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COUNTY OF KAUAI
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ENVIRONMENTAL IMPACT STATEMENT

FOR

HIKIULA GULCH DRAINAGE CHANNEL

HANAPEPE, KAUAI, HAWAII

R. M. TOWILL CORPORATION
ENGINEERS-SURVEYORS-PHOTOGRAMMETRISTS
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Honolulu, Hawaii 96822

F I N A L
ENVIRONMENTAL IMPACT STATEMENT
FOR
HIKIULA GULCH DRAINAGE CHANNEL
HANAPEPE, KAUAI

Pursuant to the Governor's Executive Order
dated August 23, 1971

Submitted by:

County of Kauai
Department of Public Works
Lihue, Kauai 96766

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I. PROJECT DESCRIPTION AND PURPOSE

A. General

The proposed project is to be located in the area between Hikiula Gulch and the Hanapepe River, near the town of Hanapepe, Kauai (Plate 1). This area is frequently flooded by moderate storms, due to the rainfall runoff in the Hikiula Gulch accumulating at the junction of Awawa and (no name) Roads (Plate 2). The purposes of the project are to control the floodwaters and silt which collect at this location, and to convey the water to the Hanapepe River.

The proposed improvement system consists of a drainage channel leading from the lower elevation of Hikiula Gulch to a sump area adjacent to the Hanapepe River, and an outlet structure to direct the runoff into the Hanapepe River. The proposed alignment is shown in Plate 3. The channel will eventually be reinforced concrete, although budget restrictions may necessitate phased construction, beginning with the excavation of an unlined channel. The outlet facility will be a broad-crested weir with its top well above the river level. The design is based on a 50 year storm and drainage area of 533 acres, resulting in a design discharge of 1200 cfs.

The estimated cost for the recommended solution is \$261,000, well above the \$100,000 already appropriated. With the authorized funds, a portion of the recommended system can be built such that it would be functional for a lower magnitude flood.

B. Need for Project

At the present time, the residents of the Hanapepe Valley below Hikiula Gulch are being flooded annually by storm runoff. The water flows down the gulch and accumulates at the junction of Awawa and (no name) roads.

The water is then conveyed by (no name) road toward the Hanapepe River and by Awawa Road toward Hanapepe town. Large portions of the flow leave the roads and flood the residents of the area (Plate 3). The water level has been measured at 5 feet above the road surface. The floodwaters and subsequent deposition of mud and silt have resulted in economic loss and personal inconvenience to the residents, and expense to the County of Kauai in maintenance of the roads. The county maintenance crews remove silt and mud up to 3 feet deep on these 2 roads. These cleanup operations are required yearly.

The area to be protected by the proposed project encompasses a total of about 15-20 acres, extending from the entrance to Hikiula Gulch down to the Hanapepe River and about 1/8 mile either side of the dirt (no name) road from Awawa Road to the river bank.

Most of the land is presently used for sugar cane and taro production and cattle and pig raising. The other land is currently unused, due in part to the flooding problem.

Previous drainage improvements consist of a low flow swale directing flood flows to two 24" corrugated metal pipe culverts under Awawa Road. A small ditch conveys the flows from the road toward Hanapepe River. During even moderate flood periods, the flow accumulates on Awawa Road. The present improvements are not adequate to protect the vicinity of Awawa Road against even annual floods.

C. Proposed Drainage System

To alleviate the flooding and siltation problem, a drainage system has been proposed and final design is underway. The recommended system was selected from the alternatives shown on Plate 2, to be discussed

later. The design flow of 1200 cfs is based on a 50 year storm and the Hanapepe drainage area. The proposed system consists of a drainage channel to be constructed along the recommended alignment shown on Plate 3. The alignment is approximately 1300 ft. long, and will require a 40-50 foot right-of-way, to accommodate a 15 ft. wide channel, a small service road and planted borders. The recommended channel is a reinforced concrete lined rectangular channel. At the upstream limit of the system, a 30 foot base width channel will intercept the natural flood flow in Hikiula Gulch at Point A. This 30 foot channel (8 feet average depth) will be transitioned to a 15 foot base width channel 58 feet downstream, which will follow the Gulch to Point B. The channel will then lead to Awawa Road and a structure will be built to convey the flow under the road. The 15 foot channel will then follow the western boundary of Mr. Kiyoshi Kimata's property and terminate at the four acre natural earth depression adjacent to the Hanapepe River. This area, with a capacity of over 500,000 cubic feet, will be used as a sump, from which the flow will be conveyed to the river by a broad-crested weir. The sump and outlet structure have been designed to remove silt and mud from the flow before it enters the Hanapepe River and will accommodate the 50 year design flood. The weir is essentially a large block of concrete, 115 feet long, placed in the river bank so that the water will be contained in the sump area until a certain height is reached. When overtopping occurs, the top 1-2 feet of water will flow into the river. The floodwaters will be contained in the pond long enough to allow deposition of the majority of the sediment load. This will be discussed in detail in Section II.c.2.d. The sump area is

on State land, and the lessee has stated that he has no objection to use of this area as a settling pond although definite effects on this area will occur.

The County of Kauai will be responsible for cleaning the sump area periodically and disposing of the material at appropriate fill sites.

The estimated total quantity of excavated material is 2,500 cubic yards, including 1,800 cubic yards for the channel and 700 cubic yards in the construction of the outlet structure. Disposal will be at appropriate fill sites, to be recommended by the Contractor and approved by County of Kauai Public Works officials.

Several other alternative solutions were considered in detail. These will be evaluated in Section IV.

D. Environmental Setting Without Project

The project site is located approximately 2 miles northeast of Hanapepe Town, between the Hanapepe River and Hikiula Gulch. The entire area is agricultural land, except for the towns of Hanapepe and Eleele. These communities, with populations of 1400 and 800 persons respectively, are presently agriculturally oriented and are expected to remain so for the foreseeable future. A slight increase in population may occur, due to development of coastal areas and the resulting employment opportunities. The area around Port Allen to the south is tentatively planned for possible resort developments. The proposed flood control project is not expected to have any effect on future developments there.

The land in the immediate vicinity of the project is presently used for a variety of agricultural uses (see Plate 3). Sugar cane, grown by McBryde

Sugar Company and taro by Mr. Miyabara are the most significant crops. Cattle and pigs are raised in the area, and some land is used for open grazing.

The land above Awawa Road is primarily rugged terrain, characterized by brush, shrubs, ferns, and a few trees (ohia). The gulch itself is rocky with varying amounts of alluvium and marine sediment, depending on the season. To the west of the gulch, livestock is raised.

Below Awawa Road, the proposed alignment traverses the land of Mr. Kiyoshi Kimata. Part of the land is presently used for grazing, and consists of various grasses. The rest is unused, and overgrown with shrubs, ferns, and trees. Beyond Mr. Kimata's land, extending to the river, the land is owned by the State of Hawaii. Taro patches are maintained by Mr. Miyabara to the east of the proposed channel. The alignment itself travels over unused land. A small channel is already present here. The proposed sump area is a natural depression, presently used for grazing.

The area below Awawa Road consists of sands and rocks of marine origin and red-brown valley deposits consisting of silts and sandy silts, formed by the deposition of topsoil eroded from the uplands.

The only obstacles in the path of the alignment are an 8" water main and an irrigation ditch. The water main will bypass the channel by going over or under it. The irrigation ditch will go over the proposed channel.

A detailed wildlife survey was not conducted, since the project is not expected to significantly affect species living in the area. The area from Awawa Road to the river is agriculturally developed and, therefore, wildlife is not abundant. A visual survey by personnel from R. M. Towill

Corporation failed to note any terrestrial species. Rats, mice, and mongoose are probably present in small quantities. Several species of birds were noted, but no unique habitats were found.

The area to the north of Awawa Road is more wooded and natural, and a corresponding increase in species and numbers would be expected. Wild pigs are reportedly found farther back in the gulch. Rodents and possibly wild cats and dogs are probably the most abundant animals.

Meteorological data for the Hanapepe area shows the average air temperature to be 74°F. Trade winds of 10-25 mph blow about 70% of the time. Strong southerly, or Kona winds are present 5-10% of the time, with variable Kona and thermal effects occurring the remainder of the year. At Eleele, annual rainfall varies from 20-50 inches per year, with an average value of 30 inches.

The Hanapepe River flows from east to west, finally terminating at Port Allen Harbor. The average discharge of the river is 54.4 mgd (84.2 cfs). During storms, the flow has been measured to be 25,200 mgd (39,000 cfs) in 1963. This flow is an approximate value for a 50 year design storm.

The design flow for the Hikiula Gulch is based upon a drainage area of 553 acres. For a 50 year storm, 1200 cfs is the calculated design flow.

There are no accurate records of the silt content of the Hanapepe River. A rough estimate can be made from the dredging required at Port Allen Harbor, where the river terminates. Two hundred fifty thousand cubic yards of material were recently (fall 1972) removed from Port Allen, representing sedimentation of the last 4 years. Some material of course continued out

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to sea, so a first order estimate of 100,000 cubic yards per year seems reasonable.

Of greater significance, and more difficult to determine, is the amount of sediment carried down Hikiula Gulch during storms. This depends on the condition of the land above, used by McBryde Sugar Company. During cleanup operations after floods, the county removes 60-100 cubic yards from Awawa and (no name) Roads. Other material is removed by individual owners, and some is allowed to remain. An estimate of 200-500 cubic yards per storm, or perhaps 1000 cubic yards per year seems reasonable. The sump area to be used as a sedimentation pond will easily accommodate this load since its capacity is about 6,500 cubic yards at a sediment depth of one foot.

II. PROBABLE IMPACT ON ENVIRONMENT

A. Economic Effects

1. General

There are no businesses or other economic activities that will be adversely affected by the project. The channel will provide flood-control protection to the residents of the area, preventing the inconvenience and economic loss that results from floodwaters and silt. The overall economic well-being of the residents will be significantly improved.

Only three separate landowners will be affected by the construction activities, one of which is the State of Hawaii. The channel will only pass through these parcels, and will not affect the present usage of the land.

The employment situation in the area is not expected to be affected by the project, except during the construction activities, when a short term increase in job opportunities may occur. The decrease in usable land due to the right-of-way acquisition is negligible. Likewise, the loss of tax revenue due to removal of these areas from the tax roles will be negligible.

2. Displacement of Families and Businesses

There will be no persons or businesses displaced as a result of the project.

3. Property Values

The proposed project may slightly reduce the value of the particular properties traversed by the right-of-way. However, the reduction in flood hazard will increase the value of all properties in the project area.

The net result will be a minimal depreciation of 3 parcels and an appreciation of 7 other parcels presently affected by the flooding. The one area, owned by the State of Hawaii, which will be used as a settling sump will, of course, devalue substantially.

4. Cost of the Project

The total cost of the optimum system is estimated to be \$261,000, including right-of-way acquisition. In addition, the sump area will have to be cleaned of silt and mud periodically, at an estimated cost of \$2,000 per year.

B. Social Effects

1. Effect on Neighborhood Character

The proposed alignment will affect a total of 3 land owners. However, no homes will be displaced by implementation of the project. Seven additional parcels will receive definite benefits from the elimination of flood hazards.

The construction effort may cause periodic minor inconveniences to the residents, due to the presence of construction equipment, but no lasting affects on the neighborhood are anticipated. No major disruption of traffic patterns is expected.

2. Public Health and Safety

The proposed project will improve public health and safety in the area, due to relief from flood hazards. The design and construction of the improvement will consider public safety as of paramount importance. The channel will be fenced off to prevent public access. During construction, no compromise of safety will be made. Only conventional equipment will be

used. Blasting is not anticipated, but should it be necessary, all regulations will be carefully observed.

3. Educational or Religious Institutions

There are no religious institutions or educational centers that will be affected by the project.

4. Historical or Archaeological Sites

Consultation with the Hawaii State Archaeologist and the Department of Land and Natural Resources indicated that no sites of historical or archaeological significance will be affected by the project. There are several burial caves located about 500 feet to the northeast of the proposed channel, and elevated 40 feet above the road. There will be no effect on these caves by the channel construction.

5. Recreation Areas or Parks

There are no recreation areas or parks in the vicinity of the project. The possibility of future recreation areas being built in the Hanapepe Valley will be enhanced by the alleviation of flood hazards.

6. Public Utilities

There will be no effect on public utilities in the area. One eight inch water main will be realigned but service will not be broken. Power lines are overhead transmission lines, and will not be affected.

C. Environmental Effects

1. Effects During Construction

a. Description of Activities

The construction activities will basically involve clearing a 30'-40' wide strip over the recommended alignment shown on Plate 3. A 15' wide channel will then be excavated to a depth of 8-10 feet. The

total amount of channel excavation is estimated to be 1,800 cubic yards. The channel will then be lined with reinforced concrete. A culvert under Awawa Road will be constructed, as will an outlet weir into the Hanapepe River. In addition, a berm will be built to enclose the siltation pond area.

b. Vegetation and Wildlife

All vegetation in the alignment strip will be grubbed and disposed of. Other nearby vegetation will not be affected.

Construction vehicles will be restricted to those areas where vegetation destruction is unavoidable. Wildlife will probably not be affected. Organisms residing in the soil will of course be destroyed, but mobile animals will relocate, with the possible exception of the very young. There do not appear to be any unique habitats in the proposed excavation area. There are no economically important or endangered species in the area.

c. Noise

The construction equipment, including dozers and trucks, may inevitably cause noise levels to increase above normal levels. This irritation will be short term and is expected to occur only during regular work hours. No nightwork is planned.

d. Air and Water Quality

Care will be taken to minimize the release of foreign materials to the atmosphere. The only possible pollutants are dust and engine exhaust. Both are expected to be negligible. Dust palliatives such as routine wetting will be used if required.

The effects of construction on water quality are also expected to be negligible. The Hanapepe River may experience a small increase in sediment load during rainy periods, due to runoff from newly cut

area, but the majority of the material will be caught in the sump area. The effect is expected to be minor due to the relatively small size of the project. The drainage area of Hikiula Gulch is 553 acres, which is insignificant (3%) compared to the 27 square mile drainage basin of the river.

The groundwater is not expected to be affected by the excavation.

e. Aesthetics

Project aesthetics will be considered throughout construction. Some visual intrusion by construction equipment is unavoidable, and the appearance of the landscape over a small area will be degraded by excavation. These effects will be minimized to the fullest extent possible, and at any rate will be of short duration. The aesthetic degradation will be over a very small area, and only visible to the few residents of the area. Upon completion, the project area will be landscaped to blend into the terrain.

f. Traffic

Traffic in the area will be unaffected except during construction of the culvert at Awawa Road. A detour will be provided, and disruptions will be announced ahead of time. The road is very lightly travelled, and no major problems are anticipated.

2. Long Term Environmental Effects

a. Land Use

The overall land use in the project area will be essentially unchanged. The economic productivity is expected to increase due to

elimination of the flood hazard. Agricultural uses are expected to remain predominant, but other uses such as the development of recreation areas will not be precluded, except on the channel strip and the sedimentation pond area.

The only major effect on land use will be at the sump area to be used as a deposition pond. The future of this area as pasture land, for which it is presently used, is questionable. The amount and quality of vegetation will depend on the frequency and intensity of storms. It is possible that the area may become unusable for grazing purposes. However, the lessee has stated that he has no objections to the use of this area as a sedimentation basin.

b. Alteration of Drainage Pattern

The proposed project will improve the drainage characteristics of the area by providing a channel to convey storm runoff to the river. The major alteration will be to eliminate the flooding of property below Awawa Road. The drainage pattern above Awawa Road will not be significantly changed. There are no deleterious effects expected as a result of the proposed drainage improvement.

c. Air Quality

After completion of the construction of the project, no further affects on air quality are expected.

d. Water Quality and Siltation

The project is expected to have only minor effects on the water quality in the Hanapepe River. A slight increase in sediment load during storms is expected. The additional silt will come from Hikiula Gulch.

and has been estimated at 200-500 cubic yards per storm, or perhaps 1,000 cubic yards per year. The majority of this amount will be removed in the settling pond prior to discharge into the river. Only a small portion will enter the river. The detention time of the pond varies with the magnitude of the flood. The total pond volume is about 525,000 cubic feet. For a yearly storm with a discharge of 200 cfs, the average pond detention time will be 43 minutes, during which time all particles greater than 0.02 mm in diameter will settle. This corresponds to about 60-70% removal according to the grain size distribution curve of Port Allen Harbor sediments obtained by R. M. Towill Corporation in December 1972. For the 50 year design storm with a flow of 1200 cfs, the pond detention time of seven minutes will remove close to 50% of the material. No adverse effects are expected as a result of this small input. McBryde Sugar Company has pump intakes on the southern shore of the river, across from the outlet, and no problems such as pump clogging are anticipated. It should be noted that during even a yearly storm, the Hanapepe River will be silt-laden and the slight increase in silt from this small drainage area (533 acres) is not expected to be significant. It is unlikely that McBryde will operate their pumps during these conditions.

e. Aesthetics

The project aesthetics will be considered throughout design and construction. After construction, the cut and fill areas can be landscaped to blend into the natural environment. The channel top will be at ground level, minimizing the visual impact.

A second area of aesthetic degradation will be the settling sump or pond next to the river. Following periods of high rainfall,

this area will be full of runoff, and appear as a pond. In dry periods, the area will be covered with silt and vegetation to varying depths depending on the season. The impact on the overall aesthetics of the area should be minimal, however, since the ponding area is a natural depression, and is not visible from the road or from most of the residences.

f. Conservation

The project will have only minor effects on the wildlife and vegetation in the area. The primary effects will be during construction as discussed previously. The vegetation in the settling pond area will be reduced by siltation and flooding, but no significant adverse effects on wildlife are expected. There are no conservation lands that will be affected by the project.

Erosion will be minimized thru careful restriction of construction vehicle activities during construction and expeditious landscaping upon completion of construction. Erosion control will be incorporated as a prime factor to add stability and longevity to the channel and to prevent detrimental environmental effects.

III. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

The project area will inevitably have some minimal adverse effects. The right-of-way will have to be cleared and grubbed, and a drainage channel will replace vegetation. The visual appearance will be altered, particularly until landscaping is developed.

Minor irritations in the form of noise, dust, and traffic interruptions will affect residents, motorists, and pedestrians for short periods of time. Care will be taken to minimize disruptions and insure continuous traffic flow, by specific instructions to the Contractor.

Some increase in silt content of the river may occur during construction, due to runoff from cut areas. This should not cause any deleterious effects to marine life. The problem will be temporary, since very little silt will escape the final settling pond once construction is complete.

The property of three landowners will be traversed and the value may decline slightly. This adverse effect is offset by the elimination of the hazards and expenses caused by floodwaters and siltation.

IV. ALTERNATIVES TO PROPOSED PROJECT

The proposed project evolved from careful consideration of several alternative solutions. The presence of floodwaters in the Hikiula area dictate that the water either be removed or contained to prevent flooding. The two general solutions are therefore (1) to dam the gulch or (2) convey the water to an appropriate area. The alternative of damming the gulch was rejected due to excessive cost and the necessity for providing an outlet channel to convey the water to the Hanapepe River.

The alternative of directing the floodwaters to the river and removing most of the sediment was selected, and several alignment alternatives were considered. The alternatives considered are described below with advantages and disadvantages of each.

A. Alignment Alternatives

The four alternate drainage system alignments are delineated in Plate 2. Each alternative starts at Point "A" and proceeds down to Point "B". This line is designated the "Common Line". Alternate alignment No. 1 proceeds from point "B", crosses Awawa Road, then parallels Mr. Kimata's western boundary and terminates at the sump area, which will be used as a holding or settling pond. The length of this alignment is approximately 1,300 ft. including the Common Line. The settling pond will be designed such that a structural outlet will prevent a major portion of silt from entering the Hanapepe River and possibly clogging McBryde Sugar Company's pumps. Consideration has been given to alternate No. 1 for possible extension to the Hanapepe River from the designated point of termination shown on Plate 1. At the public meeting held on September 27, 1972, the lessee

of the sump area stated he had no objection to the use of the sump area as a settling pond. State representatives indicated that any proposed use of State land must be cleared with the cognizant State authorities. Alternate Alignment No. 1 is the recommended alternative.

Alternate Alignment No. 2 proceeds from point "B", crosses Awawa Road, parallels the western boundary of Kiyoshi Kimata's property, cuts diagonally across McBryde's property, parallels the cane haul road, and terminates downstream of the ford. The advantage of this alignment is that the outlet is far enough downstream that its silt would not affect the McBryde pumps. One disadvantage is that the length is approximately 1,800' and requires the most private land acquisition for right-of-way. Another disadvantage is that this alignment requires two major road crossings.

Alternate Alignment No. 3 proceeds from point "B", parallels Awawa Road, and discharges into Kapahili Stream upstream of the bridge. The advantage of this route is that it affects the least usable land. The disadvantage would be that the length is long (approximately 2,000') and because of the side hill cuts required, excavation costs would be excessive.

Alternative Alignment No. 4 proceeds from point "B", crosses Awawa Road, passes through Kiyoshi Kimata's property, and ends at the sump area, which, like alternate no. 1, would be used as a settling pond. The advantage of this is that the line is short and requires the least right-of-way cost. The disadvantage is that it would cut Mr. Kiyoshi Kimata's property almost through the center into two separate parcels. This alternate elicited a definite objection from Mr. Kimata (son) at the previously mentioned public meeting.

The selection of the design alignment was based on considerations of feasibility, economic cost, effect on land areas and land uses, and environmental effects. Application of these criteria led to selection of alignment no. 1 as being most economical and having the least effect on the present environment. Alignments 2 and 3 are unfeasible due to the high cost associated with a longer alignment, and number 4, although slightly less expensive, would have more profound effects on Mr. Kimata's land.

B. Alternative Channel Types

Several drainage channel types were considered, including open unlined or rip-rap lined trapezoidal, open rectangular lined with reinforced concrete, and a closed underground pipe system.

These types were evaluated on the basis of feasibility and cost, and a reinforced concrete lined channel was deemed most desirable. An open unlined channel appears unfeasible as a long-term solution due to the steepness of the natural ground. An extremely wide channel would be required to attain velocities less than 5 feet per second and guard against erosion. The costs of the three types of lined channel are shown below for the recommended alignment number 1:

| | |
|--|-----------|
| Open Concrete Lined Channel | \$261,300 |
| Open Rip-Rap Lined Trapezoidal Channel | \$427,000 |
| Closed Reinforced Concrete Pipe | \$403,500 |

C. Alternative of No Action

The alternative of leaving the situation as it is was evaluated as well. Advantages include the following:

1. No initial environmental impact due to construction.

2. No expenditure of public funds.
3. No inconvenience to motorists or residents.

Disadvantages are summarized below:

1. Continuation of inconvenience, economic loss and possible danger to residents, and maintenance cost by the County of Kauai due to floodwaters and silt.
2. Severe environmental impact of floodwaters and silt deposition will continue.

It was decided that the benefits of the project justify the expenditure of public funds and the minor impact of construction.

V. RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

The proposed project will enhance both the short-term uses and long-term productivity of the Hikiula Gulch area. The long-term uses of this particular area are not expected to differ significantly from present activities. The construction of a drainage channel will facilitate the present agricultural activities without any negative effects on long-term productivity. In fact, the removal of flood hazards may result in some expansion of activities, either agricultural or recreational in the Hanapepe Valley.

VI. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed project will commit, irreversibly and irretrievably, land, labor, and material resources, since the concrete lined channel will be a permanent structure. A very minor amount of land (about 1.5 acres) will be committed for the project. The sump area (1-2 acres) will be committed, but future uses of this land are not precluded, if the channel is later extended to the river.

Some vegetation and immobile organisms will be irretrievably lost, but no economically important flora or fauna will be affected, and the overall effect on the ecology of the area will be negligible.

VII. POSSIBLE EFFECTS OF IMPLEMENTATION OF INTERIM SOLUTION

A. Description of Project Phases

The optimal drainage improvement as described previously will cost an estimated \$261,300. At present, \$100,000 has been authorized for the project, necessitating a phasing of the construction. With these funds, a portion of the system can be built such that it would be functional for lesser floods of the type that would occur every 5-10 years. The recommended priority in utilizing the funds available are:

1. Purchase of entire right-of-way that would be required in the final design. This will preclude subsequent construction in the area and the possibility of having to select a new alignment.

2. Construct the outlet weir structure at the river bank.

3. Construct the structure under Awawa Road and excavate an earth channel along the recommended alignment. The size of the channel will depend on available funds, but will be a "V" shape, with somewhat less than design capacity.

Although the environmental impact of the interim solution will be essentially the same, there may be some undesirable conditions which cannot be avoided, such as erosion and liability due to diversion of flood flows. Erosion of the unlined channel can be expected due to the steep slope of the natural terrain. The degree of erosion is dependent upon the degree and type of vegetative cover in the channel, the velocity of flow, the sediment load in the flow, the type of soil, and other parameters and cannot be accurately predicted. The erosion would result in an increase of silt flowing into the sedimentation pond, but would have little effect on the river. The design capacity of the pond, 6,500 cubic yards, will easily accommodate the eroded sediment.

The upstream and downstream channel improvements will convey approximately 300-400 cfs, which is about a yearly storm. Flooding will occur during more severe storms, but should be less damaging than under present conditions. The floodwaters are expected to traverse approximately the same course as under the present situation.

Another adverse effect of the phased construction is that construction activities, and the associated disruptions will occur twice rather than just once. The disturbances will be minor, however, as indicated previously.

The interim solution will be temporary, and the optimum plan will be implemented as soon as possible. Efforts are being made to have additional funds authorized as soon as possible, and the final solution may be constructed immediately.

VIII OBJECTIONS TO PROJECT AND THEIR RESOLUTION

A public meeting was held on Kauai on September 27, 1972, to discuss any public objections to the project. No major objections were raised at this time. Mr. Kimata objected to channel alignment Number 4, as discussed earlier, but this alignment was not selected. Discussions occurred regarding use of the earth depression as a sedimentation pond, but no objections were voiced by the lessee of the State owned land or by other individuals. The County agreed to periodically remove the silt from the pond. These were the only significant points raised at the meeting.

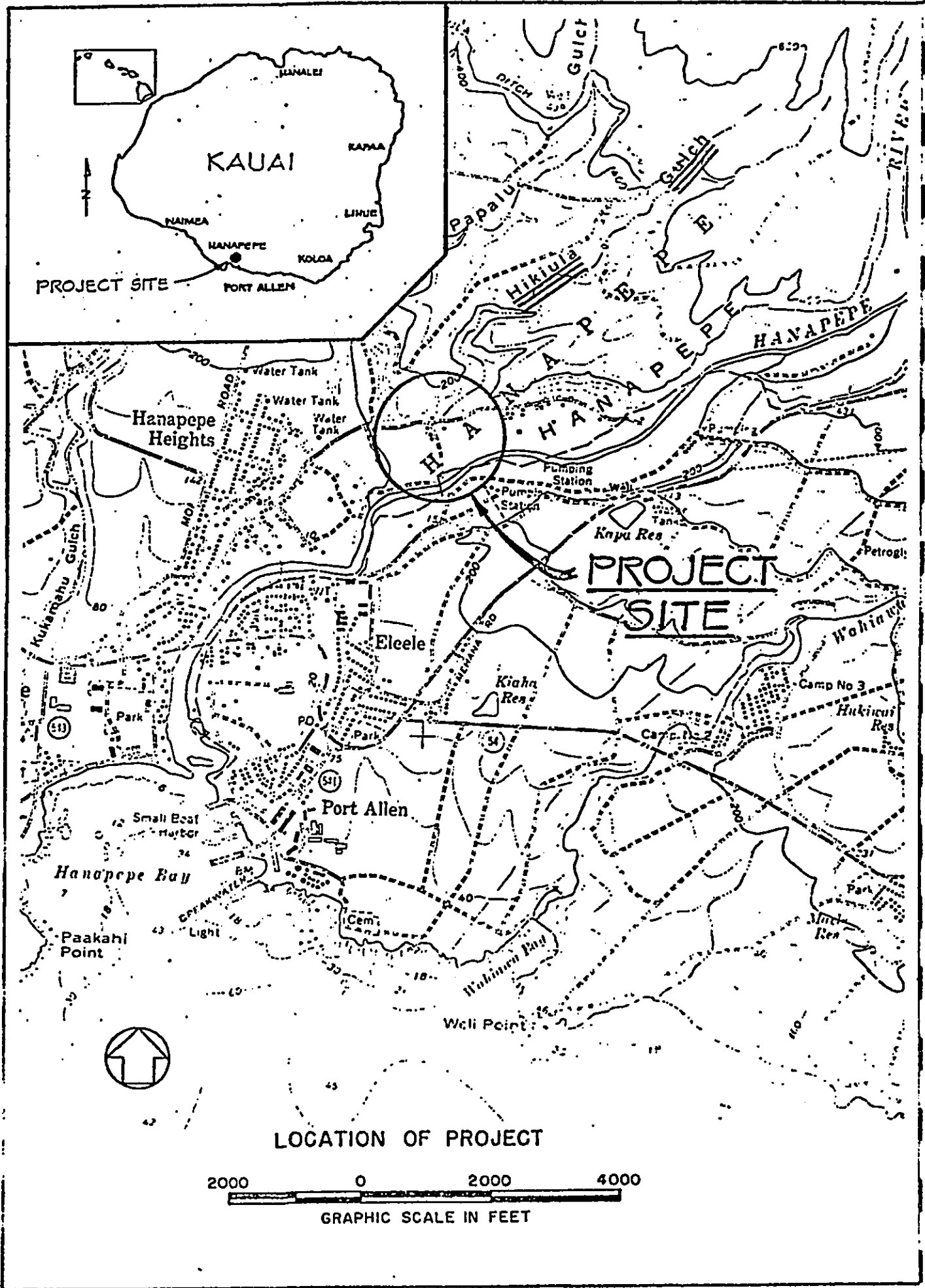
The draft Environmental Impact Statement has been reviewed by interested agencies and individuals and their comments are included as Appendix A. Responses to these comments are given in Appendix B.

PLATES

Plate 1 - Location of Project

Plate 2 - Alternative Alignments

Plate 3 - Land Ownership and Use Map



APPENDIX A

**Letters Received by the
Office of Environmental Quality Control
Regarding the Draft Environmental Impact Statement**

| | | |
|-----|------|-----|
| SCM | STY | ATC |
| 153 | 1973 | PAC |
| INT | RDP | DRM |

July 16, 1973

MEMORANDUM

TO: Hon. Richard H. Marland, Interim Director
Office of Environmental Quality Control

FROM: Sunao Kido, Chairman and Member
Board of Land and Natural Resources

SUBJECT: Comments on Draft Environmental Impact Statements

Proposed Lapaohohoe Park Wading Pond, Hilo, Hawaii

This proposed facility is to be constructed by the Hawaii County Department of Public Works as an additional facility to the existing Lapaohohoe County Park.

The Department of Public Works has been advised by this department that a Conservation District Use Application will be required for this project.

Comments will be made by the Department of Land and Natural Resources when the Conservation District Use Application is processed.

Ahala Gulch Drainage Channel

The Department of Public Works, County of Kauai, proposed to construct a concrete-lined drainage channel between Sikiula Gulch and the Hanalei River. This will control the flood waters and silt that collects at this location. State property will be used for this drainage project.

This department has no objections to the project.

BOARD OF LAND AND NATURAL RESOURCES

Sunao Kido
SUNAO KIDO
Chairman and Member

2111111111



PODED-P

DEPARTMENT OF THE ARMY
HONOLULU DISTRICT, CORPS OF ENGINEERS
BUILDING 96, FORT ARMSTRONG
HONOLULU, HAWAII 96813

| | | |
|-------|--------------|------|
| DATE | | |
| SCM | | STY |
| WR | | WIK |
| REC'D | 100 | 1973 |
| AT | | RDP |
| | 25 June 1973 | DKM |
| | | CHW |

E.I.S. REVIEW

HIKIULA GULCH DRAINAGE CHANNEL
HANAPEPE, KAUAI

Response on Functional Areas of Responsibility of the Corps of Engineers.

The Hanapepe River flood control project, consisting of levee and floodwall construction on both banks of the Hanapepe River, was completed by the Corps of Engineers in 1963. In 1966 the levees were heightened to provide increased flood protection to the residential and business center of the town of Hanapepe and the nearby agricultural lands. A portion of the proposed Hikiula Gulch Drainage Channel project area is located in the Hanapepe River flood plain and is subject to inundation. The draft statement should clarify the acreage and geographic areas to be protected by the proposed project and the extent of inundation that might be attributed to flooding of the Hanapepe River.

The capacity of the sediment-detention pond in the natural sump area is not clear. It is suggested that the pond be large enough to accommodate sediment loading in line with the design 50-year flood.

Response on Full Disclosure Aspects.

The statement that the majority of the silt will be trapped by the settling pond, in the discussion of water quality and siltation, page 12, may be misleading. While it is true that there may be some silt reduction by entrapment of bedload sediments and by the reduction of bank erosion along the channelized sections, the settling of suspended sediments is questionable. The project description section does not describe detention times in the settling pond other than to state that the "floodwaters will be contained in the pond long enough to allow deposition of the sediment load." A description of the outlet structure control mechanisms would be appropriate. The statement should present the estimated quantities of material to be excavated for the channelization and the plans for disposition of the excavated material.

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

440 Alexander Young Building
Honolulu, Hawaii 96813

June 27, 1973

Dr. Richard E. Marland
Interim Director
Office of Environmental
Quality Control
550 Halekauwila St., Rm. 301
Honolulu, Hawaii 96813

Dear Dr. Marland:

Subject: Draft Environmental Impact Statement for the
Proposed Hikiula Gulch Drainage Channel,
Hanapepe, Kauai

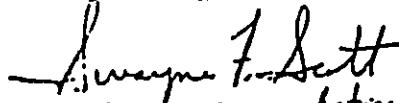
This statement has been reviewed in this office and by our
Field Office on Kauai.

Erosion control and landscaping planned for the project
appear to be adequate.

The interim solution, to be carried out if funding is
insufficient, poses some problems. The unlined earth channel,
described briefly on pages 20 and 21, may erode severely,
causing excessive sedimentation in the sump area and the
river.

We recommend that the project not be carried out until there
is sufficient funding to provide for the lined channel.

Sincerely,


Fred Haughton Acting
State Conservationist

cc:
Smithhisler
D.C., Lihue



JOHN A. BURNS
GOVERNOR



E. ALVEY WRIGHT
ACTING DIRECTOR

LAWRENCE F. O. CHUN
DEPUTY DIRECTOR

MUNNY Y. M. LEE
DEPUTY DIRECTOR

DOUGLAS S. SAKAMOTO
DEPUTY DIRECTOR

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

IN REPLY REFER TO:
ATP 8.2290

July 6, 1973

M E M O R A N D U M

TO: DR. RICHARD E. MARLAND, INTERIM DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

FROM: E. ALVEY WRIGHT, ACTING DIRECTOR
DEPARTMENT OF TRANSPORTATION

SUBJECT: DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR
1) THE PROPOSED LAUPAHOEHOE PARK WADING
POND, HILO, HAWAII
2) HIKIULA GULCH DRAINAGE CHANNEL

We have reviewed the above two subject draft environmental impact statements and the following are our comments:

1. Laupahoehoe Park Wading Pond

Mention accessibility to the project site, parking facility, etc.

Show access to the project site on the location map.

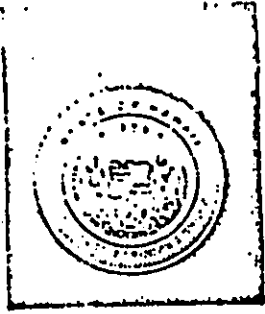
Remove traverse data clutter on figure 1 and 3 and add labeling to clarify work to be done.

The effect of deleting the west barrier should be looked into.

2. Hikiula Gulch Drainage Channel

None.

E. Alvey Wright
E. ALVEY WRIGHT



STATE OF
HAWAII

DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

P. O. BOX 2359 • HONOLULU, HAWAII 96804

July 10, 1973

JOHN A. BURNS
Governor

SHELLEY M. MARK
Director

EDWARD J. GREANEY, JR.
Deputy Director

Ref. No. 9215

MEMORANDUM

TO: Dr. Richard E. Marland, Interim Director
Office of Environmental Quality Control

FROM: ✓ Shelley M. Mark, Director SM

SUBJECT: Draft Environmental Impact Statement for Hikiula Gulch Drainage
Channel, Hanapepe, Kauai

We have reviewed the subject draft and have prepared the following comments for your consideration.

In our review of this draft EIS, it appears that the following items might be further clarified to the satisfaction of appropriate agencies involved:

Since the large amount of sediment removed each year from flooding represents a great loss of irreplaceable top soil from higher elevations, how much is the County doing to impress upon the landowners and others the need to practice intensive soil conservation measures. In this regard assistance or work on methods for erosion control, as well as utilization of the eroded sediment, may deserve additional explanation.

Landscaping plans, especially applicable to the excavated areas, might be amplified further and reviewed by County officials and affected landowners in the area.

It is apparent throughout the preparation of the draft EIS that the section of Alternatives is interpreted to mean alternate routes or channels for the selected method, instead of alternative methods of solving the problem. Clarification on this may be appropriate.

We have no other comments at this time, but appreciate the opportunity to review the draft.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 15th AIR BASE WING (PACAF)
APO SAN FRANCISCO 96553



9 JUL 1973

REPLY TO
ATTN OF: DEEE

SUBJECT: Draft Environmental Impact Statement

TO: Office of Environmental Quality Control
Office of the Governor
550 Halekauwila Street
Tani Office Building, Third Floor
Honolulu, Hawaii 96813

1. Reference is made to your letter of 31 May 73, subject as above.
2. This office has no comment to render relative to the draft environmental impact statements for the Proposed Laupahoehoe Park Wading Pond, Hilo, Hawaii and the Mikiula Gulch Drainage Channel.

A handwritten signature in cursive script, appearing to read "Allan M. Yamada".

ALLAN M. YAMADA
Asst Dep Comd for Civil Engrg

BERNICE P. BISHOP MUSEUM

P. O. Box 6037, Honolulu, Hawaii 96818 • Telephone 847-3511

June 29, 1973

Dr. Richard E. Marland, Interim Director
State of Hawaii
Office of Environmental Quality Control
Office of the Governor
550 Halekauwila Street - Room 301
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement for Proposed
Hikiula Gulch Drainage Channel

Dear Sir:

Within the site of the above named project there is a recorded archaeological site - "Cl-18 Burial Caves." Enclosed is a location map and short description. If this site would be affected by the drainage channel project the proper archaeological salvage work would have to be done before the site was destroyed.

Sincerely yours,

Yoshihiko H. Sinoto p.b.

Yoshihiko H. Sinoto, Chairman
Department of Anthropology

YHS:pb
Encls.

Ahupua'a of Hanapēpē

Site 1. Burial Caves, Kaalawiki, Hanapēpē Valley.

Several burial caves were noted at Kaalawiki point. These caves are all natural holes in the soft tuff-ash ridge. Four caves were found nearly 40 feet above the roadbed. Remnants of a stone wall which may have originally concealed the cave entrance with traces of dirt fill were seen suggesting an attempt at concealing the cave by camouflaging.

In all of the caves seen, remains of wooden-plank coffins were seen in a disheveled state with its contents strewn over the floor. Vandals had broken into and desecrated the remains. Human bones were strewn among the corpses clothes, shoes and boots.

All of the caves in Hanapēpē valley that were examined by the author and by other individuals were vandalized.

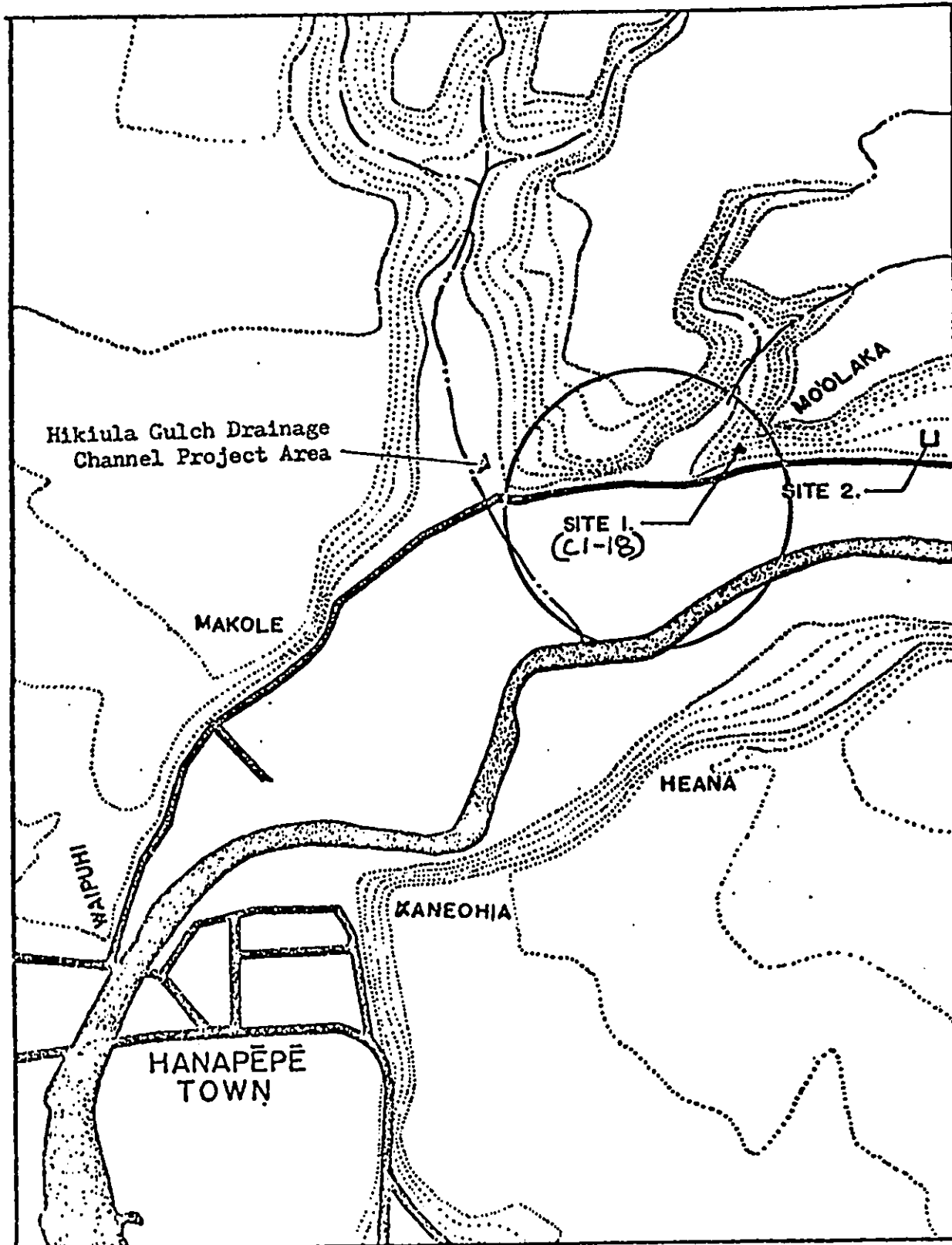


FIG 2 HANAPĒPĒ VALLEY

Reference: Kikuchi, William K.
 Archaeological Survey and Excavations on
 the Island of Kauai, Kona District,
 Hawaiian Islands. August 1963.

Manuscript filed in B.P. Bishop Museum, Anthropology Dept.

JOHN A. BURNS
GOVERNOR



FREDERICK C. ERSKINE
CHAIRMAN, BOARD OF AGRICULTURE

WILLIAM E. FERNANDES
DEPUTY TO THE CHAIRMAN

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

June 15, 1973

MEMORANDUM

TO: Richard E. Marland, Interim Director
Office of Environmental Quality Control

SUBJECT: 1) Draft Environmental Impact Statement for the Proposed
Laupahoehoe Park Wading Pond, Hilo, Hawaii

2) Hikiula Gulch Drainage Channel

1) Laupahoehoe Park Wading Pond, Hilo, Hawaii

We have reviewed subject draft and foresee no impact on agriculture.

✓ 2) Hikiula Gulch Drainage Channel, Hanapepe, Kauai

We foresee no adverse economical effect on agriculture.

Thank you for the opportunity to comment on these matters.

Frederick C. Erskine
Frederick C. Erskine
Chairman, Board of Agriculture

HAWAIIAN TELEPHONE COMPANY

P. O. BOX 2200 HONOLULU, HAWAII 96808 • TELEPHONE (808) 537-7111 • CABLE TEL-HAWAII

July 3, 1973

Dr. Richard E. Marland
Interim Director
Office of Environmental Quality Control
550 Halekauwila Street
Tani Office Bldg., Room 301
Honolulu, Hawaii 96813

Subject: Draft Environmental Impact Statement for:
1) Proposed Laupahoehoe Park Wading Pond, Hilo, Hawaii
2) Hikiula Gulch Drainage Channel

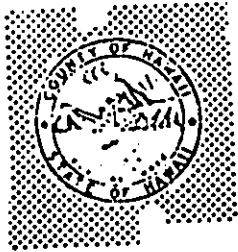
Ref: Your Memorandum dated May 31, 1973

Dear Dr. Marland:

We have reviewed the Draft Environmental Impact Statement and have no objections to the project, nor to the content of the Environmental Impact Statement.

Very truly yours,

R. Mau
Richard Mau
General Outside Plant Engineer



COUNTY OF
HAWAII

PLANNING DEPARTMENT

25 AUPUNI STREET • HILO, HAWAII 98720

SHUNICHI KIMURA
Mayor


RAYMOND H. SUEFUJI
Director

June 26, 1973

Richard E. Marland
Office of Environmental Quality Control
550 Halekauwila Street
Tani Office Building, Room 301
Honolulu, HI 96813

- Re: 1. Draft EIS for Capitol Mall Acquisition,
Honolulu, Oahu
2. Draft EIS for Hikiula Gulch Drainage Channel
Hanapepe, Kauai

Thank you for soliciting our comments on the above draft environmental impact statements. We have no comments to offer as both projects are outside of our jurisdiction.


RAYMOND H. SUEFUJI
DIRECTOR

McG:ih

JOHN A. BURNS
GOVERNOR OF HAWAII



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

WALTER B. QUISENBERRY, M.P.H., M.D.
DIRECTOR OF HEALTH

WILBUR S. LUMMIS JR., M.S., M.D.
DEPUTY DIRECTOR OF HEALTH

RALPH B. BERRY, M.P.H., M.D.
DEPUTY DIRECTOR OF HEALTH

HENRI P. MINETTE, M.P.H., DR.P.H.
DEPUTY DIRECTOR OF HEALTH

July 6, 1973

To: Dr. Richard E. Marland, Interim Director
Office of Environmental Quality Control

From: Director of Health

Subject: Draft Environmental Impact Statement Hikiula Gulch Drainage Channel,
Hanapepe, Kauai

Thank you for permitting this department the opportunity to comment on the subject draft EIS. Please be informed that we concur with the intent of the proposed project.

Our engineering staff has made the following comments relative to environmental matters. First of all the large siltation basin at the river bank will be an ideal area for mosquito breeding during periods of stagnation. Preventive measures must be programmed to address this problem. Secondly, the construction of the outlet weir structure with the proper access roads around the siltation basin for maintenance and mosquito control should be constructed first. All silt run-off due to the construction of the earth channel along the recommended alignment shall be collected in the siltation basin.

We realize however that the statements in the draft EIS are preliminary in nature. We therefore reserve the right to comment at some later date on environmental problems not addressed by the EIS.

Walter B. Quisenberry
WALTER B. QUISENBERRY, M.D.

SP. MAIL NO. MATSUNAGA
1ST DISTRICT, HAWAII

WASHINGTON OFFICE:
442 CANTON BUILDING
20515

HONOLULU OFFICE:
219 FEDERAL BUILDING
96813

Congress of the United States
House of Representatives
Washington, D.C. 20515

MEMBER
COMMITTEE ON RULES
COMMITTEE ON AGRICULTURE
STEERING COMMITTEE

June 25, 1973

Dr. Richard E. Marland
Interim Director
State of Hawaii
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Dick:

Thank you for your recent communication and the attached Draft Environmental Impact Statements for the Proposed Laupahoehoe Park Wading Pond, Hilo, Hawaii and Hikiula Gulch Drainage Channel, Hanapepe, Kauai. I appreciate being kept abreast of these activities.

Aloha and best wishes.

Sincerely,


Syirk Matsunaga
Member of Congress

UNIVERSITY OF HAWAII

Environmental Center
Office of the Director

MEMORANDUM

June 25, 1973

TO: Richard Marland

FROM: Jerry M. Johnson (JMJohnson)

SUBJECT: Draft EIS for the Hikiula Gulch Drainage Channel,
Hanapepe, Kauai

I have attached the WRRRC comments with respect to this draft EIS for
your information.

cc: R.H.F. Young, WRRRC

UNIVERSITY OF HAWAII

Water Resources Research Center
Office of the Director

MEMORANDUM

JUN 21 1973

June 19, 1973

MEMO TO: J. M. Johnson

FROM: R. H. F. Young^{copy}

SUBJECT: Review of Draft EIS: Hikiula Gulch Drainage Channel,
Hanapepe, Kauai

The only critical comment from this office on this draft EIS is that removal of accumulated sediments in the natural sedimentation area has not been considered.

RHFY:jmn

APPENDIX B

**Responses to Letters Received by the
Office of Environmental Quality Control
Concerning the Draft of the
Environmental Impact Statement**

RESPONSES/COMMENTS

1. Board of Land and Natural Resources (Letter Received 7/16/73)

No response needed.

2. Department of the Army, Corps of Engineers (Letter Received 6/25/73)

Comment: "The statement should clarify the acreage and geographic areas to be protected by the proposed project and the extent of inundation that might be attributed to flooding of the Hanapepe River."

Response: The area to be protected by the proposed project encompasses a total area of about 15-20 acres, extending from the Hikiula Gulch entrance down to the Hanapepe River and about 1/8 mile on either side of the dirt (no name) road from Awawa Road to the river.

Natural flooding from the river occasionally occurs in this area. Exact areas of inundation vary according to the specific storm. This project will not have any effect on the present river flooding. Likewise, although river flooding may flood the sedimentation pond, the effectiveness of the proposed drainage channel will not be altered.

Comment: "The capacity of the sediment detention pond in the natural sump area is not clear. It is suggested that the pond be large enough to accommodate sediment loading in line with the design 50-year flood."

Response: The capacity of the sedimentation pond is about four acres or 175,000 square feet. If the depth of sediment is one foot, then about 6,500 cubic yards of material can be contained in the pond. Although, no sediment load information is available, the rough estimate of 500-1,000 cubic yards for a bad storm presented in the draft EIS seems conservative and the pond should easily accommodate the silt from any storm. Clarification of this point has been added to the final EIS.

Comment: A description of outlet structure control mechanisms and pond detention time would be appropriate.

Response: The outlet structure is a simple broad crested weir with no control mechanisms. At peak flood periods, 1-2 feet of water is expected to overtop the structure.

The detention time of the pond varies with the magnitude of the flood. The total pond volume is about 525,000 cubic feet. For a yearly storm with a flow of 200 cfs, the average pond detention time will be 43 minutes during which time all particles greater than 0.02 min. in diameter will settle. This corresponds to about 60-70% removal according to the grain size distribution curve of Port Allen Harbor sediments obtained by R. M. Towill Corporation, 1972. For the 50-year design storm, with a flow of 1,200 cfs, the pond detention time of seven minutes will remove close to 50% of the material. It should be noted that during even a yearly storm, the Hanapepe River will be silt-laden from many other sources and the slight increase from this small drainage area (533 acres) is not expected to be significant.

Additional consideration of this point has been added to the final EIS.

Comment: "The statement should present the estimated quantities of material to be excavated for the channelization and the plans for disposition of the excavated material."

Response: The estimated total quantity of excavated material is about 2,500 cubic yards. Disposal will be at appropriate fill sites, to be recommended by the Contractor and approved by the County of Kauai Public Works officials. This additional information has been added to the final EIS.

3. U. S. Department of Agriculture, Soil Conservation Service (Letter Received 6/27/73)

Comment: "The unlined earth channel described on pages 20 and 21 may erode severely, causing excessive sedimentation in the sump area and the river.

Response: It is recognized that some erosion of the channel may occur and that the eroded material will collect in the sedimentation area. The capacity (6,500 cubic yards) of the pond is sufficient to contain this excess material and little additional sediment should enter the river

The lined channel will be installed as soon as possible, depending on available funds. In the meantime, however, flood control measures are urgently needed to protect the residents; and, the proposed interim solution should not cause any significant or irreversible effects.

4. State of Hawaii, Department of Transportation (Letter Received 7/6/73)

No response needed.

5. State of Hawaii, Department of Planning and Economic Development
(Letter Received 7/10/73)

Comment: "Assistance or work on methods for erosion control, as well as utilization of the eroded sediment, may deserve additional explanation."

Response: The County of Kauai is attempting to educate landowners in the area as to the importance of good erosion-control practices.

The eroded sediment will be transported to appropriate fill sites on Kauai, although no firm plans or sites specific have been made.

Comment: "It is apparent throughout the preparation of the draft EIS that the section of alternatives is interpreted to mean alternate routes or channels for the selected method, instead of alternative methods of solving the problem. Clarification on this may be appropriate."

Response: Additional clarification of this point has been added to the final EIS. The presence of floodwaters in the Hikiula area dictate that the water either be removed or prevented from reaching the flooding locations. The two general solutions are therefore to dam the gulch or convey the water to an appropriate area. The alternative of damming the gulch was rejected due to excessive costs and the necessity for providing an outlet channel to convey the water to the Hanapepe River.

The alternative of directing the floodwaters to the river was selected and several alignment alternatives were then considered.

6. Department of the Air Force (Letter Received 7/9/73)

No response needed.

7. Bernice P. Bishop Museum (Letter Received 6/29/73)

Comment: "Within the site of the above-named project, there is a recorded archaeological site 'C1-18 burial caves.' If this site would be affected by the drainage channel project, the proper archaeological salvage work would have to be done before the site was destroyed."

Response: The burial caves, being 40 feet above the roadbed and 500 feet to the northeast of the proposed channel, will not be disturbed by the construction of the drainage channel.

8. State of Hawaii, Department of Agriculture (Letter Received 6/15/73)

No response necessary.

9. Hawaiian Telephone Company (Letter Received 7/3/73)

No response necessary.

10. County of Hawaii (Letter Received 6/26/73)

No response necessary.

11. State of Hawaii, Department of Health (Letter Received 7/6/73)

Comment: "The large siltation basin at the inner bank will be an ideal area for mosquito breeding during periods of stagnation."

Response: The ponding area has an existing drain pipe in the southeast corner to empty the pond into the river shortly after the storm ends. Stagnation conditions conducive to mosquito breeding will not occur.

Comment: The construction of the outlet weir structure with proper access roads around the siltation basin for maintenance and mosquito control should be constructed first.

Response: The construction priorities shall be clarified with the Contractor to insure that the outlet weir structure for the sedimentation basin is completed before initiating excavation for the channel.

12. Spark Matsunaga, Member of U. S. Congress (Letter Received 6/25/73)

No response necessary.

13. Environmental Center, University of Hawaii (Letter Received 6/25/73)

Comment: Removal of accumulated sediments in the natural sedimentation area has not been considered.

Response: Officials from the County of Kauai will be responsible for periodically cleaning and maintaining the pond. The frequency of these operations will, of course, depend on the number and magnitude of storms during the year. Using

the estimate of 1,000 cubic yards per year discussed in the statement, cleaning of the pond would be required no more than once a year since the pond will accommodate up to 6,500 cubic yards of sediment.

The proposed project is the area between Hikiula Gulch and the Hanapepe River, approximately 2 miles northeast of Hanapepe Town, Kauai. The area is frequently flooded by moderate storms due to the rainfall runoff in the Hikiula Gulch. The purposes of the project are to control the floodwaters and silt that collect at this site and to direct the water to the Hanapepe River.

This EIS was done in accordance to the Governor's Executive Order dated August 23, 1971. It was submitted by the County of Kauai, Department of Public Works, and prepared by R. M. Towill Corporation.

The proposed improvement is a drainage channel leading from the lower side of Hikiula Gulch to a sump area next to the Hanapepe River, and an outlet structure to direct the runoff into the Hanapepe River.

The project is needed because the residents of the Hanapepe Valley below Hikiula Gulch are being flooded annually by storm runoff. The water flows down the gulch and accumulates at the junction of Awawa and unnamed road. The water then goes down the unnamed road toward Hanapepe River and down Awawa Road to Hanapepe Town. Large portions of the flow leave the roads and flood the residents of the area. The water level has been measured at 5 feet above the ofad surface. The floodwaters cause mud and silt deposits which result in economic loss and personal inconvenience to the residents, and expenses to the County of Kauai in the maintenance of the roads. The county maintenance crews remove silt and mud up to 3 feet deep on these 2 roads.

These cleanup operations are required yearly.

The area to be protected encompasses a total of about 15-20 acres. Most of the land is used for sugar cane and taro production and cattle and pig raising. The rest of the land is unused because of the flooding problem.

Present drainage improvements consist of a low flow swale directing the water to two 24" corrugated metal pipe culverts under Awawa Road. A small ditch directs the flows from the road toward Hanapepe River. However, during even moderate floods, the flow accumulates on Awawa Road.

The proposed system is a reinforced concrete lined rectangular channel, approximately 1300 feet long. It will require a 40-50 foot right-of-way, to accommodate a 15 foot wide channel, a small service road and planted borders. At the upstream limit of the system, a 30 foot base width channel will intercept the natural flood flow in Hikiula Gulch. This 30 foot channel will be transitioned to a 15 foot base width channel 58 feet downstream. The channel will then lead to Awawa Road and a structure will be built to convey the flow under the road. The 15 foot channel will then follow the boundary of Mr. Kiyoshi Kimata's property and end at the four acre natural earth depression adjacent to the Hanapepe River. This area will be used as a sump, from which the flow will be conveyed to the river by a broad-crested weir. The sump and outlet structure have been designed to remove silt and mud from the flow before entering the Hanapepe River. The weir is a large block of concrete 115 feet long placed in the river bank so that the water will be contained

in the sump area until a certain height is reached. When overtopping occurs, the top 1-2 feet of water will flow into the river. The floodwaters will be contained in the pond long enough to allow deposition of the majority of the sediment load. The County of Kauai will be responsible for cleaning the sump area periodically and disposing of the material at the appropriate fill sites.

The project area is agricultural land, except for the towns of Hanapepe and Eleele. These communities are agriculturally oriented and are expected to remain so for the foreseeable future. The area around Port Allen to the south is tentatively planned for possible resort developments, and are not affected by the proposed flood control project.

There would be no significant effect on the surrounding environment. The lands in the vicinity of the proposed project is used for growing sugar cane and taro, and for raising cattle and pigs. Wildlife consists of rats, mice, mongoose, birds, wild cats and dogs, and wild pigs farther back in the gulch.

Businesses and economic activities will not be adversely affected, and the well-being of the residents will be significantly improved. Only three separate landowners will be affected by the construction activities, one of which is the State of Hawaii. The channel will not affect the present usage of the land, and seven additional parcels will receive definite benefits from the elimination flood hazards.

The proposed project will improve public health and safety in the area. The channel will be fenced off to prevent public

access. No blasting is anticipated. There are several burial caves located about 500 feet to the northeast of the proposed channel which will not be affected by the channel construction. There are no historical institutions, educational centers, recreation areas or parks, and public utilities that will be affected. The noise level may increase to above normal levels but will be short term and only during regular work hours. Dust and engine exhaust are expected to be negligible. The project is expected to have only minor effects on the water quality in the Hanapepe River. A slight increase in sediment load during storms is expected.

The alternative to this project is to dam the gulch. This was rejected due to excessive cost and the necessity for providing an outlet channel to convey the water to the Hanapepe River.

The benefits of the project justify the expenditure of public funds and the minor impact of construction.