F I N A L
ENVIRONMENTAL STATEMENT

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

KAPAAKEA HOMESTEAD

MOLOKAI, HAWAII

U.S. ARMY ENGINEER DISTRICT, HONOLULU — DECEMBER 1976

FINAL ENVIRONMENTAL STATEMENT

FLOOD CONTROL PROJECT, KAPAAKEA, MOLOKAI, HAWAII

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1. Name of the Action: Flood Control Project, Kapaakea, Molokai, Hawaii.

2. Description of the Action: The Flood Control Project at Kapaakea, Molokai, Hawaii is a joint Federal- and County of Maui-planned and funded project. The recommended plan consists of the contruction of a 1,800-foot long channel with diversion levees to provide flood protection to the Kapaakea Homestead located in the Kamiloloa flood plain.

3. a. Environmental Impacts.

Channel construction activities would create temporary dust, noise, and traffic inconveniences. The channel structure and levees would be new visual elements in the project area. The channel structure would create open space in an area presently utilized for urban and agricultural activities, and would decrease the amount of land presently used for urban and agricultural activities by approximately 10 acres.

The natural environment is already significantly altered by farming, grazing and urban activities. Channel construction would eliminate approximately four acres of brushy overstory in the grazing area while creating four acres of open, grassy area habitat. Two acres of corn seed farm land would be converted to open, grassy habitat. Approximately four acres of potential urban land would be converted to open, grassy habitat. A new inland, tidal water body would be created. Less than one acre of mudflat environment will be dredged, destroying some individual benthic organisms.

b. Adverse Environmental Impacts.

Construction would create temporary dust, noise and traffic inconveniences. The channel structure would create new visual elements in the project area. Dredging on the mudflat would destroy some individual benthic organisms in less than one acre near the shoreline. Clearing in the grazing areas will eliminate some wildlife habitat. Ten acres of urban and agricultural lands will be removed from existing or potential productive use.

4. Alternatives: The alternatives considered were no-action; non-structural which include flood proofing, flood plain management, flood warning and temporary evacuation, and permanent relocation; structural, which included reservoirs, various channel and levee designs; and land treatment and management.

5. Comments have been received from the following agencies:

US Department of Agriculture

US Department of Commerce

US Department of Health, Education and Welfare

US Department of Housing and Urban Development

US Department of the Interior

US Department of Transportation

Pacific Air Force Command

US Army Support Command Hawaii

US Environmental Protection Agency

State of Hawaii, Office of Environmental Quality (Clearinghouse)
- Department of Social Services and Housing
- Department of Hawaiian Home Lands
- Department of Agriculture
- Department of Land and Natural Resources
- Department of Health
- Department of Transportation
- University of Hawaii - Water Resources Research Center and Environmental Center
- Department of Planning and Economic Development
- State Historic Preservation Officer

County of Maui
- Public Works
- Planning Department

6. Draft Statement to CEQ on 8 October 1976.

Final Statement to CEQ _____.

SECTION 1

PROJECT DESCRIPTION

FINAL ENVIRONMENTAL STATEMENT
FLOOD CONTROL PROJECT, KAPAAKEA, MOLOKAI, HAWAII

1. Project Description.

1.1 Project Location and Statement of the Flood Problem.

1.1.1 The site of the proposed project is within the Kapaakea Hawaiian Homestead on the southern coast of Molokai approximately half a mile east of Kaunakakai (Figure 1). The Kapaakea Homestead is administered by the State of Hawaii, Department of Hawaiian Home Lands. The administration of the homestead lands is in accordance with the provisions of the Federal Hawaiian Homes Commission Act, 1920, as amended and incorporated in Article XI of the Constitution of the State of Hawaii, and involves the execution of policies regarding the leasing of designated lands under specified terms to qualified persons of Hawaiian ancestry. The Department also administers the loan programs through which homesteads are leased to qualified Hawaiians at the rate of $1.00 per year.

1.1.2 Kamiloloa Stream and an unnamed stream pass through the Kapaakea homestead. The streams are dry most of the year, except during periods of heavy rainfall when rapid water runoff (flash flood) conditions occur. The lower part of the drainage basin consists of the coalescent alluvial fans of two streams. Because of the limited capacities of this drainage system, stormwater backs up above Kamehameha Highway and flows over into the homestead area. Local residents have recounted numerous incidents of flooding within the homestead. The most significant flood occurred during the period of 31 October to early November 1961 when the homestead was inundated by approximately 2 feet of water, which deposited about one foot of mud on the homestead lands. Kamehameha Highway was under 3 feet of water during the height of the storm. Damage due to this storm was estimated in 1961 to be about $15,000.

1.2 Previous Project Studies.

1.2.1 Maui County and the Kapaakea residents requested Federal assistance in providing flood protection to the Kapaakea Homestead in 1971. A reconnaissance report completed in 1972 concluded that Federal assistance appeared justified. Under the authority of Section 205 of the Flood Control Act of 1948, a Draft Detailed Project Report (DPR) was completed in December 1974. Subsequent review of the draft DPR by higher authorities resulted in the reformulation of the project plans. The draft DPR and environmental statement discussing the reformulated flood proofing and channel improvements was circulated for public review in September 1976.

1.3. The Recommended Plan.

1.3.1 Based on an evaluation and comparison of the beneficial and adverse effects of the two alternative plans in relation to the objectives of the project, the construction of a channel-levee alternative was selected as the recommended plan. Consideration was also given to comments received from governmental agencies during coordination of the two alternative plans discussed in the draft reports, and to opinions expressed during the 3 November 1976 public meeting.

1.3.2 Channel Improvement. The recommended flood protection plan consists of providing diversion levees and a channel to divert the flow of flood water around the western side of the Kapaakea Homestead subdivision to the ocean. The recommended plan is shown in Figure 2, and is described in the following paragraphs. The channel improvement is designed to accommodate a design flow of 6,500 cfs anticipated with a 100-year flood (Figure 3 illustrates various flood stages). Estimated cost for the channel amounts to $1,347,000 (see Appendix A for economic data).

1.3.3 The channel would be approximately 2,000 feet in length and would be trapezoidal in shape having a side slope of 1V and 2H. The channel would be 60 feet wide at the mouth widening to 105 feet at Kamehameha Highway and narrowing to about 50 feet before connecting with the diversion levees. Compacted earthfill levees with a crest height of about 2 feet above existing ground level would be constructed on both sides of the channel seaward of Kamehameha Highway. The earth levees would have a crest height of about 4.5 feet upstream from Kamehameha Highway. The levees would have a side slope of 1V to 2H with a crest width of about 10 feet. Grass would be used on the land-side slopes to provide cover. The channel would be lined in some sections with grouted and ungrouted riprap about 3 feet thick and would be unlined in other sections. A 50-foot wide, 55-foot long rectangular concrete channel with a 15-foot high drop structure would be located between the riprap channel and the diversion levees. A seven-cell, sectional, metal pipe culvert with concrete invert would be constructed under Kamehameha Highway. The highway would be raised 3 feet to a pavement elevation of about 10.5 feet above mean sea level. Construction cost of the box culvert would be a non-Federal responsibility. The channel would extend about 100 feet out from shore.

1.3.4 The diversion levees would be trapezoidal in cross-section with 10-foot widths and side slopes of 1V to 2H. Both left and right levees would begin at the upstream end of the concrete drop structure. The left levee would extend about 1,200 feet in an easterly direction curving around the cemetery. The right levee would extend about 200 feet in a curved alignment and terminate at the foot of the hill extending to the north. The levees would be constructed of compacted earthfill with grass cover.

1.3.5 A 15-foot minimum maintenance strip would be established along the toe of both levees. The strip would be grassed. Trees and shrubs would be planted along the outer edge of the maintenance strip.

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SECTION 2

ENVIRONMENTAL SETTING WITHOUT THE RECOMMENDED PLAN

2. Environmental Setting Without the Recommended Plan.

2.1 Molokai is the fifth largest island in the State of Hawaii, and is one of four islands in the County of Maui. The island is roughly 37 miles long and 10 miles wide, having a land area of about 166,400 acres or about 4 percent of the total land area in the State of Hawaii. Molokai is divided into three geographic regions: East, West and Central Molokai. The northern coast is virtually a steep cliff. The southern coast is a narrow coastal plain which rises gently and uniformly northward to the crest of the volcanic mountain ranges. The southern coastal plain varies in composition and drainage characteristics but consists predominantly of alluvium and coralline sand.

2.2 The alluvial soils of the coastal plain reflect a natural process of erosion aggravated by the chronic, long-term problem of overgrazing since the first sheep, goats, horses, cattle and deer were introduced to the island about 200 years ago. Although land management and the control of grazing animal populations have been in effect since the late 1800's, overgrazing by feral animals and cattle still cause much of the present soil erosion problems on Molokai (Moberly 1963; and Hawaii Water Resources Regional Study, 1975). The Hawaii Water Resources Regional Study report estimates that approximately 17 percent of Molokai's land area is actively eroding. This includes about 450 acres of forest reserve due to feral grazing animals, 9,425 acres in forest land outside of the reserve due to grazing, and 18,925 acres of grazing land. Soil erosion in the Kamiloloa drainage basin is affected by overgrazing and low annual rainfall, which prevents the rapid recovery of grazed vegetation. The lack of ground cover prevents soil development and reduces water retention in the soil and in the watershed. The occurrence of short periods of intense rainfall, which commonly occurs in Hawaii, results in flash flood conditions contributing to accelerated soil erosion in the watershed, and to flooding in the low-lying coastal areas.

2.3 The Kamiloloa drainage basin (Figure 4) is approximately 5.5 miles long, 0.8 miles wide and 4.5 square miles in area. The drainage basin rises from an elevation of about 3.5 feet above mean sea level (MSL) at the coastline to approximately 3,000 feet above MSL on the slopes of the East Molokai Mountains. The project area constitutes less than 1 percent of the drainage basin area. The East Molokai mountains rise to an elevation of approximately 4,970 feet above sea level, and are rugged and have many inaccessible gulches and canyons. East Molokai receives as much as 200 inches of rain annually and is the principle source of water for Molokai. Virtually all perennial streams on Molokai are found in the northeastern side of East Molokai. However, on the southwestern slopes of East Molokai the streams, including Kamiloloa and the unnamed stream, are intermittent in nature, flowing only during periods of heavy rainfall.

2.4 The 23-acre Kapaakea Homestead contains a total of 45 house lots and has an estimated population of 200. There are presently 37 homes in the Kapaakea Homestead. Eight house lots in the homestead have been leased and will be developed in the near future. The homes are single-family detached dwellings. The homestead is the only major residential development in the Kamiloloa flood plain. An 11-acre undeveloped parcel is adjacent to the western boundary of the homestead and is also within the flood plain. Kamehameha Highway, which runs east and west through the flood plain, separates the homestead to the south from grazing lands and a cemetery to the north. A slaughterhouse, cattle pens, grazing lands, and seed cornfields are located north of the undeveloped parcel across the highway. The land east of the homestead is partially developed for residential use. Presently, Kamiloloa and the unnamed stream pass under Kamehameha Highway through a 24-inch reinforced concrete pipe and an 8-foot by 3-foot box culvert, respectively, and then through two shallow, open swale ditches in the Kapaakea Homestead before entering the ocean. The capacities of the drainage culverts are 25 and 250 cubic feet per second, respectively.

2.5 Land along the coast south of the highway is zoned for urban use. Land north of the highway is zoned for agricultural use. Land in the higher elevations of the drainage basin is zoned for conservation use and is designated forest reserve. The homestead land is owned by the Department of Hawaiian Home Lands, State of Hawaii. Land north of the homestead is leased for grazing. Molokai Ranch Ltd. owns the 11-acre undeveloped parcel and the land extending northward into the high elevations of the drainage basin. The undeveloped lot is expected to be urbanized for residential use when flood protection improvements are resolved. Agricultural and conservation lands are expected to remain in their respective uses.

2.6 The State government controls approximately 51,400 acres of land (including Hawaiian Homes Commission lands) or approximately 31 percent of the total land area of Molokai. Ten large landowners own approximately 66 percent of the island land area or about 110,000 acres. Molokai Ranch Ltd. is the largest single landowner with holdings in excess of 73,000 acres. Approximately 99,200 acres of the total land area are used for grazing, 46,200 acres are designated for forest reserve and conservation, and approximately 16,400 acres are cultivated in pineapple. Non-agricultural lands, including pali, mangrove swamps, urban land, recreational areas, and military installations total approximately 4,300 acres. Urban designated land total approximately 3,600 acres. Major urban land use areas on Molokai are located near Papohaku Beach on the western end of the island, and between Kaunakakai, eastward to Makolelau (Hawaii Water Resources Regional Study, 1975) on the southern coast (Figure 5).

2.7 The economic future of Molokai is uncertain. For many years, pineapple was the major industry on Molokai. Regional population distribution reflects the one industry economy of Molokai with population centers at Maunaloa, Kualapuu and Kaunakakai, areas important to the pineapple industry. Kaunakakai is the urban, commercial and government center on Molokai. Approximately 45 percent of the population was employed as laborers or farm workers in 1975; while unemployment was estimated to be about 20 percent, the highest level in the State of Hawaii. Castle and Cooke's Dole plantation terminated its operations in 1975 leaving the Del Monte plantation as the only pineapple interest on Molokai. Del Monte plans to terminate its operations in 1978. The State of Hawaii, concerned over Molokai's uncertain economic future, established the Molokai Task Force in an effort to provide economic opportunities and security for the island residents. Diversified agriculture, expansion of the existing cattle industry and a shift to urban and resort development have been viewed as ways to secure the economic future of Molokai. At present, tourism is a minor economic factor on Molokai with possibly the greatest growth potential on the island. Resort hotel development is underway on the western coast of Molokai near Papohaku beach. Marshall, Kaplan, Gans, Kahn and Yamamoto (1975) have suggested that Molokai could become a residential area for metropolitan Honolulu if better commuter transportation between the islands becomes available, and that major shifts in population settlement patterns could occur with changes in Molokai's economic base. The rural character of Molokai may undergo significant alterations depending upon uncertain economic developments.

2.8 Molokai's 1975 population was estimated to be 5,400, an increase of less than one percent from the 1970 census of 5,261 (State of Hawaii, 1972). The 1970 census reflected a 4.7 percent population growth since 1960, which reflected a 4.9 percent population decline since 1950. Based on 1970 census data, Hawaiians were the largest ethnic group present on Molokai comprising 36 percent of the population, Filipinos were next with 31 percent, Caucasians were third with 16 percent and the Japanese were fourth with 14 percent. Within Maui County and State as a whole, Caucasians and Japanese are, normally, the predominant ethnic groups in the communities. About 69 percent of Molokai's population was born in the State, and approximately 43 percent was under the age of 18. The median number of school years completed for those 25 years and older was at the 10th grade level; however, approximately 43 percent had 8 years or less formal schooling. Only 7 percent of the population had received a college education. Over 90 percent of the homes on Molokai were single family dwellings. Many of the homes were plantation houses considered old by Hawaiian standards. About 10 percent of the homes were owner occupied, and had a median value of $15,000 to $20,000. There were 3.8 persons per household, the highest ratio for Maui County and higher than the State average. Under the Hawaiian Homes Commission Act of 1920, the Kapaakea Homestead is used exclusively by people of Hawaiian ancestry.

2.9 Based upon a 1974 archeological reconnaissance survey by the National Park Service, there were no archaeological resources to be found in the project area. In 1973, 1974, and 1976 the State Historic Preservation Officer indicated that no sites listed on or eligible for the Hawaii or National Register of Historic Places were located in the project area. The Kalokoeli Fishpond located approximately a quarter-mile east of the Kapaakea Homestead is on the Hawaii Register of Historic Places.

2.10 There are no water bodies within the Kamiloloa drainage basin that could support aquatic biota. The developed nature of the coastline and the extensive grazing in the upland areas have reduced the presence of native terrestrial and aquatic biota within the flood plain. Introduced song birds, game birds, feral cats, mongooses and cattle are easily found in the flood plain. Wild goats, deer, and rats also may be present. The 11-acre vacant parcel is a salt marsh with approximately 75 percent of the area cleared of vegetation. The vacant lot appears to be used as a playground for the surrounding residential communities, and was a dumping area prior to clearing. Bird, dog, mongoose and cat tracks are common in the salt-encrusted mud. The pickleweed, Batis maritima, dominates vegetation in the vacant lot.

2.11 The important wildlife areas on Molokai are found in the high elevations of the East Molokai mountains. These areas are zoned for conservation which provides for the protection of unique Hawaiian forest bird habitat. High value habitat areas for the protection of Hawaii's endangered waterfowl are located at Kakahaia Pond, five miles southeast of Kaunakakai, and Ooia-Kaluaapuhi Pond, 3 miles southwest of Kaunakakai. The numerous fishponds located along the southern coast of Molokai are also considered of value to endangered waterfowl.

2.12 No extensive sand beaches are found in the project area. The homestead shoreline is covered mostly by grass with some vegetation found in the nearshore waters. West of the homestead, the shoreline is cleared of vegetation. Wind waves have placed a thin veneer of coralline sand over the shoreline. The largest growing fringing reef in Hawaii occurs along the southeastern coast of Molokai extending from Kaunakakai to Halawa. Flourishing coral communities exist principally along the outer slopes of the reef. The inshore portions of the reef flat are covered by mud generated by years of sedimentation. At Kapaakea, the reef flat is approximately 4,000 feet wide. The nearshore area within 2,000-3,000 feet of the shoreline is a mudflat environment carpeted with the seagrass, Halophilia. The numerous crab and shrimp burrows in the substrate suggests a well-developed benthic community. Close to shore a thin veneer of coral sand covers a firm volcanic red clay substrate. Further offshore, coarse sand overlies a soft mixture of fine sand and mud shaped into gentle mounds on the bottom. Patches of hard coralline substrate occur periodically on the mudflat. The water depth on the mudflat varies from 2 to 4 feet. The mudflat is not known as an important commercial fishery resource. Crab resources on the mudflat are probably exploited by Molokai residents, and fishing with nets could be done on the mudflat.

2.13 The low coastal areas along the southern coast of Molokai are susceptible to tsunami inundation and to flooding during periods of heavy rainfall. The tsunami of 23 May 1960 caused a substantial runup of 6 feet above mean sea level along the southeast end of Molokai (US Army Corps of Engineers, 1974).

2.14 The offshore currents along the southern coast of Molokai flow from east to west during flood tide tending to reverse with falling tide (Laevastu, et al, 1964). The predominant easterly winds along the coast are primarily responsible for the east to west movement of littoral material, trash and debris.

2.15 Coastal waters are classified Class AA by the State Water Quality Standards, and the waters generally conform to the standards (Hawaii Water Resources Regional Study, 1975), except during periods of heavy rainfall when water turbidity increases significantly. Many reports and land use studies concerning the Molokai area indicate that sedimentation is the major stress factor in the nearshore marine environment.

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SECTION 3

RELATIONSHIP OF THE RECOMMENDED PLAN TO LAND USE PLANS

3. Relationship of the Recommended Plan to Land Use Plans.

3.1 The Kapaakea Homestead and the adjacent undeveloped parcel are located within urban land use areas. The grazing land and cornfields are located in agricultural zoned areas. All land zoned urban is anticipated to be developed for urban uses and all lands zoned for agricultural uses are expected to remain in agricultural use.

3.2 Constructing a channel does not require any changes in existing land use plans. However, channel improvements would require purchase and commitment of land for easements and rights-of-way, would reduce the amount of land presently available for urban and agricultural activities, and would change existing land use on about 10 acres of land. The land area where future homes could be constructed on the adjacent undeveloped parcel would be reduced by approximately four acres. The seed cornfield area would be reduced by two acres, and grazing lands would be reduced by approximately four acres. The ten acres of land would revert to open space in urban and agricultural land areas. The protected and grassed diversion levees and channel berms would provide open space for wildlife and man. The creation of open space along the coast could be considered beneficial in the face of continued urban development along the shoreline that could reduce or limit public access and use of the shoreline.

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SECTION 4

PROBABLE EFFECTS OF THE RECOMMENDED PLAN ON THE ENVIRONMENT

4. Probable Effect of the Recommended Plan on the Environment.

4.1 The Kapaakea Flood Control project would not affect any known rare or endangered plants or animals. No known historical or archaeological sites on or eligible to the Hawaii or National Registers of Historic Places, including the Kalokoeli Fishpond, would be affected by the project. Contract specifications would require the contractor to cease work if any probable archaeological resources are uncovered during construction, and to notify the Contracting Officer, who would consult with the State Historic Preservation Officer.

4.2 The construction of a flood control channel would occur in an environment that has been extensively modified and damaged by grazing, farming and urban development. Approximately four acres of kiawe brush grazing land would be cleared for construction of the diversion levees. The loss of the kiawe brush would reduce the available habitat for some wildlife, but the open grassed levees and berms would provide habitat for other wildlife. The levees would be constructed using material excavated from the lower reaches of the channel and grading the grazing area. Approximately two acres of farm land used for the production of corn seed would be eliminated by constructing the channel. The potential area available for urban development would be reduced by approximately four acres. The channel would be excavated to a maximum depth of about -6 feet MSL creating a new inland waterbody, which would be subject to tidal fluctuation. Approximately 0.1 acre of mudflat at the mouth of the channel would be excavated, destroying some individual benthic organisms, and temporarily increasing water turbidity. Turbidity would be minimized as the landward portion of the channel would be excavated before opening the channel to the ocean. The channel bottom would probably be colonized by benthic organisms similar to those found on the mudflat. The pickleweed, Batis maritima, may colonize the unlined banks of the channel. Traffic inconveneince would occur during construction of the culvert and alteration of Kamehameha Highway, but could be minimized by proper traffic management controls. Grassing exposed areas as soon as possible would minimize potential soil erosion during construction.

4.3 Periodic maintenance work would be required by the local interests to keep the channel clear. Maintenance costs to maintain the channel, levees and other appurtenances are estimated to amount to $6,000 per year.

4.4 The overland sheet flow of flood water would be diverted and conveyed to a discharge point at the shoreline. The present drainage conditions allows some suspended material to be deposited on the flood plain. A channel would tend to reduce the accumulation of sediment on the flood plain on waterborne sediments; however, the channel would also tend to reduce stream bank and bed erosion and possibly sheet erosion in the lower portion of the flood plain. Upland erosion would not be affected by the project and would continue to contribute sediment to the nearshore marine environment. Frictional forces, flocculation, onshore

winds and alongshore littoral drift would tend to confine the alluvial material to the nearshore area. Shoaling at the mouth of the channel or in the channel would be visible suggesting an increase in sedimentation in the marine environment. The effect would be highly localized and would not significantly alter the nearshore mudflat environment.

4.5 Salinity stresses would occur when seawater is diluted by freshwater discharges from heavy rains. Marine organisms would be stressed and those unable to adapt to varying salinities would be forced to relocate or perish during these periods. Repopulation of the channel during the dry seasons when there is no stream flow would be anticipated.

4.6 Periodic channel flows, salinity stresses and sedimentation would influence marine infaunal activities, distribution and abundance within and near the channel.

4.7 The amount of land presently available for urban and agricultural uses would be reduced by ten acres. The ten acres would be converted to open space providing some wildlife habitat. The channel improvement would provide flood protection without modification of homes, interrupted use of the homes, or inconvenience to the homeowners. The channel improvement would provide flood protection for all structures in the project area throughout the design life of the structure. For evaluation purposes, the economic life of the project channel is estimated at 50 years.

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SECTION 5

ANY PROBABLE ADVERSE IMPACTS THAT CANNOT BE AVOIDED

5. Any Probable Adverse Impacts That Cannot be Avoided.

5.1 Channel improvement would create temporary construction inconveniences. Dust, soil erosion, and noise can be mitigated with control devices and procedures, such as mufflers, wetting, and management of work hours. Traffic control and management would reduce traffic inconveniences and hazards.

5.2 Channel improvements will create new visual and topographic changes and reduce the amount of land area presently available for urban, and agricultural activities. A new inland marine environment would be created and the grassed levees may provide habitat for lowland wildlife. The clearing of kiawe in the grazing area would reduce the vegetative cover presently available to some lowland wildlife, and excavation on the mudflat may destroy some individual marine organisms.

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SECTION 6

ALTERNATIVES TO THE RECOMMENDED PLAN

6. Alternatives to the Recommended Plan.

6.1 A variety of actions to modify or reduce potential flood damage or losses at Kapaakea were considered, and various combinations of alternatives can be derived depending upon the degree of flood protection desired and afforded.

6.2. No-Action. The no-action alternative would leave conditions unchanged. Flooding would continue to occur at Kapaakea with damage to and loss of property. As the number of residential homes increase within the flood plain, the extent and magnitude of potential flood losses and damages would also increase. Some course of action would be needed to prevent or mitigate potential flood damages to existing and future residential developments in the Kamiloloa flood plain. The no-action alternative was not considered responsive to the study area needs and was therefore eliminated as a potential solution early in the study.

6.3 Non-Structural Alternatives. Non-structural alternatives include primarily non-physical measures to modify or reduce potential flood losses or damages. These include (1) flood warning and temporary evacuation, (2) flood plain regulation, (3) flood proofing, and (4) permanent evacuation and relocation.

6.3.1 Flood Warning and Temporary Evacuation. Reliable and timely flood forecasting can provide sufficient warning to allow the temporary evacuation and the construction of temporary flood protection structures in flood prone areas. At present, the US Weather Bureau issues flood watches during periods of heavy rains; however, the uncertainty of predicting hydrologic variables in a relatively small drainage area and the flashy nature of stream flows in Hawaii does not make flood warning predictions reliable.

6.3.2 Flood Proofing. Flood proofing measures, such as (a) raising structures above expected flood levels, (b) providing flood walls around structures, (c) sealing openings in the structures and (d) waterproof structures to reduce seepage, could be implemented to reduce flood damages or losses. Flood proofing effectiveness is dependent upon many factors including soundness of the existing structure, flood flow velocities, predictability of flood levels, and the types of appurtenances or amenities that are subject to flood damage or loss that cannot be protected. Flood proofing was considered one of the viable alternatives at Kapaakea. Estimated costs for flood proofing 37 homes amounted to about $830,000. The alternative was not publicly favored based on opinions expressed during a public meeting held on 3 November 1976 in Kaunakakai, Molokai, and coordination with various government agencies. The alternative could not have protected property and other amenities outside the home. Flood flows would continue to occur, even though damages would have been reduced. Residents within the flood prone area would still be exposed to flood hazards and may still be forced to evacuate their homes. However, implementation of this alternative creates the least amount of change in the exisitng environment and was favored by some governmental agencies.

6.3.3 Flood Plain Regulation. Flood plain management regulation and related programs are designed to control future development in flood prone areas to lessen the damaging effect of floods. The County of Maui enacted a flood plain and tsunami inundation area ordinance in 1972 with the intention of regulating development in flood and tsunami prone areas. The ordinance prohibits development within the stream flood ways and flood plains, unless protection against a 100-year frequency flood is provided. The ordinance may prevent or minimize future flood damages to new developments, but does not protect existing structures in the flood plain. Flood plain management regulations are usually effective when combined with structure measures or flood proofing activities. Application of flood plain management regulations would be required if flood proofing only is done in Kapaakea Homestead.

6.3.4 Permanent Evacuation and Relocation. All inhabitable structures and people in the Kamiloloa flood plain could be permanently relocated to a safer, less flood prone area. The Kamiloloa flood plain would then be converted to a use that is compatible with the degree of flood risk. The County of Maui and residents of Kapaakea Homestead have opposed any permanent relocation emphasizing the problem of social acceptability of the alternative. Secondly, residents of the homestead obtain their leases from the State of Hawaii, Department of Home Lands for $1.00 a year and other Hawaiian Home Land lots to accommodate the Kapaakea residents are not presently available. There are approximately 162 applications for 30 lots planned for development on Hawaii Home Lands. To relocate the 37 residences in the Kapaakea Homestead on improved lands on Molokai is estimated to cost $2.5 million.

6.4 Structural Measures. A wide variety of structural measures for managing and reducing flood damages, as well as minimizing or preventing the occurence of floods were considered for application in the Kamiloloa flood plain. These measures included reservoirs, levees, channel improvements or any combination of these measures to confine and channel harmful floodwaters.

6.4.1 Reservoirs. The function of a reservoir is to store a portion of the flood flow in such a way as to reduce the flood peak in flood prone areas. Reservoirs offer the possibility of multiple uses of a flood control structure including water supply, irrigation, recreation, hydroelectric power and fish and wildlife conservation. However, no feasible sites could be found in the Kamiloloa drainage basin to construct a reservoir.

6.4.2 Channel and Levee Improvements. Both channels and levees are used to confine and divert flood waters away from or through flood prone areas. Levees can be used to enlarge the capacity of a channel or divert flood waters. Channel improvements can be used to remove flow restrictions in an existing channel, preventing bank erosion, control flow velocity, and divert flood water. Both channel and levee

improvements are considered feasible in the Kamiloloa flood plain. One plan considered use of a single diversion levee along the edge of the Kapaakea Homestead; however, the plan would shift the flood hazard westward into another community. Channel construction without levees would necessitate a wide channel right-of-way incurring land procurement costs and infringing on other land use activities.

6.5 Supplemental Flood Control Alternatives. This section primarily deals with land treatment and management to improve water retention properties of the soil or land in the drainage basin. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service have been concerned with the regional problem of soil erosion on Molokai and have supported the incorporation of soil erosion control measures, such as land treatment or land management, with the flood control project. The incorporation of land treatment or management with the flood control project was not considered feasible.

6.5.1 As indicated in Section 2, grazing activities in the drainage basin and low annual rainfall have an adverse effect on vegetative cover causing soil erosion problems and affecting the water retention capability of the land. Inasmuch as the condition of the land affects surface runoff, land treatment and management were evaluated for the Kamiloloa drainage basin. On the assumption that the drainage basin is revegetated, the estimated 100-year flood flow in the basin is estimated to be 6,000 cubic feet per second (cfs); a reduction of 8 percent from the project design flow of 6,500 cfs. The reduced estimated flow would not significantly change the size of the proposed channel, not significantly reduce cost of channel construction or flood proofing, or minimize potential flood damages or losses. However, soil conditions would be stabilized with an improved ground cover reducing soil erosion.

6.5.2 The Soil Conservation Service was consulted to assist in evaluating the feasibility, success and effects of land treatment and management in the Kamiloloa drainage basin. Based on the data used to compile the Soil Survey of Islands of Kauai, Oahu, Maui, Molokai, and Lanai, State of Hawaii, (1972, Soil Conservation Service) chances for successful revegetation of the area were considered doubtful. The rocky, erodible and relatively infertile soil could not be recommended for cultivation or pasture use in the Soil Survey. Poor access, steep slopes, poor soils, and water supply were considered factors which prohibited revegetation using present land treatment techniques. Successful revegetation would also be prevented by present grazing pressures. The Soil Conservation Service concluded that before any successful land treatment could be employed, grazing by cattle and feral animals would have to be controlled or terminated. A successful land treatment program would allow natural revegetation to occur. Land treatment and management may reduce damages resulting from sediment and reduce clean up costs, but would not eliminate the flood hazard. It would also take many years for the beneficial effects of land treatment to be realized.

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SECTION 7

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

7. The Relationship Between Local Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity.

7.1 The proposed flood control project at Kapaakea would provide adequate flood protection to the Kapaakea Homestead and future residential developments within Kamiloloa flood plain. Construction of a channel would commit approximately 10 acres of land actively used for agricultural and urban activities to inactive use, and would probably encourage further urban development in the flood plain. The land area required by the channel would create open space in urban and agricultural areas. The grassed channel levees and berms and water course increase habitat diversity within the project area.

7.2 The channel improvement would prevent Kamehameha Highway from being cut off by flood waters in the Kapaakea area for about 2 to 3 hours during the 100-year flood occurrence.

7.3 The channel improvement would enhance land values for private lands in the protected area and increase the tax assessed value of the land in the vacant lot. The discounted value of the net increase in land values (location benefits) for 7 acres of land in the vacant lot was estimated to be $12,000, which was calculated as a benefit. Land values in the Kapaakea Homestead owned by the State of Hawaii are not affected by channel improvement.

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SECTION 8

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH CANNOT BE AVOIDED SHOULD THE RECOMMENDED PLAN BE IMPLEMENTED

8. Irreversible and Irretrievable Commitments of Resources Which Would be Involved if the Proposed Action Should be Implemented.

8.1 Channel construction would involve the commitment of monetary resources, labor and materials, and would require land commitments for easements or rights-of-way.

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SECTION 9

COORDINATION, COMMENT, AND RESPONSE

9. Coordination, Comment and Response.

9.1 Public Participation.

9.1.1 In preparation of the first draft DPR in 1974, public meetings were held in Molokai on 24 May 1971, 4 December 1972, and 17 January 1973. At these meetings the Kapaakea residents voiced preference for channel improvements and routing the channel through the vacant lot to the west of the homestead. Molokai Ranch, owner of the adjacent lands, expressed preference for routing the channel through the homestead. Both the Kapaakea residents and the County of Maui were opposed to relocation of people and residences.

9.1.2 A workshop was held on Molokai on 5 August 1976 for the Kapaakea residents. At this workshop those present favored channel improvements, but did not oppose flood proofing modifications.

9.1.3 A plan selection public meeting was held in Kaunakakai, Molokai, on 3 November 1976. The opinion expressed at the public meeting favored flood protection measures. The majority of opinions expressed favored channel improvements.

9.2 Agency Coordination.

9.2.1 Prior to the reformulation of the proposed project, the first draft DPR and draft environmental statement were reviewed by governmental agencies and interested parties during the period from September 1974 to November 1974.

9.2.2 The 1976 draft DPR and environmental statement were circulated to the following agencies and interested parties for comment:

US Department of the Interior
US Department of Agriculture
US Environmental Protection Agency
US Department of Commerce
US Department of Health, Education & Welfare
US Department of Transportation, Federal Highway Administration
State of Hawaii, Office of Environmental Quality Control, Clearinghouse
State of Hawaii, Department of Agriculture
State of Hawaii, Department of Hawaiian Home Lands
State of Hawaii, Department of Transportation, Division of Highways
State of Hawaii, Department of Land and Natural Resources
State of Hawaii, Department of Planning and Economic Development

State Historic Preservation Officer
County of Maui, Mayor
County of Maui, Department of Public Works
County of Maui, Planning Department

9.2.3 The following agencies and interested parties have reviewed the draft environmental statement:

US Department of Agriculture - no comment
US Department of Commerce
US Department of Health, Education and Welfare
US Department of Housing and Urban Development - no comment
US Department of the Interior
US Department of Transportation - no comment
Pacific Air Force Command, Hickam Air Force Base - no comment
US Army Support Command, Hawaii - no comment
US Environmental Protection Agency - no comments, rated LO-1
State of Hawaii
- Office of Environmental Quality Control
- Department of Agriculture
- Department of Hawaiian Home Lands
- Department of Health
- Department of Land and Natural Resources
- Department of Planning & Economic Development
- Department of Social Services and Housing - no comment
- Department of Transportation
- University of Hawaii
  - Environmental Center
  - Water Resources Research Center - no comment
- State Historic Preservation Officer

County of Maui
- Department of Public Works
- Planning Department

9.2.4 Comments from the agencies and interested parties are summarized below. Comments were answered by individual letter to the agency or interested party and are contained in Appendix B.

9.2.5 Summary of Comments and Responses.

1. Comment: The County of Maui and the Kapaakea homesteaders prefer the channel improvements.

   Response: Comment acknowledged.

2. Comment: Flood occurrences in the Kapaakea area should be documented.

   Response: Flood occurrences in the Kapaakea flood plain have not been well-documented. The information on past floods was based on interviews of residents and governmental agencies. In 1971, the County of Maui and Kapaakea residents requested federal assistance to reduce the flood hazard at Kapaakea.

3. Comment: The channel improvement would produce more environmental change than the flood proofing alternative.

   Response: This comment is acknowledged and discussed in the draft Detailed Project Report and Environmental Statement.

4. Comment: A channel improvement would be considered a benefit in maintaining road access to the eastern section of Molokai.

   Response: The benefit of access to eastern Molokai would not be considered significant because the estimated 100-year flood flow would cut off the highway for only about 2 to 3 hours, but would be a benefit.

5. Comment: Channel improvements would provide flood protection to a larger area than compared with flood proofing structures in the homestead.

   Response: With the flood proofing alternative, future homeowners or builders in the flood plain would have to provide flood protection against the 100-year flood. This protection would be provided at the expense of the homeowner or builder. Under this concept, the flood proofing alternative could cover as wide an area as the channel alternative.

6. Comment: Raising the homes in the homestead will not be compatible aesthetically with the neighboring homes.

   Response: Comment acknowledged.

7. Comment: Under the flood proofing alternative, there is still the possibility of continued flood damage, loss of property, personal injury, and temporary evacuation and abandonment of homes and property.

Response: This comment was acknowledged and discussed in the draft environmental statement.

8. Comment: Flood proofing is a more desirable alternative because it would retain the flood plain as a natural sedimentation basin and reduce water quality degradation.

Response: As indicated in the draft environmental statement, water quality along the southern coast of Molokai generally conforms to Class AA Hawaii water quality standards, except during periods of high rainfall when coastal waters are reddish-brown in color because of the high sediment load. Flood proofing would retain use of the flood plain as a natural sediment trap; however, neither the channel improvement nor flood proofing would significantly increase or decrease coastal water quality degradation during periods of high rainfall.

9. Comment: Were flows exceeding the channel design caused by "kona", hurricane type storms, tides, and sheet flow evaluated in the recommended plan?

Response: Yes, and the highest tide of +2 feet above mean sea level recorded for the area was used in the hydrology analysis.

10. Comment: What are the potential impacts associated with a flood flow exceeding the design capacity of the channel?

Response: Flood damages expected with a flood flow exceeding the design capacity of the channel are estimated to amount to about $3,000 annually. However, as urban development increases in the flood plain, damage costs may also increase.

11. Comment: There would be less government regulation in the flood plain with the channel improvement as compared with the flood proofing alternative which requires continued flood plain regulation and management.

Response: A channel improvement may reduce the extent of government control in the flood plain; however, it does not alleviate government regulation of activities in the flood plain or management of the channel improvement.

12. Comment: Flood proofing would preserve the salt marsh in the vacant lot.

Response: The salt marsh in the vacant lot has been cleared by the landowner. The area is designated for urban land uses as discussed in the draft environmental statement and would be expected to be developed for urban uses. The channel alternative would enhance the urban value of the land, but flood proofing would not prevent urbanization. Other salt marshes along the southern coast of Molokai located in urban land use areas face the threat of being destroyed for urban uses.

13. Comment: Would elevating the homes in the homestead protect them from tsunamis and would this protection be a benefit for the flood proofing alternative?

Response: Elevating the homes would not necessarily protect them from tsunami inundation and waves because structural modifications are not designed to withstand the internal forces generated by a tsunami. Accordingly benefits under the tsunami cateogry were not included in the benefit-cost analysis.

14. Comment; Does the benefit-cost computation for the flood proofing alternative take into consideration the continued cost for cleaning up after a flood?

Response: Yes. The elimination or reduction of cleanup costs was considered in the benefit-cost analysis.

15. Comment: Why was the 100-year flood selected for the design considerations?

Response: Based on preliminary benefit maximization studies, the protection against the 100-year flood was used to analyze various alternatives.

16. Comment: Why is the channel improvement significantly greater in capacity than the existing culverts under Kamehameha Highway?

Response: The existing culverts were constructed as interior drainage facilities and not as designed flood control improvements. The basic difference is that drainage facilities are designed for more frequent runoff such as a 10-year recurrence interval.

17. Comment: Where are the details for deriving the benefits and costs of the project?

Response: The detailed benefit-cost computation is available in the Detailed Project Report. The complete document is available at the US Army Engineer District, Honolulu.

18. Comment: Does the channel improvement affect the tax base and land values?

Response: The channel improvement would enhance land values for the private lands protected by the improvement and may increase land tax assessed values; this does not include State-owned, Hawaiian homestead lands. A discounted value of the net increase in land values (location benefits) amounting to $12,000 was included as a benefit in the benefit-cost analysis. Floodproofing does not affect land tax assessed values.

19. Comment: The flood control project would have a negligible impact on agriculture.

Response: The comment is acknowledged. However, the environmental statement indicates that about 2 acres of corn seed farm land and about 4 acres of grazing land would revert to inactive use.

20. Comment: The Maui County flood plain and tsunami inundation area ordinance has not been implemented, thus, plans should not be based on this ordinance.

Response: For planning purposes, use of the Maui County flood plain and tsunami inundation area ordinance is deemed appropriate. Implementation of the ordinance is expected in the near future.

21. Comment: How many homes could be built in the vacant lot?

Response: In the economic analysis, 20 homes were estimated for construction in the 7-acre vacant lot.

22. Comment: Why were different channel alignments not discussed in the draft environmental statement?

Response: The discussion of alternatives in the draft environmental statement dealt with alternatives which were significantly different from one another. Some criteria affecting channel design and alignment derived from project coordination in 1972-1974 were determined to be valid and appropriate for reformulation plans and others were rejected. The criteria deemed appropriate included limiting the amount of land required for the structural alternative to minimize the loss of property and to prevent displacement of people. Based on the criteria, the channel alignment proposed in 1974 was utilized in reformulation, and channel features were modified to reduce visual impacts and to incorporate different design, economic and environmental considerations.

23. Comment: The impact of shifting and concentrating freshwater discharge on the reef ecology should be discussed.

Response: A significant shift in reef ecology resulting from a concentrated freshwater discharge is not anticipated. As discussed in the draft environmental statement, salinity would be detrimental or fatal to sessile marine organisms which cannot tolerate wide salinity fluctuations. However, most of the infauna near the project area probably tolerate wide salinity fluctuations. Channel flow would be intermittent, and during periods of no flow, marine organisms would recolonize the mudflat area around and within the channel. Wave forces, onshore winds and water currents would tend to increase the mixing of the runoff with seawater. Flourishing coral communities are located on the outer edge of the reef flat some 4,000 feet offshore; these communities are too distant to be impacted by the project.

24. Comment: Sedimentation would increase in the nearshore marine environment.

Response: Sedimentation in the nearshore marine environment at the project site would be changed; however, whether it will increase or decrease cannot be predicted by present analytical techniques. While the flood plain does act as a sediment trap, stream bank, bed and sheet erosion may be significant. Particularly, if flow velocities are great or the water does not stay in the flood plain long enough to allow particles to settle. A channel project would reduce stream bank and bed erosion and possibly sheet erosion in the lower portions of the Kamiloloa drainage basin. Shoaling in the channel and at the mouth of the channel are expected to occur and may be visible suggesting an increase in sedimentation. However, the effect would be highly localized.

25. Comment: Sedimentation would result in a significant change in the marine environment.

Response: A significant change to the marine environment is not anticipated. The offshore area for a distance of 2,000 to 3,000 feet offshore and to either side of the project area is an extensive mudflat habitat. Onshore winds and wind waves would confine sedimentation to the mudflat environment.

26. Comment: Would the high velocity flows in the channel push sediments further offshore?

Response: The estimated discharge velocity of 9 cubic feet per second declines significantly upon reaching the ocean. As indicated in the draft statement, friction, flocculation and onshore water movement would tend to confine sedimentation to the extensive mudflat.

27. Comment: Both the flood proofing and channel alternative should be coordinated with appropriate agencies to develop effective range management and erosion and sedimentation control programs in the Kamiloloa drainage basin.

Response: As discussed in the draft environmental statement and detailed project report, the Soil Conservation Service indicated that the land treatment method most likely to succeed in the Kamiloloa drainage basin would consist of regulating grazing activities and allowing natural revegetation to occur. The method of land treatment would not significantly reduce the potential flood flow and the size of the channel structure. Copies of the environmental statement and detailed project report were sent to the responsible agencies.

28. Comment: The Corps should include land treatment and management programs in the recommended flood control plan for Kapaakea.

Response: Providing upland land treatment and management as developed by the Soil Conservation Service was not considered feasible as part of the Kapaakea flood control project. The beneficial effects of land treatment measures, if implemented, would not be realized for many years and would not significantly reduce the potential flood hazard.

29. Comment: How was the 8 percent reduction in the 100-year flood flow with land treatment calculated?

Response: The 8 percent reduction in the 100-year flood flow with land treatment was calculated using the same procedure used to calculate the 100-year flood flow without land treatment, except that a higher infiltration rate was used. The increase in infiltration rate reflects the improved soil porosity and water retention ability with land treatment.

30. Comment: Are there any regulations controlling grazing practices in the watershed?

Response: There are no federal or local authorities known to regulate grazing practices or impose mandatory grazing practices on private or leased landowners in the watershed or Hawaii as a whole.

31. Comment: The channel improvement would drop soil-moisture content creating drier conditions and increasing soil erosion in the watershed.

Response: The Soil Conservation Service soil survey of Molokai indicates that soils in the Kamiloloa drainage basin are mostly stony and rocky and vegetation reflects a dry arid climate. Erosion and sedimentation are presently considered significant regional problems on Molokai. Of the approximately 3,000 acres of land in the watershed, less than 100 acres in the coastal area may possibly experience a drop in soil-moisture as the channel improvement would prevent stream overflow. Channel improvements would have little effect on soil-moisture content in the upper portion of the drainage basin.

32. Comment: Would the channel discharge meet Hawaii Water Quality Standards in the State's Water Pollution Laws, Chapter 37A?

Response: Most probably not. During periods of high rainfall, studies throughout the State of Hawaii indicate that most stormwater runoff does not conform to State water quality standards.

33. Comment: The effects of sedimentation and freshwater discharges on the marine environment should be addressed.

Response; The effects of freshwater discharge and sedimentation have been discussed as probable effects of the recommended plan on the environmental statement indicating that the factors would influence marine infaunal activities, distribution and abundance within or near the channel.

34. Comment: What marine organisms are found on the mudflat that suggest a well-developed benthic community?

Response: The numerous holes on the mudflat are marine organism burrows. The number of burrows suggest a well-developed marine benthic community. Crabs, polychaete worms, and a variety of shrimp and fish would be found in the burrows.

35. Comment: Nearshore fishery species important to recreational or subsistence fishery to the Kapaakea residents should be identified.

Response: No detailed fishery data is available from the State of Hawaii Division of Fish and Game to identify recreational subsistence fishery resources of significant importance to the Kapaakea residents. No public opinion was expressed during public meetings and workshops emphasizing any specific or important subsistence or recreational fisheries on the mudflat. Crab resources on the mudflat are probably exploited by Molokai residents and fishing with nets is probably done on the mudflat.

36. Comment: Will the long-term productivity of the mudflat resources be diminished by the channel project?

Response: The mudflat environment is wide and extends about 2,000 to 3,000 feet offshore and for miles along the southern coast of Molokai. The channel improvement would not adversely reduce or affect the productivity of the mudflat.

37. Comment: Recommend that the alterations to Kamehameha Highway be coordinated with the State of Hawaii, Department of Transportation.

Response: The State of Hawaii, Department of Transportation has been consulted and has indicated that they have no plans to improve the highway.

38. Comment: Who would be responsible for the construction of the new culvert under Kamehameha Highway associated with the channel improvement?

Response: The construction of the culvert and alterations of the highway are a non-federal responsibility and are the responsibility of the local sponsoring agency.

39. Comment: What is to happen to the existing culverts under Kamehameha Highway if the channel improvements are implemented?

Response: The existing culverts would be left in place.

40. Comment: As shoaling within the channel or at the mouth of the channel are expected, what is the cost of maintaining the channel?

Response: Shoaling within the channel or at the mouth of the channel by sedimentation or littoral material is expected. The estimated cost for maintaining the channel would probably amount to about $6,000 per year. The cost includes maintenance of the levees, other channel features, and maintenance dredging. The maintenance cost estimate was based on a review of similar activities for comparable channel projects across the nation.

41. Comment: What would be the impact of removing six acres of seed corn fields from productive use?

Response: Approximately 2 acres of seed cornfields would be removed from productive use. The State of Hawaii, Department of Agriculture has indicated that the effect of the flood control project on agricultural activities would be negligible.

42. Comment: Turbidity could be expected during construction of the channel.

Response: This comment was acknowledged and discussed in the draft environmental statement. Turbidity can be reduced by excavating and dredging the inland portions of the channel before opening the channel to the ocean.

43. Comment: A figure delineating the various flood stages in the flood plain in relation to the urban areas should be provided in the final environmental statement.

Response A figure has been added to the final statement illustrating the various flood stages in relation to the urban community.

44. Comment: A figure illustrating the urban land use areas on Molokai should be included in the final environmental statement.

Response: The figure has been included in the final environmental statement.

45. Comment: It does not appear that the new channel could be compared with existing channels west of Kaunakakai as discussed in the draft environmental statement.

Response: Reference to the comparison with existing channels west of Kaunakakai was deleted from the final statement.

46. Comment: What is the approximate timing and phasing of each of the alternative plans?

Response: Construction of the channel-levee alternative would take approximately 1 year to complete. Flood proofing modifications would take approximately 6 months to complete.

47. Comment: Would the project have an adverse effect on the historic Kalokeoli Fishpond located a quarter-mile east of Kapaakea?

Response: The flood control project would have no adverse effect on the Kalokeoli Fishpond.

48. Comment: In the event that any unanticipated sites or remains are encountered, the State Historic Preservation Officer should be contacted.

Response: Construction contract specifications will require that the contractor cease work if any probable archaeological remains are uncovered and notify the Contracting Officer, who will consult with the State Historic Preservation Officer.

49. Comment: Archeological monitoring of the contruction should be included in the project.

Response: Archeological monitoring during construction is not necessary based on the U.S. National Park Service archeological reconnaissance survey which did not identify any items of archaeological or historic interest in the project area.

50. Comment: The grassed levees and maintenance strip are considered green belts. The extent of the green belts should be shown in the environmental statement.

Response: The grassed levees and maintenance strip would create open space amid urban and agricultural activities in the flood plain. The 15-foot wide maintenance strip and levees could be considered green belts and are illustrated in the final environmental statement.

51. Comment: The species of birds in the Kapaakea area should be listed in their order of abundance.

Response: There is no data available to list the birds in the Kapaakea area in their order of abundance. As indicated in the draft environmental statement, introduced birds are easily found in the project area. Existing urban development and agricultural activities have already altered the existing environment favoring introduced birds and have contributed significantly to the decline of native Hawaiian bird populations in the State as a whole. Altering 10 acres of land in the lower portion of the 3,000 acre watershed would not significantly alter bird populations within or outside of the watershed.

52. Comment: The presence or absence of listed threatened or endangered species should be documented and coordinated with the U.S. Fish and Wildlife Service.

Response: Documentation of the presence or absence of known threatened and endangered species in the Kapaakea flood control project area are not available. Project coordination with the U.S. Fish and Wildlife Service has not indicated or suggested that the project area is highly sensitive to known threatened or endangered species. The urbanized and agricultural nature of the area has already created extensive environmental change adversely affecting unique Hawaiian species. The draft environmental statement identified those areas where known threatened or endangered species would most likely be found.

53. Comment: What specific soil erosion control measures would be implemented to reduce possible soil erosion? Would the measures include limiting construction to months of low rainfall or limit the amount of land open during construction at any one time?

Response: Limiting construction to months of low rainfall is considered too restrictive when considering 10 acres of land in a 3,000 acre watershed are being modified. The amount of land open during construction depends on the timing and phasing of each segment of construction. Highway modifications would probably be done first, followed by construction of the concrete channel section and then simultaneous excavation of the channel and construction of the diversion levees. All open areas are to be grassed as soon as possible to minimize potential soil erosion.

54. Comment: Would the channel affect existing groundwater supplies and sources? Would existing wells need to be modified?

Response: As reported in the Soil Conservation Service, Tri-Isle Resource Conservation and Development Project, Program of Action, 1971, and the Hawaii Water Resource Regional Study, 1975, reservoir and wells are located at higher elevations along the southern Molokai slopes. The project would not necessitate or involve modification to existing upland water resources.

55. Comment: Would the lack of water identified by the Soil Conservation Service as a problem in developing a successful land treatment program be a problem in grassing the levees during construction?

Response: No. When the Soil Conservation Service discussed a lack of water for a successful land treatment, they were referring to water needs for land treatment on a large portion of the 4.5 square miles of land area within the drainage basin. Water for grassing the levees, landscaping, and dust control is available during construction because of the accessibility of nearby existing water supply sources.

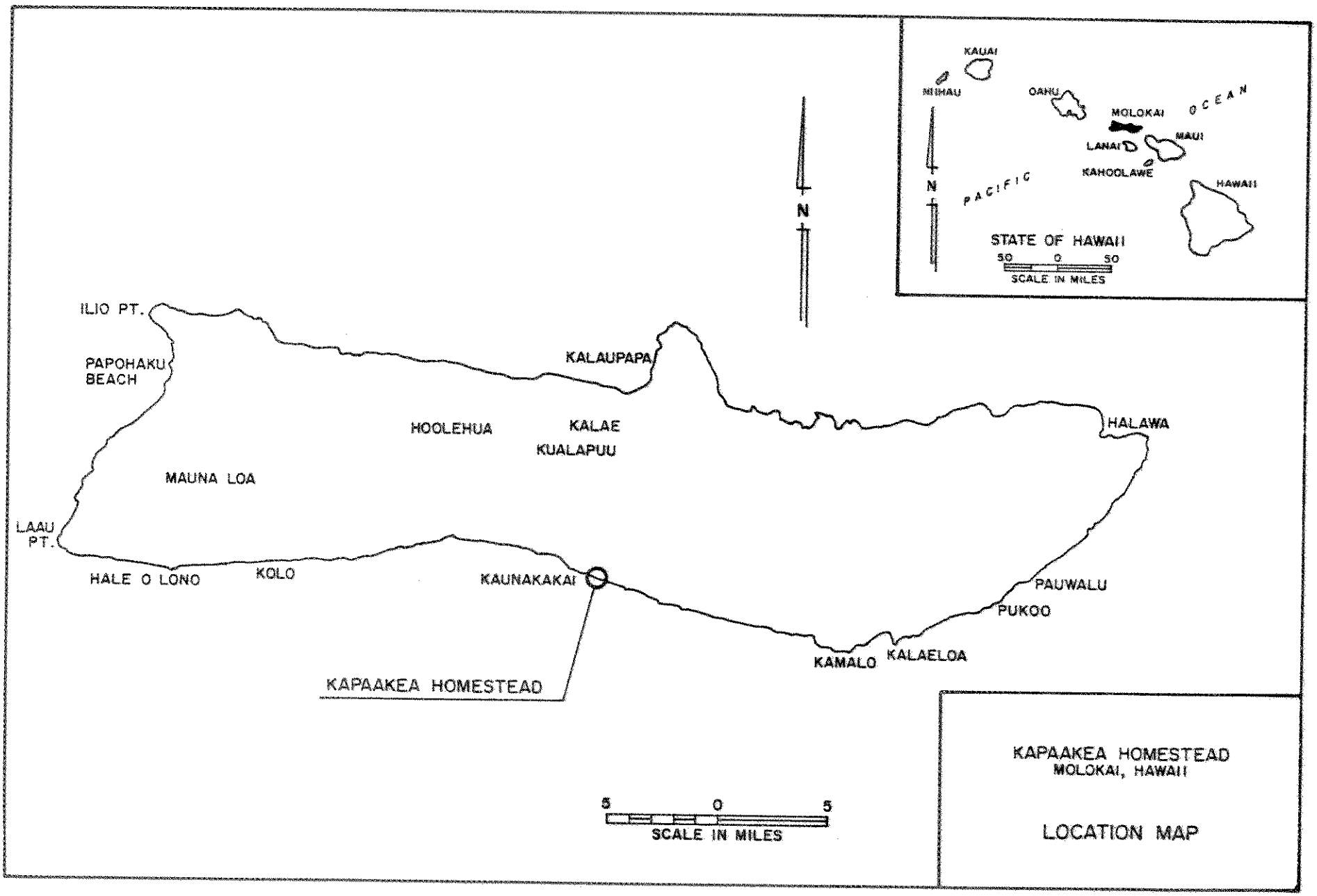

FIGURE 1

FIGURE 1

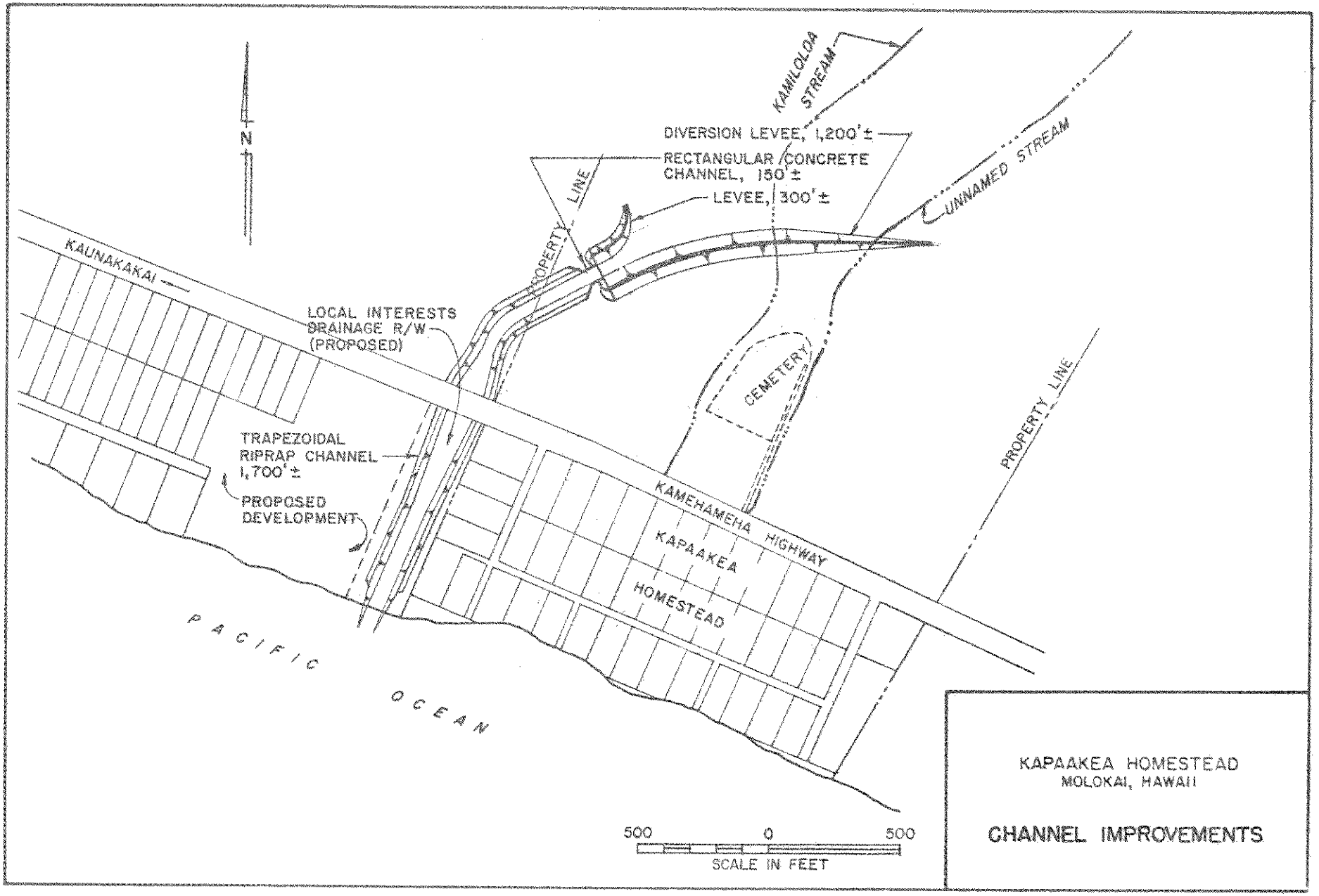

FIGURE 2-2

FIGURE 2-2

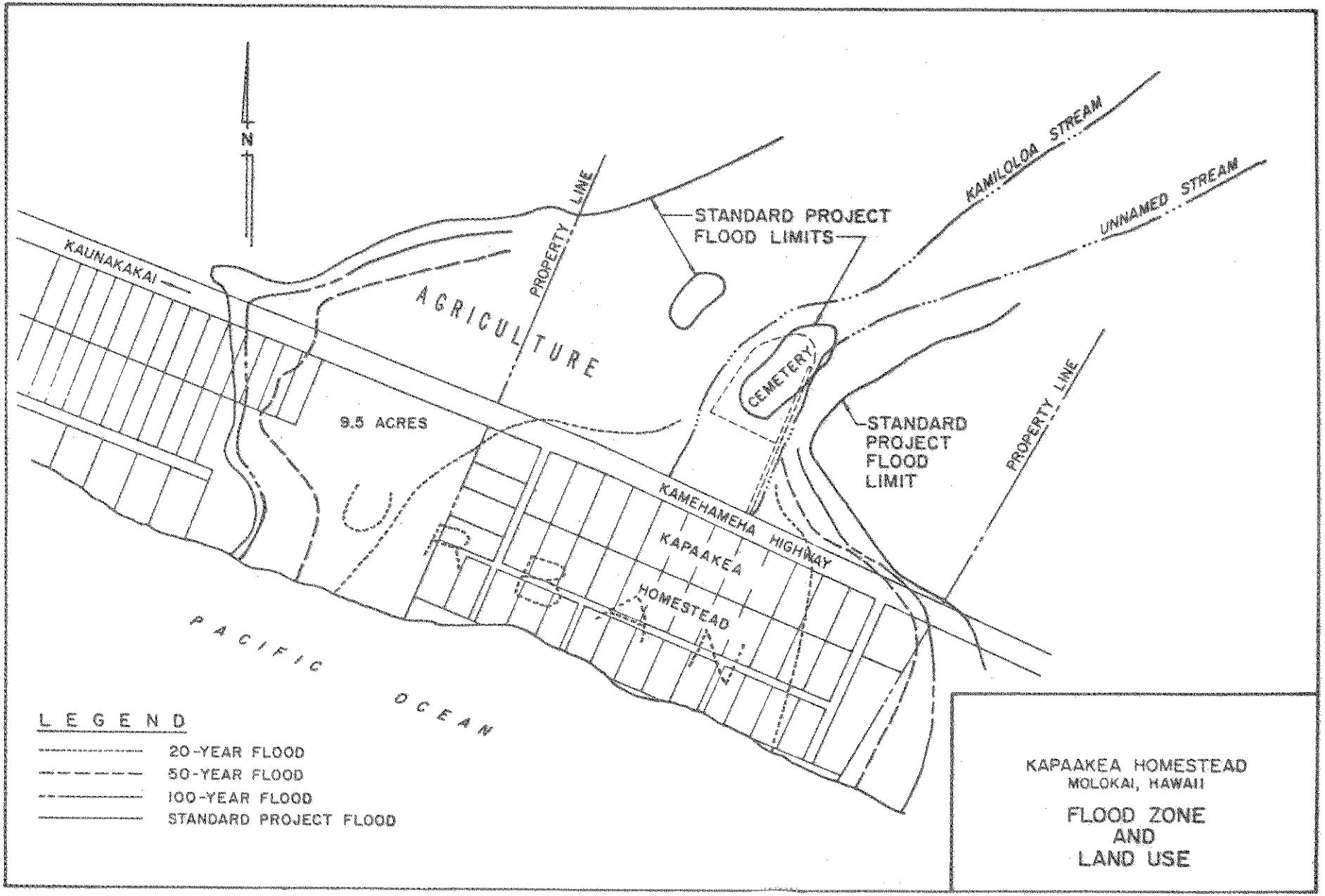

FIGURE 3

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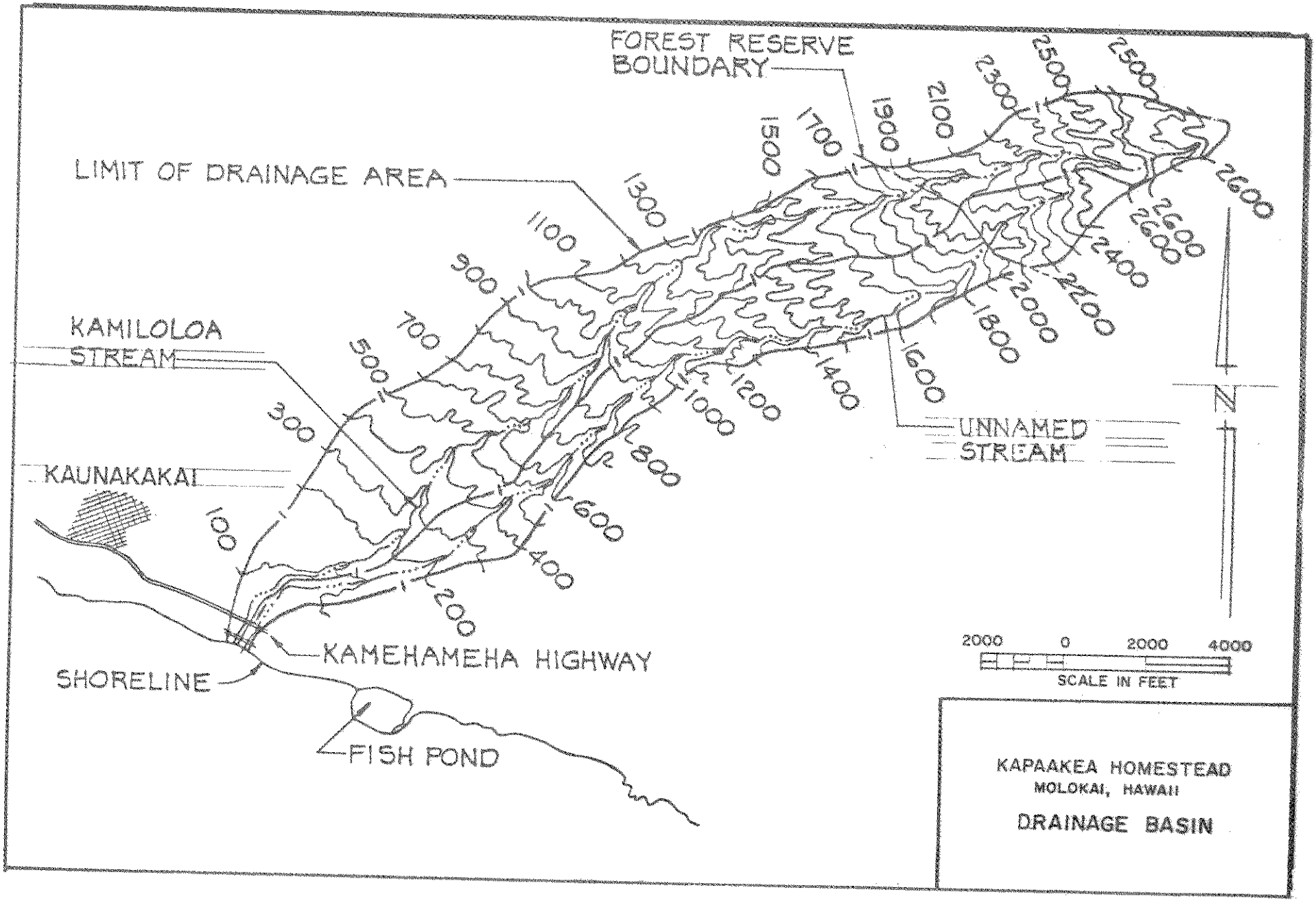

FIGURE 4

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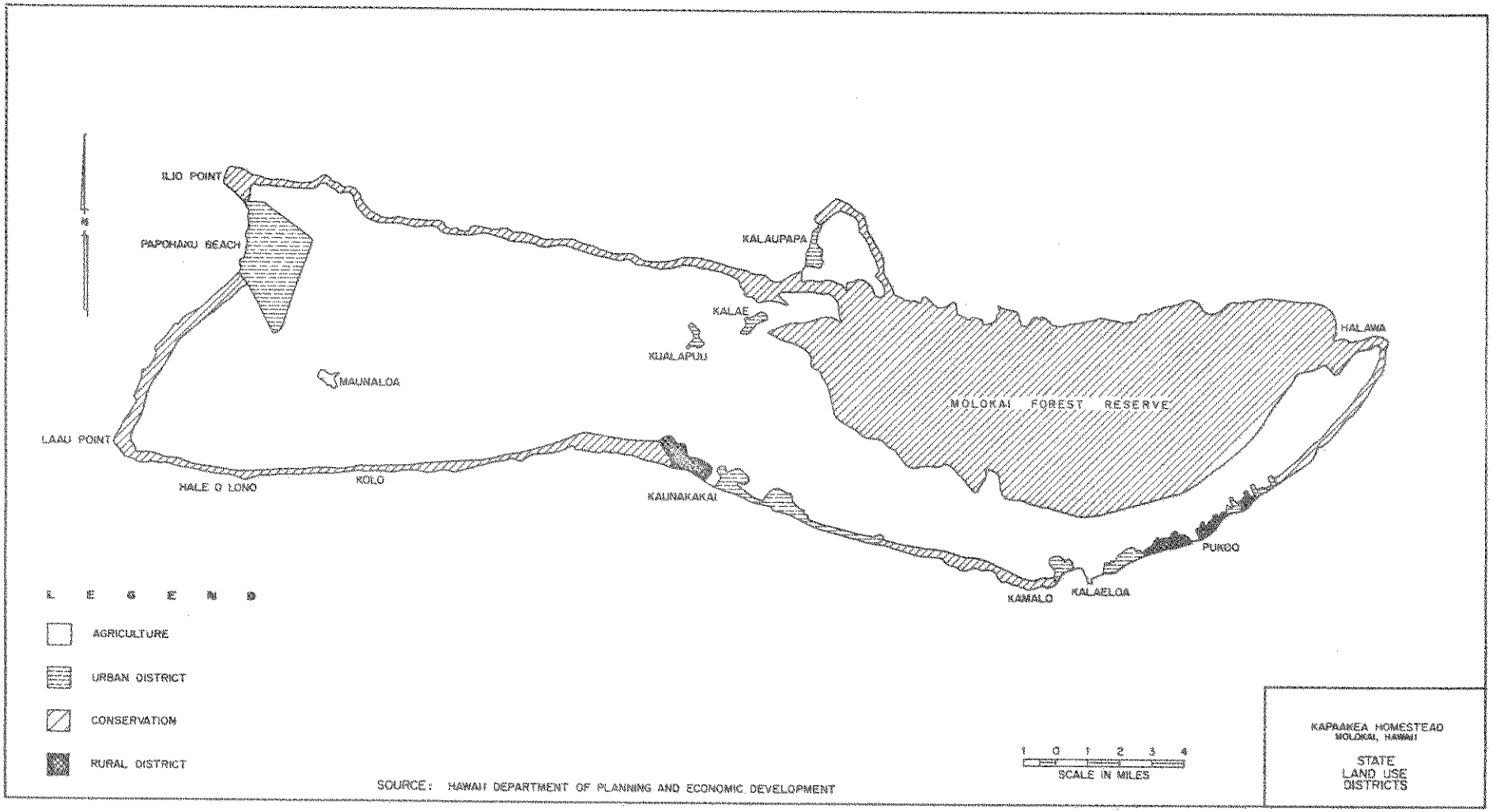
N
ILIO POINT
PAPOHAKU BEACH
KALAUPAPA
KALAE
KUALAPUU
MAUNALOA
MOLOKAI FOREST RESERVE
HALAWA
LAAU POINT
HALE O LONO
KOLO
KAUNAKAKAI
PUKOO
KAMALO
KALAELOA
L E G E N D
AGRICULTURE
URBAN DISTRICT
CONSERVATION
RURAL DISTRICT
SOURCE: HAWAII DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
1 0 1 2 3 4
SCALE IN MILES
KAPAAKEA HOMESTEAD
MOLOKAI, HAWAII
STATE
LAND USE
DISTRICTS

FIGURE 5

BILBIOGRAPHY

1. Hawaii Water Resources Regional Study Element Team Reports, 1975.

2. Laevastu, et al; Coastal Currents and Sewage Disposal in the Hawaiian Islands, 1964, University of Hawaii, Hawaii Institute of Geophysic Report HIG-64-1.

3. Marshall, Kaplan, Gans, Kahn and Yamamoto; Report to the People, Technical Report No. 2, Hawaii's Vulnerable Environments, 1975, for the State Land Use Commission, second five-year District Boundaries and Regulation Review.

4. Moberly, Ralph J.; Coastal Geology in Hawaii. Final Report, Hawaii State Department of Planning and Economic Development. Contract No. 6031, Hawaii Institute of Geophysics 41:216 pp.

5. Soil Conservation Service, US Department of Agriculture; Soil Survey of Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii, 1972.

6. State of Hawaii, Department of Planning and Economic Development, Community Profiles for Hawaii, 1972.

7. US Army Engineer District, Honolulu; Draft Detailed Project Report, Flood Control, Kapaakea Homestead, Molokai, Hawaii, 1974.

8. Draft Environmental Statement, Flood Control Project, Kapaakea, Molokai, Hawaii, 1974.

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APPENDIX A

BENEFITS AND COSTS

APPENDIX A

SUMMARY OF BENEFITS AND COSTS

The analysis of benefits and costs is based upon a comparison of the equivalent average annual charges with the equivalent average annual benefits anticipated to accrue over the estimated economic life of each alternative plan. The applicable interest rate is at 6-3/8 percent.

The fiscal analysis does not include intangible environmental and social costs, either beneficial or adverse. These costs and benefits are discussed in the text of this statement and are not quantified in terms of dollar costs.

	Channel Improvements
Total Project Final Cost	$ 1,347,000
Federal	1,015,000
County	332,000
Total Average Annual Cost 1/	96,000 2/
Total Average Annual Benefits	98,000
Damage Prevention	64,000
Reduction of Emergency Costs	7,000
Location Benefits	
Private Land	15,000 3/
State Land	0
Affluence Factor	12,000
Benefit-Cost Ratio	1.02

1/ Includes maintenance costs; $6,000/year.

2/ Economic life = 50 years.

3/ Location benefits are the discounted value of the net increase in land values.

NOTE: Economic Data was extracted from the US Army Corps of Engineers Detailed Project Report, "Flood Control, Kapaakea Homestead, Molokai, Hawaii." The complete document is available at the US Army Engineer District, Honolulu, Hawaii.

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APPENDIX B

COORDINATION, COMMENT, RESPONSE

CORRESPONDENCE

NOTE: IN THIS SECTION, COPIES OF RESPONSE LETTERS FROM THE CORPS OF ENGINEERS FOLLOWS COMMENT LETTERS FROM GOVERNMENT AGENCIES AND INDIVIDUALS.

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

November 10, 1976

Kisuk Cheung
Chief, Engineering Division
U.S. Army Engineer District, Honolulu
Department of the Army
Bldg. 230, Ft. Shafter
APO San Francisco 96558

Dear Mr. Cheung:

Subject: Draft Environmental Statement
Kapaakea Homestead, Molokai, Hawaii

We have reviewed the above-mentioned draft environmental statement and have no comments to offer.

Thank you for the opportunity to review the statement.

Sincerely,

Jack P. Kanalz
State Conservationist

cc:
Dr. Richard E. Marland
Office of Environmental Quality Control
Honolulu, HI

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558
Receipt acknowledged: 18 November 1976.

B-1

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

REPLY TO ATTN OF: DEEE (Mr. Nakashima, 4492158)

29 OCT 1976

SUBJECT: Environmental Impact Statements

TO: Environmental Quality Commission
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

1. This headquarters has no comment to render relative to the following environmental impact statements:

a. Environmental Impact Statement for "Bulkhead and Other Improvements, Kahului Harbor, Maui."

b. Draft Environmental Impact Statement for "Kapaakea Homestead, Molokai."

2. We greatly appreciate your cooperative efforts in keeping the Air Force apprised of your development projects throughout the State and the opportunity to review the subject statements.

BEN D. KOSA
Dep Dir of Civil Engineering

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558
Receipt acknowledged: 18 November 1976.

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

APZV-PE-EE

01 NOV 1976

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

Gentlemen:

Reference is made to Draft Environmental Statement prepared by US Army Engineer District, Pacific Ocean for Kapaakea Homestead Flood Control Project in Molokai, Hawaii, dated September 1976.

The draft environmental statement has been reviewed and we have no comments to offer. There are no Army installations or activities in the area of the proposed project.

Thank you for the opportunity to review this document.

Sincerely yours,

CARL P. RODOLPH
Colonel, CE
Director of Facilities Engineering

CF:
Division Engineer
US Army Engineer Division
Pacific Ocean
ATTN: Planning Branch
Bldg 230, Fort Shafter
APO 96558

Receipt acknowledged: 1 December 1976
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
APO SAN FRANCISCO 96558
Office of Environmental Consultant

AFZV-SG-EC

14 October 1976

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

Dear Dr. Marland:

The Draft Environment Statement for Kapaakea Homestead, Molokai, Hawaii, was reviewed by this office. We have no comments to offer at this time.

Thank you for the opportunity to review this statement.

Sincerely,

LEE C. HERWIG, JR.
Colonel, MSC
Environmental Consultant to Commander,
U.S. Army Support Command, Hawaii

Receipt acknowledged: 18 November 1976.
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Science and Technology
Washington, D.C. 20230

November 16, 1976

Mr. Kisuk Cheung
Chief, Engineering Division
Honolulu District, Corps of Engineers
Department of the Army
APO San Francisco, California 96558

Dear Mr. Cheung:

This is in reference to your draft environmental impact statement entitled, "Kapaakea, Molokai, Hawaii," a flood control project. The enclosed comments from the National Oceanic and Atmospheric Administration are forwarded for your consideration.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving eight copies of the final statement.

Sincerely,

Sidney R. Galler
Deputy Assistant Secretary
for Environmental Affairs

Enclosure: Memo from National Marine Fisheries Service

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Region
300 South Ferry Street
Terminal Island, California 90731

NOV 1976

Date : November 2, 1976 FSW1/JJN

To : Director, Office of Ecology and Environmental Conservation, EE

NOV 3 1976

Thru : Acting Assistant Director for Scientific and Technical Services, F5

From : Gerald V. Howard, Regional Director, FSW

Subject: Comments on DEIS, Flood Control Project, Kapaakea, Molokai, Hawaii (7610.16) (CE)

The draft environmental impact statement for the proposed Flood Control Project, Kapaakea, Molokai, Hawaii, has been received by the National Marine Fisheries Service for review and comment.

The statement has been reviewed and the following comments are offered for your consideration.

General Comments

The National Marine Fisheries Service (NMFS) was consulted during the planning stages of the proposed project and during development of the initial DEIS and Detailed Project Report. Resources for which NMFS bears a responsibility have been briefly but satisfactorily addressed in the DEIS, as have the newly developed alternatives to reduce adverse impacts on these and other resources.

The DEIS does not indicate to what degree the total volume of sediment carried to the ocean will be reduced by the proposed structural measures. We are concerned with the possibility that the funneling action of the levees and channel will concentrate and extend sediments further out on the reef flat where they may adversely impact the reef. As mentioned in the DEIS this reef along the southeastern coast of Molokai extending from Kaunakakai to Halawa is the largest growing fringing reef in Hawaii. We feel this reef and its associated biota should be completely protected from the stress of sedimentation.

Excessive erosion in the watershed above the proposed project, resulting primarily from overgrazing by feral animals and cattle, contributes the major proportion of siltation in the nearshore marine environment off south Molokai. Although we realize this

is not the responsibility of the Corps of Engineers we feel a sound upland management program should be included in the proposed flood control project for Kapaakea.

We would appreciate receiving a copy of the final environmental impact statement.

U.S. ARMY ENGINEER DISTRICT, HONOLULU
[illegible] 230, FORT SHAFTER
[illegible] SAN FRANCISCO 96553

PODED-P

2 December 1976

Mr. Sidney R. Galler, Deputy Assistant
Secretary for Environmental Affairs
U. S. Department of Commerce
Washington, D. C. 20230

Dear Mr. Galler:

We have received your letter, dated 16 November 1976, transmitting comments on the Kapaakea Flood Control Project, Molokai, by the Southwest Regional Director of the National Marine Fisheries Service.

We have completed our detailed evaluation of the project and have selected the channel improvement as the recommended plan. Our evaluation consisted of determining and comparing the beneficial and adverse effects of each alternative plan in relation to the objectives of the project. Consideration was also given to comments received during coordination of the alternative plans with governmental agencies and opinions expressed during the 3 November 1976 public meeting.

At present, no method is available to accurately predict whether the channel improvements would increase or decrease sedimentation in the receiving waters. Sedimentation patterns would change as a result of the channel improvement and possible gradual shoaling at the mouth of the channel and within the channel is anticipated. We feel that the effects would be highly localized, and that the edge of the fringing reef is much too distant from the shoreline to be affected by any discharge of fresh water or sediment. The nearshore area is an extensive mud-covered reef flat extending about 2,000 to 3,000 feet offshore. Erosion and sedimentation along the entire southern coast of Molokai has contributed to present environmental conditions on the mudflats. The channel improvement would not significantly enhance or degrade present environmental conditions.

As indicated in the draft reports on the Kapaakea Flood Control Project, land treatment will not significantly reduce the estimated floodflows and will not affect the structural design of the channel.

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558
PODED-P

Mr. Sidney R. Galler

2 December 1976

As noted in the draft environmental statement, the method of land treatment most likely to succeed at Kapaakea includes regulating grazing intensity and allowing natural revegetation to occur. However, the beneficial effects of these measures, if implemented, would not be expressed for many years.

We have determined that it is not feasible to provide upland land treatment or management measures as recommended by the Soil Conservation Service as a part of the flood control project.

Sincerely yours,

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

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
REGIONAL OFFICE
50 FULTON STREET
SAN FRANCISCO, CALIFORNIA 94102
Office of Environmental Affairs

OFFICE OF
THE REGIONAL DIRECTOR

November 5, 1976

Kisuk Cheung
Chief, Engineering Division
Department of the Army
Honolulu District, Corps of Engineers
Bldg 230, Ft. Shafter
APO San Francisco 96558

Dear Sir:

The above Draft Environmental Impact Statement has been reviewed in accordance with the interim procedures of the Department of Health, Education and Welfare as required by Section 102(2)(c) of the National Environmental Policy Act, PL 91-190.

The material provided appears to describe adequately the impacts of the proposed action as well as the alternatives that were presented. The major concerns of this department are realted to possible impacts upon the health of the population, services to that population and changes in the characteristics of the population which would require a different level or extent of services. Our review does not identify problems related to these specific concerns.

The opportunity to review this statement was appreciated.

Sincerely,

James D. Knochenhauer

James D. Knochenhauer
Regional Environmental Officer

Receipt Acknowledged: 18 November 1976.
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Environmental Affairs

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

November 5, 1976

Re: Flood Control Project at Kapaakea,
Molokai, Hawaii

Kisuk Cheung
Chief, Engineering Division
Department of the Army
Honolulu District, Corps of Engineers
Bldg 230, Ft. Shafter
APO San Francisco 96558

Dear Sir:

The above Draft Environmental Impact Statement has been reviewed in accordance with the interim procedures of the Department of Health, Education and Welfare as required by Section 102(2)(c) of the National Environmental Policy Act, PL 91-190.

The material provided appears to describe adequately the impacts of the proposed action as well as the alternatives that were presented. The major concerns of this department are realted to possible impacts upon the health of the population, services to that population and changes in the characteristics of the population which would require a different level or extent of services. Our review does not identify problems related to these specific concerns.

The opportunity to review this statement was appreciated.

Sincerely,

James D. Knochenhauer
Regional Environmental Officer

E-6

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
AREA OFFICE
1000 BISHOP STREET, P.O. BOX 3377
HONOLULU, HAWAII 96813

November 5, 1976

IN REPLY REFER TO:
9.7F (Sakamoto/
546-5554)

Mr. Kisuk Cheung
Chief, Engineering Division
Department of the Army
Honolulu District, Corps of Engineers
Building 230, Fort Shafter
APO San Francisco 96558

Dear Mr. Cheung

In accordance with your request of October 8, 1976, we have reviewed the Draft Environmental Statement for the proposed flood control project at Kapaakea Homestead, Molokai, Hawaii.

We have no comments.

Sincerely,

Alvin K. H. Fang
Director

cc:
Council on Environmental Quality

Receipt acknowledged: 10 November 1976.
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

FILE COPY

OFFICE	SURNAME	DATE	OFFICE	SURNAME	DATE	OFFICE	SURNAME	DATE

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

PEP ER-76/986

NOV 29 1976

Dear Mr. Cheung:

Thank you for the letter of October 8, 1976, requesting our views and comments on the draft environmental statement and detailed project report for the Kapaakea, Molokai, Hawaii flood control project. Our review has revealed some omissions and deficiencies in the draft statement which should be corrected before the documents are finalized. Specific comments arranged by section designation and page numbers are presented below.

Project Description, Page 1, Paragraph 1.1.2. The description of past flooding incidents should be expanded to identify damages from other less significant floods.

Page 2, Paragraph 1.3.2. The extent of green belts along the project area should be noted along with levee dimensions and riprap/concrete channel sections.

Environmental Setting, Pages 2-6. The draft statement does not address the occurrence of ground water or related impacts of the proposed project. We anticipate no significant impacts on ground water if the proposed construction of a 2000-foot long channel with diversion levees is implemented. However, because other alternatives are considered, the statement should mention the existing ground-water situation, including use and significance, and explain any necessary measures to floodproof wells or other ground-water facilities.

Page 5, Paragraph 2.9. The statement appears to adequately address the issue of cultural resources within the boundaries of the proposed project. However, it is stated that the Kalokoeli Fishpond is located approximately one-quarter mile from the Kapaakea Homestead. The effects of the proposed project upon this historic place should be assessed and discussed in the final statement.

In addition, a qualified archeologist should be consulted to determine if archeological monitoring will be necessary during construction.

Page 5, Paragraph 2.10. Bird species within the project area of influence should be described in accordance with abundance.

Page 6, Paragraph 2.12. The discussion should be expanded to identify nearshore species of importance to the subsistence of sport fishery.

Page 7, Paragraph 4.1. The statement that there are no rare and endangered species should be documented. We suggest contact with our Fish and Wildlife Service officials in Honolulu.

Probable Effect of the Proposed Project, Page 8, Paragraph 4.3. Specific erosion control practices to be used during project construction should be discussed. For example, would land clearing be restricted to the low rainfall months? Would the contract specifications restrict the amount of land that can be exposed at any one time?

Page 8, Paragraph 4.3.3. Sheet-flow runoff associated with "kona" and hurricane storms combined with storm-generated tides conveyed inland along the flood-control channel may exceed the design capacity of the proposed channel. This possibility should be evaluated.

The statement should indicate whether or not higher velocity channelized flows would tend to push sediments further offshore than under present conditions.

Alternatives, Page 11, Paragraph 6.5.1. The statement should include additional details in calculating the 8% flow reduction with revegetation. With sedimentation described as a major stress factor to this nearshore area, the feasibility of implementing land treatment measures along with other alternatives deserves discussion.

Page 12, Paragraph 6.5.2. The statement should describe existing regulations concerning grazing practices in the watershed.

We hope these comments will be of assistance to you in preparing your final documents.

Sincerely yours,

Deputy Assistant Secretary of the Interior

Mr. Kisuk Cheung
Chief, Engineering Division
Honolulu District, Corps of
Engineers
Department of the Army
Building 230, Fort Shafter
APO San Francisco 96558

B-8

Mr. Stanley D. Doremus
Deputy Assistant, Secretary of the Interior
US Department of the Interior
Office of the Secretary
Washington, D.C. 20240

Dear Mr. Doremus:

We have received your letter of 29 November 1976 commenting on the draft environmental statement (ES) and detailed project report (DPR) on the Kapaakea Flood Control Project, Molokai, Hawaii.

Please be assured that we have considered your concerns as addressed in your letter, and have been in communication with the US Fish and Wildlife Service and US National Park Service offices in Honolulu since 1972 in developing the Kapaakea Flood Control Project. As your comments have been extensive, we extend an invitation to meet with your representatives to discuss any matters which they feel have not been addressed or considered during our project formulation or in response to your review comments on the draft ES and DPR.

We have completed our detailed analysis of the two alternative plans discussed in the draft DPR and ES. This analysis involved an evaluation and comparison of the beneficial and adverse effects of the two alternative plans in relation to the objectives of the project. Consideration was also given to comments received from governmental agencies during coordination of the two alternative plans and to opinions expressed during the 3 November 1976 public meeting. Based on the evaluation, the channel-levee alternative was selected as the recommended plan.

We have indicated in paragraph 5 and 6 of the draft DPR that the flood history of the Kamiloloa drainage basin has not been well documented and that our information is based on interviews with the residents of the Kapaakea Homestead and governmental agencies. In 1971, the County

of Maui on behalf of the residents requested federal flood assistance to reduce the flood problem at Kapaakea.

The dimensions of the levee and channel are provided in the final DPR and ES. The levees would be grassed and landscaped and would create open space amid agricultural and urban activities in the flood plain. The 15-foot minimum maintenance strip and grassed levee embankments could be considered green belts. We have addressed the benefits of creating open space in the flood plain in Section 3 of the final ES dealing with land use plans.

As reported in the Soil Conservation Service, Tri-Isle Resource Conservation and Development Project, Program of Action, 1971 and in the Hawaii Water Resources Regional Study, 1976, reservoirs and wells are located at higher elevations along the southern Molokai slopes. The flood control project did not necessitate or involve modifications to existing upland water resources. Your comment on the effects of the recommended plan on the existing ground water situation on Molokai is addressed in the Comments and Response Section of the final ES.

A statement of no adverse effect on the historic Kalokoeli Fishpond will be added to the final ES.

We have determined at this time that archaeological monitoring is not necessary during construction of the flood control project based on the US National Park Service, Arizona Archaeological Center, Department of Interior, archeological reconnaissance survey which did not identify any items of historic or archeologic interest in the project area. Preparation of plans and specifications will include consultation with the State Historic Preservation Officer if any probable archeological items are uncovered prior to or during construction.

Telecon inquiries with the State of Hawaii, Division of Fish and Game indicates that no documented bird counts are available to describe the birds in the Kapaakea area by their order of abundance. As indicated in the draft ES, introduced birds are readily found in the project area. The alteration of 10 acres of agricultural and urban land in a 3,000-acre watershed was not considered significant to alter the abundance of bird resources in or out of the Kamiloloa flood plain. Existing urban development, grazing and farming activities have already altered the existing environment favoring introduced birds and have contributed significantly to the decline of native bird populations in Hawaii as a whole.

Telecon inquiries with the State Division of Fish and Game indicates that no detailed fishery data is available to identify recreational or subsistence fishery resources of importance to the Kapaakea residents.

We have indicated in the final ES that crab resources may be exploited by the Molokai residents and that fishing with nets could also be done on the mudflat. There was no public opinion expressed during public meetings and workshops emphasizing any specific or important subsistence or recreational fisheries on the mudflat area.

The documentation of the presence or absence of listed threatened or endangered species specific to the Kaneohe area is not available. Dr. Herbst of our environmental resources staff surveyed the vegetation in the project area and did not identify any known threatened or endangered plants. Project coordination with the US Fish and Wildlife Service and State Department of Land and Natural Resources in 1972 to the present have not indicated or suggested that the area is highly sensitive to known threatened or endangered species. The urbanized and agricultural nature of the area has already created extensive environmental change adversely affecting unique Hawaiian species. Changing 10 acres in the lower portion of the Kamiloloa watershed was not considered detrimental to known areas sensitive to or necessary to the survival of known threatened or endangered species. The draft ES identified those areas where known threatened or endangered species would most likely be found.

Specific erosion control measures to be employed during construction have not been developed at this time. Much of the existing watershed presently lacks ground cover due to grazing, farming activities and land clearing. The amount of land open at any one time would be dependent upon construction phasing, i.e., culvert improvements and highway reconstruction would occur before construction of the upstream channel drop structure and diversion levees. The channel would not be open to the ocean until other features have been constructed thus minimizing probable sedimentation effects in the ocean. Open areas would be grassed or mulched as soon as possible. Confining land clearing to months of low rainfall is considered too restrictive and costly. Your comment has been addressed in the Comments and Response Section of the final ES.

Your comment concerning evaluation of sheet flow runoff and storm generated tides exceeding the design capacity of the channel are addressed in the final DPR and ES. A design tide of 2.0 feet above mean sea level, the highest recorded tide for the area was used in the hydraulic analysis. Based on benefit maximization studies, protection against the 100-year flood resulting from either a "kona" or hurricane-type storm was used to analyze various alternatives. An average annual damage cost amounting to $3,000 was estimated for floodflows exceeding the design capacity of the proposed channel. However, as urban development increases in the flood plain estimated damage costs may also increase.

We have indicated in the draft ES that we expect the suspended sediments to settle out within the mudflat environment. We do not anticipate the discharge would push sediments further offshore or significantly alter the mudflat environment. The estimated design flow velocity of 9 feet per second within the channel would drop drastically upon reaching the ocean. Onshore winds, friction, and flocculation were a few factors which would tend to confine the sediments to the mudflat area.

Your comment concerning the 8 percent reduction in the 100-year flood flow with land treatment is addressed in the Comments and Response Section of the final ES. The 8 percent reduction is the result of a comparison between the 6,500 cfs anticipated with the 100-year flood without land treatment and the 6,000 cfs anticipated with the 100-year flood with land treatment. The 6,000 cfs was calculated based on an increase in soil infiltration rate caused by improving the soil porosity and water retention properties with land treatment. The details for hydrologic analysis are contained in the Detailed Project Report.

We have discussed the feasibility of land treatment measures in conjunction with the proposed flood control project in both the DPR and draft ES. The Soil Conservation Service has indicated that the land treatment program most likely to succeed is to regulate grazing and to allow natural revegetation to occur.

We do not know of any federal or local authority which regulates grazing practices or imposes mandatory controls on grazing on private or leased land in the Kamiloloa watershed or Hawaii as a whole. Your comment has been added to the comments and response section of the final ES.

We hope that your concerns have been addressed adequately. We extend an invitation to meet with your representatives if there are additional concerns you feel need to be discussed.

Sincerely yours,

KISUK CHUNG
Chief, Engineering Division

United States Department of the Interior

NATIONAL PARK SERVICE

HAWAII GROUP
677 ALA MOANA BLVD., SUITE 512
HONOLULU, HAWAII 96813

IN REPLY REFER TO:

October 19, 1976

Mr. Kisuk Cheung, Chief
Engineering Division
Corps of Engineers, Honolulu District
Building 230, Fort Shafter
APO San Francisco 96558

Dear Mr. Cheung:

We have reviewed the draft environmental statement for the proposed flood control project at Kapaakea, Molokai and have no comments to offer.

Sincerely,

Robert L. Barrel
State Director

E11

Receipt Acknowledged: 29 October 1976.
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

AMERICAN REVOLUTION BICENTENNIAL 1776-1976

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
REGION NINE
677 Ala Moana Blvd., Suite 613
Honolulu, Hawaii 96813

ARIZONA
CALIFORNIA
NEVADA
HAWAII
GUAM
AMERICAN SAMOA

October 18, 1976

IN REPLY REFER TO
915EC

Mr. Kisuk Cheung, Chief
Engineering Division
Department of the Army
Honolulu District, Corps of Engineers
Bldg. 230, Fort Shafter
APO San Francisco 96558

Dear Mr. Cheung:

Subject: Draft Environmental Statement, Flood Control Project, Kapaakea, Molokai, Hawaii

We thank you for the opportunity of reviewing the subject Draft EIS.

The Kapaakea Homestead channel improvements may affect drainage structures crossing Kamehameha Highway, Federal-aid Secondary Route 450, however, we understand that the proposed flood control project is being coordinated with the State of Hawaii Department of Transportation, Highways Division.

We have no other comments to offer.

Sincerely yours,

Ralph T. Segawa
Division Administrator

By H. Kusumoto
H. Kusumoto
Assistant Division Administrator

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

PODED-PV

21 October 1976

Mr. Ralph T. Segawa
Division Administrator
Federal Highway Administration, Region IX
U.S. Department of Transportation
677 Ala Moana Boulevard, Suite 613
Honolulu, HI 96813

Dear Mr. Segawa:

Thank you for your timely review and response to the Draft Environmental Statement for the Flood Control Project at Kapaakea, Molokai, Hawaii. The existing culvert crossings under Kamehameha Highway will be left in place. If channel improvements are selected as the recommended plan, a new culvert crossing under Kamehameha Highway would be provided. The State of Hawaii, Department of Transportation, is being consulted for their planning input.

Sincerely yours,

KISUK CHEUNG
Chief, Engineering Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
100 CALIFORNIA STREET
SAN FRANCISCO, CALIFORNIA 94111

Mr. Kisuk Chung
Chief, Engineering Division
Department of the Army
Honolulu District, Corps of Engineers
Building 230
Fort Shafter
APO San Francisco CA 96558

NOV 17 1976

Attn: PODED-P

Dear Mr. Chung:

The Environmental Protection Agency has received and reviewed the Draft Environmental Impact Statement for Kapaakea Homestead Molokai, Hawaii.

EPA's comments on the Draft Environmental Impact Statement had been classified as LO-1. The classification and date of EPA's comments will be published in the Federal Register, in accordance with our responsibility to inform the public of our views of the proposed Federal actions under Section 309 of the Clean Air Act. Our Procedure is to categorize our comments on both the consequences of the proposed action and the adequacy of the Environmental Statement.

EPA appreciates the opportunity to comment on this Draft Environmental Impact Statement, and requests two copies of the final statement when available.

If you have any questions about our comments, please contact Patricia Sanderson Port, EIS Coordinator, at (415)556-3232.

Sincerely,

for Paul De Falco, Jr.
Regional Administrator

cc: Council on Environmental Quality

Receipt Acknowledged: 22 November 1976.
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

EIS CATEGORY CODES

Environmental Impact of the Action

LO--Lack of Objections

EPA has no objection to the proposed action as described in the draft impact statement; or suggests only minor changes in the proposed action.

ER--Environmental Reservations

EPA has reservations concerning the environmental effects of certain aspects of the proposed action. EPA believes that further study of suggested alternatives or modifications is required and has asked the originating Federal agency to reassess these aspects.

EU--Environmentally Unsatisfactory

EPA believes that the proposed action is unsatisfactory because of its potentially harmful effect on the environment. Furthermore, the Agency believes that the potential safeguards which might be utilized may not adequately protect the environment from hazards arising from this action. The Agency recommends that alternatives to the action be analyzed further (including the possibility of no action at all).

Adequacy of the Impact Statement

Category 1--Adequate

The draft impact statement adequately sets forth the environmental impact of the proposed project or action as well as alternatives reasonably available to the project or action.

Category 2--Insufficient Information

EPA believes that the draft impact statement does not contain sufficient information to assess fully the environmental impact of the proposed project or action. However, from the information submitted, the Agency is able to make a preliminary determination of the impact on the environment. EPA has requested that the originator provide the information that was not included in the draft statement.

Category 3--Inadequate

EPA believes that the draft impact statement does not adequately assess the environmental impact of the proposed project or action, or that the statement inadequately analyzes reasonably available alternatives. The Agency has requested more information and analysis concerning the potential environmental hazards and has asked that substantial revision be made to the impact statement.

If a draft impact statement is assigned a Category 3, no rating will be made of the project or action, since a basis does not generally exist on which to make such a determination.

GEORGE R. ARIYOSHI
GOVERNOR

JOHN FARIAS, JR.
CHAIRMAN, BOARD OF AGRICULTURE

YUKIO KITAGAWA
DEPUTY TO THE CHAIRMAN

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

November 10, 1976

MEMORANDUM

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

Subject: Draft EIS and Detailed Project Report
Flood Control, Kapaakea Homestead
Kapaakea, Molokai

The Department of Agriculture has reviewed both the Draft Environmental Statement and the Draft Detailed Project Report Flood Control for Kapaakea Homestead, Kapaakea, Molokai. Our analysis indicates the subject flood control project will have a negligible impact upon agriculture.

Thank you for the opportunity to comment.

JOHN FARIAS, JR.
Chairman, Board of Agriculture

JF:k:h

Receipt acknowledged: 18 November 1976.
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

PROJECT OFFICES

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

KEAUKAHA OFFICE
P. O. BOX 853
HILO, HAWAII 96720

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

PROJECT OFFICES

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

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

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

November 4, 1976

Colonel F. M. Pender
Department of the Army
U. S. Army Engineer District, Honolulu
Bldg. 230, Ft. Shafter
APO San Francisco 96558

Dear Colonel Pender:

SUBJECT: Flood Control Improvements
Kapaakea Homestead Area, Molokai

In response to your notice for public meeting for the subject project, we offer the following testimony:

Recognizing the need to protect the people and their homes and property from the flood hazard conditions that exist, the Department is in accord with the concept of flood control improvements for this area. However, the Department favors the construction of a channel to divert the flood water from the Kapaakea residential area, as opposed to elevating the existing as well as new homes above the flood level. While elevating the residences will prevent damage to the home itself, it is the Department's view that the area will continue to be in danger of flooding. Property damage will still be sustained to secondary structures, automobiles, cesspools, vegetation and other ground level improvements. More importantly, the possibility of personal injury and loss of life would still exist. In addition, evacuation of the area will always remain a possibility.

We appreciate this opportunity to present our views, and would like to thank the Corps of Engineers for coordinating this project with the Department of Hawaiian Home Lands.

Owau no meka haahaa,
(I am, humbly yours)

Billie Beamer

(MRS.) BILLIE BEAMER, CHAIRMAN

WB:mkn

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

PODED-PV

23 November 1976

Mrs. Billie Beamer, Chairman
Department of Hawaiian Home Lands
State of Hawaii
P. O. Box 1879
Honolulu, Hawaii 96805

Dear Mrs. Beamer:

Thank you for your review, comments and opinions on the Draft Detailed Project Report and Environmental Statement on the Kapaakea Flood Control Project, Molokai, Hawaii.

We have completed our detailed analysis of the two alternative plans. This analysis consisted of determining and comparing the beneficial and adverse effects of each plan in relation to the objectives of the project. Based on the results of this evaluation, the channel-levee alternative was selected as the recommended plan. Consideration was also given to comments received during coordination of the alternative plans with governmental agencies and public opinions expressed during the 3 November 1976 public meeting.

Sincerely yours,

F. M. PENDER
Colonel, Corps of Engineers
District Engineer

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

GEORGE A. L. YUEN
DIRECTOR OF HEALTH

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

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

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

In reply, please refer to:
File: EPHS - SS

November 5, 1976

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

Dear Dr. Marland:

Subject: Draft Detailed Project Report Flood Control, Kapaakea Homestead, Kapaakea, Molokai

As we had expressed to the Corps of Engineers in February, 1974, we reiterate our opinion that channelization of the flow, as proposed by the subject project is not desirable.

The Department of Health believes that the use of the low-lying area for flood period discharge is a more desirable alternative than channelization of the flow.

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

Sincerely,

SHINJI SONEDA, Chief
Environmental Protection &
Health Services Division

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

PODED-PV

23 November 1976

Mr. Shinji Soneda, Chief
Environmental Protection & Health
Services Division
Department of Health, State of Hawaii
P. O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Soneda:

Thank you for your review, comments and opinions on the Draft Detailed Project Report and Environmental Statement on the Kapaakea Flood Control Project, Molokai, Hawaii.

We have completed our detailed analysis of the two alternative plans. This analysis consisted of determining and comparing the beneficial and adverse effects of each plan in relation to the objectives of the project. Based on the results of this evaluation, the channel-levee alternative was selected as the recommended plan. Consideration was also given to comments received during coordination of the alternative plans with governmental agencies and public opinions expressed during the 3 November 1976 public meeting.

As indicated in the draft environmental statement, water quality along the southern coast of Molokai generally conforms to Class AA, Hawaii water quality standards, except during periods of high rainfall when coastal waters are reddish brown in color because of the high sediment load. While flood proofing would retain the use of the flood plain as a natural sediment trap, neither the channel nor flood proofing alternatives would significantly increase or decrease coastal water quality degradation during periods of high rainfall. Furthermore, flood proofing would result in continued loss or damage of property outside of the elevated homes.

Sincerely yours,

F. M. PENDER
Colonel, Corps of Engineers
District Engineer

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

CHRISTOPHER COBB, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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

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

November 9, 1976

Honorable Richard E. Marland
Office of Environmental Quality Control
550 Halekauwila Street
Honolulu, HI 96813

Dear Sir:

We have reviewed the draft EIS for the Kapaakea Flood Project.

We note that channeling would require clearing 10 acres of land for construction of the channel. This acreage is presently used for urban and agricultural purposes as well as 0.1 acre of mudflat at the channel mouth. We would expect turbidity during construction at the channel mouth.

We find that the channel alternative would produce greater environmental change than the flood proofing alternative.

The statement appears to be weak in the following respects:

a) Para. 4.3.2 does not compare Kapaakea with "similar channels west of Kaunakakai" in specific terms, such as topography, soil types, sediment loads, flow quantities, and shoaling rates.

b) The cost of channel maintenance is omitted.

We would appreciate the opportunity to review the final EIS when it has been completed.

Very truly yours,

GORDON SOH
Program Planning Coordinator

GS:mp

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

PODED-PV

November 1976

Mr. Gordon Soh
Program Planning Coordinator
Department of Land and Natural
Resources, State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Soh:

Thank you for your review, comments and opinions on the Draft Detailed Project Report and Environmental Statement on the Kapaakea Flood Control Project, Molokai, Hawaii.

We have completed our detailed analysis of the two alternative plans. This analysis consisted of determining and comparing the beneficial and adverse effects of each plan in relation to the objectives of the project. Based on the results of this evaluation, the channel-levee alternative was selected as the recommended plan. Consideration was also given to comments received during coordination of the alternative plans with governmental agencies and public opinions expressed during the 3 November 1976 public meeting.

We agree that the implementation of channel improvements would produce the greatest amount of environmental change as compared with the flood proofing alternative. The cost of maintaining the channel is estimated to amount to $6,000 per year. The comparison to existing channel areas to the west of Kaunakakai has been deleted.

Sincerely yours,

F. M. PENDER
Colonel, Corps of Engineers
District Engineer

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

CHRISTOPHER COBB CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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

November 22, 1976

Kisuk Cheung
Chief, Engineering Division
Honolulu District, Corps of Engineers
Building 230, Fort Shafter
APO San Francisco 96558

Dear Mr. Cheung:

Subject: Corps of Engineers Flood Proofing for Section at Kapaakea Homesteads, Molokai Island

Thank you for the opportunity to comment on the draft EIS for the subject undertaking.

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

Sincerely yours,

Jane L. Silverman
Historic Preservation Officer
State of Hawaii

83-117

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

PODED-P

3 December 1976

Ms. Jane L. Silverman
Historic Preservation Officer
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Silverman:

Thank you for your letter of 22 November 1976 giving your review of the draft environmental statement for the Kapaakea Flood Control Project, Molokai, Hawaii.

Contract specifications would require the construction contractor to cease work if any items of possible archaeological value are uncovered, and to notify the Contracting Officer, who would consult with the State Historic Preservation Officer.

Sincerely yours,

KISUK CHEUNG
Chief, Engineering Division

DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

GEORGE R. ARIYOSHI
Governor

HIDETO KONO
Director

FRANK SKRIVANEK
Deputy Director

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

November 15, 1976

Ref. No. 2366

MEMORANDUM

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

FROM: Hideto Kono, Director

SUBJECT: Draft Environmental Impact Statement for Flood Control Project, Kapaakea, Molokai, Hawaii

We have reviewed the Draft E.I.S. for the above-mentioned project and would like to offer the following comments at this time.

In general, the Statement adequately addresses the major environmental impacts. However, in order to better evaluate the two alternatives, an approximation of the timing and phasing of the proposed improvements may be desirable.

We appreciate the opportunity to review and comment upon the Draft E.I.S.

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

Receipt Acknowledged: 3 December 1976.

Mr. Hideto Kono, Director
Department of Planning and Economic Development
State of Hawaii
P.O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Kono:

Thank you for your response to the draft environmental statement for the Kapaakea Flood Control Project, Molokai, Hawaii, which you transmitted through Dr. Richard Marland, Director, Office of Environmental Quality Control, State of Hawaii, on 15 November 1976.

We have completed our evaluation and comparison of the beneficial and adverse effects of the two alternative flood control improvement plans in relation to the objectives of the project. The construction of a channel-levee improvement was selected as the recommended plan. Construction of the channel would take approximately one year to complete. Flood proofing modifications would take approximately six months to complete.

Sincerely yours,

KISUK CHEUNG
Chief, Engineering Division

GEORGE R. ARIYOSHI
GOVERNOR

ANDREW I. T. CHANG
DIRECTOR OF SOCIAL SERVICES & HOUSING

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
P.O. Box339
Honolulu, Hawaii 96809

October 19, 1976

E-19

MEMORANDUM

To: Environmental Quality Commission
550 Halekauwila Street., Room 301
Honolulu, Hawaii 96813

From: Andrew I. T. Chang, Director
Department of Social Services and Housing

Subject: Draft Environmental Statement on Kapaakea Homestead, Molokai

We have reviewed the subject draft EIS and have no comment to offer relating to our program areas.

We are returning the EIS for your usage. Thank you for the opportunity to review and comment.

Andrew I. T. Chang
Director

Attachment

Receipt acknowledged: 18 November 1976.
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

GEORGE R. ARIYOSHI
GOVERNOR

E. ALVEY WRIGHT
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
RYOKICHI HIGASHIONNA
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON

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

IN REPLY REFER TO:

November 19, 1976

STP 8.3975

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

Dear Dr. Marland:

Subject: Draft Environmental Statement
Kapaakea Homestead, Molokai

In reference to the above-captioned document, the Department of Transportation has no plans to improve the affected portion of Kamehameha Highway. Any flood control project requiring new highway structures will have to be funded and constructed by the sponsoring agency.

Sincerely,

E. ALVEY WRIGHT
Director

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

PODED-P

30 November 1976

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

Dear Mr. Wright:

Thank you for your review and comments on the draft environmental statement for the Kapaakea Flood Control Project, Molokai.

The costs for new highway drainage structures and reconstruction are included as a local sponsor's cost.

Sincerely yours,

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

GEORGE R. ARIYOSHI
GOVERNOR

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

RICHARD E. MARLAND, PH.D.
DIRECTOR

TELEPHONE NO.
548-6915

November 15, 1976

Kisuk Cheung
Chief, Engineering Division
Honolulu District, Corps of Engineers
Department of the Army
Bldg. 230, Ft. Shafter
APO San Francisco 96558

SUBJECT: Draft Environmental Statement for Kapaakea Homestead, Molokai, Hawaii

Dear Mr. Cheung,

As of this date, this Office has received ten comments on the above subject as shown on the attached sheet.

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

Present System

Maps indicating where flooding has occured, diagrams of the present drains, dimensions of the watershed, and discharge would be helpful in the analysis of the EIS.

Hydrologic Data

We note that the design flow is 6500 cubic feet per second. Why was this figure selected? There is little data in the statement concerning the hydrology of the subject watersheds. We note that the present drains under Kamehameha Highway have a capacity of 275 cfs. The proposed channel is significantly greater than the present system. A discussion of the justification for such an increase is strongly recommended.

Marine Environment

What marine organisms are found in the mudflat environment that is suggested as a well-developed benthic community? Are these organisms a food source for the homestead residents? Will long-term productivity of this possible resource be diminished by the proposed project?

Methods of Flood Protection

Would elevating the homes also serve to protect them from tsunamis? Would this protection add to the benefits of this alternative?

Relationship of the Proposed Action to Land Use Plans

It is our understanding that the Maui County flood plain and tsunami inundation area ordinance has not been implemented. Thus, statements based on this ordinance might not be practical.

How many homes might be constructed on the seven acres that would be provided protection with the channel/levee alternative?

Sufficient details of the channel alternative should be provided in the statement. Only one small scale drawing of the channel is provided (figure 3). What are the various heights and widths of the structures? How large will the man-made estuary be? Will the channels be fenced?

We note that several alternative designs for the channel were presented in 1974 and are not being considered at present. This included the use of a low-flow channel and levees in an open flood plain. Why were these alternatives dropped from consideration?

Impacts on the Environment

There appears to be a substantial difference between the alternatives that are discussed. Elevating of the present houses would create few adverse environmental impacts. The channel and levees would create potentially significant impacts to the watershed and the marine environments. The large capacity system such as that proposed will increase the total run-off amount and concentrate it at one point on the shoreline. Several impacts might occur. The soil-moisture might drop creating dryer conditions therefore increasing the erosion potential. The dryer conditions may also create more dust which would affect down-wind areas. The dryer soils would be more susceptible to erosion from rainfall thereby increasing the sediment load. With the increased capacity of the drainage system the sediment load that can be carried also increases. The net result is the increase in the stress factors of sediments and fresh water on the marine environment. We would identify these as adverse impacts under the channel alternative. Would the discharge from this channel meet the State's Water Pollution Laws, Chapter 37?

Changes in the tax base resulting from the different alternatives should be discussed.

We note that the SCS cites the lack of water as one problem that would affect any revegetation in the watershed (p. 11). Will this be a problem for the revegetation of the levees and during construction for dust control?

Adverse Impacts on the Environment

The above cited impacts of soil erosion, sedimentation and fresh water concentration on the marine environment should be addressed as adverse impacts.

The impact of taking six acres of agricultural lands and four acres of open space, especially the seed corn acreage, should be discussed as an adverse impact.

Benefits and Costs

How were the different figures for the average annual benefit derived? Does the channel improvement figure include the potential benefits to the proposed subdivision on the adjacent seven acres, or are just the present residences being considered?

This Office has not summarized the comments by other reviewers, instead, we recommend that: (1) each comment be given careful consideration; (2) that written responses be sent to all commentors, including this Office, indicating how specific concerns were considered evaluated and disposed; (3) all comments and your responses should be incorporated as an appendix to the final EIS; and, (4) 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
Director

attachment

List of commentors for the Draft Environmental Impact Statement for the Flood Control Project, Kapaakea, Molokai, Hawaii. COE.

State Agencies	Comment Date
Dept. of Agriculture	Nov. 10, 1976
*Dept. of Social Services and Housing	Oct. 19, 1976
Dept. of Health	Nov. 5, 1976
Dept. of Land and Natural Resources	Nov. 9, 1976
University of Hawaii	
*Water Resources Research Center	Oct. 19, 1976
Environmental Center	Nov. 12, 1976
Federal Agencies	
*15th ABW/DEE USAF	Oct. 29, 1976
*Army-Commanding General/Environmental Section	Oct. 14, 1976
*Army-DAFE	Nov. 1, 1976
*U.S. Soil Conservation Service	Nov. 10, 1976

*denotes no comments

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

POEED-P

2 December 1976

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

Dear Dr. Marland:

We have received your comments on the Kapaakea Flood Control Project Draft Environmental Statement (ES).

A map illustrating the various flood limits at Kapaakea has been added to the final ES.

The channel design flow of 6,500 cfs corresponds to the estimated 100-year flood. Based on preliminary benefit maximization studies, this level of protection was used to analyze various alternatives. The technical data on hydrology is described in Section E, The Selected Plan, of the detailed project report. In comparing the estimated 100-year flood to the existing culvert capacities, it should be realized that the existing culverts were constructed as interior drainage facilities and not as designed flood control improvements. The basic difference is that drainage facilities are designed for more frequent runoff such as a 10-year recurrence interval.

The numerous holes on the mudflat are burrows of marine organisms. The number of burrows suggests a well-developed marine benthic community. Crabs, polychaete worms, and a variety of shrimp and fish would be found in the burrows. Crab resources on the mudflat are probably exploited by Molokai residents. The mudflat environment is wide and extends about 2,000 to 3,000 feet offshore and for miles along the southern coast of Molokai. The flood control project would not adversely reduce or affect water quality and productivity of the mudflat. The organisms characteristic of the mudflats are probably adapted to wide variations in salinity, temperature, turbidity, and other factors.

Elevating the homes would not necessarily protect them from tsunami inundation and waves because structural modifications are not designed to

POEED-P 2 December 1976
Dr. Richard E. Marland

withstand the internal forces generated by a tsunami. Accordingly, benefits under the tsunami category were not included in the benefit-cost analysis.

For planning purposes, use of the Maui County flood plain and tsunami inundation area ordinance is deemed appropriate. It is our understanding that implementation of the ordinance will occur in the near future.

In our economic study, 20 homes were estimated to be constructed on the 7-acre lot under the channel alternative.

Details of the channel features will be provided in the final ES. The trapezoidal channel mouth will not be truly estuarine. Freshwater flow would be intermittent dependent upon rainfall. Fencing would be provided at selected areas.

The discussion of alternatives in the draft ES dealt with feasible alternatives which were significantly different from one another. Some criteria affecting the channel design and alignment derived from project coordination in 1972-1974 were determined to be valid and appropriate for reformulation plans, and others were rejected. The criteria included limiting the amount of land required for the structural alternative to minimize loss of property and to prevent displacement of people. The channel alignment proposed in 1974 was utilized in reformulation, and channel features were modified to reduce visual impact and to incorporate different design, economic, and environmental considerations.

Please consult the Soil Conservation Service Soil Survey of the Hawaiian Islands for additional information on the soil characteristics in the Kamiloloa drainage basin. The soils are mostly rocky and stony, and vegetation is characteristic of a dry arid climate. Erosion and sedimentation are presently considered significant regional problems affecting water quality along the entire southern coast of Molokai. Of the approximately 3,000 acres of land within the drainage basin, less than 100 acres in the coastal area that might experience some drop in soil moisture were attributed to the channel improvements. Channel improvements would prevent streamflows from overflowing the banks of the stream and would prevent overland floodflows. Channel improvements will have little effect on the upper portion of the watershed because they will be confined to the lower portion of the drainage basin. During periods of high rainfall, the channel discharge would not meet the State's Water Pollution Laws, Chapter 37.

Increase in the tax base resulting from the channel improvements will be discussed in the final environmental statement. Floodproofing does not change the tax base.

When the Soil Conservation Service indicated that a lack of water is instrumental in discussing the success of land treatment, they were

POEED-P 2 December 1976
Dr. Richard E. Marland

referring to the whole 4.5 square miles in the drainage basin. Water for grass on the levees, landscaping, and dust control can be provided during construction of the channel improvements because of the accessibility of nearby existing water supply sources.

The State of Hawaii Department of Agriculture has indicated that the effect of losing 6 acres of agricultural land is negligible. The draft ES does identify the change in land use from agricultural to open space as adverse; however, there is a benefit in maintaining open space in the face of continued urban development along the shoreline that prevents and limits public access to the shoreline.

Details on deriving the benefit-cost ratio are included in the detailed project report. Location benefits from the approximately 7 acres of undeveloped land were included in the benefit-cost analysis for the channel alternative.

We hope that the information provided is helpful to you, and we will be available to discuss any facet of the project at your request.

We have completed our detailed evaluation of the project alternatives and have selected the channel improvement as the recommended plan. Our evaluation consisted of determining and comparing the beneficial and adverse effects of each alternative plan in relation to the objectives of the project. Consideration was also given to comments received during coordination of the alternative plans with governmental agencies and to opinions expressed during the 3 November 1976 public meeting in Kaunakakai, Molokai.

Sincerely yours,

KISUK CHEUNG
Chief, Engineering Division

GEORGE R. ARIYOSHI
GOVERNOR

RICHARD E. MARLAND, PH.D.
DIRECTOR

TELEPHONE NO.
548-6915

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

December 1, 1976

Kisuk Cheung
Chief, Engineering Division
Honolulu District, Corps of Engineers
Department of the Army
Bldg. 230, Ft. Shafter
APO San Francisco 96558

SUBJECT: Kapaa Kea Homestead Flood Control Project, Molokai

Dear Mr. Cheung,

Please find attached the comments made by the Department of Transportation on the above subject. Please append this to our correspondence of November 16, 1976 on this subject.

Sincerely,

Richard E. Marland
Director

attachment

B-24

University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

Office of the Director

RE: 0212
November 12, 1976

MEMORANDUM

TO: Richard E. Marland

FROM: Doak C. Cox

RE: Review of Draft EIS for Kapaakea Homestead, Molokai, Hawaii

Time and available personnel have not permitted our standard broad review of the above cited EIS. A copy of the EIS and a brief review by the Environmental Center staff were submitted to Gordan Dugan, Yu-Si Fok, and Edmund Cheng of Civil Engineering. Unfortunately they were unable to respond by the due date hence their input was not available for inclusion. Additional or contrary views will be forwarded as they are received.

Pg. 1. The drainage basin of Kamiloha Stream and the adjacent unnamed stream are described as resembling an outwashed alluvial fan. The significance of the term "outwashed" is unclear (outwash is a term used for sediment of glacial origin). The description is not valid for the greater part of the drainage basin for the two streams. The part of drainage basin on the coastal plan does not merely resemble an alluvial fan, it consists of the coalescent alluvial fans of the two streams. The final EIS should reflect the correct geological terms.

There is no detail in the DEIS of the proposed channel mouth, but it is stated that a new inland tidal water body will be created. This is presumably an estuarine channel mouth. There is no discussion in the DEIS of the tendancy for sediments carried along shore to block the mouth of such a channel between floods. The final EIS should address this potential sedimentation problem and the maintenance costs for periodic dredging should it be necessary.

Pg. 2. The proposed channel would have a design discharge of 6,500 cfs., but there is no indication in the DEIS of the average recurrence frequency of such a discharge. What are the potential impacts associated with a flood exceeding the design discharge? A figure delineating the present flood plain (eg: 10 yr., 100 yr.) configuration should be included in the final EIS.

Pg. 6. The DEIS indicates that "sedimentation is the major stress factor in the nearshore marine environment." However, there is no discussion in the DEIS of the increased sedimentation in the nearshore environment resulting from a decrease in flood plain settlement area and floodborne sediment.

Presumably the reef ecology and morphology off Kapaakea reflects the storm drainage of Kamiloloa stream (though not necessarily the historical accelerated sediment load born by the stream. There is no discussion in the EIS of the impact on the reef ecology of shifting and concentrating the freshwater discharge to the west.

Detailed figures showing the relationships between existing structures, the 10 year and 100 year flood plain, potential tsunami inundation areas, and areas to be affected by, and the cross sectional configuration of, the proposed levee and channel system should be included in the final EIS.

cc: Gordan Dugan
Yu-Si Fok
Edmund Cheng

E-23

U.S. ARMY ENGINEER DISTRICT, HONOLULU
SEDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

PODED-PV

23 November 1976

Mr. Doak Cox
Environmental Center
University of Hawaii
2550 Campus Road
Honolulu, Hawaii 96822

Dear Mr. Cox:

Thank you for your review, comments and opinions on the Draft Detailed Project Report and Environmental Statement on the Kapaakea Flood Control Project, Molokai, Hawaii.

We have completed our detailed analysis of the two alternative plans. This analysis consisted of determining and comparing the beneficial and adverse effects of each plan in relation to the objectives of the project. Based on the results of this evaluation, the channel-levee alternative was selected as the recommended plan. Consideration was also given to comments received during coordination of the alternative plans with governmental agencies and public opinions expressed during the 3 November 1976 public meeting.

The environmental statement has been revised to include the correct geological terms in describing the coalescent alluvial fans at Kapaakea. The new inland water body created at Kapaakea is not expected to be truly estuarine, except during periods of rainfall.

Maintenance costs, which include the removal of shoal material from the channel mouth or from the channel reach because of littoral drift or other factors, are estimated to be about $6,000 per year.

A figure detailing the channel improvements has been provided in the final environmental statement. The design discharge of 6,500 cfs is based upon the 100-year flood. A figure detailing the relationship between the existing urban residences and various flood stages is also provided in the final environmental statement. Average annual damages by flows exceeding the design flood are estimated to be $3,000.

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

PODED-PV
Mr. Doak Cox

22 November 1976

Sedimentation in the offshore marine environment at the project site would be changed; however, whether it will increase or not cannot be substantiated. While the flood plain does serve as a natural settling basin, stream bank and sheet erosion may be significant. A channel project would reduce stream bank erosion and sheet erosion in the lower portion of the drainage basin, but would not influence erosion higher up in the drainage basin. Shoaling at the mouth of the channel may be visible suggesting an increase in sedimentation, but the effect may be highly localized.

A significant shift in reef ecology resulting from a concentrated freshwater discharge is not anticipated. As discussed in the draft environmental statement, salinity stresses would be fatal to sessile marine organisms that cannot tolerate wide salinity fluctuations. However, most of the infauna near the project area probably are tolerant to wide salinity fluctuations. Channel flow would be intermittent and, during periods of no flow, marine organisms would recolonize the mudflat area around and within the channel. Wave forces, onshore winds and water currents would tend to increase the mixing of the runoff with seawater. Flourishing coral communities are located on the outer edge of the reef flat some 4,000 feet offshore; these communities are too distant to be impacted by the project.

Sincerely yours,

F. M. PENDER
Colonel, Corps of Engineers
District Engineer

University of Hawaii at Manoa

Water Resources Research Center

October 19, 1976

MEMORANDUM

TO: Office of Environmental Quality Control

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

SUBJECT: Draft Environmental Statement: Kaapakea Homestead Flood Control Project

We have reviewed the draft environmental statement for the flood control project at Kaapakea Homestead, Molokai, Hawaii, and have no critical comment.

RMFY:jm

cc: Env. Center

Receipt acknowledged: 18 November 1976.
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

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Deputy Planning Director

COUNTY OF MAUI
PLANNING DEPARTMENT
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

November 1, 1976

Mr. Kisuk Cheung, Chief
Engineering Division
Corps of Engineers
Honolulu District
Bldg. 230, Fort Shafter
Honolulu, Hawaii 96558

Dear Mr. Cheung:

Re: Kapaakea Flood Control Improvements, Kapaakea, Molokai

After review of the draft EIS and detailed project report, we recommend the selection of the alternative utilizing channel and levee construction to divert flood waters away from the Kapaakea Homestead. Our recommendation is based on the following comments:

1. Raising the homes above anticipated flood levels will not curtail silt laden flood waters from entering the homestead. Damage to Kamehameha V Highway will continue.

2. Channel and levee construction will provide flood protection to a larger area as opposed to only the homestead area by the home elevation alternative.

3. Raising the homes in the homestead will not be compatible aesthetically with neighboring homes.

4. The Kapaakea homesteaders prefer the channel and levee alternative.

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

Yours very truly,

TOSH ISHIKAWA
Planning Director

cc Mr. Wayne Uemae, Public Works Director

Receipt Acknowledged: 5 November 1976
U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

ELMER F. CRAVALHO
Mayor

WAYNE UEMAE
Director of Public Works

CLARO R. CAPILI, S.E.
Deputy Director of Public Works

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Land Use and Codes Enforcement
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COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

November 9, 1976

Mr. Kisuk Cheung, Chief
Engineering Division
Corps of Engineers
Bldg. 230, Fort Shafter
Honolulu, Hawaii 96558

Dear Mr. Cheung:

Re: Kapaakea Flood Control Project, Kapaakea, Molokai

The following are our comments on the DPR and EIS for the Kapaakea Flood Control Project.

DPR 11. Page C-3. Our records indicate that the County of Maui and local residents clearly desired channel and levee construction. In fact the County of Maui had already provided the local participation requirements for such a project.

EIS 9.1.2 Page 13, "but did not speak out against flood proofing modifications." does not appear to be the kind of fact to be included in an EIS.

General Comment: In both the DPR and EIS does the computation of the Benefit - Cost Ratio include the cost of flood proofing the future 8 homes?

Does the computation also include the cost of cleaning up the subdivision and highway after storms for the Raising Homes alternate?

A comment should also be addressed to the benefit of the channel improvement in providing access to the area to East that is now cut off when the flood waters flow over the road.

An additional comment may include the fact that there will be less government regulation for the area in the future, relative to flood plain regulation, if the channel and levee alternative is selected.

There should also be further discussion on the fact that flood proofing raises only the dwelling and will leave a lot of other properties at the mercy of the flood waters. Because of the mild climate, outdoor type living is a fact and the quantity of property exposed will be considerable. Since it is admitted that warning and temporary evacuation was not considered adequate because of the small drainage area and flashy nature of the stream flow, it is anticipated that if

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the flood proofing alternate was selected, the sudden rush to rescue and save property would in fact expose more people to hazards than would the channel and levee altarate.

Very truly yours,

WAYNE UEMAE
Director of Public Works

U.S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG 230, FORT SHAFTER
APO SAN FRANCISCO 96558

PODED-P 22 November 1976

Mr. Wayne Uemae, Director
Department of Public Works
County of Maui
200 South High Street
Wailuku, Hawaii 96793

Dear Mr. Uemae:

Thank you for your views and comments on the Draft Detailed Project Report and the Environmental Statement on the flood control project at Kapaakea, Molokai, Hawaii.

We have completed our detailed analysis of the two alternative plans. This analysis consisted of determining and comparing the beneficial and adverse effects of each plan. Based on the results of this evaluation, the channel-levee alternative has been selected as the recommended plan. Consideration was also given to comments received during coordination of the alternative plans with governmental agencies and public opinions expressed during the 3 November 1976 public meeting.

In response to your specific comments on the derivation of the benefit-cost ratio, we furnish the following.

a. Under the flood proofing alternative, flood proofing costs for the future eight homes were not included in the B/C ratio computation. The assumption was made that future development of these lots would not be allowed without flood protection. The benefits resulting from elimination or reduction of the need to clean up the subdivision and highway after storm runoffs were included in the economic analysis for the alternatives.

b. The benefit of channel improvements in providing access to and from East Molokai that is now cut off during flood flows was not included due to the estimated short peak flow period, estimated to be about 2 to 3 hours for the 100-year flood.

Sincerely yours,

F. M. FENDER
Colonel, Corps of Engineers
District Engineer