DRAFT
ENVIRONMENTAL IMPACT STATEMENT
FOR

NORTH KONA FLOOD CONTROL PROJECT

HOLUALOA DRAINAGE SYSTEM

North Kona, Hawaii

August 1974

EIS file

SEP 3 1974

BRUCE McCALL
MAYOR

EDWARD K. HARADA
CHIEF ENGINEER

BUREAUS AND DIVISIONS:
AUTOMOTIVE EQUIPMENT & MOTOR POOL
BUILDING CONSTRUCTION AND INSPECTION
PLANS AND SURVEYS
ROAD CONSTRUCTION AND MAINTENANCE
SEWERS AND SANITATION
TRAFFIC SAFETY AND CONTROL

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS
25 AUPUNI STREET
HILO, HAWAII 96720

August 28, 1974

Water Resources Research Center
University of Hawaii
2540 Dole Street
Honolulu, HI 96822

SUBJECT: NORTH KONA FLOOD CONTROL PROJECT
HOLUALOA DRAINAGE SYSTEM
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Attached is a copy of responses to the draft EIS comments submitted for the subject project by the various agencies for your files.

Included also in the attachment are the evaluations to the comments.

EDWARD HARADA
Chief Engineer

Attach.

APPENDIX B .

VIII. DISCUSSION OF PROBLEMS AND OBJECTIONS RAISED BY INTERESTED PARTIES IN THE REVIEW PROCESS

JOHN A. BURNS
GOVERNOR

RICHARD E. MARLAND, PH.D.
INTERIM DIRECTOR

TELEPHONE NO.
548-6915

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

July 29, 1974

Edward Harada
County of Hawaii
Department of Public Works
25 Aupuni Street
Hilo, Hawaii 96720

SUBJECT: Draft Environmental Statement for Master Plan of Kona Flood Control Project (Holualoa Drainage System)

Dear Mr. Harada,

This Office has received seven responses to the proposed project, as of this date. An attached sheet lists the responding agencies.

In our evaluation of the draft EIS (dEIS) and comments provided, this Office finds several areas in which the final EIS should expand discussion. The following comments are offered:

I. INTRODUCTION

We recommend that the estimated cost, $6,900,000, of the project be included within this section. Also, it is suggested that the number of phases planned and their completion dates be included.

Although it appears that the project will alleviate or eliminate flood problems in Holualoa, Environmental Center asks, can they assume that no other flood problems affecting properties will exist there?

II. DESCRIPTION OF THE PROPOSED ACTION

C. Proposed Action

Discussion of the five points listed should be expanded. Size of drain, its capacity, and description of the phases should be mentioned in the final EIS.

Discussion of how the channel will fit in with the planned project and the work involved to conform to the new channel dimensions, as indicated by Environmental Center, is also recommended. In addition, please be more specific when referring to the channel.

If deepening the existing stream will be rock lined and the channel will be mostly unlined except at transition structures (p.6), is there a possibility of erosion along the soil banks? Because erosion brings the following comments from these agencies, discussion is recommended:

1. Water Resources Research Center comments that since the design flow and size of the channel provide fairly high flow velocities that will erode the pockets, will some measures be taken to line these erodible pockets?

2. Corps of Engineers finds that discussion should include existing conditions of drainage basin and erosion control measures which may be required to reduce sediment production.

3. Environmental Center suggests basic practices needed for erosion control. Top soil can be conserved if proper measures are taken.

III. PROBABLE IMPACT OF THE PROPOSED ACTION

Under Adverse Effects, item 4 leads to confusion and needs discussion. What is "shorter" concentration time? Environmental Center finds item 4 a serious consideration. During heavy rainfall, fine-grained silt cannot be caught in the settling ponds and is carried out to sea. Consideration of the impact of silt-laden water on the coastal environment should be given.

Reference made to cattle crossing on page 8 raises a question from Water Resources Research Center. Will the crossings be temporary bridges or ramps?

Department of Transporation recommends the final EIS provide sufficient information concerning compliance with Water Quality Standards of this State.

V. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

The last paragraph on page 13 is confusing. Why will the overall effect be beneficial? A discussion should be provided to explain it.

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

The discussion of the long term productivity should be expanded to include the projected growth of urbanization resulting from the flood control. Will the flood control increase urbanization? What kind of growth is anticipated? Residential? Commercial? Industrial? Where will the growth be concentrated? Will land zoning change because of this proposed project? Will growth be flood free?

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Once the flood control project is implemented, run-off water from the rain will end up at the ocean instead of returning to the ground. Thus, less fresh water will be returning to the underground water source. A discussion concerning this point is strongly recommended.

RECOMMENDATIONS

Since only a brief summary of the letters were given, it would be advantageous to consider the comments individually.

We recommend that (1)written responses be sent to all commentators including this Office, indicating how specific concerns were considered, evaluated and disposed; (2) all comments and your responses should be incorporated as an appendix to the final EIS; (3) a copy of the final EIS should be sent to those individuals that provided substantive comments to the draft EIS.

We trust that these comments will be helpful to you in preparing the final EIS. Thank you for the opportunity to review the draft EIS. We look forward to the final EIS.

Sincerely,

Richard E. Marland
Interim Director

Attachment

LIST OF RESPONDING AGENCIES

FEDERAL	
Department of the Army (Corps of Engineers)	July 23, 1974
*Department of the Army	July 2, 1974
*Department of the Air Force	July 22, 1974
Department of Agriculture (S.C.S.)	Aug. 2, 1974
STATE	
Department of Transportation	July 15, 1974
Water Resource Research Center (UH)	July 15, 1974
Environmental Center	July 22, 1974
*Department of Land & Natural Resources	July 29, 1974
Department of Health	July 25, 1974
*Department of Agriculture	Aug. 6, 1974
COUNTY OF HAWAII	
*Board of Water Supply	July 1, 1974

*No comments offered

University of Hawaii at Manoa

Environmental Center
Maile Bldg. 10 • 2540 Maile Way
Honolulu, Hawaii 96822
Telephone (808) 948-7361

Office of the Director

July 22, 1974

MEMORANDUM

TO: Richard E. Marland, Director, OEQC

FROM: Jerry Johnson, Acting Director
Jacquelin N. Miller, Assistant Researcher

RE: EIS for Kona Flood Control Project
(Holualoa Drainage System) North Kona, Hawaii

The Environmental Center has been assisted in a review of the above cited EIS by Mr. Tamotsu Sahara of the Office of Physical Planning and Construction, University of Hawaii.

Mr. Sahara has raised several questions with which we concur. Rather than devoting time to paraphrasing his comments, we will present them in their entirety:

> From the statement in the introductory section, it appears that this project will alleviate or eliminate flood problems in Holualoa. Can we assume that no other flood problems affecting properties exist in Holualoa.
>
> A more specific breakout of land uses directly affected by this project is desired. A general land use description of the area is given.
>
> The Soil Conservation Service and the County of Hawaii have assisted in constructing flood control channels. How does this channel fit in with the planned project channel? How much work is needed to make this channel conform to the new channel dimensions?
>
> Reference is made that the flood control will increase land values. The flood control will be a factor in increasing the land value by eliminating flood hazards but this is not the only reason for increase in value. The general acceleration of land values will also be a factor.

The inference that "precious top soil would be preserved" must be modified. Top soil in the undefined flow area will definitely be saved after the surface runoff is confined in the channel. However top soil in the Holualoa area will only be saved from eroding if proper conservation measures are applied to the land. For example, all intensively cropped lands should be contour farmed, diversion terraces built to control runoff, strip cropped if large area is cropped and use of ground cover when land is fallow. These are a few of the basic practices needed to control erosion.

Explanations should be given so the two conflicting statements on Page 7 can be better understood. In the "Benefits" section, Item 9 states "Aesthetics of the area would be improved." In the Adverse Effects" section, Item 3 states, "Excavation will mar the landscape."

Will any provision be made to reduce the length of the Great Wall of Kuakini that need to be demolished?

Three alternatives are discussed. Have any others been investigated? Why was the SCS design not continued in the reconstruction of the project? Have the possibility of USDA-RECP cost sharing program investigated for this project?

Upon completion of the project, what maintenance will be needed for the channel and the service roads?

In addition to the points raised by Mr. Sahara, we find a few additional areas where somewhat more detail would be appropriate.

Pg. 7. Benefits

Care should be taken that the construction of a modest drainage system will not lend false security to the previously flood hazard limited area and thus promote greater growth in areas still subject to longer term flood damage.

The social, environmental, and general impact on community services of opening of land area for development which had heretofore been subject to flooding and therefore unsuitable for housing should be discussed in the final EIS.

Adverse Effects

One of the more serious considerations is mentioned in item 4 under this topic. With increased rate of runoff and higher velocities, greater quantities of silt and debris will be transported. The settling ponds should catch the larger material but fine-grained silt will not be retained during periods of heavy rainfall and will instead be carried to the sea rather than being deposi on the flood plain as in the past. Consideration should be given to the impact

of this silt laden water on the coastal environment. It is an unfortunate fact that siltation catchment basins do not trap silt under maximum flood conditions. We agree that the "effect on marine life due to dilution (pg. 9) would be minimal;" however, the effect of the silt and turbidity may well be significant.

cc: T. Sahara

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
APO SAN FRANCISCO 96557

HCFE-PS

2 JUL 1974

Office of Environmental Quality Control
Office of the Governor
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Gentlemen:

The draft Environmental Impact Statement for the following project has been reviewed:

Master Plan of Kona Flood Control Project (Holualoa Drainage System) (Ordinance No. 586), District of North Kona, County of Hawaii

We have no comments to offer.

Sincerely,

Charles S. Varnum

CHARLES S. VARNUM
Colonel, CE
Director of Facilities Engineering

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

ATTN OF: DEEE (Mr Kimura, 4492158)

22 JUL 1974

SUBJECT: Draft Environmental Impact Statement

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

This office has no comment to render relative to the draft environmental impact statements for the following projects:

a. New Piilani Highway, Maui, Hawaii

b. Kona Flood Control Project

ALLAN M. YAMADA
Asst Dep Comdr for Civil Engrg

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII
P. O. BOX 1820 • HILO, HAWAII 96720 • 25 AUPUNI STREET

July 1, 1974

Office of Environmental Quality Control
Office of the Governor
550 Halekauwila Street, Room 301
Honolulu, HI 96813

Re: Environmental Impact Statement for Master Plan of the Kona Flood Control Project (Holualoa Drainage System, Ordinance No. 586), County of Hawaii

The proposed flood control project will have no significant adverse effects on our water system.

Akira Fujimoto
Manager

WHS

... Water brings progress ...

JOHN A. BURNS
GOVERNOR

E. ALVEY WRIGHT
DIRECTOR

LAWRENCE F. O CHIN
DEPUTY DIRECTOR

MURRAY 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 8.2631

July 15, 1974

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

Dear Dr. Marland:

Subject: Environmental Impact Statement
Kona Flood Control Project
(Holualoa Drainage System)

In reference to the above subject statement, we make the following comments:

1. It is recommended that the EIS provide sufficient information to indicate compliance with the water quality standards of the State.

2. The completion dates for various phases of the project should be approximated to assist future planning activities. The statement should indicate assurance of coordination with the Department of Transportation by the initiating agency.

Sincerely,

Douglas S. Sakamoto
for E. ALVEY WRIGHT
Director

UNIVERSITY OF HAWAII

Water Resources Research Center
Office of the Director

MEMORANDUM

July 15, 1974

MEMO TO: Richard E. Marland
Interim Director, OEQC

FROM: Reginald H. F. Young
Asst. Director, WRRC

SUBJECT: Draft EIS, Holualoa Drainage System, Kona

The subject EIS was reviewed in this office and the following brief comments are submitted for your consideration.

During the deepening of the existing stream to the rock base will some measures be taken to line pockets of erodible material? From the design flow and size of channel, fairly high flow velocities may be reached which can erode these pockets.

For the parcels of land divided by the channel, what type of cattle crossings will be provided to reconnect grazing lands? Will they be temporary bridges or ramps?

RHFY:jmn

cc: H. Gee
J. Johnson

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

PODED-P

23 July 1974

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

Dear Dr. Marland:

We have reviewed the draft environmental statement for the Master Plan of the Kona Flood Control Project (Holualoa Drainage System) (Ordinance No. 586) District of North Kona, County of Hawaii, and have the following comments:

a. The final EIS should include discussion of the condition of the drainage basin and its vegetation with regard to erosion control measures which may be required to reduce sediment production.

b. The final EIS should include discussion of a flood plain management alternative to the recommended structural measures.

Sincerely yours,

ELROY CHINN
Acting Chief, Engineering Division

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 25, 1974

In reply, please refer to
File EPHS-PTR

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

From: Director of Health

Subject: Draft Environmental Impact Statement for Master Plan for Kona Flood Control Project: (Holualoa Drainage System) (Ordinance No. 586)

The Pollution Technical Review Branch of the Department of Health has reviewed the subject draft Environmental Impact Statement and submit the following comments:

During construction all waste matter generated shall be disposed of at proper landfill sites. Also, siltation and debris basins shall be properly maintained to prevent the accumulation of undesirable material that may decrease the efficiency of the basins.

Other adverse effects such as fugitive dust, noise and traffic problems should be kept to a minimum.

Walter B. Quisenberry

WALTER B. QUISENBERRY, M.D.

JOHN A. BURNS
GOVERNOR OF HAWAII

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

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

July 29, 1974

MEMORANDUM

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

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

Subject: Comments on EIS for the Master Plan of the Kona Flood Control Project

This Department has reviewed the EIS presented by the Department of Public Works, County of Hawaii, covering the Master Plan of the Kona Flood Control Project, Ordinance No. 586, North Kona, Hawaii.

We have no objections to the proposal as presented.

Sincerely yours,

BOARD OF LAND AND NATURAL RESOURCES

SUNAO KIDO
Chairman and Member

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
440 Alexander Young Building, Honolulu, HI 96813

August 2,1974

Dr. Richard E. Marland
Office of Environmental
Quality Control
550 Halekauwila St.-Room 301
Honolulu, Hawaii 96813

Dear Dr. Marland:

Re: Draft EIS pursuant to Executive Order, Plan of Kona Flood Control Project (Holualoa Drainage System) District of North Kona, County of Hawaii, June 1974

We have reviewed the above-mentioned draft as you requested. The following comments are offered for the consideration of the planners:

High-velocity flows from the upper areas of the project may cause high rates of erosion in the proposed unlined channels. Many areas in these reaches are composed of fractured rock underlain with ash and cinders. As a result, there may be a large amount of deposition in the lower, flatter part of the channel, requiring extensive maintenance and clean out.

Alternative B could be a feasible approach to the problem by requiring that flood control measures be in accordance with the County General Plan.

Alternative C also appears to be a logical approach to the problem if a combination of flood plain management and flood insurance were utilized, since the greater part of the area is undeveloped.

The type of construction proposed in the project will cause the generation of debris from more than one storm. Because of this, it will be important that the proposed debris basin provides an adequate amount of storage.

There may be a need to install farm crossings at various points along the channel, so that landowners will have access to their property on both sides of the channel.

In past years the stream flow from Waiaha was diverted to Luawai Reservoir and overflow from the reservoir outletted into Holualoa Stream. Huehue Ranch has, in addition, diverted their water into Waiaha Stream. These modifications should be considered in the design of the proposed diversions.

Thank you for the opportunity to review this draft.

Sincerely,

Francis C. H. Lum

Francis C. H. Lum
State Conservationist

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

August 6, 1974

MEMORANDUM

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

SUBJECT: Draft Environmental Impact Statement for
Master Plan of Kona Flood Control Project
(Holualoa Drainage System) (Ordinance No. 586)
District of North Kona, County of Hawaii

The Department has reviewed this draft statement. This type of problem results from unrevised land use zoning. Past decisions failed to recognize the great hazards of stream flooding which future review should prevent.

It is essential to provide for flow velocity reduction and sedimentation to prevent discharge of sediment into the ocean. The most important benefit will be improved protection of areas designated for urban use. The plan appears adequate to reduce losses due to flooding.

Direct agricultural impacts relate primarily to grazing areas. The proposed improvements will have no serious impact.

Thank you for the opportunity to review this statement.

Frederick C. Erskine
Chairman, Board of Agriculture

A. INTRODUCTION

The estimated cost has been extracted from the Master Plan Report and is attached. Completion dates which are included in the cost estimate are approximate, as no definite time table has been set for construction. The number of phases and the extent of each phase is shown on Plate 5.

Some local flood problem will still exist but can be corrected once this project is constructed, as a point of discharge will be established. The flood control project will serve as a "spine" for all the collected runoff within the basin. This project will also enable new developments to have properly planned drainage systems.

The County will consider submitting an application to the U.S.D.A. Resource Conservation and Development for approval. If approved, the County may request for funding to implement this project.

VII. ESTIMATED COST

The following estimated costs were developed using current construction costs and should be adjusted for escalation when this plan is implemented.

The phasing of construction is shown on Plate 5, Appendix A.

ESTIMATED COST (SUMMARY)

PHASE I:	
Outlet	$ 100,000
Bridge	80,000
Channel	335,000
Siltation Basin	263,000
Miscellaneous	156,000
Total Construction Cost	934,000
Planning & Engineering	187,000
Right-of-Way Cost	1,206,000
Total	$ 2,327,000
Estimated Completion Date (ECD) - June, 1977	
PHASE II:	
Channel	$ 453,000
Bridges	60,000
Culverts	20,000
Miscellaneous	107,000
Total Construction Cost	640,000
Planning & Engineering	128,000
Right-of-Way Cost	1,176,000
Total	$ 1,944,000
ECD - June, 1979	
PHASE III:	
Channel	$ 573,000
Bridges	120,000
Miscellaneous	139,000
Total Construction Cost	832,000
Planning & Engineering	166,000
Right-of-Way Cost	130,000
Total	$ 1,128,000
ECD - June, 1981	

PHASE IV:

Channel	$ 506,000
Bridge	96,000
Miscellaneous	120,000
Total Construction Cost	722,000
Planning & Engineering	144,000
Right-of-Way Cost	137,000
Total	$ 1,003,000
ECD - June, 1983	

PHASE V:

Channel	$ 265,000
Miscellaneous	53,000
Total Construction Cost	318,000
Planning & Engineering	64,000
Right-of-Way Cost	72,000
Total	$ 454,000
ECD - June, 1985	

TOTALS FOR PHASES I, II, III, IV & V:

Total Construction Cost	$ 3,446,000
Total Planning & Engineering	689,000
Total Right-of-Way Cost	2,721,000
Total Estimated Cost	$ 6,856,000

Construction Cost, not including planning and engineering and right-of-way costs for each phase has been kept below $1 million. Planning and engineering includes surveys, design, soil investigation, construction inspection, contract administration and general administration costs.

B. DESCRIPTION OF THE PROPOSED ACTION

The sizes and capacities are shown on Plate 5. The extent of each phase, the structures included, new and existing channel widths and depths are also shown.

The new channel alignment will coincide with the existing. The amount of work required on the existing channels to conform to the new channel size is indicated by the dimensions of the new and existing channels.

Erodible pockets encountered in the channel excavation will be lined to prevent progressive erosion. Ranchers William Paris, Jr. and Peter L'Orange, and District Conservationist Arch McCabe have suggested planting grass for erosion control along the entire right-of-way, including the maintenance roadway where the existing ground is disturbed by construction. Their suggestion will be incorporated in the Master Plan and final design. Controlling soil erosion within the entire drainage basin is beyond the province of this project and would require a soil conservation project. The benefit of preservation of top soil is incidental to this flood control project.

High energy flows will be controlled by the incorporation of energy dissipators in the final design. These energy dissipators will be located in critical areas where the alignment is bad and dictated by criteria other than hydraulics. The exact locations of these energy dissipators will be established during the design phase.

Diversions for stream flow constructed by the ranchers will be accounted for in the final design.

C. PROBABLE IMPACT OF THE PROPOSED ACTION

In any drainage basin, there is a natural length of time in which runoff from the entire basin begins contributing to the volume of flow pass a given point. If the character of the basin is altered in any way, such as improving the hydraulic efficiency of the channel to concentrate the runoff faster, the result would be a shorter concentration time and hence a higher rate of runoff since the same volume of runoff must pass the given point in a shorter time.

It is agreed that all the fine-grained silt cannot be trapped by a basic type siltation basin unless the basin is large enough to retain all the flood waters. However, in lieu of a sophisticated and expensive study to determine the effect of silt-laden water on the marine environment, it is offered that this flood control project will reduce the amount of silt generated by containing the runoff in the channel. The flood waters will not be able to jump the channel and flow overland, causing erosion as it now does. The existing condition, which spreads mud and debris over a wide area, would be improved. This belief also resulted in the "conflicting" statement, "the overall effect may be a beneficial one."

The cattle crossings required will be ramps with gates and locks. When the cattle have to be moved for grazing, the ranchers will operate the gates and locks. Keys for the locks

will remain with the ranchers. Any farm crossings (bridges) required will also be provided for in the final design.

The design of this project will incorporate features as necessary to comply with the Water Quality Standards of the State. The construction work at the outlet area will be kept to a minimum to preserve the aesthetic and recreational value of the beach frontage. Since the construction of this project will reduce the amount of erosion now occuring, the addition of the silt and debris basin should maintain, if not improve the Class A status of the beach area.

The two conflicting statements "Aesthetics of the area would be improved" and "Excavation will mar the landscape," result from the attempt to just list the proble impacts of the proposed action. An example where both beneficial and adverse effects could occur from a single action would be the use of pesticides.

The statement"Aesthetics of the area would be improved" refers to the mud and debris that would be concentrated in the silt and debris basin and hauled away for disposal instead of being spread out over a wide area as is now occuring.

In general, any excavation in a natural landscape would have an adverse effect.

D. PROJECT ALTERNATIVES

Alternate C can be expanded to include Flood Plain Management. Under this alternative, the County can control building in the flood hazard areas by specifying floor elevations, flood proof structures, or restrict the construction of flood damageable structures in the area. Land uses may be changed for more appropriate uses in the flood hazard areas.

These land use controls would be enacted, administered and enforced by the County. More details of Flood Plain Management can be found in Reference 3.

E. UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

In any proposed action, there will be beneficial and adverse effects. When benefits are weighed against the adverse effects, the overall effect could possibly result in favor of benefits.

The proposed action in this flood control project will concentrate the storm water at the outlet to one point as opposed to the sheet flow now occuring which spreads mud and debris into Holualoa Bay over a wide area. With most of the mud and debris removed and the concentrated storm water being spread out by continuous wave action, the end result could be a beneficial one when compared to the existing condition.

F. RELATIONSHIP BETWEEN SHORT TERM USES AND LONG TERM PRODUCTIVITY

This flood control project is not expected to significantly accelerate urbanization in the area. Growth is expected to follow the present land use designations and no zoning changes are anticipated as a result of this project.

All new growth is expected to be flood free.

G. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

There are no existing ground water sources in the drainage basin. The Department of Land and Natural Resources does not foresee any ground water developments in the area.

This flood control project is not expected to have any significant effect on the existing main source of water supply in Kahaluu, which is located approximately two miles south of the drainage basin.