wave action</td>
<td>Sandy-muddy</td>
<td>Brackish</td>
</tr>
<tr>
<td>3</td>
<td>Very slow flow ocean-ward</td>
<td>Muddy-silty</td>
<td>Brackish</td>
</tr>
<tr>
<td>4</td>
<td>Slow flow ocean-ward</td>
<td>Muddy-silty</td>
<td>Brackish</td>
</tr>
<tr>
<td>5</td>
<td>Strong riffle, rapid</td>
<td>Sand, gravel</td>
<td>Freshwater</td>
</tr>
<tr>
<td>6</td>
<td>Not flowing, between 3 and 30 cm depth</td>
<td>Mud, covered with rotting leaves</td>
<td>Freshwater</td>
</tr>
<tr>
<td>7</td>
<td>Strong riffle, comes out of culvert, goes underground some distance downstream</td>
<td>Mud, covered with rotting leaves</td>
<td>Freshwater</td>
</tr>
<tr>
<td>8</td>
<td>Strong riffle</td>
<td>Clay, mud and rotting leaves</td>
<td>Freshwater</td>
</tr>
</tbody>
</table>
Appendix B.
Hanamaulu Stream and Locations of the Eight Sampling Sites

1" = 2000'